

iii. Output Items:

Monthly commodity prices and its average.

iv. Utilization:

This report will be used to check the monthly trends of world market conditions concerning major exporting commodities.

(4)-2. Monthly Indicators by Commodity: R(3,10)

i. Contents:

Monthly indicators are calculated for each commodity by the moving average method.

ii. Frequency:

This is a monthly report.

iii. Output Items:

Monthly indicators are the outputs.

iv. Utilization:

This report will be used to check the monthly trends of world market conditions concerning major export commodities.

4-2-4. Registration of Enterprises (General Trader's License)

Currently, every business firm is obliged to apply for registration to the Department of Trade and Cooperatives. There are three types of registration forms, i.e., large, medium, and small size enterprises, respectively. The

mentioned items of the three types of forms are nearly the same, including names, addresses, types, representative's names, business activities, bank references, date of establishment, capitalization, and other basic information concerning the enterprises

The distinctive feature of the processing required of the information on registration of enterprises is that the volume of the information obtained is so large.

The registration form consists of six to nine pages, and the total number of enterprises to be registered is expected to be approximately 2,000,000. Even the number of enterprises to be registered at the initial stage would be about 400,000. Thus the data concerning registration of enterprise being so voluminous, totalizing and retrieving this information by manual operation would be so difficult that a system to make possible the computer processing of these tasks is desired. Even if this operation were to be computerized, the time and effort required for the data entry would be considerably large.

The expiration (term of validity) of the general trader's license is five years, therefore, each firm is required to renew their license once every five years. Firms must also apply for renewal of their license for any changes in business activities, extension in business activities, in representative, and in place of business.

The following data can be processed by establishing a data file for registered enterprises:

- i. Information retrieval of particular enterprise by specific input items.
- ii. Preparation of detailed table of registered enterprises by district and province.
- iii. Preparation of detailed analysis table of registered enterprise by district and province.
- iv. Preparation of analysis table of registered enterprises classified by the number of years passed after establishment by district and province.
- v. Preparation of analysis table of registered enterprises classified by business activity by district and province.
- vi. Preparation of analysis table of registered enterprises classified by type of enterprises by district and province.
- vii. Preparation of analysis table of number of registered enterprises classified by commodities handled by district and province.
- viii. Preparation of list of enterprises requiring renewal of the license by district and province.

(2) Input Data ,

(2)-1. Registration Form Application for Approved License: I(4,1)

i. Contents:

Registration form applications for general trader's license are submitted from each enterprise through the provincial trade office issuing the license, and then forwarded from the provincial trade office to the Head Office. The name of enterprise, address, license number, date of issue, field of business activity, name of re-

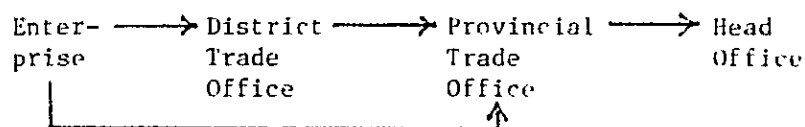
presentative, type, commodities being handled, number of employees, bank references, and other pertinent information is entered in the six to nine page registration form.

ii. Generation Frequency:

Registration forms are being submitted to the Head Office whenever applications are made by enterprises and approved by the provincial trade office. The number of registration made at the initial stage is estimated to be approximately 400,000, and the total number of registered enterprise is expected to reach 2,000,000 in the next four years.

iii. Information Flow:

In most of the cases, enterprises registering for the general trader's license file their applications with their district trade offices from which the registration form is submitted to the Head Office through the provincial trade office which undertakes the issuance of general trader's license. In case the enterprise is located at the capital of the province where there is no district trade office, the application is made directly to the provincial trade office. Following shows the information flow:



iv. Information Media:

Copies of registration forms are submitted to the Head Office.

v. Consideration for Data Check:

This form for the registration of enterprises is a very important information source concerning the enterprises. Therefore, the items of entry must be thoroughly checked needless to say by the enterprises registering for the license, but also by the district trade office or provincial trade office when accepting the forms.

It would almost be impossible to check the errors of the items mentioned in the registration form at the Head Office. However, a system must be established at the Head Office to check the errors arising at the time of data entry.

vi. Input Items:

Following are the input items obtained from the registration form:

- a. Reasons for submitting application.
- b. Name of enterprise.
- c. SIUP number.
- d. NPWP number.
- e. Type of enterprise.
- f. Address of enterprise.
- g. location of head office/branch office.

- h. Name of representative.
- i. Address of representative,
- j. Position of representative at other enterprises (if any).
- k. Date of establishment.
- l. Size of enterprise (capitalization, credit, liabilities).
- m. Commodities handled.
- n. Field of business activity.
- o. Number of employees.
- p. Location of warehouses, etc.
- q. Bank references.
- r. Date of approval.

vii. Input Device:

Floppy disk reader unit will be used for the data entry of information for registration of enterprises.

viii. Volume/Frequency of Input:

Information obtained from one registration form is equal to approximately 1,000 characters. The average number of transactions generated per year is 400,000. Therefore, the volume of input data per year would be as follows.

400,000 transactions x 1,000 characters / year

The number of transaction for initial data entry is also estimated to be approximately 400,000.

(3) Computer Processing

(3)-1. Information Retrieval and Tabulation of Results of the Analysis Concerning Registered Enterprises

i. Contents:

Processing which requires to be performed regularly is the updating of the data file,

Information retrieval by specific items must be made available on demand. Processing of lists of enterprises falling under certain conditions and analysis tables by province and district will be required only on a semiannual or annual basis. List of enterprises requiring renewal of their general trader's license within the next month must be prepared monthly.

ii. Frequency:

Updating of the data file will be performed monthly.

Information retrieval by specific input items must be made possible on demand. Other processing for tabulation of lists of enterprises will be performed either monthly, half-monthly, or annually, depending on its necessity.

iii. Input Data:

I(4,1)

iv. Output Reports:

R(4,1), R(4,2), R(4,3), R(4,4), R(4,5), R(4,6), R(4,7), R(4,8)

(4) Output Reports

(4)-1. Report on Information Retrieved by Specific Items: R(4,1)

i. Contents:

Information on the registered enterprises must be made possible to retrieve by the following items:

- a. Name of enterprise.
- b. SIUP number.
- c. Type of enterprise.
- d. Name of province/district.
- e. Name of representative.
- f. Size of enterprise.
- g. Commodities handled.
- h. Field of business activity.
- i. Number of employees.
- j. Date of approval.

Information retrieval by specific items must be performed for a certain province.

ii. Frequency:

Reports on information retrieved by the above-mentioned items must be prepared on demand.

iii. Output Items:

When retrieved by the name of enterprise, all of the input data items concerning the enterprise will be required as output items. When retrieved by other items, name of the enterprise would be the minimum requirement as outputs.

iv. Utilization:

This system will enable the Head Office to retrieve the

information on registered enterprises or search for enterprises falling under certain conditions.

(4)-2. Detailed Table of Registered Enterprise by District and Province: R(4,2)

i. Contents:

This is a table describing details of the enterprise classified by district and province.

ii. Frequency:

This list will be prepared on a semiannual basis.

iii. Output Items:

- a. Name of province/district.
- b. Date prepared.

(Following items by each registered enterprise)

- c. Name of enterprise.
- d. SIUP number.
- e. Date of approval.
- f. Expiring date.
- g. Address of enterprise.
- h. Name of representative.
- i. NPWP number.
- j. Field of business activity.
- k. Commodities handled.
- l. Number of employees.
- m. Bank references.
- n. Type of enterprise.
- o. Size of enterprise.

iv. Utilization:

This report is to be used for checking the latest status of registered enterprises by district and province.

(4)-3. Analysis Table of Registration Made by District and Province: R(4,3)

i. Contents:

This is a table of the number of registrations made in each district and province classified by the purpose of application, that is, registration of newly established enterprise, changes in business activities, extension in business activities, changes in representative, or changes in location. The number of registration is also classified by national and non-national enterprises.

ii. Frequency:

This is a semiannual report.

iii. Output Items:

- a. Name of province/district.
- b. Date prepared.
- c. National or non-national.
- d. Number of registrations made for newly established enterprises.
- e. Number of registrations made for renewal.
- f. Number of registrations made for change in location.
- g. Number of registrations made for change in representative.

- h. Number of registration made for expansion in business activity.
- i. Number of registration made for changes in business activity.
- j. Total of each of above mentioned items d. through i. by districts.
- k. Each total of above mentioned items d. through i. by provinces, and the total for Indonesia.

iv. Utilization:

This will enable the Head Office to know regularly the most recent breakdown of the number of applications made by its purpose in each district and province.

(4)-4. Analysis Table of Registered Enterprise Classified by the Different Number of Years after Their Establishment by Province and District: R(4,4)

i. Contents:

This is a list of the number of registered enterprises in each district and province classified by the different number of years after their establishment of the enterprise. The number is also classified into national and non-national enterprises. The number of years are classified into two years or less, two to five years, five years or more.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Name of province/district.
- b. Date prepared.
- c. National or non-national.
- d. Number of registered enterprise which were established within the last two years.
- e. Number of registered enterprise which were established in the last two to five years.
- f. Number of registered enterprise which were established more than five years ago.
- g. Total of above-mentioned items d. through f. by district.
- h. Total of above-mentioned items d. through f. by province, and the total for Indonesia.

iv. Utilization:

This will enable the Head Office to know the breakdown of the number of registered enterprises by the number of years after their establishment by district and province.

(4)-5. Analysis Table of Registered Enterprise Classified by Business Activities by Province and District: R(4,5)

i. Contents:

This is a table of the number of registered enterprises in each district and province classified by business activities, and also classified into large and medium/small size enterprise. Large size enterprises are classified into seven business activity fields such as ex-

porter, importer, fabricator, etc. Medium and small size enterprises are classified into nine business activity fields such as supermarkets, large shops, service industries, etc.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Name of province/district.
- b. Date prepared.
- c. Number of registered enterprises by each business activity classification and by size.
- d. Total number of registered enterprise by district and by province for each business activity classification.
- e. Total number of registered enterprise by each business activity classification.

iv. Utilization:

This will enable the Head Office to know the breakdown of the number of registered enterprise by business activities and by province and district.

(4)-6. Analysis Table of Registered Enterprise Classified by Type of Enterprise by Province and District: R(4,6)

i. Contents:

This is a list of the number of registered enterprise in each district and province classified by the type of

enterprise. The types are classified into stock company, partnership company, private company, cooperatives, etc.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Name of province, district.
- b. Date prepared.
- c. Number of registered enterprise by each type.
- d. Total number of registered enterprises by district and by province for each type of enterprise.
- e. Total number of registered enterprises by each type of enterprise.

iv. Utilization:

This will enable the Head Office to know the breakdown of the number of registered enterprise by its type and by district and province.

(4)-7. Analysis Table of Registered Enterprises Classified by Commodities Handled by Province and District: R(4,7)

i. Contents:

This is a list of number of registered enterprises in each district and province classified by the commodities handled such as, household utensils, electric appliances, agricultural products, chemical, medicine, machinery, etc.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Name of province, district.
- b. Date prepared.
- c. Number of registered enterprise by the type of commodities handled.
- d. Total number of registered enterprises by district and by province for each type of commodity handled.
- e. Total number of registered enterprises by type of commodity handled.

iv. Utilization:

This will enable the Head Office to know the breakdown of the number of registered enterprise by the type of commodities handled by province and district.

(4)-8. Table of Enterprises Whose License Will Expire by Province and District: R(4,8)

i. Contents:

This is a list of registered enterprises by districts and provinces whose general trader's license will expire in the coming month so that they must apply for renewal.

ii. Frequency:

This is a monthly report.

iii. Output Items:

- a. Name of province, district.
- b. Date prepared.
- c. Name, address, SIUP number, representative name of the enterprise whose general trader's license will expire in the coming month.

iv. Utilization:

By picking out the enterprises which must request to apply for renewal of the general trader's license and informing the names of these enterprises to the provincial trade offices, they can make notice to these enterprises beforehand.

4-2-5. Concerning Cooperatives

(1) General

The following three are the transactions generated in relation with the cooperatives:

- i. Annual performance record of cooperatives.
- ii. Monthly performance record of KUD.
- iii. Annual performance record of KUD.

Processing of above information has already been computerized by an external organization. Therefore, the Master Plan will aim at establishing a system within the Department by expanding the current system established of at external organization.

However, the obstacles for the processing of these information is that the above-mentioned annual reports i. and

iii. are being sent to the Head Office every 31st of December, and the monthly report ii. at the end of each month, so that the transactions received at the Head Office to be processed in January and February becomes very voluminous amounting to 28,000 transactions. If all of these transactions are to be received at once, the computer load for the data entry and processing will become too heavy to perform efficient information processing since there are also other processings to be performed. Therefore, the actual operation of the data entry of annual reports should be performed separately, by each province for example, to avoid the heavy concentration of transactions. However, the format of present reports are well designed for the data entry, so that there will be no major problem other than the concentration of data mentioned above. The next thing to be considered is the method for data check.

It is very difficult to clearly judge whether the mentioned figures of the report are correct or not, since these are reports on the performance of cooperatives. However, by comparing the data with the report of the previous period, errors in the column, etc. could be checked at provincial cooperatives offices and district cooperatives offices.

(2) Input Data

(2)-1. Annual Report on Cooperatives: I(5,1)

i. Contents:

This report states the conditions of cooperatives

(number of members, capitalization, assets, liabilities, etc.) as of each December 31. This report is being submitted by all cooperatives.

ii. Generation Frequency:

The total number of transaction each year is 20,000, as it is being submitted from every cooperatives.

iii. Information Flow:

Cooperatives —————> District Cooperatives Office
—————> Provincial Cooperatives Office —————> Head Office

iv. Information Media:

Annual reports are being submitted to the Head Office.

v. Consideration for Data Check:

The mentioned items of the reports should be checked at the district cooperatives offices and provincial cooperatives offices in accordance with the report of the previous year. Also, appropriate system for checking the errors arising from coding and data entry should be established.

vi. Input Items:

Following are the key items obtained from the report.

- a. Name, address, and category of cooperatives.
- b. Number of members.
- c. Existence of manager.
- d. Assets.

- e. Liabilities.
- f. Annual accounts, etc.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

Following is the total data volume for the month, each transaction containing information equal to 560 characters.

20,000 transactions x 560 characters / month

(2)-2. Monthly Report on KUD: I(5,2)

i. Contents:

Performance record of KUD's for the month is reported from the point of view of earnings, expenditures, etc., classified by categories of KUD. Reports are submitted by all KUD's.

ii. Frequency:

Reports from KUD's are being submitted at the end of each month. The monthly number of transaction is 4,000.

iii. Information Flow:

KUD —————> District Cooperatives Office
—————> Provincial Cooperatives Office —————> Head Office

iv. Information Media:

Monthly reports are being submitted.

v. Consideration for Data Check:

An effective method of data check of the mentioned items of the report must be considered. For example, one practical method would be to compare the contents with those of the previous month at provincial cooperatives office and district cooperatives office. On the other hand, a system to check the errors arising from coding and data entry should be established at the Head Office.

vi. Input Items:

Following shows the key input items.

- a. Name, monitor number, address of KUD, and month.
- b. Numbers of full members and new members.
- c. Capitalization such as basic savings, obligatory savings, and voluntary savings.
- d. Activity category of KUD.
- e. Breakdown of credit, amount of credit refund, performance by means of money term, performance by means of quantity, in relation to the production activity by each commodity.
- f. Purchases on credit, amount of loans.
- g. Performance in terms of money and volume concerning the basic commodities (rice, petroleum, sugar and wheat).
- h. Other items.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

Monthly report consisting of information equal to 2,000 characters is being submitted from KUD. The monthly data volume is as follows:

4,000 KUD x 2,000 characters / month

(2)-3. Annual Report on KUD: I(5,3)

i. Contents:

This is a report on annual performance of KUD of their activity, financial affairs, administration, and economic capability. The report is submitted by every KUD.

ii. Generation Frequency:

The reports are submitted from KUD's at the end of each year, therefore, the total number of transactions generated is 4,000 per year.

iii. Information Flow:

KUD —————> District Cooperatives Office
————-> Provincial Cooperatives Office <————-> Head Office

iv. Information Media:

Annual reports are being submitted.

v. Consideration for Data Check:

The mentioned items a. through h. of the report can be checked in accordance with the accumulated data of the monthly reports. On the other hand, the mentioned items i. through k. of the report must be checked in accord-

ance with the items mentioned in the first half of the report.

A system must be established at the Head Office to check the errors arising from coding and data entry.

vi. Input Items:

Following are the major input items. The items mentioned in the first half are same as those for the monthly reports:

- a. Name, monitor number, address of KUD, and month.
- b. Number of full members and new members.
- c. Capitalization such as basic savings, obligatory savings, voluntary savings.
- d. Activity category of KUD.
- e. Breakdown of credit, amount of credit refund, performance in terms of money, performance by means of quantity, in relation with the production activity by each commodity.
- f. Purchases on credit/loan of credits.
- g. Performance in terms of money and quantity concerning the basic commodities (rice, petroleum, sugar and wheat).
- h. Other items.
- i. Balance sheet.
- j. Organization and business performance.
- k. Financial capability, etc.

vii. Input Device:

Floppy disk reader unit will be used for the data entry into computer.

viii. Volume/Frequency of Input:

The reports being submitted by KUD's contain information equal to approximately 3,000 characters. Following is the annual data volume:

4,000 KUD x 3,000 characters / year

(3) Computer Processing

(3)-1. Processing of Annual Reports on Cooperatives

i. Contents:

The required processing is to totalize all of the reports from the cooperatives and update the data file, and output various lists. Also, to enable information retrieval by specific items.

ii. Frequency:

Totalizing and preparation of reports are performed annually. Information retrieval by specific items will be performed on demand.

iii. Input Data:

I(5,1)

iv. Output Reports:

R(5,1), R(5,2), R(5,3), R(5,4), R(5,5), R(5,6)

(3)-2. Processing of Monthly Reports on KUD's

i. Contents:

The required processing is to totalize all of the monthly reports from KUD and update the data file, and output various lists. This data file can be used to check the mentioned items of the annual report.

ii. Frequency:

This is a monthly processing. Information retrieval can be performed on demand.

iii. Input Data:

I(5,2)

iv. Output Reports:

R(5,7), R(5,8), R(5,9), R(5,10), R(5,11)

(3)-3. Processing of Annual Reports on KUD

i. Contents:

The required processing is to totalize the data obtained from the annual reports from KUD and update the master file, and to output various lists. Also, to perform information retrieval by specific items.

ii. Frequency:

Totalizing and processing of lists will be performed annually. Information retrieval is possible on demand.

iii. Input Data:

I(5,3)

iv. Output Reports:

R(5,12), R(5,13), R(5,14), R(5,15), R(5,16), R(5,17)

(4) Output Reports

(4)-1. Number of Cooperatives by Province and Type: R(5,1)

i. Contents:

This is the report indicating the number of cooperatives of each level by province and by type.

ii. Frequency:

This is an annual report.

iii. Output Items:

a. Year.

b. Name of province (type of cooperatives).

c. Number of cooperatives by each level (village level, district level, province level, and national level).

d. Total number of cooperatives in each province by type.

e. Total of each items c. and d. above.

iv. Utilization:

This report will enable the Head Office to have first-hand information on the development conditions of cooperatives by getting the figures of the number of cooperatives at each level.

(4)-2. Number of Members by Province and Type: R(5,2)

i. Contents:

This is the report indicating the number of members at each level of cooperatives by province or by type.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Year.
- b. Name of province (type).
- c. Number of newly affiliated members.
- d. Number of full members (by sex and totals).
- e. Number of associate members.
- f. Total number of member by province and by type.
- g. Total of each items c. through f. above.

iv. Utilization:

This report will enable the Head Office to understand the development conditions of cooperatives by obtaining the number of members by province or by type.

(4)-3. Amount of Savings by Province and Type: R(5,3)

i. Contents:

This is the report indicating the amount of savings by province and by type.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Year.
- b. Name of province (type).
- c. Amount of basic savings.
- d. Amount of obligatory savings.
- e. Amount of voluntary savings.
- f. Other savings.
- g. Total amount by province and type.
- h. Total of each items c. through g. above.

iv. Utilization:

Savings of the cooperatives are equal to what capital is to a company. Performance of the cooperatives can be known by the amount of savings.

(4)-4. List of Fixed Assets of the Cooperatives: R(5,4)

i. Contents:

This is the report on the number of rice mills and warehouses and their operating/storage capacity by province.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Year.
- b. Name of province.

- c. Number of rice mills and operating capacity.
- d. Number of warehouses and storage capacity.
- e. Total of each items c. and d. above.

iv. Utilization:

By comparing the operating/storage capacity and the actual results, evaluation of the performance can be performed.

v. Others:

Information required for this report cannot be obtained from the annual report on cooperatives and so it must be obtained from other sources.

(4)-5. List of Cooperatives with Managers: R(5,5)

i. Contents:

This is the report on the number of cooperatives with managers by each level.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Year.
- b. Name of province.
- c. Number of cooperatives with managers by each level (village level, district level, province level, and national level).
- d. Total by each province.

e. Total of each item c. and d. above.

iv. Utilization:

Not all of the cooperatives have managers. Therefore, it is necessary to obtain the number of cooperatives with managers to know the activities of cooperatives.

(4)-6. Address List of Cooperatives: R(5,6)

i. Contents:

This is a ledger of names and addresses of cooperatives.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. Year.
- b. Name of cooperatives.
- c. Address.
- d. Year established.
- e. Type and level.

iv. Utilization:

This report will be used to compare with other reports submitted from the cooperatives.

(4)-7. Performance of KUD: R(5,7), R(5,12)

i. Contents:

This is a report on the quantity and type of products handled by each KUD.

ii. Frequency:

There will be a monthly report as well as an annual report.

iii. Output Items:

- a. Name of province, district and KUD.
- b. Month, year.
- c. Commodity code number and name.
- d. Quantity and value of the products handled.
- e. Unit prices of the products handled.

iv. Utilization:

Performance of KUD's can be known from the type and quantity of products handled.

(4)-8. Recapitulation of Credit by Province: R(5,8), R(5,13)

i. Contents:

This is a report on recapitulation of credit of KUD by each province.

ii. Frequency:

There is a monthly report and an annual report.

iii. Output Items:

- a. Kind of credit.
- b. Month or year.
- c. Name of province.
- d. Credit agreement.
- e. Credit realization.
- f. Credit recapitulation.

g. The ratio of credit recapitulation to credit agreement.

iv. Utilization:

This will enable the Head Office to manage the utilization of credit at each KUD.

(4)-9. Recapitulation of Credit at the National Level:

R(5,9), R(5,14)

i. Contents:

This is a report on credit recapitulation of KUD at the national level.

ii. Frequency:

This is a monthly report and an annual report.

iii. Output Items:

- a. Month or year.
- b. Type of credit.
- c. Credit agreement.
- d. Credit realization.
- e. Credit recapitulation.
- f. The ratio of credit recapitulation to credit agreement.

iv. Utilization:

This will enable the Head Office to manage the utilization of credit by KUD.

(4)-10. List of Number of Members of KUD: R(5,10), R(5,15)

i. Contents:

This is a list indicating the fluctuations of the number of members of each KUD.

ii. Frequency:

There is a monthly report and an annual report.

iii. Output Items:

a. Month or year.

b. Name of KUD, province, and district.

c. Number of full member and rate of increase (or decrease).

d. Number of new members and rate of increase (or decrease).

iv. Utilization:

Development status of each KUD can be examined by checking the fluctuation in the number of members of the KUD.

(4)-11. Amount of Products Managed by KUD: R(5,11), R(5,16)

i. Contents:

This is a report indicating the amount of main products managed by KUD's.

ii. Frequency:

This is a monthly report and an annual report.

iii. Output Items:

- a. Month or year.
- b. Name of KUD, province, district.
- c. Amount of products managed.
- d. Rate of increase.

iv. Utilization:

Performance of KUD activities can be checked by means of the amount of products handled.

(4)-12. Ledger of KUD: R(5,17)

i. Contents:

This is a ledger of KUD listing the name, address, etc.

ii. Frequency:

This is an annual report.

iii. Output Items:

- a. KUD monitor number.
- b. Name of KUD.
- c. Address.

iv. Utilization:

This can be used to compare with other reports from KUD's.

4-2-6. Personnel Administration

(1) General

Currently 22 key items of the various items mentioned in the personnel record documents being submitted to the Head Office by all of the staff employees of the Department of Trade and Cooperatives are totalized by computer processing. These items are coded for computer input, and the 22 items are equal to 95 characters. The items mentioned in the personnel record documents contain the latest information on each personnel at the time submitted each year. However, the information does not necessarily cover all the items to enable the personnel planning by indicating thoroughly the knowledge, technical skill, and past business experiences of each staff member for re-assignment. Therefore, computer processing of the personnel history record must be also considered to be added to the system. The first thing to be considered for the designing of the basic function is to select the necessary personnel record items. The items mentioned below were selected for this system. However, the selected items does not necessarily cover all the personnel history record items mentioned in the personnel record document, but rather the final selection of the items must be determined by thoroughly considering items required by the users of the system.

The function of this system will not be aimed only at providing the users with the latest information concerning personnel affairs on a regular basis but also to enable on-demand processing and reporting of the necessary information upon request by the users. Therefore, designing of the data file and the functions to support the on-demand information retrieval would be the crux of the system design.

(2) Input Data

(2)-1. Personnel Record Information: I(6,1)

i. Contents:

Input data in this case will be the selected items of the personnel record document. Code conversion of the information obtained will be performed according to the code table. Then the coding of the encoded data will be performed for the data entry after checking. At the initial stage, all of the data items will be subject for data entry, but afterwards, data entry of only the updated items need to be performed.

ii. Generation Frequency:

Personnel record documents are submitted to the Head Office of the Department of Trade and Cooperatives each year. Therefore, the generation of the transaction is on an annual basis.

iii. Information Flow:

Each Staff Member —————> District Trade/Cooperatives Office
—————> Provincial Trade/Cooperatives Office —————> Head Office

iv. Information Media:

Personnel record information are reported in the personnel record document to be submitted to the Head Office.

v. Consideration for Data Check:

A system must be established to check the errors arising from data coding, and errors occurring when posting the information or key operations for the data entry, since personnel record information are very important for personnel administration.

vi. Input Items:

Following items selected from the personnel record document for each staff member will be subject for the data entry.

- a. Employee number.
- b. Name.
- c. Date of birth.
- d. Sex.
- e. Religion.
- f. Marital status.
- g. Official status and background.
- h. Transfers or original hire.
- i. Date employed by the Department.
- j. Record of class and rank.
- k. Record and dates of promotions.
- l. Record of sections assigned.
- m. Record of assignments and functions.

- n. Record and dates appointed to assignments.
- o. Record and dates appointed to official positions.
- p. School records and academic career.
- q. Number of times of domestic training and record of training.
- r. Number of times of overseas training and record of training.
- s. Number of thesis published.
- t. Number of wives.
- u. Number of children.
- v. Record of transfer to diplomatic service.
- w. Blood group.
- x. Name of spouse.
- y. Record of professional career before entering the Department.
- z. Record of professional career after entering the Department.

vii. Input Device;

Floppy disk reader unit will be used for data entry.

viii. Volume/Frequency of Input;

Initial data volume is as described below for the 16,000 staff employees of the Department. 2,000 characters are required for one staff member:

16,000 persons x 2,000 characters

Also, if information equal to 300 characters is to be updated annually for one person, the following would be the estimated amount of total data volume for all of

the staff employees of the Department for annual processing:

16,000 persons x 300 characters / year

ix. Others:

If the data file of the personnel record information presently established at C.B.S. could be transferred to the Department of Trade and Cooperatives, the initial work required for the data entry could be reduced.

(3) Computer Processing

(3)-1. Preparation and Updating of Personnel Record Information Master File

i. Contents:

A master file for personnel record information will be prepared and updated in accordance with the input data items. This file must be organized in the form suitable for the on-demand information retrieval.

ii. Frequency:

A master file will be established at the initial stage, and the updating of this master file is to be performed on an annual basis.

iii. Input Data:

I(6,1)

iv. Output Reports:

None.

(3)-2. Processing of Report on the Current Status of the Staff

i. Contents:

A report indicating the current status of each staff employee will be processed based on the personnel record information master file.

ii. Frequency:

This processing is required at the initial stage and once every year afterwards.

iii. Input Data:

None.

iv. Output Reports:

R(6,1), R(6,2)

(3)-3. Processing of the Report on Information Retrieved

i. Contents:

A report necessary for personnel planning will be processed by retrieving the detailed information of a certain staff member, or names of personnel falling under certain conditions specified.

ii. Frequency:

This processing will be performed on demand by the users.

iii. Input Data:

Specific conditions only for the information retrieval

will be necessary for the processing.

iv. Output Reports:

R(6,3)

(4) Output Reports

(4)-1. Report of Current Status of Staff by Classification:

R(6,1)

i. Contents:

This is a report indicating the basic information concerning the current status of all of the staff of the Department by operation units.

ii. Frequency:

This is an annual report.

iii. Output Items:

This table will be prepared by each operation unit. Following items on every staff member will be listed.

- a. Name.
- b. Employee number.
- c. Date of birth.
- d. Sex.
- e. Blood group.
- f. Religion.
- g. Last schooling
- h. Date appointed to official servies.
- i. Date employed by the Department.

- j. Domestic training record.
- k. Overseas training record.
- l. Number of thesis published.
- m. Class and rank.
- n. Date promoted to present class and rank.
- o. Function.
- p. Date appointed to present function.
- q. Length of service in present function.
- r. Name of spouse.
- s. Number of children.
- t. Other remarks.

iv. Utilization:

This report can be used for various planning related to personnel affairs. Some examples are, to select the right person for the right post, to select candidates for promotion, to select candidates having suitable experience for a newly established operations unit, or to make plans concerning training, management of capabilities, management of professional careers, recruiting, expansion of operation unit, and many other personnel planning.

(4)-2. Report on the Current Staffing Status: R(6,2)

i. Contents:

This is a report on the total number of all of the staff at each operation unit classified by basic items.

ii. Frequency:

This will be an annual report, which will usually be prepared following the processing of the report R(6,1).

iii. Output Items:

The report will be prepared by each office (Head Office, provincial trade/cooperatives office, district trade/cooperatives office) and also by each operation unit of the offices. The report is a classified total of staff by the following items.

- a. By age group.
- b. By sex.
- c. By latest academic career.
- d. By number of years after appointed to official service.
- e. By number of years after employed by the Department.
- f. By number of times attended domestic training.
- g. By number of time attended overseas training.
- h. By class and rank.
- i. By number of years passed after promoted to present class and rank.
- j. By function.
- k. By number of years passed after assigned to present function.

iv. Utilization:

This report can also be used for various planning related to personnel affairs as in the case of report R(6,1). Compared with the R(6,1) report which will be used for the detailed investigation of the planning,

this report will be used for the basic consideration for the planning. This is because the report includes the macro information concerning the current situation necessary for consideration of the basic planning and policy making.

(4)-3. Report on the Retrieved Information of the Staff:

R(6,3)

i. Contents:

This system will have the function of on-demand retrieval of the detailed information on a certain staff, or retrieval of the names and related personnel affairs information of the staff falling under certain specified conditions. This is a report of the retrieved information. It will have functions to enable the following information retrieval.

- a. Limitation of the staff to be specified for the information retrieval. (By assigned office or operation unit,)
- b. Specified items and conditions for the information retrieval of the limited staff. Such example would be, specified items would be "sex" and the condition would be "men."
- c. The limitation for the scope of the output items of the report. For example, to output only the names of all of the staff falling under conditions "A" and "B", or to output names, assigned operation

units, and number of times of domestic training
all at the same time,

ii. Frequency:

This will be an on-demand processing to be performed
whenever requested by the user.

iii. Output Items:

Output items depends on the function of the information
retrieval mentioned in above item i, and the conditions
for the information retrieval. These items are a part
of the input items or all of the input items.

iv. Utilization:

Basically, this report can also be used for various
planning relating to personnel affairs as in the case
of report R(6,1). And unlike the report R(6,2), this
report will be used mainly for detailed investigation
for planning.

4-2-7. Inventory Administration

(1) General:

The total number of articles being carried as assets of the
Department of Trade and Cooperatives is said to be approxi-
mately 50,000, even when it is limited to the operation
units and offices of the Head Office. It would require
tremendous amount of work and time just to get a compre-
hensive picture of the current condition of the assets.
Errors are incidental to the processing of the information on

these assets when performed manually. Furthermore, it will be quite difficult to manage the current assets information for the effective utilization of the assets possessed, or purchase planning and maintenance schedules, since too many articles must be covered. The importance of systematizing the processing required for inventory administration is to solve such existing problems.

By storing the basic assets information in a form which can be processed by a computer, information concerning assets processed in various styles can be prepared accurately for the management thereof. The sheer volume of assets information will not be a problem any more.

The basic function of the inventory administration module described below is aimed at the formation of a data file and tabulation of a detailed assets table, listing the important information of major articles of assets. This would be the first step of the completion of the information system. It is considered that this is the most urgent and important requirement at the Head Office for the time being. There are five groups of assets subject for the administration, equipments, four wheel motor vehicles, two wheel vehicles, resident/building and office buildings. Various results of the analysis of assets information can be prepared as output reports in the future based on the established data file.

(2) Input Data

(2)-1. Office Equipment Information: I(7,1)

i. Contents:

This is the detailed information necessary for the administration of various office equipment being used at various operation units of the Department.

ii. Generation Frequency:

Information concerning the condition of newly purchased office equipment are being generated at each operation unit whenever they are purchased, or whenever there is a change in the condition of the equipment possessed. However, both of these information are required to be obtained at the Head Office only on a monthly basis.

iii. Information Flow:

Operation Unit \longrightarrow Head Office

iv. Information Media:

The information on office equipment is obtained at the Head Office in the form of documents.

v. Consideration for Data Check:

If the latest information (computer output lists) on the equipments they possess could be obtained at each operation unit, they could check which information needs to be reported to the Head Office for updating of the data file, for the next output. Also, thorough checking of the contents of the data could be performed at

each operation unit possessing the equipment. The accuracy of information management can be expected to improve even by conducting automatic checking of the information at the Head Office for those items which could be checked by computer.

vi. Input Items:

Following items will be subject for data entry for each equipment, classified by operation unit and by location. Once the equipment is registered, data entry of only the revised information is required for the updating.

- a. Registration number.
- b. Trade mark/name of equipment.
- c. Serial number.
- d. Equipment (property record) number.
- e. Year manufactured.
- f. Year purchased.
- g. Classification code for financial management.
- h. Annual maintenance cost.
- i. Code number stating current condition.
- j. Other remarks.

vii. Input Device:

Floppy disk reader unit will be used for data entry.

viii. Volume/Frequency of Input:

The total number of transaction relating to the entire operation of inventory administration, including those

on office equipment information, would be 50,000 for the initial data entry, each containing information equal to 200 characters. The number of transactions generated each year for updating would be 5,000, each containing information equal to 200 characters. The volume of information on office equipment is included in the above mentioned data volume.

ix. Others:

Items such as operation unit, location, financial management classification, and current conditions should be coded before undertaking the data entry. Also, if the classification of equipment could be reflected in the code for equipment number, it would be helpful for preparing new reports in the future.

(2)-2. Four Wheel Motor Vehicle Information: 1(7,2)

i. Contents:

This is the detailed information necessary for the administration of four wheel motor vehicles being used at various operation units of the Department.

ii. Generation Frequency:

Information concerning the condition of newly purchased four wheel motor vehicles are being generated at each operation unit whenever they are purchased, and the updated information for those vehicles purchased earlier than the previous year will be generated whenever up-

dating is required. However, both of these information are required to be obtained at the Head Office only on a monthly basis.

iii. Information Flow:

Operation Unit —————> Head Office

iv. Information Media:

These information on four wheel motor vehicle are obtained at the Head Office in the form of documents.

v. Consideration for Data Check:

If the latest information (computer output lists) on the four wheel motor vehicles they possess could be obtained at each operation unit, they could check which information needs to be reported to the Head Office for updating of the data file for the next output. Also, thorough checking of the contents of the data could be performed at each operation unit possessing the four wheel motor vehicle. The accuracy of information management can be expected to improve even by conducting automatic checking of information at the Head Office for those items which could be checked by computer.

vi. Input Items:

Following items will be subject to data entry for registration of four wheel vehicles, classified by operation units and by location. Once the vehicle is registered, data entry of only the renewed information is

required for the updating.

- a. Registration number.
- b. License number.
- c. Trade mark (name of vehicle).
- d. Type code.
- e. Year manufactured.
- f. Year purchased.
- g. Chassis number.
- h. Engine number.
- i. Purchased price
- j. Classification code for financial management.
- k. Present value.
- l. Annual maintenance cost.
- m. Code number stating current condition.
- n. Name of user.
- o. Other remarks.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

The total number of transactions relating to the entire operation of inventory administration is 50,000 for the initial data entry, each containing information equal to 200 characters. The number of transactions generated every year for updating would be 5,000, each containing information equal to 200 characters. The volume of information on four wheel motor vehicles is included in

the above mentioned figure.

(2)-3. Two Wheel Motor Vehicle Information: I(7,3)

i. Contents:

This is a detailed information necessary for the administration of two wheel motor vehicles being used at various operation units of the Department.

ii. Generation Frequency:

Information concerning the condition of newly purchased two wheel motor vehicles are being generated at each operation unit whenever they are purchased, and the updated information for those vehicles purchased earlier than the previous year will be generated whenever necessary. However, both of these information are required to be obtained at the Head Office only on a monthly basis.

iii. Information Flow:

Operation Unit → Head Office

iv. Information Media:

The information on two wheel motor vehicles are obtained at the Head Office in the form of documents.

v. Consideration for Data Check:

If the latest information (computer output lists) on two wheel motor vehicles they possess could be obtained at each operation unit, they could check which infor-

mation needs to be reported to the Head Office for updating of the data file for the next output. Also, thorough checking of the contents of the data could be performed at each operation unit possessing the two wheel motor vehicle. The accuracy of information management can be expected to improve, even by conducting automatic checking of information at the Head Office for those items which could be checked by computer.

vi. Input Items:

Following items will be subject to data entry for registration of two wheel motor vehicle, classified by operation unit and by location. Once the vehicle is registered, data entry of only the revised information is required for the updating.

- a. Registration number.
- b. License number.
- c. Trade mark (name of vehicle).
- d. Type code.
- e. Year of manufacture.
- f. Year of purchase.
- g. Body number.
- h. Engine number.
- i. Purchased price
- j. Classification code for financial management.
- k. Present value.
- l. Annual maintenance cost.
- m. Code number stating current condition.

- n. Name of user.
- o. Other remarks.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

The total number of transactions relating to the entire operation of inventory administration is 50,000 for the initial data entry, each containing information equal to 200 characters. The number of transactions generated every year for updating would be 5,000, each containing information equal to 200 characters. The volume of information on two wheel vehicles is included in the above mentioned figure.

(2)-4. Resident/Building Information: I(7,4)

i. Contents:

This is a detailed information necessary for the administration of residents and buildings of each operation unit of the Department.

ii. Generation Frequency:

Information concerning the condition of new residents and buildings are being generated at each operation unit whenever they are built/purchased, and the updated information for those resident/building obtained earlier than the previous year will be generated whenever necessary. However, both of these information are required

to be obtained at the Head Office only on a monthly basis.

iii. Information Flow:

Operation Unit \longrightarrow Head Office

iv. Information Media:

The information on resident and buildings are obtained at the Head Office in the form of documents.

v. Consideration for Data Check:

If the latest information (computer output lists) on the residents and buildings they possess could be obtained at each operation unit, they could check which information needs to be reported to the Head Office for updating of the data file for the next output. Also, thorough checking of the contents of the data could be performed at each operation unit possessing the resident/building. The accuracy of information management can be expected to improve, just by conducting automatic checking of information at the Head Office for those items which could be checked by computer.

vi. Input Items:

- a. Registration number.
- b. Operation unit code.
- c. Plottage.
- d. Building code.
- e. Number of stories.

- f. Type code.
- g. Classification code.
- h. Building life classification code.
- i. Code number stating current condition.
- j. Appraised value,
- k. Year built.
- l. Classification code for financial management.
- m. Other remarks.

vii. Input Device:

Floppy disk reader unit will be used for data entry.

viii. Volume/Frequency of Input:

The total number of transactions relating to inventory administration and the data volume is as described before, 50,000 transactions for initial data entry and 5,000 transactions for updating, each containing information equal to 200 characters. The above figure include those transactions for residents and buildings.

(2)-5. Office Building Information: I(7,5)

i. Contents:

This is the detailed information necessary for the administration of office buildings of each operation unit of the Department.

ii. Generation Frequency:

Information concerning the condition of new office buildings are being generated at each operation unit

whenever they are built/purchased, and the updated information for those office buildings obtained earlier than the previous year will be generated whenever necessary. However, both of these information are required to be obtained at the Head Office only on a monthly basis.

iii. Information Flow:

Operation Unit —————> Head Office

iv. Information Media:

The information on resident and buildings are obtained at the Head Office in the form of documents.

v. Consideration for Data Check:

If the latest information (computer output lists) on office buildings they possess could be obtained at each operation unit, they could check which information needs to be reported to the Head Office for updating of the data file for the next output. Also, thorough checking of the contents of the data could be performed at each operation unit possessing the office building. The accuracy of information management can be expected to improve, just by conducting automatic checking of information at the Head Office for those items which could be checked by computer.

vi. Input Items:

- a. Registration number.
- b. Operation unit code.

- c. Plottage.
 - d. Building code.
 - e. Number of stories.
 - f. Building life classification code.
 - g. Code number stating current condition.
 - h. Appraised value.
 - i. Year built.
 - j. Classification code for financial management.
 - k. Other remarks.
- vii, viii. Same as in the case of (2)-1.

(3) Computer Processing

(3)-1. Establishing and Assets Master File

i. Contents:

The required processing is the data entry of information concerning each asset item, and after data check and editing, to establish an assets master file.

ii. Frequency:

This processing is required only once at the initial stage of development.

iii. Input Data:

I(7,1), I(7,2), I(7,3), I(7,4), I(7,5)

iv. Output Reports:

R(7,1), R(7,2), R(7,3), R(7,4), R(7,5)

(3)-2. Updating of Assets Master File

i. Contents:

The required processing for updating the assets master file is data entry of revised information, data check, and editing.

ii. Frequency:

This processing is required once at the end of every month.

iii. Input Data:

I(7,1), I(7,2), I(7,3), I(7,4), I(7,5)

Data entry of only the information concerning the newly purchased assets and renewed items during the month is required.

iv. Output Reports:

No special output reports are required except for the list of updated information for confirmation.

(3)-3. Reporting of Assets Information

i. Contents:

To output the list of each asset stating their condition.

ii. Frequency:

This processing will be performed at the end of each fiscal year, after the updating is completed.

iii. Input Data:

Assets master file will be used.

iv. Output Reports:

R(7,1), R(7,2), R(7,3), R(7,4), R(7,5)

Same as in the case of (3)-1.

(4) Output Reports

(4)-1. Report on Office Equipment: R(7,1)

i. Contents:

This is the report on details of office equipment possessed by each operation unit and by location.

ii. Frequency:

This report is prepared at the end of each fiscal year.

iii. Output Items:

All of the input data items mentioned in (2)-1. will be listed.

iv. Utilization:

This report could be used as a ledger of assets at the Head Office, as well as for maintenance planning, checking current conditions and trends of maintenance costs, purchase planning, interchange of office equipment between operation units, etc. Also if the purchased price could be recorded in "other remarks" depreciation of assets could also be calculated by computer. The report could also be used at each operation unit level

for the same purpose as described above,

(4)-2. Report on Four Wheel Motor Vehicles: R(7,2)

i. Contents:

This is the report on details of four wheel motor vehicles possessed by each operation unit and by location.

ii. Frequency:

This report is prepared at the end of each fiscal year.

iii. Output Items:

All of the input data items mentioned in (2)-2. will be listed.

iv. Utilization:

This report could be used in the same manner as that for office equipment, mentioned before in paragraph (4)-1.

(4)-3. Report on Two Wheel Motor Vehicles: R(7,3)

i. Contents:

This is the report on details of two wheel motor vehicles possessed by each operation unit and by location.

ii. Frequency:

This report is prepared at the end of each fiscal year.

iii. Output Items:

All of the input data items mentioned in (2)-3. will be listed.

iv. Utilization:

This report could be used in the same manner as that for office equipment, mentioned before in (4)-1.

(4)-4. Report on Residents and Buildings: R(7,4)

i. Contents:

This is the report on details of residents and buildings possessed by each operation unit and by location.

ii. Frequency:

This report is prepared at the end of each fiscal year.

iii. Output Items:

All of the input data items mentioned in (2)-4. will be listed.

iv. Utilization:

This report could be used in the same manner as that for office equipment, mentioned before in (4)-1. In the future, evaluation and administration of each asset items could be undertaken if the appraised value of land and buildings could be checked separately.

(4)-5. Report on Office Buildings: R(7,5)

i. Contents:

This is the report on details of office buildings possessed by each operation unit and by location.

ii. Frequency:

This report is prepared at the end of each fiscal year.

iii. Output Items:

All of the input data items mentioned in (2)-5, will be listed.

iv. Utilization:

This report could be used in the same manner as that for residents and buildings mentioned before in (4)-4.

4-2-8. Project Administration

(1) General

Project administration can be considered from the viewpoint of financial accounting and managerial accounting, as means of administration methods. This study will be focussed on the procedures being taken at the Head Office for the preparation of project evaluation reports and be aimed at establishing a system which will provide the Head Office with supportive information. As for the basic concept of progress evaluation in accordance with requirements for preparing the project evaluation report, two methods of comparing the projected and actual budget by means of procurement and consumption of project resources on material basis as a physical evaluation, and by means of project expenditures on a monetary basis for a monetary evaluation can be considered. Therefore, emphasis will be placed on managerial accounting for the designing of the system, and the financial accounting aspect will not be considered in this study.

The current method of data processing for progress evaluation of projects are being performed manually both at the project administration section of the Head Office and at each operation unit in charge of the project. The work volume for the calculation and the degree of complexity of the processing have a tendency to increase rapidly as the process and resources (human resources and material resources) required by the project increases. Therefore, there is a limit to perform the processing manually, even when the number of projects is at a level of 500. Even if the contents of the reports to the Head Office were to be condensed, by limiting the process and resources to an extent possible to be managed, then the manual procedure to condense the contents of the report must be taken at each operational unit in charge of the project.

These problems arising from the current operations can be solved all at once by recording all the updated information on the project plan and progress made of the project by a computer system, and also undertaking the complex calculations by a computer.

It will not be necessary to include all of the items mentioned of the current project plan, project progress report, and project evaluation report for establishing the system to achieve the above purpose. Attributive information on the project such as the names and addresses of responsible persons or persons in charge of the accounting were not taken into consideration for this reason.

The section in charge of project administration at the Head Office is to review the project on a quarterly basis according to the following procedure:

- a. Check the project plan when received and post the necessary information to the project evaluation report.
- b. Check the project progress report when received and post the information relating to the actual progress made of the project to the project evaluation report.
- c. Re-check the items mentioned of the computer output list concerning the progress evaluative figures and post it to the project evaluation report.
- d. Evaluation of the progress of the project and considerations for future countermeasures.

The projects can be evaluated each quarterly based on the above work flow.

Items to be computer processed for the calculation of progress evaluative figures must be selected carefully for the system to function efficiently, and be utilized thoroughly based on this system. If the data processing by this system turns out to be fully efficient to support the operations of project administration, all the items of the project evaluation report which are possible to be processed by computer can be added to the system, and even the preparation of the project evaluation report itself may be computerized.

(2) Input Data

(2)-1. Project Plan Information: I(8,1)

i. Contents:

Of the attributive information and project plan information, detailed information necessary for project administration is included by each project.

ii. Generation Frequency:

It will be generated whenever a new project is started.

iii. Information Flow:

Operation Unit \longrightarrow Head Office

iv. Information Media:

The project plan is submitted in the form of documents.

v. Consideration for Data Check:

The Head Office will check the contents of the project plan report, and then the project plan information will be posted to the project evaluation report. Therefore, it is advisable that the information posted in the project evaluation report be used for the data entry at this time. This will enable the Head Office to practically administer the principal points of the project uniformly with the project evaluation report.

vi. Input Items:

- a. Project number.
- b. Code number of operation unit undertaking the project.
- c. Code number of project site.

- d. Project period (starting date, completion data).
- e. Total budget.
- f. Quarterly budget allocation.
- g. Name of project.
- h. Project authorization number (when any modification made to the project, authorization number for the modification made).
- i. Following items by each process:
 - code number of the process
 - name of process
 - scheduled period (quarterly)
 - budget allocation
- j. Following items by each resource:
 - Code number of the resource,
 - required quantity,
 - budget allocation.
- k. Following items by each process and scheduled period (quarterly):
 - Code number of required resource,
 - required volume,
 - budget allocation.

vii. Input Device:

Floppy disk reader unit will be used for data entry.

viii. Volume/Frequency of Input:

There will be 500 transactions for the initial data entry for all of the transactions concerning project plan and project progress mentioned in (2)-2., includ-

ing those for project plan report. Each contains information equal to 1,000 characters. The number of transaction generated for quarterly updating is estimated to be the same volume. The information volume of project plan report is included in the above figure.

ix. Others:

If the project plan itself is to be changed at the time of implementation, data entry of only the modified information is required at the time of updating.

(2)-2. Project Progress Information: I(8,2)

i. Contents:

This is the detailed information of each project required for the project progress administration at the time of implementation of the project.

ii. Generation Frequency:

This information is generated on a quarterly basis.

iii. Information Flow:

Operation Unit \longrightarrow Head Office

iv. Information Media:

The project plan is submitted in the form of documents.

v. Consideration for Data Check:

The Head Office will check the contents of the project progress report, and then the necessary information will

be posted to the project evaluation report. Therefore, it is advisable that the following items, after they are checked, be used as input data.

vi. Input Items:

a. Project number.

(Following items are all on a quarterly basis.)

b. Total amount of SPM disbursed (SPM is the amount to be appropriated in the disbursement certificate among the payments made).

c. Total amount of SPM outstanding.

d. Total amount of SPJ appropriated (SPJ is the amount paid which is not appropriated in the disbursement certificate).

e. Total amount of un-appropriated SPJ.

f. Balance of credit on hand at the operation unit undertaking the project.

g. Following items by each process:

Code number of process,
correct condition,

Following items for the resources already procured for each process:

Code number of resource,
amount procured,
total amount of SPM disbursed,
total amount of outstanding SPM.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

The volume and frequency of input is as previously mentioned before in (2)-1.

(3) Computer Processing

(3)-1. Establishing of Project Administration Master File

i. Contents:

The required processing is the data entry of information concerning project plan of each project, and after data check and editing, to establish a project administration master file.

ii. Frequency:

This processing is required only once at the initial stage of development.

iii. Input Data:

1(8,1)

iv. Output Reports:

R(8,1)

(3)-2. Updating of Project Administration Master File

i. Contents:

The required processing for updating the project ad-

ministration master file is data entry of information on changes/addition made to the project plan, and information from the project progress reports, data check, and editing to review the master file.

ii. Frequency:

This processing is required once each quarterly.

iii. Input Data:

I(8,2) [and also I(8,1) if necessary]

iv. Output Reports:

R(8,2)

(3)-3. Reporting of Project Progress Evaluation Report

i. Contents:

To calculate and output progress evaluative figures by each project.

ii. Frequency:

This processing will be performed once each quarterly, after the updating of the file is completed.

iii. Input Data:

Only the project administration master file will be used.

iv. Output Reports:

R(8,3)

(4) Output Reports

(4)-1. Report of Registered Project Plans: R(8,1)

i. Contents:

This is the report on the details of the registered project by each operation unit undertaking the project.

ii. Frequency:

This report is prepared once at the initial stage.

iii. Output Items:

All of the input data items mentioned in (2)-1. will be listed.

iv. Utilization:

Project administration section of the Head Office and operation units undertaking the project can use this as a ledger for the administration of projects.

(4)-2. Registration of Modifications to Project Plan

Report: R(8,2)

i. Contents:

This is the latest information on the details of the project plan by each operation unit undertaking the project for those project plans that have had changes or addition. A detailed list of all the project will be made once each year.

ii. Frequency:

This report is prepared once each quarterly.

iii. Output Items:

All of the input data items mentioned in (2)-2. will be listed.

iv. Utilization:

Project administration section of the Head Office and operation units undertaking the project can use this as a ledger for the administration of projects.

(4)-3. Project Progress Evaluation Report: R(8,3)

i. Contents:

This is a report of the progress evaluation figures of each project by operation units undertaking the project. The progress evaluation figures will be calculated by means of actual conditions of physical procurement of project resources and payments made in terms of money.

ii. Frequency:

This report will be prepared once each quarterly for all the projects implemented.

iii. Output Items:

- a. Project number.
- b. Project authorization number.
- c. Name of project.
- d. Project period.
- e. Project site.
- f. Total budget,

- total accumulative amount of SPM disbursed,
 - total amount of outstanding SPM,
 - total accumulative amount of appropriated SPJ,
 - total amount of unappropriated SPJ,
 - balance of bank account reserves,
 - ratio of each item to the total budget,
 - progress rate (RK).
- g. Items mentioned in item (f) above for each fiscal year and its breakdown by each quarterly.
- h. Total amount of projected procurement for each resource required,
- total amount of actual procurement and the progress rate (RF),
 - budget allocation,
 - total accumulative amount of SPM disbursed,
 - total amount of outstanding SPM,
 - total amount of SPM,
 - progress rate (RK).
- i. Items mentioned in item (h) above for each fiscal year and the breakdown by each quarter.
- j. Present condition, budget allocation, total accumulative amount of SPM disbursed, total amount of outstanding SPM, total amount of SPM, progress rate (RK) by each process,
- total amount of projected procurement,
 - total amount of actual procurement, progress rate (RF) by each resource required.
- k. Items mentioned in item (j) above for each fiscal

year and the breakdown by each quarter.

iv. Utilization:

This report will enable the project administration section at the Head Office to check the items mentioned in the project progress report such as the progress rate and other evaluation figures. Furthermore, other accurate progress evaluation figures could be obtained to be posted to the project evaluation report, and the current progress conditions could be checked quantitatively from the physical point of view and budget allocation. Therefore, current problems for the project administration and future trends in expenditures could be analyzed numerically. It could also be used in the same manner at each operation unit undertaking the project, if the various evaluation figures of the report could be forwarded to them.

If the actual progress rate of the project which each operation unit has evaluated could be mentioned in the project progress report in the future, it would be of great help for decision making of measures to be taken for solving the current problems and for future policy making. For example, effects such as to enable modifications to be made to the project plan in case the material (resource) requirements and manpower requirements have already reached 70% and also the expenditure has reached 75% of the projected amount when the actual progress rate of the process is only 50% completed, or

to find out problems at an early stage such as the estimated expenditures could be expected to reach 130% of the projected amount by the time of completion of the process, could be expected.

4-2-9. Middle East Work Force

(1) General

This system is aimed at establishing a system for recording the personnel information on the Middle East work force and making available the processing of reports and information retrieval by specific input items. Currently, there are some 38,000 people dispatched to the Middle East countries. When looking into the annual trends of the number of workers in the Middle East, 5,000 people were newly dispatched in 1981. Information for the input is being obtained from the domestic contractor or labor supplying company.

The information on workers to be dispatched shall be recorded in the data file monthly, from which preparation of annual reports and information retrieval can be performed. The volume of data entry and data file will be for the registration of information on 38,000 workers at the initial stage, and for 5,000 workers for the newly generated information annually. The volume of data for one person is estimated to be 100 characters, however, there are so many workers to be covered that the total data volume will become very large. Therefore, designing of the file and its updating must be considered carefully in connection with the file media.

The data check of the input information is considered to be already performed by the domestic contractor or labor supplying company.

(2) Input Data

(2)-1. Report on the Work Force: I(9,1)

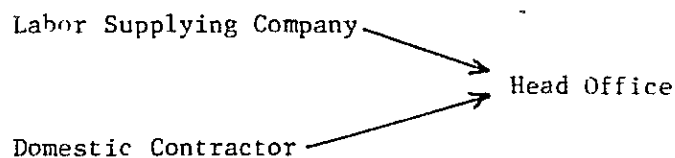
i. Contents:

This report contains information about the workers to be dispatched, which is being submitted from the domestic contractor or labor supplying company. There is one transaction for each worker being dispatched.

ii. Generation Frequency:

The transaction itself is being generated whenever there will be a dispatching of workers, however, the Head Office receives them on a monthly basis.

iii. Information Flow:



iv. Information Media:

This information is obtained from documents.

v. Consideration for Data Check:

It is assumed that the mentioned items are already being checked by domestic contractor and labor supplying com-

pany. Therefore, a simply logical check (checking of scope) should be performed.

vi. Input Items:

Following are the major input items concerning the worker to be dispatched.

- a. Name.
- b. Age.
- c. Sex, marital status.
- d. Occupational classification.
- e. Salary.
- f. Birth place.
- g. Country to be dispatched.
- h. Name of firm receiving the workers.
- i. Term of contract.
- j. Name of dispatching firm.
- k. Date (year, month) to be dispatched.

vii. Input Device:

Floppy disk reader unit will be used for the data entry.

viii. Volume/Frequency of Input:

The number of transactions generated each year is approximately 5,000 each containing information equal to 100 characters. Following is the annual data volume:

5,000 transactions x 100 characters / year

(3) Computer Processing

(3)-1. Data Entry of Work Force Information

i. Contents:

Data entry of the above mentioned transaction I(9,1) and data check is to be performed before the updating of the data file.

ii. Frequency:

This processing will be performed monthly.

iii. Input Data:

I(9,1)

iv. Output Reports:

None.

(3)-2. Reporting of Work Force Information

i. Contents:

The processing required is to prepare reports on the Middle East work force annually from the updated data file.

ii. Frequency:

Processing will be performed on annual basis.

iii. Input Data:

None.

iv. Output Reports:

R(9,1)

(3)-3. Information Retrieval by Specific Items

i. Contents:

This processing is to retrieve the necessary information on the work force by specific input items such as by names, age, sex, occupational classification, birth place, dispatched country, dispatched date, etc.

ii. Frequency:

The information retrieval will be performed on demand.

iii. Input Items:

None.

iv. Output Reports:

R(9,2)

(4) Output Reports

(4)-1. List of Work Force: R(9,1)

i. Contents:

These are annual reports on number of workers dispatched classified by following items.

- a. Dispatched month.
- b. Dispatching firm.
- c. Age group.
- d. Salary amounts.
- e. Birth place.
- f. Dispatched country.

ii. Frequency:

These are annual reports.

iii. Output Items:

Number of workers by each items mentioned in above item i.

iv. Utilization:

This report will be used to obtain the current status of work force dispatched by means of number of workers.

(4)-2. Information Retrieval by Specific Items: R(9,2)

i. Contents:

This is the report on the information retrieved by specific items.

ii. Frequency:

This is to be performed on demand.

iii. Output Items:

All of the input data will be listed when retrieved by names. The names of dispatched worker will be listed when retrieved by other items.

iv. Utilization:

This will enable the Head Office to list up the personnel information or names of dispatched workers contained in the data file which falls under certain conditions. This will result in improvement of efficiency for the administration of the work force.

4-3. Hardware

4-3-1. General

(1) Scope of the Hardware

In a general sense, the term hardware includes only the main frame of the computer, the peripheral units, and the terminals. However, off-line input devices and other auxiliary equipment necessary for operating the computer system will also be studied in this Master Plan. Furthermore, the spaces to install these machines and equipment will be taken into consideration.

(2) Requirements for the Selection of the Hardware

i. Requirements Concerning the Configuration of the Hardware:

The minimum requirements, when considering the configuration of the hardware, is to enable the information processing mentioned in section 4-2. of this chapter. Requirements for the processing is described below.

- a. Data entry will be performed mostly with floppy disk reader units. Punch cards and magnetic tapes will also be used in some cases.
- b. Data file is to be established separately for each operation.
- c. Information retrieval by specified items must be made possible for some data files.
- d. Software development will be based on batch processing, and also real-time processing utilizing

TSS terminals. However, operations requiring processing on a regular basis will be performed by batch processing,

- e. The processing required mainly is the updating of the master file and tabulation of various lists.
- f. Back up files for the data file must also be prepared.
- g. The volume of data entry at the end of each fiscal year will become so heavy since the nature of the operations have the tendency of concentrating of the transactions at this time.

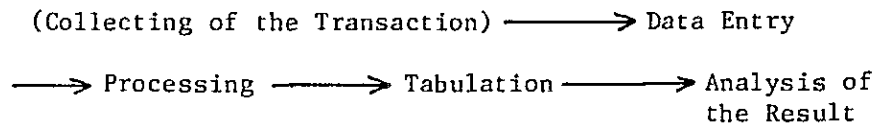
ii. Capacity of the Hardware:

The next item to be considered for the selection of the hardware is to estimate the required capacity of the hardware. The term capacity in this case means:

- a. To have enough memory space for the execution of the program.
- b. To be able to complete the processing including the data entry within the desired time period.
- c. To enable the processing to be performed smoothly even in the case one of the peripheral units is not in working order.

Capacity from the standpoint of items a. and c. can be estimated rather easily. Therefore, capacity from the standpoint of item b. will be studied in detail since the nature of the operation will have a great influence on the capacity.

The following shows the flow of operations when the information system is introduced at the Head Office:



Characteristics of the operations studied in this Master Plan is that the volume of transactions being generated is very large. Therefore, the most crucial procedure, besides the collecting of the transaction, would be the data entry. The estimated amount of manpower requirement for the data entry, based on the data volume mentioned in section 4-2. would be approximately 550 man-months. It would be necessary to be provided with enough input devices to make the data entry possible for the above mentioned work volume within one year at the longest.

iii. Space Requirements for the Installation of the Hardware:

Since the computer system is composed of highly precise devices, the system requires very close control of room temperature, humidity and dust. There will be auxiliary equipment required as described hereinafter, which will take three to five times the space required for the computer room.

4-3-2. Configuration of the Hardware

Following are the characteristics of the current operations which were considered when determining the configuration of the hardware.

(1) Concerning Data Entry

Punch cards, floppy disks, and magnetic tapes can be used for the data entry. However, floppy disks will be mainly used for data entry due to its portability and operability. One more reason for using floppy disks for data entry is because there is a plan to introduce mini-computers at the Directorate General for Cooperatives. A standard 8 inch floppy disk is the most popular peripheral equipment for the mini-computer system, and therefore, expansion of the system by having an interface with the mini-computer can be expected.

Many key-floppy units will be required for preparing the floppy disks for data entry since there are some system modules which must handle mass data.

Byte (B) is used to express the volume of data. One byte is equal to one character, however, by encoding the data properly, data equal to ten characters can be condensed to one byte.

(2) Concerning the Data File

Information retrieval of the data file by specific items can be performed efficiently if the data file is recorded to disk packs which will make possible random accessing. Therefore, various data files for each operation should be developed on disk packs. However, some system modules would require the data file to be recorded on magnetic tapes since the data volume of the system is too large so that it would require too many disk pack units.

(3) Concerning the Software

A disk pack for basic softwares, various application programs and user programs would be required for the execution. Development and maintenance of user programs, and application of various softwares will be performed by punched cards. Therefore, key punch units and a card reader unit will also become necessary. Also, TSS terminals will be partly used in order to improve the efficiency of the software development and maintenance.

(4) Concerning the Processing

This system will enable both the batch processing and the real-time processing using the terminals. Most of the programs for batch processing will be processed by single task operation so that only one line printer unit will be required for the output device. The main memory area other than that for the operating system (OS) will be shared equally for batch processing and real-time processing.

Following is the configuration of the hardware, taking into consideration the above mentioned point.

- Central Processing Unit: 2 MB

Approximately 0.5 MB of the main memory area will be required for the OS. Therefore, 0.75 MB each can be allocated for the batch processing and real-time processing.

- Card Reader Unit: 1 unit

This will be used for the development, application, and maintenance of the software.

- Floppy Disk Reader Unit: 2 units

This will be used for data entry. One is for the alternation for consecutive data entry processing.

- Line Printer Unit: 1 unit

This is for printing out the hardcopy outputs.

- Disk Pack Unit: 3 units (300 MB)

One unit will be used for the system disk which includes basic softwares such as the compiler, and application programs. The second unit will be for the user disk which includes data files established for each operation. The third unit is usually used as a work file.

- Magnetic Tape Unit: 4 units (6,250 BPI)

For some system modules where the data volume is so large, the data files must be recorded on magnetic tapes. Four MT units will be necessary in this case. The first unit is for the old master file, the second is for the transaction file, the third is for the new master file, and the fourth is the work file.

- Key-to-Floppy Disk Unit: 25 units

This is used to connect the information obtained from transactions to computer readable media for data entry

processing which is the floppy disk in this case. The approximate manpower requirement for the data entry is 550 man-month/year. Therefore, when this task is performed in two shifts, the required number of key-to-floppy units would be 25 units.

- Key Punch Unit: 2 units

This will be used for maintenance and data entry of the system as well as for the development, application, and maintenance work of the software. Therefore, one unit must be installed inside the computer room.

- CRT Display Unit: 3 units

These will be used for the development and maintenance of the user programs. Also, retrieval of necessary information can be performed on demand. The reason for having three CRT display units is because the memory size of the CPU allocated for real-time processing is 0.75 MB and the memory size required for one terminal is 0.2 to 0.4 MB,

4-3-3. Auxiliary Equipment

Following auxiliary equipments are indispensable for the operation and management when introducing a computer system.

(1) Power Supply Unit

Stable supply of electricity is required to avoid malfunction and perform the processing accurately when operating the computer. Stable supply of electricity means that there

will be no power failure, nor rapid fluctuations in the voltage. The allowable voltage fluctuation is within 1%. Usually, a constant voltage device is installed which are usually provided with batteries capable of use for 5-20 minutes in case of a power failure. This is to enable the recording of information of the main memory to an external memory such as magnetic disks within a short time in case of power failures.

Switch board must be installed in the computer room to make possible the switching at the beginning/end of the work and also for proximity to the work area in times of emergency. Earthing (grounding) is also required for electrical stability, elimination of noise, and safety. Especially, common use of the earth for the main frame of the computer and other devices must be avoided.

Furthermore, the electric power supply must be more than enough since the computer system would usually require power supply from 10 to 30 kVA.

(2) Air Conditioning Unit

Various elements of the computer system and auxiliary memory, such as magnetic tapes, and disk packs have allowable range concerning the temperature and the humidity. Therefore, computer room and storage room for magnetic tapes must be air conditioned. The following table shows the optimum temperature and humidity conditions required by the computer system.

TABLE: Temperature/Humidity Allowance for Computers

	In Operation	Out of Operation
Temperature	16 - 30°C	10 - 40°C
Relative Humidity	20 - 80%	10 - 80%

Above figures are standard for computer systems, and therefore, the following figures should be used for the design of the computer room.

Temperature: 24°C, Humidity: 50%

This is because 24°C is also the best temperature for the operators to work in. Following are the reasons for keeping the humidity at 50%.

- i. Static electricity will cause malfunctions if the humidity is lower than these values.
- ii. Corrosion will advance due to the corrosive gases if the humidity becomes any higher.
- iii. Condensation will occur.
- iv. 50% humidity is a comfortable environment for the people to work in.

An automatic temperature/humidity control unit or recorder is necessary to keep the temperature/humidity of the room at a constant level. Also, a humidifier is necessary in case the room becomes too dry. Dust and harmful gases will have a bad influence on the computer system. Therefore, the air being supplied to the computer room must be filtrated through an electric dust collector composed of activated

charcoal filter.

(3) Cooling Devices

Electronic circuits of the computer will generate heat when operated, and therefore, some type of computers have water cooling devices. For such type of computers, heat exchanger, filters, circulation pump and other circulating equipment would become necessary. Water cooling facilities for the air conditioning unit can be used if it meets the specifications of the cooling device for the computer. If it does not meet the specifications, a new cooling tower or chiller facility would be necessary. Considering the maintenance of cooling water circulation equipment, the cooling water must be filtrated.

(4) Other Related Matters

i. Thermal Insulation:

Thermal insulation should be provided for the computer room so that it will not be influenced by the heat outdoors in order to keep the room temperature at a constant level.

ii. Lighting:

The computer room should have two to three times more average luminous intensity than ordinary office rooms, that is 500 to 800 lux at 75cm above the floor. Also, attention must be paid so that the back side of each equipment will not become dark for maintenance work. However, the windows must have blinds to avoid direct

rays of the sun, since this will partially heat the equipment which will result in malfunction thereof.

iii. Noise Control:

Many equipment producing considerable noise will be installed in the computer room, air conditioning equipment room, and power supply room. Therefore, sound-absorbing materials must be used for the walls and floor in order to keep the level of noise as low as possible. It will be effective if airtight doors and sound-absorbing treatment of air ducts are provided.

4-3-4. Installation Space

(1) General

Many factors such as the physical requirements, electrical requirements, and operational requirements must be considered for the selection of space for the installation of the computer system. The space required for the installation and its layout plan based on the hardware configuration shown in section 4-2-2. will be mentioned after various requirements concerning the area for installation of the computer system is made clear.

(2) Requirements for the Computer Room

There are structural requirements for the installation of the computer system and operational requirements for the utilization of the installed computer system for the selection of the computer room. Requirements from each stand-

point is described below:

i. Structural Requirements:

a. Safety:

Fire protection measures must be taken for the computer room. The computer room must be located in fire-resistant building or room, and there must be no combustible nor explosive materials stored/handled near the computer room. Furthermore, measures must be taken such as to use non-combustible materials for the inside wall of the computer room, or to prevent the spreading fire from the outside by attaching shutters to the window openings or even by closing off the window.

b. Loading Capacity:

Whether the planned space is suitable for the computer room will depend on the total weight of the computer system and its layout whether the planned and the loading capacity of the room is sufficient or not. Even if the loading capacity is insufficient, this problem could be solved by installing the computer system on a beam, or by reinforcing the floor.

c. Others:

The computer room must be kept free of flood and rain waters from the point of view of electrical safety. Especially, attention must be paid to the roof of the computer room on the upper floors to prevent inundation

from the upper side, so that it should be watertight. Drainage should also be considered in case of emergency flooding.

On the other hand, the height of the ceiling must also be considered from the following viewpoint. The floor of the computer room is usually made of a secondary raised floor. This is because the cables connecting the processing unit and peripheral units are to be run under the floor for its protection. The clear height of the ceiling must be measured from the raised floor level. Following are three major factors for the determination of the ceiling height:

- Height of the equipment including space for maintenance work.
- Flow of the air of the computer room and the thermal distribution.
- Psychological effect on the operators.

Taking the above factors into consideration, the height of the ceiling must be at least 2,440mm.

ii. Operational Requirements:

Following factors having adverse effects on the operation of the computer should be avoided.

a. Vibration:

Disk pack units and MT units are very sensitive to vibration. Therefore, places where there will be a

large amount of vibration must be avoided.

b. Magnetic Field and Electromagnetic Field:

Since computer system functions by magnetism and magnetic substances, external magnetic or electromagnetic effects must be removed because this will be the cause of malfunctions. Therefore, it will not be favorable to have electrolytic cells, broadcasting antennas, or radar facilities nearby the computer room.

c. Others:

The computer room must be protected from dust and harmful gases, therefore, the pressure of the room should be kept slightly higher than the outside or airtight doors provided or anterooms should be considered. Also, the computer room and adjoining room should be designated as no smoking areas.

Furthermore, the computer room should be located near to the storage room for disk packs, MT's and other computer supplies, and it is also required that close communication can be taken with each operation unit. The former point will be mentioned later.

(3) Required Area:

Following facilities are required for the installation of a computer room.

- Computer Room.
- Data Entry Room.

- Electric Power Room.
- Air Conditioning Room.
- Maintenance Room.
- Resting Room for Key Punchers.
- Office Room.
- Programming Room.
- Storage Room for Secondary Memory Media.
- Storage Room for Computer Supplies.

i. Computer Room:

All of the equipment mentioned in section 4-3-2. will be installed in the computer room except for the key-to-floppy units for data entry, one key-punch unit for operational use, and CRT display units. There must be enough space between each equipment for the panel doors to be opened for maintenance. Also, 25% margin should be reserved for future expansion.

The computer room would require following area taking the above points into consideration:

90 - 115 m²

ii. Data Entry Room:

25 key-floppy units, 3 CRT display units, and 1 key punch unit will be installed in the data entry room. 4m² will be necessary for one data entry device when considering the working space of the operator. Following is the total area required:

120 m²

iii. Electric Power Room:

Constant-voltage device and no-break unit power will be installed. Size of these devices depends on the electric energy requirements. Usually, the following area is required:

30 m²

iv. Air Conditioning Room:

This is the room for installing the air conditioning facilities for the computer room and also the heat exchangers, chillers, and pumps if the computer is of the water cooling type. Usually following space would be sufficient:

20 m²

v. Maintenance Room:

This is a room for the customer engineer dispatched by the maker for the maintenance of the computer. Therefore, following space would be sufficient:

20 m²

vi. Resting Room for Key Punchers:

Data entry is an exhausting work and therefore, a resting room is necessary for the operators to take a rest during their working hours. 1m² would be required at the minimum per person so that the total area required would be as follows:

30 m²

vii. Office Room:

This is for the operation, control of the computer, reception of the jobs, and administration of computer supplies. At least 5 m² is required for one person.

The total area required is as follows:

50 m²

viii. Storage Room for Secondary Memory Media:

Secondary memory media such as MT's disk packs, and floppy disks will be stored in this room. This room must be kept at the same condition as the computer room since these materials have certain requirements. The area required for this room is:

20 m²

ix. Storage Room for Computer Supplies:

This room is for storing output forms, punch cards, coding sheets, ink ribbons for line printer, and other computer supplies. The area required is as follows:

20 m²

x. Programming Room:

This is a room where debugging and meetings can be held.

The area required is as follows:

30 m²

The following table shows the area required of each room which will amount to 430 - 455 m² as a whole.

TABLE : Required Space for the Rooms

Facility	Area (m ²)
Computer Room	90 - 115
Data Entry Room	120
Electric Power Room	30
Air Conditioning Room	20
Maintenance Room	20
Resting Room for Key Punchers	30
Office Room	50
Store Room for Secondary Memory Media	20
Store Room for Computer Supplies	20
Programming Room	30
Total	430 - 455

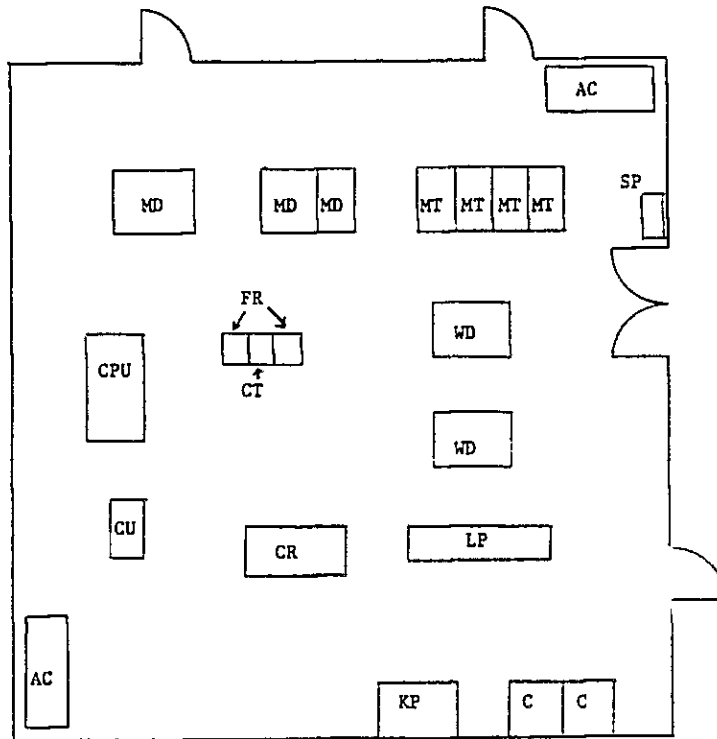
(4) Layout

Layout of the equipment within the computer room and the layout of facilities will be described.

i. Layout of the Computer Room:

As mentioned before, not only the working space for the operation but also space required for the maintenance such as the space of the access covers must be considered. The figure shows the layout of equipment based on the hardware configuration mentioned in section 4-3-2.

FIGURE: Layout of Computer Room



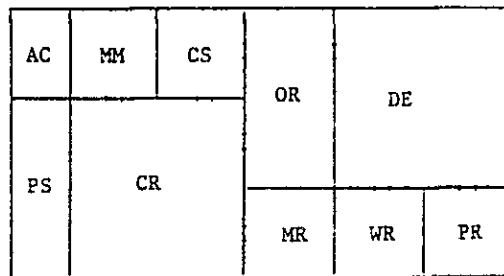
Notes:

- AC - Air Conditioning Unit
- C - Cabinet
- CPU - Central Processing Unit
- CR - Card Reader Unit
- CT - Console Terminal
- CU - Control Unit
- FR - Floppy Disk Reader Unit (2 units)
- KP - Key-Punch Unit
- LP - Line Printer
- MD - Disk Pack Unit (3 units)
- MT - Magnetic Tape Unit (4 units)
- SP - Switch Panel
- WD - Work Desk

ii. Layout of Associated Facilities:

Operations should also be considered for designing the layout of the associated facilities. For example, computer room and reception room, store room must be located next to each other, but it is desirable to have the air conditioning room and electric power supply room separated from the reception room or the work room since these facilities generate much noise. Next figure describes the layout of these associated facilities.

FIGURE: Layout of the Associated Facilities



- Notes: AC - Air Conditioning Room
CR - Computer Room
CS - Computer Supply Room
DE - Data Entry Room
MM - Secondary Memory Media Store Room
MR - Room for Maintenance Staff
OR - Office Room, Reception
PR - Key Punchers' Resting Room
PS - Electric Power Supply Room
WR - Work Room for Programmers

The figure does not include corridor but shows only the location of each facility.

(5) Requirements for the Hauling-in Route

Following two points must be considered for the hauling-in of the computer to the prepared computer room:

- Raising to the floor of the computer room,
- Hauling-in to the computer room.

The size of the largest equipment can be estimated to be 140cm x 200cm x 200cm (width x length x height), and the weight to be 1,400kg.

i. Raising of Equipment to the Floor of the Computer Room:

If possible, the elevator would be the best way to carry the equipment of the size described above. In this case the depth of the elevator is the limiting factor rather than the frontage, while the loading capacity must be more than 1.5 tons. If elevators cannot be used, it must be hoisted upstairs through the windows or the stairwell. In this case, it will be difficult to haul to high floors.

ii. The Haul-in Route to the Computer Room:

The major problem for installing the computer system is the entrance to the computer room and the width of the corridors. Especially when the corridor is crooked, attention must be paid to whether there is enough room for the equipment to be turned. Also, in order to keep the vibration to the machine as low as possible and

ramps should be provided where there are differences in floor levels.

4-4. Software

4-4-1. General

(1) Classification of Software

The softwares to be considered in this Master Plan Study can be classified into the following four categories by the type of applications.

i. Basic Softwares:

These are softwares necessary for the operation of the computer system which are common for all types of processing regardless of the operation.

ii. Application Programs:

These are programs necessary for the operation of the computer system for specific processing requirements. These are also called service programs.

iii. Programming Languages:

These are languages used to describe the programs.

iv. User Developed Softwares (User Programs):

User programs are softwares designed and developed by the users by carefully considering the characteristics of their operation, hardware configuration, processing requirements in order to enable the processing of the

transactions generated and the necessary output reports.

Usually, softwares of the first three categories are provided by the computer makers who will also undertake the maintenance services.

On the other hand, the maintenance of the user programs must be performed by the staff who are engaged in the development of the software or some other staff in charge of the maintenance, which will require a large volume of work. Therefore, maintenance of the program must be considered at the time of program design in order to reduce the work load for the maintenance. The relation between program design and program development is mentioned in the next section concerning the life cycle of software.

(2) Life Cycle of Software

i. Life Cycle Model:

Life cycle model of software indicates the several phases of the software, from the development phase until it is discarded. Softwares are generally an important factor of the configuration and functioning of the system. Therefore, the life cycle of the software has inseperable relation with the life cycle of the system. The life cycle model of software can roughly be divided into the following four phases:

- System Planning.
- System Development.

- System Operation.
- System Maintenance.

Usually, the four phases take place consecutively. However, in some cases, it is required to go back to the previous phase. Following figure shows the life cycle model of the software.

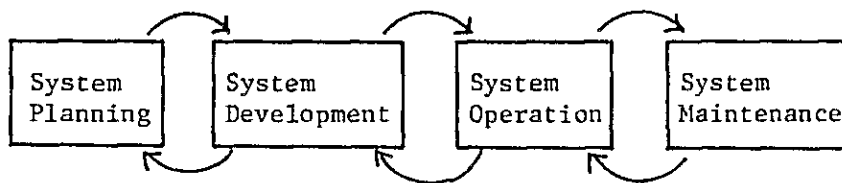


FIGURE: Life Cycle Model

The important thing to be considered when expressing the software development/operation process in a model is to make clear the procedures required at each phase and to define the conditions to advance to the next phase (or return to the previous phase). These definitions must be made at the phase of system planning.

Such phase can be further divided into detailed steps, which is shown in the next diagram.

ii. Details of the System Planning:

The purpose of the system planning is to comprehend the whole framework of the information system such as system installation and operation. This phase can be divided into master plan study, system development planning, system operation planning, and system maintenance planning.

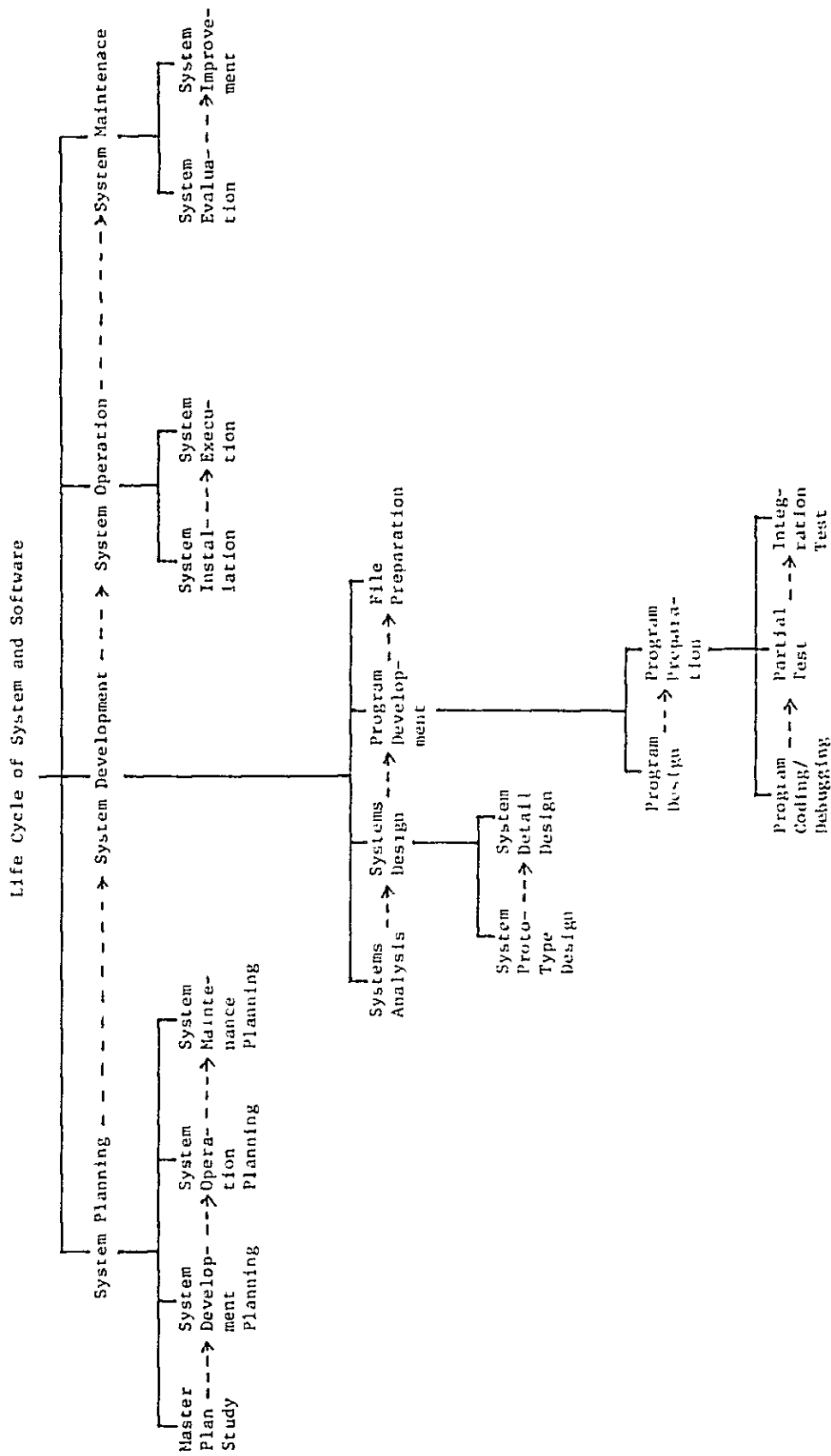


FIGURE: System/Software Life Cycle

Objectives of this phase are as follows:

- a. To conduct a general study of the operation.
- b. To analyze the results of the study from the viewpoint of hardware, software, and manpower.
- c. To make a basic plan concerning the development, operation, maintenance of the information system which can be realized in terms of manpower, facilities, funds and schedule.

iii. Details of the System Development:

System development is the most important phase in the life cycle of software. This phase can be divided into system analysis, system design, program development, and file design.

a. Systems Analysis:

System analysis is performed to define the orientation of the function the system must have by analyzing the operation in detail and finding out the requirements for the information system.

b. System Design:

System design consists of system prototype design and system detail design.

b-1. System Prototype Design:

Functional design of the information system will be performed irrespective of any specially designated hardware or software. Basis of the processing methods and

its contents will be determined by the available input data and desired output reports. If necessary, division of function and basic hardware configuration will also be considered.

b-2. System Detail Design:

Based on the results of the prototype design, logical and physical detail design of the system will be performed. Detailed processing requirements will be determined from the function and the divided function of the information system. Also, input/output specifications will be determined together with the code design and file design for the preparation of specifications for the system design, including code tables and file specifications. Furthermore, operation of the information system (especially in case of emergency) and maintenance system must be considered.

c. Program Development:

This is the main part of the development of an information system to develop the programs based on the results of the system design. It is divided into program design and program preparation.

c-1. Program Design:

Composition and structure of the program to be manufactured is decided and examined in detail. Also, details of the processing requirements and data structure will be decided at this time. In this case, top-down design-

ing method will enable the designing of the program systematically. The items fixed at this step must be arranged into a program specification to be used for program preparation.

Also, check items of the program must be considered at this step. Check items, in pairs of input and expected output, to be included in the check specification must be considered by each functional unit as well as the whole program.

c-2. Program Preparation:

This work can be divided into three steps of program coding/debugging, partial test, and integration test.

- Program Coding/Debugging: Programs will be prepared according to the program design specifications. At this time, understandability of the program can be increased while the work load for maintenance can be reduced by using the structured programming method or by undertaking the standardization of the programming. Also, test data will be prepared based on the check specifications. Debugging is the work to modify the program, which will be performed after the coding and is usually continued until the completion of the program.

- Partial Test: When the debugging of the program is finished, partial test of the program will be performed. Partial test will be performed by each func-

tion unit. Data given in the check specification will be used to check the differences between the actual output and the expected output. If any differences in the outputs should occur, the program must be modified. Partial test will be completed when all of the actual output items matches with the expected output figures.

- Integration Test: Integration test is performed by integrating all of the functional units. This will be the same as in the case of partial test, this test will compare the differences in the actual output and the expected output, based on the check specifications.

d. File Preparation

Master file necessary for the operation of the information system will be prepared in this step. File specifications and code table prepared at the stage of detail design must be referred for this.

iv. Details of the System Operation:

The phase of system operation can be divided into two stages of system installation and system execution.

a. System Installation:

The main procedures required for system installation is to conduct the transition test of the developed information system under conditions of actual operation, and

to transfer the system to an operational status. System test will use the actual data concerning its operation and be processed under the same condition as the actual operation to examine if any error occurs which were not found before, and also if there are any problems in the procedures from the data collection to processing of output reports.

b. System Execution:

After the transition test is finished, the new system will be put into operational status. However, the operation should not be shifted to the new system all at once but parallel running of both the new and old system should be performed during the initial months. The purpose of the parallel running is to confirm the stability of the new system as well as to have the staff get accustomed to the new system.

Following figure shows the typical procedure of parallel running operation.

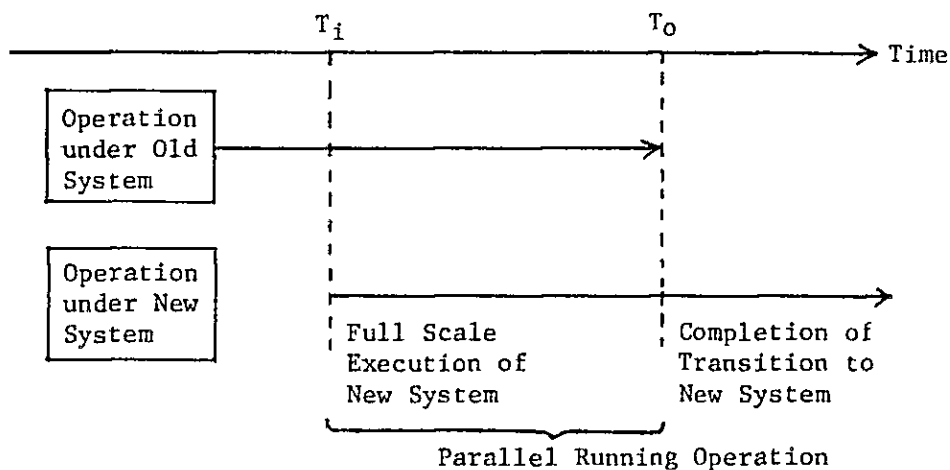


FIGURE: Concept of Parallel Running

v. Details of the System Maintenance:

Modifications, alterations, and additions must be made to the information system after being placed in full operation due to newly found abnormalities, operational difficulties, or changes in the procedure of the operation. The system maintenance required for such work could be further divided into system evaluation and system improvement.

a. System Evaluation:

The information system in execution must be evaluated in terms of operational efficiency, reliability, operational simplicity, attainability of the purpose for the installation, degree of satisfaction of the users, etc., in order to analyze to see if there are any problems. If there should be any problems, necessity for improvement and its timing must be considered.

b. System Improvement:

The information system must be improved in accordance with the results of the system evaluation. The procedure for the improvement of the information system is as described in the software life cycle.

4-4-2. Basic Software

(1) General

Basic softwares are indispensable for the operation of the computer system. There are two types of basic softwares as

described below;

- i. Control program which is for the control of execution of the program and the consolidated file management.

(Operating System: OS)

- ii. Language processors which are for generating the machine language statements from the programming language statements.

(2) Operating System (OS)

The function of OS is to control the execution of programs. This includes operations control of the I/O devices, processing of interruption, management of data file, allocation of storage area, etc.

(3) Language Processor

Language processors are programs to compile/translate the programs from programming language to machine language. Assembler and compiler are such language processors. Generators, which can generate a certain program by giving the skelton and the necessary parameters for generating the program, may also be included in the language processor.

These language processors are provided by the computer makers, and there are several types of language processors for each programming language. There are some language processors including optimization processing such as machine code generation, which is aimed at increasing the memory efficiency for the execution or increasing the execution

speed when performing the translating. Therefore, the circumstances for the utilization of programs developed must be considered when selecting the language processor.

4-4-3. Application Program

(1) General

These are programs necessary for the operation of the computer system. These programs support the operation of the system or the execution of user programs. Service programs and support programs are the application programs.

The application programs can be classified into two categories according to their usage:

- Those programs used for the development and maintenance of user programs.
- Those programs used for the execution of the computer system.

The examples of application programs and their functions are described below.

i. Application Program for Program Development and Maintenance:

These programs are used at the system development phase and system maintenance phase of the system life cycle, which will reduce the work load for these operations.

a. Linkage Editor:

This program is to link the user programs compiled/assembled into object programs and the run time routine

prepared by the system to generate an executable program. And also, by using the linkage editor, modification of the developed program can be performed by each module unit.

b. Editor/Screen Editor:

There are two software development methods. One method is the batch processing mainly using punch cards for the input of programs. The other is the real-time processing using TSS terminals. It is a well-known fact that the development efficiency will improve by using TSS terminals for those system for which the response time of TSS terminals is fast. The software necessary for utilizing TSS terminals for the software development is the editor. The editor is a program to input/modify the program source code by the terminal.

An ordinary editor performs input/modification by each line, but the screer editor will enable the input/modification to be performed by the whole screen.

c. Program Source Code Management System:

Program source code management system has the same function as the editor described above but designed to enable batch processing, so it is called a batch type editor. This software enables to give instructions for modification, print, compile, etc., of the source programs recorded on magnetic disks by punch card input commands. Also, temporary modifications can be made,

and the changed records can be kept. Therefore, this is a very useful program for the software development.

d. RPG:

RPG is the abbreviation for "Report Program Generator" which is a program for generating a program automatically for the processing of reports. By giving the input/output format and calculation method as parameters, an object program will be generated. This would reduce the work required for programming.

e. Statistical Analysis Package/Scientific Calculation

Library:

Computer makers are providing a group of ready made program or subroutines as packages or as libraries. The performances of these programs are guaranteed, and they could be easily used as an independent program or as a subroutine of the user programs. Therefore, it is advisable that the program packages or libraries provided by the makers be used for those processings such as statistical analysis or scientific calculations which would require a long time for its development.

f. Screen Image Definition Program:

When performing standardized work using the display terminal instead of batch processing, the efficiency of the work will improve if the input of necessary items could be performed according to the menu of the display. Screen image definition program will enable conversa-

tional processing of operations which could use the display efficiently by selecting the menu.

g. Software Testing/Evaluation Tool

These are programs to test and evaluate whether the developed softwares operate according to the specifications. By examining the results obtained from these tools, program bugs and the cause of inefficiency can be identified.

ii. Application Program for Execution of the Computer System:

These are programs used at the time of processing of the files, usually provided by the computer makers as utility programs.

a. SORT/MERGE Program:

The processing required mainly for the transactions is to update the data file and prepare various output reports. In order to perform the processing smoothly, the contents of the master file and transaction file must be arranged in a certain order by the key items.

SORT/MERGE program is a generator for fabricating a program to sort the data within a file or to merge the data recorded to several files into a single file.

Input/output device, DCB (data control block) information, memory capacity, sort data information, etc., are the input parameters to be defined.

b. FILE UTILITY:

Another key processing required for the transaction is to formulate the transaction files and backup file. FILE UTILITY is a program to reproduce the entire file or a part of the file formulated on one device (including card deck) to the same or another device (including printing out by line printer). There are also programs to compare the contents of the two files, other than this program for reproduction.

c. DBMS:

DBMS is the abbreviation for "Data Base Management System" which is a program to manage the entire processing concerning the data file such as retrieving and updating. All of the procedures required for the handling of the file could be processed by the command to DBMS, when using the DBMS so that the retrieving and updating of the data file could be performed without knowing the structure of the data file.

In this Master Plan, DBMS with only the minimum function such as the capability to construct simple data base and to retrieve information from the data base is required.

4-4-4. Programming Language

(1) General

These are languages used to describe the programs to be translated by the language processors as mentioned in section 4-4-2. Various programming languages are available depending on the processing requirements. Therefore, it is an important factor to select the suitable programming languages, and their features are described below.

(2) Assembly Language

Assembly language is the lowest level programming language which is made up of instruction codes corresponding to the machine language. Since these instruction codes are dependent on the machine language, it has the disadvantage that it does not have compatibility between machines with different machine languages.

On the other hand, since it corresponds with the machine language, detailed handling of the data or programming considering the efficiency can be performed, which cannot be performed by other high level languages such as FORTRAN or COBOL. Therefore, assembly language is usually used for the maintenance of the computer system or for special purpose programs which requires quick response.

(3) COBOL

COBOL is the abbreviation of "COmmon Business Oriented Language" which was developed for the programming for the administrative data processing. Work required for the development of a program which requires output reports could be reduced by using COBOL, and since the statements similar to English can be used for describing the program, understanding of the program could also be increased. Furthermore, programs in COBOL language can be used on different machines by slightly modifying the program. However, COBOL is not suitable as the programming language for complicated scientific calculations since it requires more execution time and it lacks accuracy, since it was developed for prepara-

tion of output reports.

(4) FORTRAN

FORTRAN is the abbreviation for "FORMula TRANslator" which was developed for programming of scientific calculations. Work required for the programming, including those for numerical calculations such as statistical processing, can be reduced by using FORTRAN. Similar to the case of COBOL, programs can be used on different machines by making slight modifications to the program. However, FORTRAN is not suitable as the programming language for data processing which requires complicated output reports.

(5) PL/I

PL/I is the abbreviation for "Programming Language I" which was developed for the programming of complicated programs for both management/administrative data processing and scientific calculations. Therefore, it can be said that PL/I has both the functions of COBOL for administrative data processing represented by the processing of output reports, and FORTRAN for scientific calculations. However, the understanding of the program and its maintainability is not as good when compared with COBOL or FORTRAN.

PL/I will not be included in the Master Plan when considering the complicated feature of PL/I from the point of understandability, compared with that of COBOL or FORTRAN.

4-4-5. User Developed Software

Most of the programs necessary for the operations must be designed and developed by the users. The following describes the points which must be considered for this.

- i. The development procedure must be in accordance with the life cycle of the software. Especially, analysis of the operation is very important to understand the characteristics of the operation since it may have great effect on the selection of programming language and the processing requirements.

- ii. It must be noted, when softwares are being developed, that they need to be maintained at the operational phase. Therefore, it is recommended that the standardization of the programming method will be performed by establishing a coding rule based on the structural programming method. The standardization will have the advantage of being capable of having interface with plural programmers while they are working on the development of the same program. The standardization should not be limited to the program coding but extended to the naming of files and the numbering of identification numbers of magnetic tapes and disk packs. This will help prevent troubles occurring from mis-designation of the file.

- iii. Documents stating the contents of the software must also be prepared in parallel with the development of softwares. This is because even the person who developed the program will not remember in detail the contents of the program after a lapse of half year. Therefore, a record explaining the program would be necessary for conducting the maintenance work promptly. Following are the

major documents usually prepared for the software development:

- a. Functional Specifications: This describes the functions that the software must have.
- b. Design Specifications: This describes the functions which the functional modules of the program must have, the processing procedure, variables being used, structure of the file and specifications of the input/output.
- c. Check Specifications/Report: This describes the check method of the developed program and the expected movement.
- d. User's Manual: This describes the standard use of the program and the limitations concerning its use.

The descriptive style of these documents should also be standardized. And, also, when any modification/changes are made to the program, they must be reflected in the documents immediately. A profile of the change should also be recorded.

4-4-6. Problems in the Software Installation

(1) OJT (On the Job Training)

The most crucial point of the installation of software is the relation between the training of systems analyst (SA), systems engineer (SE) and programmers, and the development work. This section will touch on this matter in general since the details are described in Chapter 5 and Chapter 6.

Designing and development of softwares requires experience and accuracy, which cannot be acquired just from the training obtained by attending lectures on some actual case studies. In this sense, a method called OJT was invented, which aims at acquirement of the techniques through the actual operation. Although, the development efficiency at the initial stage would be small, the effects of this training system can be expected to manifest itself later on compared with usual training methods.

(2) Operation

TSS terminals are planned to be introduced in the Master Plan Study. Generally, introduction of TSS terminals is considered to have more technical difficulty for its utilization compared with the batch processing. However, no major problem is predicted since it was reported by U.S. university study team that it is better to actually use the TSS terminals and teaching performed by a well trained instructor than by conducting training only by the manuals.

On the other hand at the initial stage of the operation, inexperience with information system or misshandling by the operator may destroy the file.

Therefore, great emphasis must be placed on the management of backup files at the initial stage in order to be prepared for such unforeseen accidents, which are likely to occur.

CHAPTER 5

STAFF TRAINING PLAN

The operations required for close examination of the information system and the division of duties by staff, manpower requirements for the operation, and staff training will be considered in this chapter.

5-1. Establishment and Operation of the Information System

(1) Development and Operational Work

The operation of the information system can be divided into development work and operational work. The development work and operational work will be further examined.

(2) Life Cycle of the Information System

Similar to the case of living bodies, there is a life cycle of the information system, from the planning and development stage to the operation and maintenance stage until the accomplishment of its mission. The following shows the life cycle of the information system.

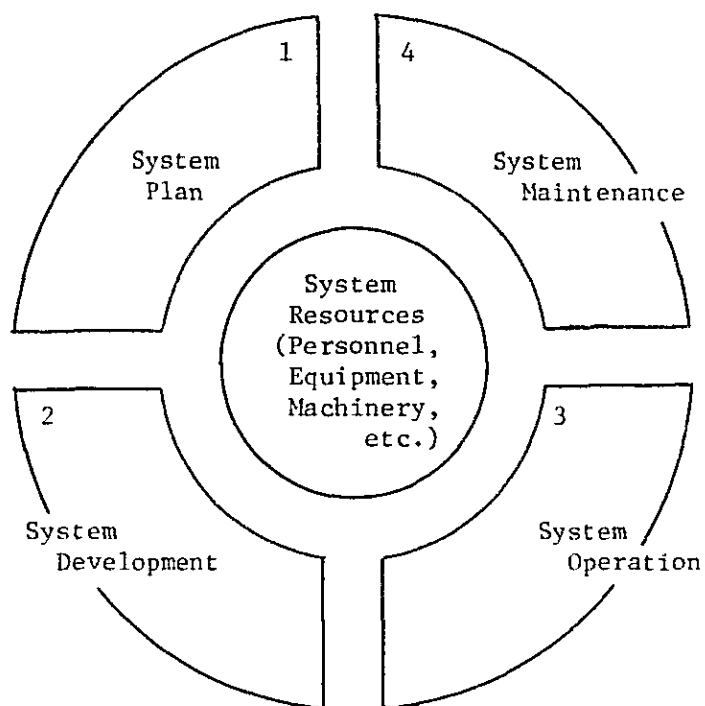


FIGURE: Life Cycle of Information System

The life cycle of information system consists of four phases, namely system planning, system development, system operation, and system maintenance in this order.

System resources (personnel, equipment, machinery, etc.) are allocated for each phase for its accomplishment and will permit proceeding to the next phase.

System Planning: This is the phase where the fundamental plans throughout the life cycle including planning study, development plan, operation plan and maintenance plan are formulated.

System Development: This is the phase where system analysis, system design, and program development are performed.

System Operation: This is the phase starting from system installation (i.e., installation of the computer system, test run of software, etc.) through the system execution (i.e., full-scale execution of computer system and software, etc.) are made.

System Maintenance: This includes the system evaluation and the system improvement which reflects the results of evaluation. To be accurate, the system evaluation is not always conducted after the system operation but rather conducted in parallel with the system operation to check the operational condition of the system continuously in order to examine whether the system can be operated without any modifications, or whether the life cycle of the system has come to an end so that an entirely new system must be developed. The system maintenance at the final 4th phase of the life cycle is equally as important as any other phase for efficient functioning of the information system. This is because, information systems are the models of the actual operation, and therefore, it will lose its effectiveness unless it can conform with the changes of the actual operations.

Information systems are subject to changes at all times, and it will mean the end of the life cycle when it stops conforming with the changes required of the actual operations. Therefore, the phase of system improvement reflecting the results of the evaluation is as important as the phase of system development

and operation for the constant maintenance of the information system to function on a realistic basis.

(3) Management Cycle: PLAN-DO-SEE

The management of an organization is understood to comprehend the changing environments correctly and make effective use of resources (i.e., manpower, materials, money, etc.) for the accomplishment of its objectives. The series of actions taken can be divided into three different stages in the management cycle as shown below.

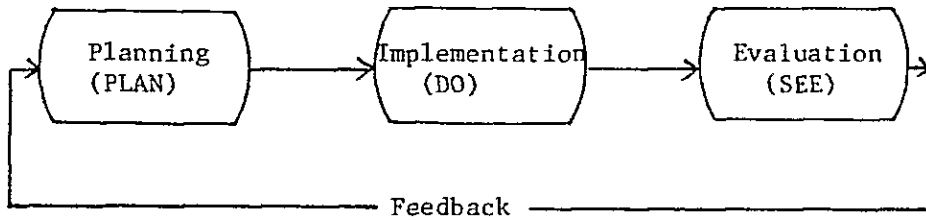


FIGURE: Management Cycle

(4) Development/Operation of the Information System from the Viewpoint of Management Cycle

When viewed within the PLAN-DO-SEE concept, the life cycle of information systems previously described in paragraph (1) can be shown as below:

<u>Phase</u>	<u>Action</u>
- System Planning	PLAN
- System Development	DO
- System Operation	DO

- System Maintenance/
Evaluation SEE
- System Maintenance/
Improvement DO

The following table shows the position of the major work items by development/operational phases in terms of PLAN-DO-SEE management cycle.

TABLE: Major Work Items by Phases

Life Cycle Management Cycle	Development	Operation
Planning (PLAN)	Development Plan	Operation Plan
Implementation (DO)	Systems Analysis System Design Program Development System Improvement	System Execution*
Evaluation (SEE)	System Evaluation (Developmental Progress Management)	(Operational Progress Management)

* A further breakdown of system execution is shown in the next figure.

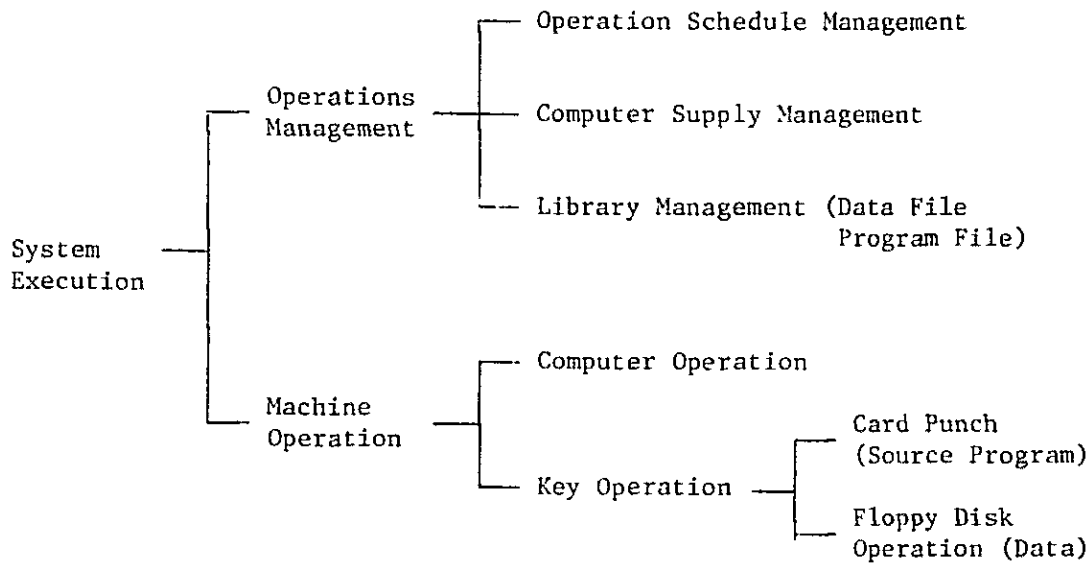


FIGURE: Operations for the System Execution

5-2. Staff Requirement and Job Classifications

(1) Division of Work

When performing the work described in section 5-1., the staff should be divided into two groups, namely the development group and the operations group. The former group will be in charge of the works concerning the development, and the latter group, concerning the operation. Each group will have personnel exclusively assigned for each job.

Both two groups will be organized under the Director of the Systematization, which is described in details in section 6-1-(1), for carrying out their respective jobs. Therefore, all of the personnel of the two groups engaged in the systematization must be under the control and management of the Team for the Strengthening of Data Processing and Information, including those personnel selected from the user group of the information system.

(2) Work Description and Type of Personnel Requirement

The following table shows the type of personnel required by each job description.

TABLE: Required Staff by Job Description

Job Description	Required Staff
(Development Work)	(Development Group)
Development Planning	Development Manager
Systems Analysis	Systems Analyst
System Design	Systems Engineer
Program Development	Programmer
System Improvement	Systems Analyst/Systems Engineer/Programmer
System Evaluation	Systems Analyst/Systems Engineer/Programmer
Developmental Progress Management	Development Manager
(Operational Work)	(Operations Group)
Operation Planning	Operations Manager
Operation Schedule Management	Scheduler
Computer Supply Management	Resources Handler
Library Management	Librarian
Computer Operation	Computer Operator
Key Operation (Key Punching)	Key Operator (Key Puncher)
(Floppy Operation)	(Floppy Operator)
Operational Progress Management	Operations Manager

5-3. Manpower Requirement and Duties by Job Classifications

(1) Assumption for Staffing: Calculating Minimum Required Manpower

When the required staffing is made clear, the next thing to be considered is the number of staff required for each job description. Following are the basic assumptions for the calculation of the required number of personnel.

- i. One manager for each group. A scheduler, a resources handler, and a librarian for the operations group will be assigned on full-time basis.
- ii. Systems analysts, systems engineers, and programmers are staffed subjectwise. The information system subject for the development is divided into the following six subject themes considering the characteristics and relations of each operation.
 - a. Foreign Trade.
 - b. Domestic Trade.
 - c. Concerning Price Information.
 - d. Registration of Enterprises.
 - e. Cooperatives.
 - f. The office of Secretariat General, and Middle East Work Force.

One systems analyst is assigned for each subject theme respectively. As for the systems engineers and programmers, the number assigned will be subject to the work

volume (development phases).

The development phases are calculated in relation to the number of steps required for the user programs to be developed.

An average work load of a systems engineer is assumed to be 800 steps/month, and that of a programmer, 400 steps/month.

At least one systems engineer and one programmer will be assigned to each subject theme.

- iii. Following are the assumptions made for the computer operator. Computer operators will work in two shifts. Two operators will be assigned for each shift. A reserve operator is always available for emergencies.
- iv. Key punchers will be assigned according to the number of key punch units (2 units).
- v. Floppy operators are assigned according to the number of key-to-floppy disk units (25 units). They will work in two shifts per unit.

(2) Estimate of Development Phase

i. The Number of Steps for the Program Developments:

Following is the estimated development phases by each subject theme defined in paragraph (1), shown in terms of the number of steps required for user programs.

<u>Subject Theme</u>	<u>Number of Steps Required for Program Development (unit; thousand steps)</u>	
a. Foreign Trade	30	
b. Domestic Trade	10	
c. Concerning Price Information	17	
d. Registration of Enterprises	20	
e. Cooperatives	5	
f. The Office of Secretariat General	35	} 38
Middle East Work Force	3	
<hr/>		
(Total)	120	

ii. Period Required for System Development:

In the course of system development, a year and a half would be required for systems analysis/design, and two years for program development.

(3) Calculation of Manpower Requirements for Systems Engineers and Programmers

The number of systems engineers and programmers required for each subject theme is calculated as follows based upon the premise mentioned in the preceding paragraphs (1) and (2).

Number Required

	<u>Systems Engineer</u>	<u>Programmer</u>
a. Foreign Trade	2 ^(NOTE 1)	3 ^(NOTE 2)
b. Domestic Trade	1	1
c. Concerning Price Information	1	2
d. Registration of Enterprises	1	2
e. Cooperatives	1	1
f. The Office of Secretariat General and Middle East Work Force	3	4
<hr/>		
(Total)	9	13

(NOTE 1) $30,000 \text{ steps} \div (800 \text{ steps/person/month} \times 18 \text{ month})$
= 2.08 persons \approx 2 persons

(NOTE 2) $30,000 \text{ steps} \div (400 \text{ steps/person/month} \times 24 \text{ month})$
= 3.12 persons \approx 3 persons

The calculation of the above figures are also performed in the same manner.

(4) Manpower Requirement by Job Classifications

Following is the list of required number of personnel by each job classification summarizing the foregoing considerations:

TABLE; Manpower Requirement by Job Classification

Job Classification	Number of Staff	Job Description	Remarks
(System Development/Improvement/Evaluation)			
a. Development Manager	1	(a)	
b. Systems Analyst	6	(b)	(NOTE 1)
c. Systems Engineer	9	(c)	(NOTE 2)
d. Programmer	13	(d)	
(Management of Computer Room)			
e. Operations Manager	1	(e)	
f. Scheduler	1	(f)	
g. Librarian	1	(g)	
h. Resources Handler	1	(h)	
i. Computer Operator	5	(i)	
j. Key Operator		(j)	
Floppy Operator	50		
Key Puncher	2		

The details of the above-stated job specifications (a) to (j) is described below:

(a) Development Planning/Progress Management

- Planning of development plans concerning computerization.

- Supervision of staff members for the promotion of the development plan.
- Management of the progress of the development plan.
- Adjustment/coordination with related departments/sections.
- Adjustment/coordination with the operation manager.

(b) Business Analysis/System Evaluation and Improvement.

- Research/study/analysis of the operations.
- Improvement/standardization of the operations for computerization.
- Proposal for a new system for the operation to be computerized.
- Evaluation of the system and suggestions for its improvement.

(c) System Design/System Evaluation/Maintenance.

- Designing of a new system for computerization.
- Evaluation and maintenance of the system.
- Supervising of the programmers and assignment of the program development work.

(d) Program Development/Program Evaluation and Maintenance.

- Design and preparation of the program.
- Program debugging and test.
- Evaluation and maintenance of the program.

(e) Operational Planning/Progress Management.

- Planning of computer operations plans.
- Supervising of personnels to promote the operation plan.
- Management of progress of the operation plan.

- Adjustment/coordination with related departments/
sections.
 - Adjustment/coordination with the development manager.
- (f) Planning, Management of Computer Operation Schedule.
- Planning and management of the schedule.
- (g) Management of Data File and Program File.
- Management of the ledger for data files and program
file.
- (h) Management of Computer Supplies.
- Management of the ledger for computer supplies and
other computer related equipment.
- (i) Computer Operation.
- Operation of the computer system including both the
mainframe and the peripheral equipment.
- (j) Key Operation.
- Operation of key-to-floppy disk unit and key punch
unit.

(NOTE 1) Systems analyst can serve as a systems engineer
concurrently or vice versa.

(NOTE 2) Systems engineer can serve concurrently as a programmer.

5-4. Personnel Training

(1) Personnel Qualifications

The qualifications required by each job classification for
undertaking the work mentioned in section 5-3. will be ex-

amined, which is as described below.

i. Development Manager:

- a. Fundamental knowledge on overall development work.
- b. Understanding of the basic flow of the work procedure and its processing methods. Wide experience of management is preferred.
- c. Ability to visualize the information system and to plan, promote and integrate development plans on his own initiative.
- d. Ability to make necessary adjustments for the computerization with other related sections smoothly.

ii. Systems Analyst:

- a. Basic knowledge of overall operations in general.
- b. Full knowledge of some of the actual operations.
- c. Skilled experience of necessary methods for business analysis.
- d. Ability to fulfill the proposal to build up a new system.

iii. Systems Engineer:

- a. Basic knowledge of overall operations in general.
- b. Skilled experience of necessary methods of system design.
- c. Knowledge concerning the functions of the computer.
- d. Ability to negotiate and make proper adjustments with other sections.
- e. Ability to instruct programmers in program develop-

ment work.

iv. Programmer:

- a. Possess skill and experience in the methods and techniques necessary for program design and programming.
- b. Accuracy, reliability, and patience in job execution.

v. Operations Manager:

- a. Basic knowledge of overall operations in general.
- b. Comprehension of overall basic flow of the management work and methods.
- c. Ability to make operation plans, promote and integrate them.
- d. Ability to make proper adjustments with the other related sections smoothly.

vi. Scheduler:

vii. Librarian:

viii. Resources Handler:

- a. Ability to make operational contacts with other sections and make proper adjustments of the operation with each person in charge.
- b. Ability to carry out jobs at a steady pace.
- c. Especially, schedulers must have basic knowledge on the flow concerning computer execution of the program.

ix. Computer Operator:

- a. To have knowledge of the hardware and the skills necessary for computer operation.

- b. To have the ability to make exact judgement and positive attitude in computer operation.

x. Key Operator:

- a. Possess knowledge and skills necessary for machine operation.
- b. Ability to execute jobs accurately and endurance, stability and patience in job.

(2) Staff Training Curriculum by Job Classification

Some of the qualifications mentioned in section (1), which relates directly to the field of computer can be satisfied provided with reasonable and professional education and training.

Major curriculums required by each job classification are shown in the following table.

TABLE: Curriculum by Job Classification

Job Classification \ Curriculum	Curriculum											
	A	B	C	D	E	F	G	H	I	J	K	L
a. Development Manager		○	○	○	△	○	○	○	○			
b. Systems Analyst	○	○	○	○		○		△				
c. Systems Engineer	○	○	○	○	△	○	○	○	○			○
d. Programmer	○		○		○	○	○	○				○
e. Operations Manager			○			○	○	△	○	○		△

f. Scheduler			○			○	○			○	○	
g. Librarian			○			○				○		
h. Resources Handler			○			○				○		
i. Computer Operator			○			○	○				○	○
j. Key Operator			△			△						○

Legend: ○ : Very Important

△ : Important

- A. Basic Mathematics, Statistics.
- B. Systems Engineering.
- C. General Course on Information Processing.
- D. Systems Analysis, Design, Evaluation Techniques.
- E. Programming Language and Programming Techniques.
- F. Introduction to Hardware.
- G. Concept of the Operating System.
- H. Production Management of Software.
- I. Project Management Techniques.
- J. Management of Computer Room and Resources.
- K. Operation of the Computer System.
- L. Key Operation.

(3) Implementation of Curriculums and Required Time

The best way to implement a curriculum and give the time required is as shown below:

- i. Curriculum A (Basic Mathematics and Statistics) to J (Management of Computer Room and Resources), training courses are available and provided by various training

institutions. It is recommended to perform by small classes with an experienced instructor.

ii. Curriculum E (Programming Language and Programming Techniques), F (Introduction to Hardware), G (Concept of the Operating System) and H (Production Management of Software) is recommended for personnel to attend courses prepared by each computer maker in addition to the ones provided by educational institutions. This is because each computer maker has their own type of software, so that the maker-provided curriculum made in conformity to its own machine is more practical.

iii. Concerning E (Programming Language and Programming Technique) and G (Concept of the Operating System) in particular, since the specification of programming language differs by type of machines, a training based upon respective machine type is highly required.

iv. Time required for curriculums A. through J. varies depending upon the standards to be accomplished. When the goal is set at the minimum-required standard, time for training by curriculum would be as follows:

A:	2 - 4 weeks
B:	2
C:	1
D:	2
E:	2 - 8
F:	1
G:	1

H: 1 - 2 weeks
I: 1 - 2
J: 1

Above length of period shown varies depending upon job classification of the trainee.

- v. Curriculum K. (Operation of the Computer System), to attend practical trainings provided by the computer maker is recommended. The minimum time for a course of training would be two weeks.
- vi. Trainings on key operation (Curriculum L.) are available from proper training institutions and from computer makers. Either course would be fine as long as much practical instruction is given. Time for a course would be one week as a minimum.

(4) On-the-Job Training

Above-mentioned curriculums are designed to acquire the minimum fundamental knowledge to become an expert both in terms of method and period of instruction.

Therefore, after receiving a course of instruction, on-the-job training should be given for a certain period of time.

For further improvement of techniques or skill, it is necessary to take occasionally advanced courses and to perform self-study using reference books even after finishing the O.J.T.

(5) Total Time Required for Staff Training

Time required for training varies depending upon the degree of knowledge and techniques already attained by the trainee. However, in general, the average length of time required for a total training from the course training based upon necessary curriculums through on-the-job trainings is shown by classification in the chart below. Three months are allocated for each job classification for O.J.T.

TABLE: Time Required for Training

Job Classification	Total Month of Curriculums	Months for OJT	Total Months
a. Development Manager	3	3	6
b. Systems Analyst	3	3	6
c. Systems Engineer	5	3	8
d. Programmer	4	3	7
e. Operation Manager	2	3	5
f. Scheduler	2	3	5
g. Librarian	1	3	4
h. Resources Handler	1	3	4
i. Computer Operator	2	3	5
j. Key Operator	1	3	4

(6) Formation of a Core Group

In order to promote the system development more positively and to carry out the training program mentioned in this Chapter more smoothly, it would be most effective to form a core group to be trained overseas. This means that a core group for the system development should be formed prior to the implementation of the above said training programs to receive overseas training on the system development for a period of 6 - 12 months. It would be desirable to select personnel among the Department of Trade and Cooperatives having college or university education and also having positive devotion for the systematization. The members of the core group, after completing their overseas training, should assist in the training program for the other members of the systematization group within the Department, and also take lead in the on-the-job training.

CHAPTER 6

SCHEDULES FOR THE IMPLEMENTATION OF THE MASTER PLAN

6-1. Implementation Schedules

The outline of the preparatory work such as determining the system plans, and the implementation schedule are shown in the chart below, which have taken into consideration the factors mentioned in the previous chapters. The details of each development stage will be described in the following sections.

Development Stage	Year	Preparatory Phase	1	2	3	4	5
<u>Preparatory Work</u>		
Establishment of an Functional Framework for the Promotion of the Systematization		→
Establishment of Internal Rules		→
Determining the Fundamental Principles of the System Plan		→
Determining the System Plans		→
Overseas Training of the Core Group		→

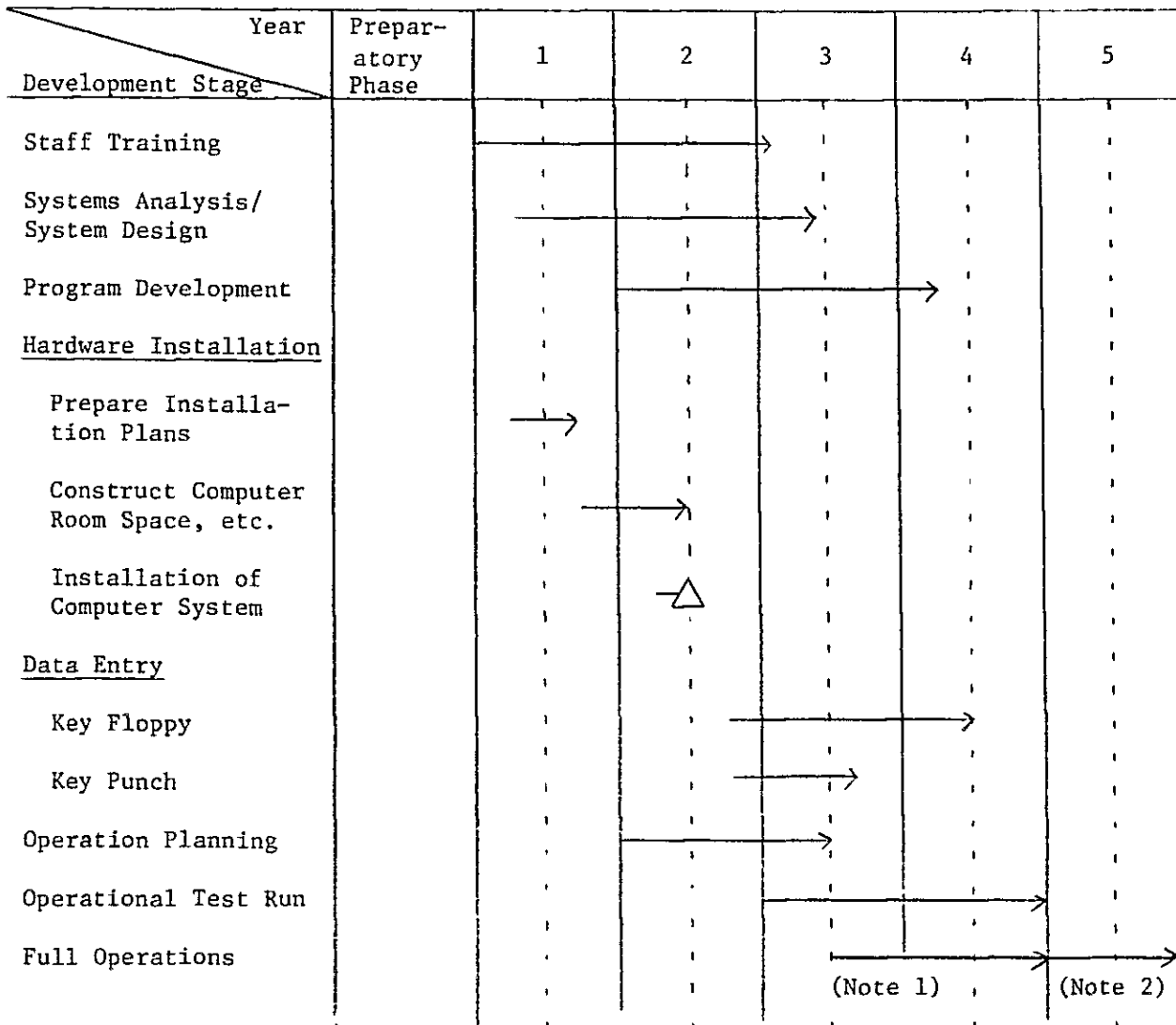


FIGURE: Implementation Schedule

Note 1: Partial Run

Note 2: Full Scale Run

(1) Conditions for the Implementation of the Schedule

It must be reminded that the following matters must be settled during the preparatory period. The implementation schedule can be proceeded when the following matters are accomplished.

i. Establishing an Functional Framework for the Promotion of the Systematization:

The following chart shows the minimum functional framework required for proceeding with the systematization.

Therefore, this does not mean that the present organizational structure of the Department of Trade and Cooperatives should be changed in any sense but only the functional relationships are shown so that it will have nothing to do with the current organization of the Department. However, these functions must be assigned to the respective personnel by considering carefully the relationship with the current organization.

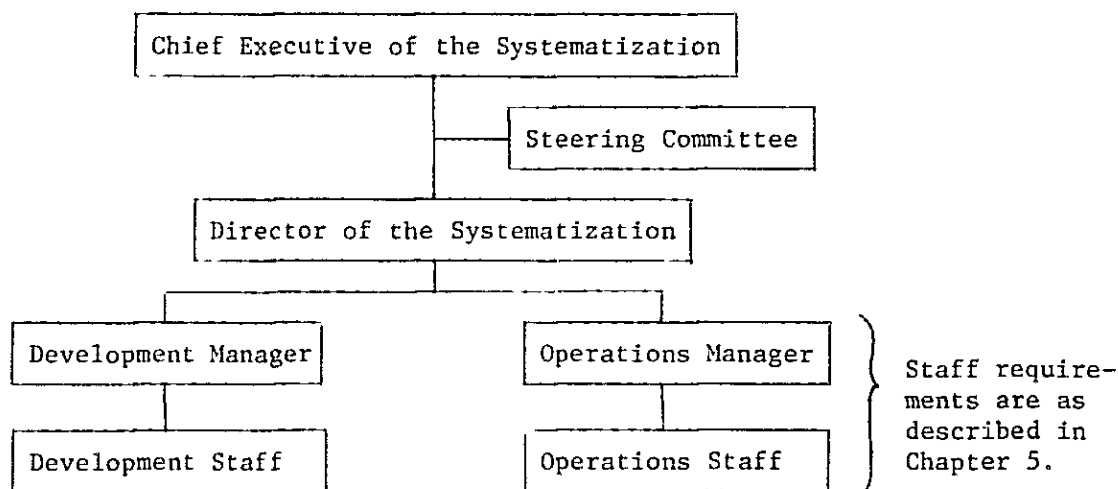


FIGURE: Chart for the Promotion of Systematization

The Chief Executive of the systematization indicated in the above chart is the highest executive for the promotion of the systematization with a strong authorized power. It is desired that an executive capable of promoting the systematization from the point of view of the entire Department and making final decisions for the systematization be assigned to this post.

The Steering Committee must function as a strong counseling committee to the Chief Executive of the systematization. This committee must take part in the entire system life cycle of system planning, implementation, and evaluation. The committee also has the responsibility and power to formulate the policy and give suggestions for the systematization after their mature deliberation. Therefore, the Director of the systematization and the Director of the user section of the information system must be included in the committee. The Director of the section in charge of the systematization will be the superior officer of the Development Manager and the Operations Manager, and must control and coordinate both the development group and the operations group.

ii. Establishing Internal Rules:

Internal rules of the Department of Trade and Cooperatives must be established in order to authorize the activities of the personnel engaged in the systematization, as well as to establish the functional framework for the promotion of the systematization.

iii. Determining the Fundamental Principles of the System Plan:

The functional framework for the promotion of the systematization must determine the fundamental principles of the system plan according to the following steps:

- a. A thorough study must be performed by the section in charge of the systematization based on the Master Plan in order to formulate fundamental principles for the systematization.

- b. The Steering Committee must review the fundamental principles for the systematization and must make definite comments to the Chief Executive of the systematization.
- c. The Chief Executive of the systematization must make decisions based on the comments raised by the Steering Committee.

iv. Determining the System Plans:

System plans for the establishment of the information system mentioned below must be formulated in the same procedure as that described in above item iii. The system plans are to include the following items:

- a. System Development Plan: Functions of the information system, development methods, development schedule.
- b. System Operation Plan: Hardware configuration, space for the installation, operation methods, operation schedule.
- c. System Maintenance Plan: Maintenance methods of the information system, maintenance schedule.

(2) Role of the Functional Framework for the Promotion of the Systematization within the Implementation Schedule

The functional framework established and already functioning for the promotion of the systematization must also undertake the following matters as the key organization for the systematization even after the system plan is formulated and the implementation schedule is proceeded.

i. Review of the System Plan:

The system plan will be formed more in details and must be slightly modified when proceeding with the systems analysis and system proto-type design. The functional framework must examine and decide the system detail plan.

ii. Forming the Concrete Foundations for the Operation of the System:

In parallel with the development work for the information system, following matters must be examined and established before the operation of the system:

- a. Detailed rules for the operation of the computer room.
- b. Detailed rules for the registration, management, and use of the data files and programs.
- c. Detailed rules concerning the transfer, check and protection of the necessary data within the Department.
- d. Agreement with other organization concerning the transfer, check and protection of the data.
- e. Standardization of the programs, files, documents, and operations.
- f. Installation of the equipment/facilities.
- g. Maintenance of the space and construction work for the installation.
- h. Detailed rules concerning the shift of operators and their health care.
- i. Other matters.

6-2. Explanation of Each Stage

Each stage of planning indicated in section 6-1. is explained in details as follows.

6-2-1. Staff Training

(1) Assumptions Made in Preparing the Schedule

- i. It is assumed to establish the overall staff training period as approximately 2 years and 2 months, which should be completed 8 months after the installation of the computer.
- ii. It is planned to have the different grades of staff trained for the full training curriculum for the development managers of the development group, systems analysts, systems engineers, and the programmers to the level of operational proficiency. They will be given on-the-job training as a part of their normal work.
- iii. Of the different grades of staff of development managers of the management group, schedulers, librarians, resources handlers, computer operators, and key operators will have completed 8 months of on-the-job training after installation of the computer. The key operators, especially, shall have reached a practical level of proficiency by having an extra 3 months of special period of short key-punch training after installation of the computer.
- iv. Since there will be a large group of systems engineers, programmers and floppy disk operators required, they

shall be divided into small groups and their training periods staggered. In this manner the training can be performed in small groups for reasonable and better training.

- v. In forming the groups described above, 9 systems engineers can be formed into 2 groups of 4 to 5, 13 programmers can be formed into 2 groups of 6 to 7, and trained at the lead group and the second group. The group of 50 floppy operators can be formed into 4 groups of 12 to 13 each and trained in staggered groups.
- vi. The training of the systems engineers can be performed for the 6 themes described in Chapter 5, and the courses can be performed in 2 groups of 3 themes. Training can be given by dividing into the lead group and the second group.

This separation of group can be set up in accordance with the system design and the program development (it may not agree with the order of completion of the development), and the order of priority could be decided from this sequence.

(2) Implementation Schedule

The number of days described in section 5-4. can be shown in the form of a schedule in the following diagram, based on the above.

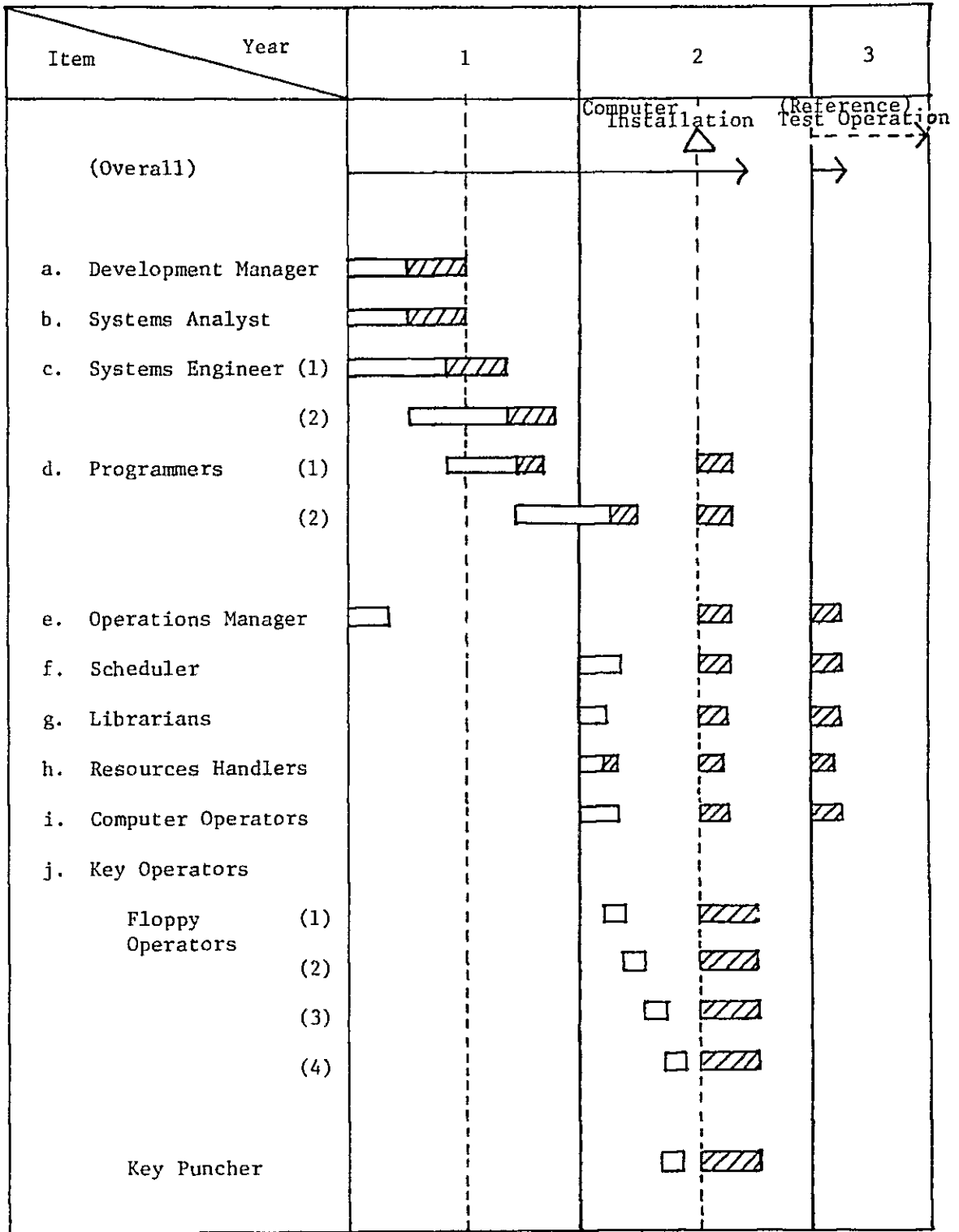


FIGURE: Staff Training Schedule

Legend: : Training Curriculum

: On-the-Job Training

6-2-2. Analysis and Design of Information System

(1) The Assumptions Made for Establishing the Schedule

- i. Systems analysis operations and system design operations will be performed comprehensively in establishing the schedule. The reason for this is due to the fact that both operations can be performed by one person.
- ii. The total time requirement will be approximately 2 years before, during and after the computer installation.
- iii. The operations of the information systems can be divided into the 6 themes as described in Chapter 5. and the themes can be further divided into analysis and design, and conducted consecutively. It will require 18 months for the development of one theme as described in section 5-3. of the previous chapter.

The make-up of the systems analysis and design group of the 6 themes are as follows:

	<u>Systems Analyst</u>	<u>Systems Engineer</u>	<u>Total</u>
a. Foreign Trade	1	2	3
b. Domestic Trade	1	1	2
c. Price Related Items	1	1	2
d. Registration of Enterprises	1	1	2
e. Cooperatives	1	1	2
f. Secretariat General & Middle East Work Force	1	3	4
<hr/>			
Total	6	9	15

- iv. The systems analyst will commence actual work as soon as he has completed his curriculum after completing the training described as in the bar chart in section 6-2-1. He will receive on-the-job training in his operation.
- v. Of the lead group of systems engineers, they will commence actual work as soon as they have completed their training schedule described in section 6-2-1., as indicated in the bar chart. They will receive on-the-job training in their work.
- vi. When the system engineer in charge is in the lead group, he can perform the systems analysis and design operation simultaneously as his allotted theme. When the system engineer in charge is in the second group, only the systems analysis by the systems analysts can be performed until his curriculum is completed
- vii. The time for commencement of the system design will be divided into 6 themes with 3 in the lead group and 3 in the second group at different times, and the method of establishing the differences should be decided based on the priorities of the themes.
- viii. The systems engineer should direct the programmers to develop the program for those operation which the system design is completed.

(2) Implementation Schedule

The following chart gives the schedule based on the above assumptions.

Item \ Year	1	2	3
(Overall Schedule)		Computer Installation ▲	→
(1) 3 Allotted Themes (Lead Group)			→
(2) 3 Allotted Themes (Second Group)	(Note)		→

FIGURE: System Analysis and Design Schedule

Note: Only the system analysis will be performed during this period.

6-2-3. Program Development

(1) Assumption Made in Preparing the Schedule

- i. The overall time requirement is established as 2 years before, during and after the computer is installed.
- ii. The program development of the information systems will be divided into 6 theme groups as described in Chapter 5, with all six program developments being performed simultaneously on a parallel.

It will require 2 years to develop one theme as described in section 5-3. of the previous chapter.

The make-up of program development groups according to their 6 allotted themes will be as follows;

<u>Item</u>	<u>Number of Programmers</u>
(a) Foreign Trade	3
(b) Domestic Trade	1
(c) Price Related Items	2
(d) Registration of Enterprises	2
(e) Cooperatives	1
(f) Secretariat General and Middle East Work Forces	4
<hr/>	
Total	13

iii. Of the 2 training groups indicated in the schedule in section 6-2-1., the lead group will be assigned to their respective operations as they have completed their assigned curriculum, and receive on-the-job trainings through their work.

The commencement of the assigned theme will differ depending on whether the programmer in charge is assigned to the lead group or the second group.

iv. The difference in the development of the assigned themes will correspond to the time of assignment of system development or design as described in full in section 6-2-2.

v. Program development will commence with the completion of

the system design operation.

- vi. Since it will be impossible to perform debugging during the time preceding the computer installation, the operation prior to computer installation will be limited to coding operations.
- vii. The coding information will next be passed on to key punching operation as indicated in the schedule in section 6-2-7.
- viii. After key punching, debugging will be performed. Errors discovered at this stage will be corrected and key punched a second time.

(2) Implementation Schedule

The schedule in graphical form based on the assumption stated above is shown in the bar char.

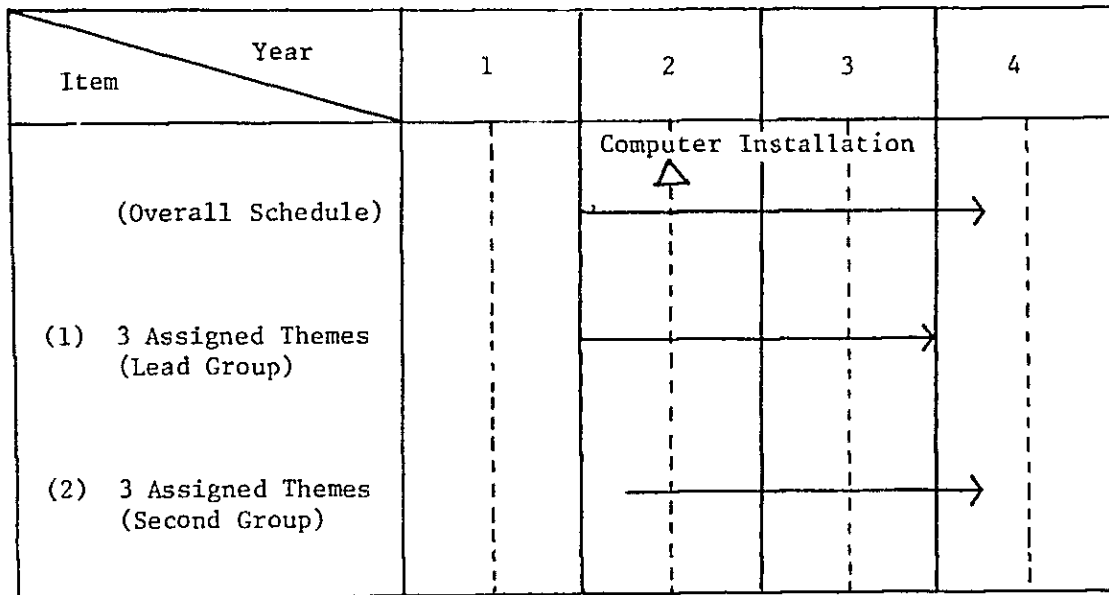


FIGURE: Program Development Schedule

6-2-4. Hardware Installation

(1) Assumption Made in Preparing the Schedule

- i. The layout of the computer room will be made by holding meetings with the engineers of the computer maker. The installation schedule can be fixed at this time.
- ii. The items of work in the installation of the hardware are as follows:
 - a. Construction of Computer Room (structural work on floors, walls, ceilings and illuminations).
 - b. Installation of auxiliary equipment (electric power, air conditioning, cooling water, etc.).
 - c. Installation of Computer System (includes key-to-floppy disk unit and key punch unit).
- iii. Installation of the computer system is scheduled as 18 months from the start of the project program.
- iv. The preparation of installation plan, construction work of space for the computer system and the installation of auxiliary equipment must be completed by the time the computer system will be installed for all facility works. The time allotted to this work is 15 months.

(2) Implementation Schedule

The above can be shown diagrammatically in the following schedule.

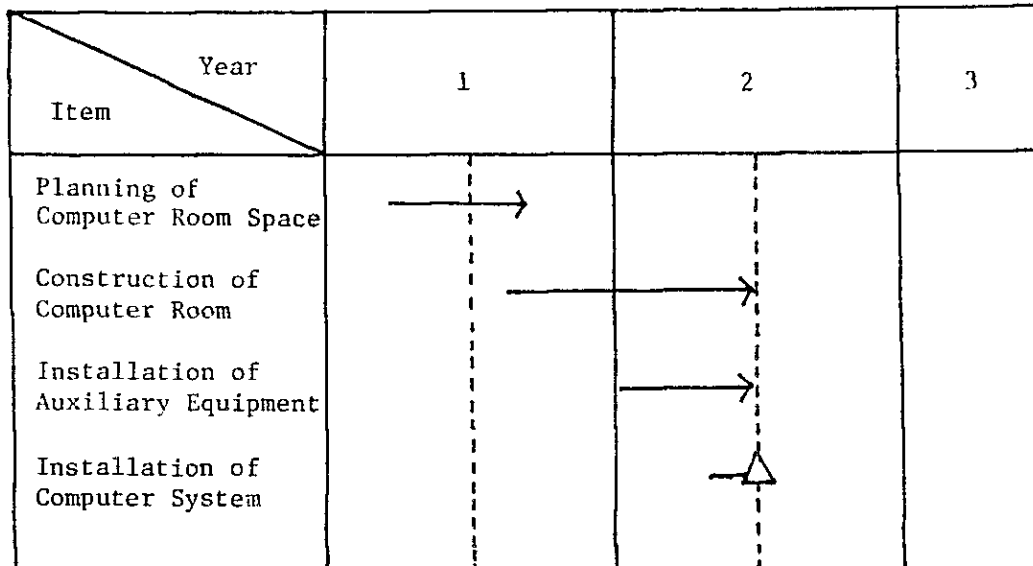


FIGURE: Hardware Installation Schedule

6-2-5. Data Entry (Input of Initial Data into Floppy Disk and Establishment of Initial Data File)

(1) Assumptions Made in Preparation of Schedule

- i. In order to operate the information system, it will be necessary to prepare the initial data file.
- ii. The various subjects for which the input data volumes will have to be set up for the initial data file is as follows:

	<u>Input Data Volume</u>
a. Foreign Trade	6,174 (thousand characters)
b. Domestic Trade	2,713
c. Price Related Items	3,173
d. Registration of Enterprises	400,000
e. Cooperatives	119,200
f. Secretariate General	42,500
g. Middle East Work Force	3,800
<div style="display: flex; justify-content: space-between;"> Total 577,560 </div>	

- iii. The input data volume for the initial data file is $577,560 \times 10^3$ characters. This will be the number of touches for floppy operator.
- iv. The number of key floppy disk unit is 25 to be operated by 2 shifts.
- v. The average work load per floppy disk operator is:

$$10,000 \text{ touches} \times 5 \text{ hours} \times 20 \text{ days/month} = 1,000,000 \text{ touches/month}$$
- The number of months required will be:

$$577,560,000 \text{ touches} \div (25 \text{ operators} \times 2 \text{ shifts} \times 1,000,000 \text{ touches}) = 11.6 \text{ months}$$
- vi. After installation of the key-to-floppy disk unit and the input data is furnished, they can be put in operation in the order of completion.

(2) Implementation Schedule

Based on the above assumptions, the schedule can be shown as the following bar chart:

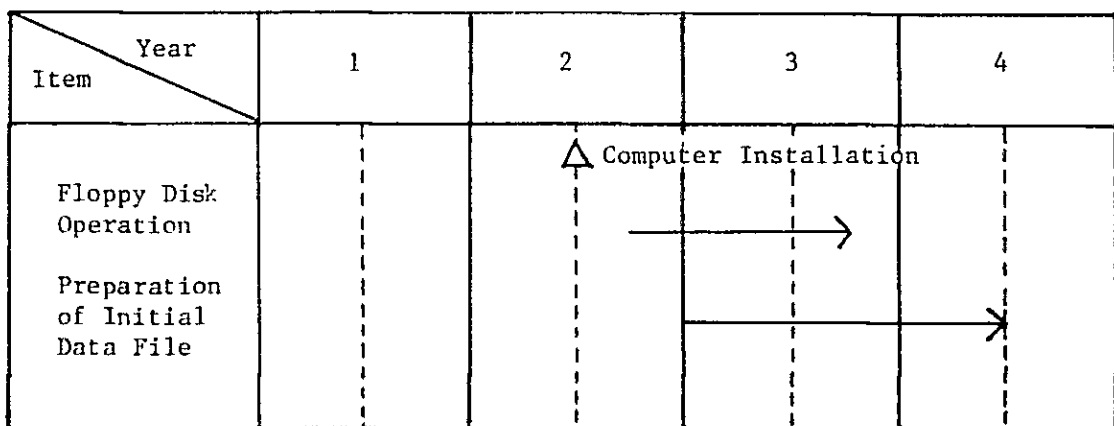


FIGURE: Data Entry Schedule (Input of Initial Data on Floppy Disks & Preparation of Initial Data File)

6-2-6. Data Entry (Key Punch Operation of Source Program and Preparation of Source Program File)

(1) Assumptions Made in Preparation of Schedule

- i. The total number of steps of the source program to be key punched into the machine is 150×10^3 steps.
- ii. Assuming an average of 50 characters per step, the total number of characters will be $7,500 \times 10^3$ characters. This will also be the number of touches for the key punch.
- iii. There will be 2 machines installed for the key punch operation, and each key puncher will be required to handle an average load of 500×10^3 touches/month, and the number of months required for this operation will be:
$$7,500,000 \text{ touches} \div (2 \text{ operators} \times 500,000 \text{ touch/} \\ \text{month}) = 7.5 \text{ months}$$
- iv. After the installation of the key punch unit, and the program coding has been completed for the program development, the key punch operation can be performed. Therefore, it does not necessarily mean that the key punch operation (7.5 man-months) will be completed in 7.5 months.

(2) Implementation Schedule

Based on the above assumption, the time requirement for scheduling will be as follows:

Item \ Year	1	2	3	4
Key Punch Operation		Computer Installation ↑	→	
Preparation of Initial Source Program File			→	

FIGURE: Key Punch Schedule

6-2-7. Establishment of Operational Systems

(1) Assumptions Made in Preparing Schedule

- i. When the information system has reached the operational stage, the transactions that have been generated at the various operation units will be forwarded regularly to the operations section for data entry. This data is computerized within a given time table and distributed to the various operation units in the form of reports and the system will then become fully operational.
- ii. It will become an important item of business for the operation system of the computer systems section to prepare operation manuals in printed form after coordinating the contents with all the other sections.
- iii. This function will be handled as one of the operational items for the manager of the operation section who will be required to coordinate this matter.

- iv. Prior to the test run, the draft of the manuals shall be prepared and the testing shall be performed using this manual. The manual shall be evaluated during the test run and modified at this stage as necessary.
- v. The time required for this operation will be assumed as 18 months.

(2) Implementation Schedule

A graphical representation of the above operation is indicated in the following bar chart:

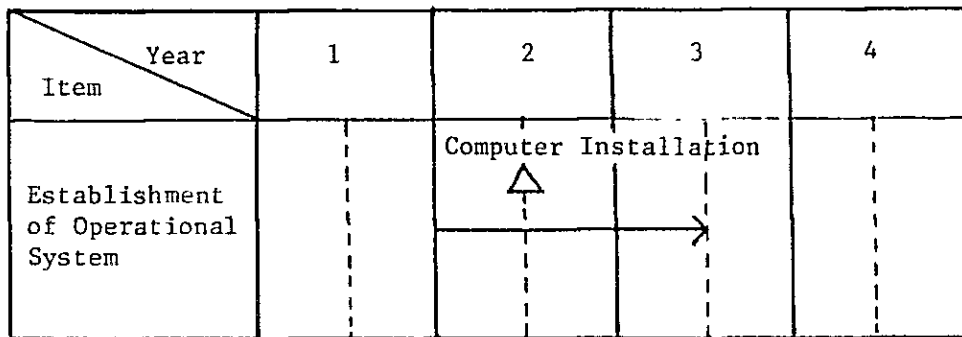


FIGURE: Schedule for Operation Systems

6-2-8. Test Run of Information System

(1) Assumption Made in Preparing the Schedule

- i. The purpose of the test run is to simulate the condition that may occur when the system is fully operational for the following items.
 - a. Testing of the various system modules of user programs.
 - b. Testing of the various files of the system modules.
 - c. Testing of the various softwares (basic software,

application program).

- d. Testing of the computer system.
- e. Various tests related with the above items.

When any malfunction is discovered during the operational tests, the information shall be fed back, and the necessary revisions and modifications shall be made.

- ii. As the development of the various user programs of the various system modules are completed, the system tests shall be performed using actual files.
- iii. Since the test runs will be performed using actual data, test will be performed for those system modules which the initial data file described in section 6-2-5. is prepared.
- iv. The various software (basic software, etc.) will have to be completed by this time.
- v. The computer system will have to be fully operational by this time.
- vi. The time required for this operation is assumed to be two years.

(2) Implementation Schedule

The graphical representation of the above can be shown in the following schedule:

Year Item	1	2	3	4
Test Run		Computer Installation ↑		

FIGURE: Test Run Schedule

CHAPTER 7

COST ESTIMATION

7-1. Outline

Estimation of the costs required for the introduction of this information system will be studied in this chapter. The cost estimates indicated hereon are all calculated based on the current export prices effective in Japan. The exchange rate of US\$1.00 = ¥250 is used. Following table shows the estimates of each item.

TABLE: Cost Estimates

Item	Initial Cost	Operating Cost (Annual)
Hardware	¥695,000,000 (\$2,780,000)	¥ 23,000,000 (\$92,000)
Software:		
Basic Software	¥ 15,000,000 (\$60,000)	¥ 1,050,000 (\$4,200)
Application Software	¥ 21,000,000 (\$84,000)	¥ 1,540,000 (\$6,160)
Staff Training:		
Instructor's Fee	¥ 35,000,000 (\$140,000)	-
Teaching Materials	¥ 1,870,000 (\$7,480)	-
Others:		
Costs for Development of User Programs	¥ 3,512,000 (\$14,048)	} ¥ 4,109,500 (\$16,438)
Costs for Development of Data File	¥ 12,150,000 (\$48,600)	
Fixtures	¥ 1,986,000 (\$7,944)	-
Total	¥785,518,000 (\$3,142,072)	¥ 29,699,500 (\$118,798)

The cost estimates for the hardware and software are based on FOB Tokyo prices. The costs incurred for inviting the instructor from abroad (such as traveling and living expenses), costs for training the staff of the Department overseas (such as traveling and living expenses), and costs arising from maintaining the space for installing the hardware and other equipment are not included in the above estimates. Also, the cost items which must be financed by the Department of Trade and Cooperatives, such as import duties, handling fees, port charges, expenses for the personnel of the Department of Trade and Cooperatives, power/water supply and other operational costs, and contingency are not included in the cost estimation. These local portion costs must be considered by the Department of Trade and Cooperatives.

Since this cost estimate is of preliminary nature, more detailed cost estimate in accordance with the requirements for the information system by the Department of Trade and Cooperatives must be performed at the stage when the concrete plan for the systematization is determined.

Detailed breakdown of the above cost items are described in the following paragraphs.

7-2. Hardware

7-2-1. General

Cost estimates for the introduction of the hardware, configuration is as described in section 4-3-2., will be considered.

The items subject for the estimates are limited to the following four items.

- Expenses for the purchase of equipment.
- Construction cost for the computer room, etc.
- Cost for the transportation, installation, and adjustment.
- Maintenance fees for the equipment.

Costs arising from maintaining the space required for computer and other auxiliary equipment rooms. or other internal fees arising from the introduction of the hardware such as personnel expenses, and costs of electric power/water supply for the operation will not be included in the estimation.

7-2-2. Costs of the Hardware

The costs for the hardware, configuration as described in section 4-3-2., installation cost, and annual operating cost will be considered. There are two ways for introducing the hardware. One is to purchase the hardware, and the other is by rental. Only the costs required for purchase of the hardware will be examined. The following describes the cost estimation for the purchase of hardware. The estimated costs are based on FOB Tokyo prices.

TABLE: Initial Costs for the Hardware

Item	Number	Amount	Remarks
Central Processing Unit	1 set	¥ 86,000,000 (\$344,000)	2MB
Card Reader Unit	1 unit	¥ 11,000,000 (\$44,000)	
Floppy Disk Reader Unit	2 units	¥ 10,000,000 (\$40,000)	1MB/floppy
Line Printer Unit	1 unit	¥ 38,000,000 (\$152,000)	
Disk Pack Unit	3 units	¥ 60,000,000 (\$240,000)	300MB/unit
Magnetic Tape Unit	4 units	¥ 59,000,000 (\$236,000)	6,250 BPI
Key-to-Floppy Disk Unit	25 units	¥ 36,000,000 (\$144,000)	1MB/floppy
Key Punch Unit	2 units	¥ 7,000,000 (\$28,000)	
CRT Display Unit	3 units	¥ 7,000,000 (\$28,000)	
Constant Voltage Device	1 set	¥ 80,000,000 (\$320,000)	
Air Conditioning Unit	1 set	¥ 31,000,000 (\$124,000)	
Construction Cost of Computer Room, Etc.	Lump Sum	¥244,000,000 (\$976,000)	
Cost for Transportation, Installation, and Adjustment	Lump Sum	¥ 20,000,000 (\$80,000)	
Ocean Freight and Insurance	Lump Sum	¥ 6,000,000 (\$24,000)	
Total	-	¥695,000,000 (\$2,780,000)	-

TABLE: Hardware Operating Cost

Item	Operating Cost (annual)
Maintenance Fee for Equipment	¥23,000,000 (\$92,000)

The construction cost of computer room, etc. indicated in the above table is for remodeling ordinary office rooms into a computer room, data entry room, secondary memory media store room, power supply room, air conditioning room, etc. The works required for the remodeling includes raising and reinforcement of the floor, piping work for the air conditioning, wiring, illumination, sound proofing, thermal insulation, etc. It has been concluded that the room prepared at the 12th floor of the office building of the Department of Trade and Cooperatives can be used as a computer room, when checking various conditions of this room. The estimated cost is for remodeling this room into a computer room. If a new office building were to be constructed, the cost for the construction of the computer room may be reduced by taking into consideration the requirements for the computer room at the designing stage, such as the reinforcing and raising the floor.

The costs for transportation, installation, and adjustment is for inland freight and hoisting up to the 12th floor.

7-3. Software

7-3-1. General

Cost estimation of the softwares described in section 4-4. except for the user programs will be performed. The user programs are not included since the cost of user programs are the internal fees of the developer consisting of personnel expenses and operating cost of the hardware. Software can also be obtained by purchase or by rental. Only the purchase price of software is considered.

7-3-2. Basic Software

Basic software, which are the nuclei for the operation of the computer system, can be classified into two categories, as mentioned in section 4-4-2., Operating System (OS) and language processors. Assembler, COBOL compiler, FORTRAN compiler will be necessary. Following table shows the cost estimates of the basic software.

TABLE: Cost Estimates of Basic Softwares

Item	Initial Cost (purchase price)	Operating Cost (annual maintenance fee)
OS	¥ 8,000,000 (\$32,000)	¥ 550,000 (\$2,200)
Assembler	-	-
COBOL Compiler	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
FORTRAN Compiler	¥ 5,000,000 (\$20,000)	¥ 350,000 (\$1,400)
Total	¥15,000,000 (\$60,000)	¥1,050,000 (\$4,200)

7-3-3. Application Program

Purchase price of application program mentioned in section 4-4-3.

will be examined. Following are the cost estimates.

TABLE: Cost Estimate of Application Program

Software	Initial Cost (purchase price)	Operating Cost (annual maintenance fee)
Linkage Editor	-	-
Editor/Screen Editor	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
Program Source Code Management System	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
RPG	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
Statistical Analysis Package/Scientific Calculation Library	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
Screen Image Definition Program	¥ 4,000,000 (\$16,000)	¥ 300,000 (\$1,200)
Software Testing/ Evaluation Tool	¥ 2,000,000 (\$8,000)	¥ 150,000 (\$600)
SORT/MEGRE Program	¥ 1,000,000 (\$4,000)	¥ 70,000 (\$280)
FILE UTILITY	¥ 1,000,000 (\$4,000)	¥ 70,000 (\$280)
DBMS	¥ 5,000,000 (\$20,000)	¥ 350,000 (\$1,400)
Total	¥21,000,000 (\$84,000)	¥1,540,000 (\$6,160)

7-4. Staff Training

7-4-1. General

The costs required for the personnel training curriculum for personnel training program described in Chapter 5 is estimated. Therefore, only the initial costs will be examined. The costs required for the personnel training can be classified as follows:

- Fees concerning instructors.
- Costs for teaching materials.

7-4-2. Fees Concerning Instructors

Fees incurred for the instructors for the staff training consists mostly of remunerations for the lectures and guidances. If a foreign instructor is to be invited, the traveling expenses and living expenses would also be necessary. Following costs would be required for carrying out the personnel training programs described in Chapter 5.

TABLE: Fees for the Instructor

Curriculum	Number of Courses	Duration of One Course	Fees per Course	Amount
Basic Mathematics/Statistics	5	4 weeks	¥1,000,000 (\$4,000)	¥ 5,000,000 (\$20,000)
Systems Engineering	4	2	¥ 500,000 (\$2,000)	¥ 2,000,000 (\$8,000)
Introduction to Information Processing	12	1	¥ 250,000 (\$1,000)	¥ 3,000,000 (\$12,000)
Systems Analysis, Design, Evaluation Techniques	3	2	¥ 500,000 (\$2,000)	¥ 1,500,000 (\$6,000)
Programming Language/ Programming Techniques	5	8	¥2,000,000 (\$8,000)	¥10,000,000 (\$40,000)
Introduction to Hardware	12	1	¥ 250,000 (\$1,000)	¥ 3,000,000 (\$12,000)
Concept of the Operating System	7	1	¥ 250,000 (\$1,000)	¥ 1,750,000 (\$7,000)
Production Management of Software	7	2	¥ 500,000 (\$2,000)	¥ 3,500,000 (\$14,000)
Project Management Techniques	4	2	¥ 500,000 (\$2,000)	¥ 2,000,000 (\$8,000)
Management of Computer Room and Resources	1	1	¥ 250,000 (\$1,000)	¥ 250,000 (\$1,000)
Operation of the Computer System	1	2	¥ 500,000 (\$2,000)	¥ 500,000 (\$2,000)
Key Operation	10	1	¥ 250,000 (\$1,000)	¥ 2,500,000 (\$10,000)
Total	-	-		¥35,000,000 (\$140,000)

The period required for one course listed in the above table indicates the maximum period of time so that the necessary time for the same curriculum may be shortened depending on the type of staff members attending the course and the level of their knowledge. Therefore, the actual costs required does not necessarily require the whole amount of the estimated costs.

7-4-3. Costs for Teaching Materials

Costs incurred for teaching materials consists mainly of costs of the textbook used for the lectures given by the instructors and for the expendable supplies necessary for the programming exercises. Costs for teaching materials are shown below when the costs for programming exercise is estimated at 20% of the total development cost indicated in section 7-5-1., paragraph (1).

TABLE: Cost for Programming Exercise

Item	Volume	Unit Price	Amount
Coding Sheet	60 volumes	¥ 200	¥ 12,000 (\$48)
Punch Card	60,000 sheets	¥ 1.5	¥ 90,000 (\$360)
Form Sheet	2 packages	¥4,000	¥ 8,000 (\$32)
Floppy Disk	50 sheets	¥3,000	¥150,000 (\$600)
Total	-	-	¥260,000 (\$1,040)

TABLE: Cost of the Textbooks

Curriculum	Number of Persons	Unit Price	Amount
Basic Mathematics/Statistics	28	¥10,000 (\$40)	¥ 280,000 (\$1,120)
Systems Engineering	16	¥ 5,000 (\$20)	¥ 80,000 (\$320)
Introduction to Information Processing	90	¥ 2,500 (\$10)	¥ 225,000 (\$900)
Systems Analysis, Design, Evaluation Techniques	16	¥ 5,000 (\$20)	¥ 80,000 (\$320)
Programming Language, Programming Techniques	23	¥20,000 (\$80)	¥ 460,000 (\$1,840)
Introduction to Hardware	90	¥ 2,500 (\$10)	¥ 225,000 (\$900)
Concept of OS	30	¥ 2,500 (\$10)	¥ 75,000 (\$300)
Production Management of Software	30	¥ 5,000 (\$20)	¥ 150,000 (\$600)
Project Management Techniques	11	¥ 5,000 (\$20)	¥ 55,000 (\$220)
Management of Computer Room and Resources	4	¥ 2,500 (\$10)	¥ 10,000 (\$40)
Operation of the Computer System	6	¥ 5,000 (\$20)	¥ 30,000 (\$120)
Key Operation	80	¥ 2,500 (\$10)	¥ 200,000 (\$800)
Total	-	-	¥1,870,000 (\$7,480)

7-5. Other Cost Related Matters

7-5-1. General

Other cost items for the development, installation, and operation of the system can be classified as follows:

- At the Development and Installation Stage: Cabinets and other office equipment to store the magnetic tapes, disk packs, punch cards, manuals, etc.
- At the Operational Stage: Computer supplies such as magnetic tapes, disk packs, form sheet, etc.

The costs for initial data files, user programs, and other equipment necessary at the development/installation stage, and running costs for computer supplies necessary at the operational stage will be examined separately.

7-5-2. Costs at the Development/Installation Stage

Costs incurred for the development and installation of the system can be classified into three categories as shown below:

- Cost for the development of user programs.
- Cost for the development of initial data files.
- Cost for the fixtures.

(1) Cost for the Development of User Programs

The costs for the systems analysts, systems engineers, and other personnel expenses will not be included in the cost concerning the development of user programs. Only the costs for computer supplies such as coding sheets and punch cards, and the secondary memory media to record the complete program will be considered.

The total steps of the user programs is assumed to be approximately 150 thousand steps. Therefore, the development cost could be estimated as shown in the table below.

If the programming of user programs are to be entirely sub-contracted to an external organization, additional ¥400,000,000 (only for the personnel expenses) would be necessary.

TABLE: Development Cost of User Programs

Item	Volume	Unit Price	Amount
Coding Sheet	300 volumes	¥200	¥60,000 (\$240)
Punch Card	300,000 sheets	¥1.5	¥450,000 (\$1,800)
Form Sheet	8 packages	¥4,000	¥32,000 (\$128)
Disk Pack	4 units	¥700,000	¥2,800,000 (\$11,200)
Magnetic Tape	18 reels	¥5,000	¥90,000 (\$360)
Document File	80 volumes	¥1,000	¥80,000 (\$320)
Total	-	-	¥3,512,000 (\$14,048)

(2) Cost for the Development of Initial Data Files

The personnel expenses required for the development of data files will also be excluded, but only the costs of the computer supplies will be examined. Coding sheets, floppy disks, magnetic tapes, disk packs, etc., will be necessary for the development.

Since the initial data volume is approximately 576 million characters, the cost estimates for the development of initial data files would be as follows:

TABLE: Material Cost Required for the
Development of Initial Data Files

Item	Volume	Unit Price	Amount
Coding Sheet	400 volumes	¥200	¥80,000 (\$320)
Form Sheet	25 packages	¥4,000	¥100,000 (\$400)
Floppy Disk	650 sheets	¥3,000	¥1,950,000 (\$7,800)
Disk Pack	12 units	¥700,000	¥8,400,000 (\$33,600)
Magnetic Tape	300 reels	¥5,000	¥1,500,000 (\$6,000)
Document File	120 volume	¥1,000	¥120,000 (\$480)
Total	-	-	¥12,150,000 (\$48,600)

(3) Fixtures

The fixtures to be furnished are cabinets to store the input media such as punch cards, magnetic tapes, floppy disks, etc., and documents. Also, a shredder to shred the output sheets and coding sheets would be necessary. The following table shows the costs required for the fixtures.

TABLE: Cost for the Fixtures

Item	Volume	Unit Price	Amount
Card Cabinet	3 sets	¥150,000	¥450,000 (\$1,800)
Magnetic Tape Cabinet	3 sets	¥110,000	¥330,000 (\$1,320)
Floppy Disk Cabinet	3 sets	¥42,000	¥126,000 (\$504)
Disk Pack Cabinet	1 set	¥170,000	¥170,000 (\$680)
Document Cabinet	4 sets	¥70,000	¥280,000 (\$1,120)
Shredder	1 unit	¥630,000	¥630,000 (\$2,520)
Total	-	-	¥1,986,000 (\$7,944)

7-5-3. Running Costs

Running costs are for maintenance of software and for data entry of the transactions generated. The annual maintenance cost of the software is assumed to be 20% of the total development cost. And also, the annual volume for data entry is 540 million characters. Therefore, the following figures can be estimated as the annual running costs.

TABLE: Running Costs

Item	Volume	Unit Price	Amount
Coding Sheet	460 volumes	¥200	¥92,000 (\$368)
Punch Card	65,000 sheets	¥1.5	¥97,500 (\$390)
Form Sheet	30 packages	¥4,000	¥120,000 (\$480)
Floppy Disk	400 sheets	¥3,000	¥1,200,000 (\$4,800)
Magnetic Tape	160 reels	¥5,000	¥800,000 (\$3,200)
Disk Pack	2 units	¥700,000	¥1,400,000 (\$5,600)
Document File	40 volumes	¥1,000	¥40,000 (\$160)
Ink Ribbon	60 pieces	¥6,000	¥360,000 (\$1,440)
Total	-	-	¥4,109,500 (\$16,438)

However, the number of disk packs and magnetic tapes mentioned above are the number required for the operation of the first or the second year. Therefore, after the third year, only the costs for the replacement of the damaged magnetic tapes or disk packs would be required. On the other hand, fixtures such as cabinets are not mentioned here. These must be purchased as necessary when those mentioned in section 7-4-2 becomes insufficient.

CHAPTER 8

CASE STUDIES

The main purpose of the case study is to perform an in-depth analysis of the Master Plan for establishing an information system at the Head Office as described in the previous chapters, and examine the possibilities of the proposed Master Plan.

Usually, a preliminary study is conducted when designing the concept of the information system at the initial stage of system planning, as in the case of this Master Plan Study. In the next step, a detailed feasibility study is conducted after accomplishing the systems analysis and the system proto-type design. This detailed feasibility study is the final examination for checking the possibilities of the realization of the information system. The case studies to be conducted in this chapter are, therefore, at the initial stage of designing the concept of the information system which is meant to be a preparatory study to be performed before proceeding to the system planning of the information system.

Two operation items, "Registration of Enterprises" and "Personnel Administration," were selected out of all of the studied 11 operation items of the Master Plan for conducting the case studies, focused on the above-mentioned points.

The case studies will be conducted based on the basic functions required for the information system of each operation as described

in Chapter 4. And, the possibilities of realizing these basic functions will be examined from both sides of interrelationship between the personnel working on the operation and the computer processing (man-machine interface), and the actual computer processing procedures required. Furthermore, comment will be made on the problems to be solved at the stage of system development planning, system operation planning, and system maintenance planning. Also, hardware, software, staff training plan, implementation schedule, and cost estimation will be studied in the same manner as in the Master Plan Study mentioned in the previous chapters, which will give the ideas to whether the proposed plan can be realized or not.

8-1. Registration of Enterprises (General Trader's License)

8-1-1. Basic Functions and the Data Processing Methods

8-1-1-1. General

The basic functions required for the information system concerning the registration of enterprises are as already described in Section 4-2-4. Matters to be considered for establishing this system could be summarized as follows.

- i. The data to be covered is of so large a volume, and the accumulated volume is certain that it will tend to increase in the future. The initial data volume is 400,000 transactions, and it is expected that this number will increase every year at the rate of 400,000 transactions per year and the accumulated number will finally reach 2,000,000 transactions as a whole.

The system design will be performed under such conditions.

- ii. Volume of the data to be covered by this operation is outstanding compared with those of the other operations. Therefore, if it would be aimed at establishing a system capable of processing the data efficiently, there is a concern that the hardware configuration will become too large which would not be required by other operations. A solution to this imbalance must be found out.
- iii. An efficient and accurate method/system for constant data entry must be considered since the enormous volume of data entry is required to be performed not only at the initial stage but also for the processing of continuous volume of transactions being generated.
- iv. Another problem relating to the enormous data volume is to establish a method and system of data check of the registered information. If there are too many data of which its reliability is considerably low, the problem would not only be the great amount of work required for correcting the data but it would also present unnecessary confusion to the activities of the operation units utilizing the output reports.
- v. Most of the processing requirements for the preparation of output reports are intended to tabulate various analysis tables covering all of the registered enter-

prises by provinces or by districts, which will be a sequential processing. However, concerning the processing of output reports on the enterprises retrieved by specific items [R(4,1)], all of the input items of the registered enterprises must be obtained in detail when retrieved by the names of the enterprises. This processing is what is called direct access processing. If possible, file structure layout is recommended for high-speed processing.

- vi. Many memory media will be required for recording the data to a file when including those for the updated file and backup file. Therefore, an efficient method of file maintenance must be considered by its utilization and the frequency of its usage.

When the system planning and the system development is performed in accordance with the above points, the information system for the registration of enterprises could support the administration of the Head Office in the following manner:

- a. It will enable the Head Office to investigate the actual condition of the enterprises or the tendency of the registration at the national level as well as by each provincial/district level. Various analysis tables necessary for this could be processed by the computer.
- b. Based on these analysis tables, measures for pro-

moting the growth of enterprises and various policy making and review of the industrial policy can be performed.

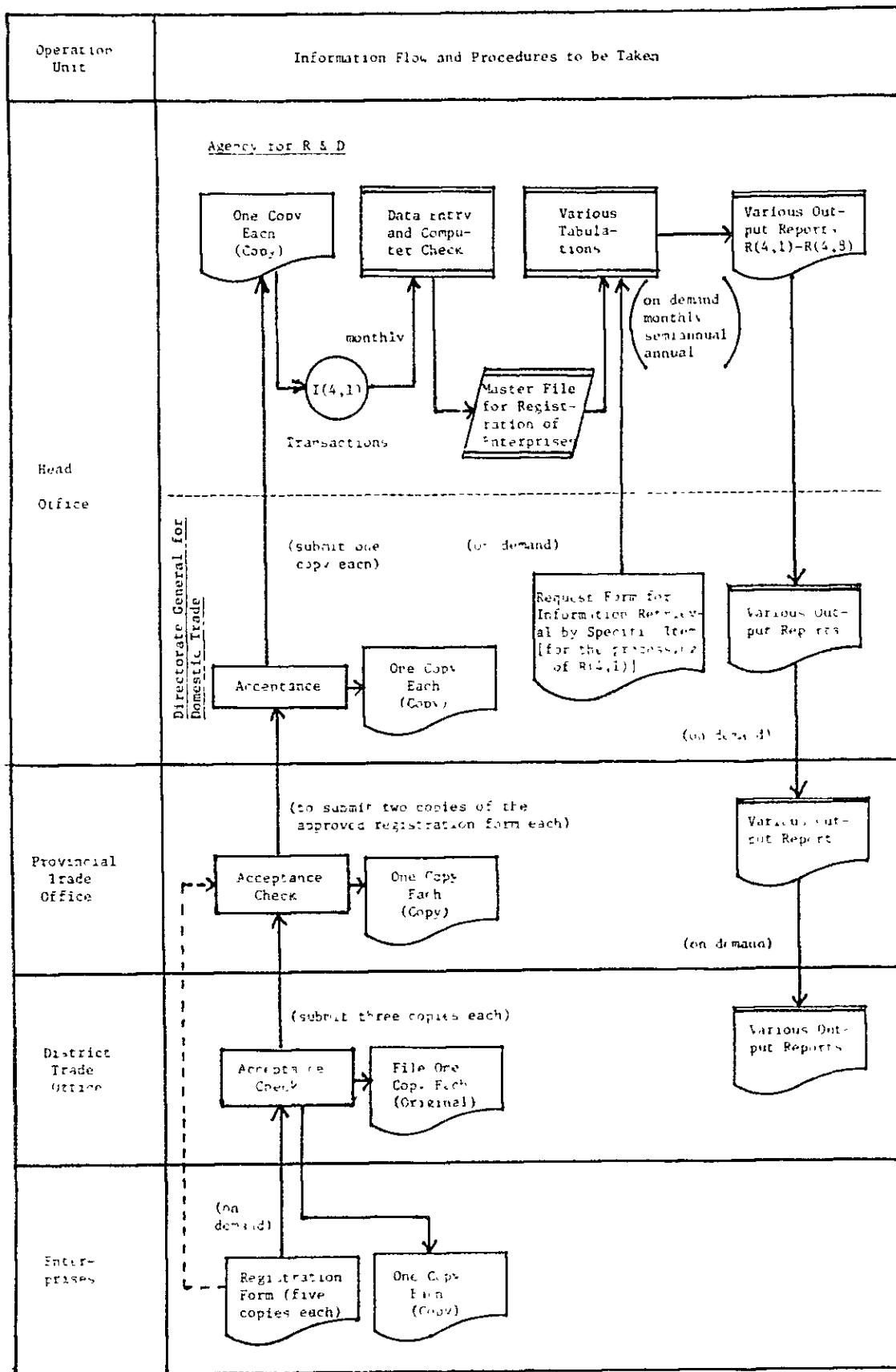
c. It will not only contribute to the long range macro policy making but also for utilizing the information obtained for daily administration. For example, it would enable to retrieve at once the detailed information of enterprises necessary for the administrative guidance to the individual enterprises or some specific industry located in a certain region for the promotion of their business activities.

d. For these reasons, the output reports can be used in many ways, not only by the Head Office but also by provincial and district trade offices.

8-1-1-2. Flow of Input/Output Information

The flow of input/output information concerning the information system for the registration of enterprises and how each operation unit plays a part in this information system must be made clear. This will enable the most purposive and preponderant examination to be performed when conducting the systems analysis and the system design. Therefore, the flow of transactions and reports, and also the relation between each operation unit and the procedures are shown in the next figure. The detailed flow of computer processing is mentioned in the next section 8-1-1-3.

CHART: Flow of Input/Output Information



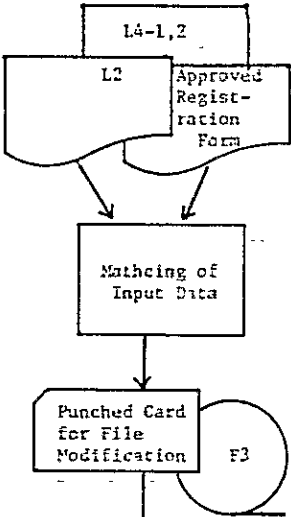
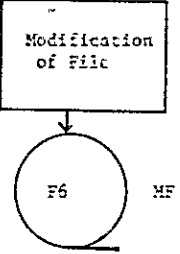
8-1-1-3. Computer Process Flow

The actual procedures for the computer processing from the data entry to the reporting will be examined as key part of the flow of input/output information. The detailed process flow is shown in the next chart.

PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
<p>MF1</p> <p>(Note): MF indicates manual processing</p>	<p>Initial</p>		<p>Key operators input data obtained from approved registration form to floppy disks. Floppy disks are prepared by provinces. Following are the data volume.</p> <p>(National total)</p> <p>400,000 transactions x 1,000 c/transactions = 400 MC</p> <p>(Note): 'c' indicates characters 'MC' indicates million characters</p> <p>(Average volume by Each Province)</p> <p>15,000 transactions x 1,000 c/transactions = 15 MC</p>
<p>CP2</p> <p>(Note): CP indicates computer processing</p>	<p>Initial</p>		<p>Check all data recorded to floppy disk and edit the data to form a master file to be recorded on magnetic tapes. A list of error data will be also prepared.</p>
<p>CP3</p>	<p>Initial</p>		<p>Sort data by regions and by registered numbers. If no errors when processing of CP2 and CP4 performed, this sorted magnetic tape will become the master file. The data volume of this file will be equal to MF1.</p>
<p>CP4</p>	<p>Initial</p>		<p>Check overlapping registered data, etc., and output a list of error data. Also, detail-list of correct data will be processed for checking.</p>

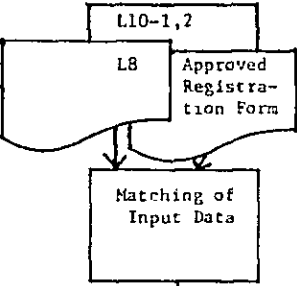
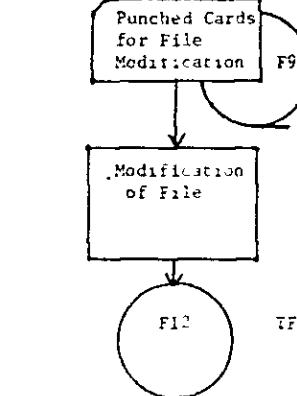
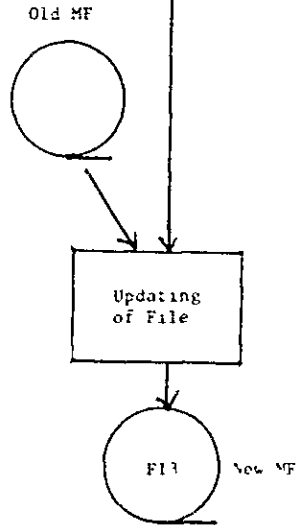
PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
MP5	Initial	 <pre> graph TD L4["L4-1,2"] --> MD["Matching of Input Data"] L2["L2 Approved Registration Form"] --> MD MD --> PC["Punched Card for File Modification (F3)"] </pre>	<p>Matching of all input data will be performed for checking. Also, checking of the error data recorded on F3 will be performed. The error data items of file will be modified by punched cards.</p>
CP6	Initial	 <pre> graph TD MF["Modification of File"] --> F6["F6 MF"] </pre>	<p>Punched cards for file modification will be arranged in order by regions and by registered numbers. F3 will be modified in accordance with this information to obtain the correct master file. This master file will be used as the input for the next monthly processing or to output various analysis tables at this time. This master file must be held until the monthly processing of the month after the next is completed. 27 reels of magnetic tapes will be required for the master file since one reel will be used for each province.</p>

PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
MP7	Monthly		<p>Key operators to input data obtained from approved registration form to floppy disks. Floppy disks to be prepared by provinces following are the data volume</p> <p>(National Total) 33,000 transactions x 1,000 of transactions = 33 M (Average volume by Province) 1,200 transactions x 1,000 transactions = 1.2 M</p>
CP8	Monthly		<p>To check all data recorded to the floppy disk and edit the data to form a transaction file to be recorded on magnetic tape. A list of error data will also be prepared.</p>
CP9	Monthly		<p>To sort data by regions and by registered numbers. If no errors when processing of CP8 and CP10 are performed, this sorted magnetic tape will become the transaction file. The data values of this file will be output to MP7.</p>
CP10	Monthly		<p>To check and process registered data, etc., and to output list of error data. Also, detail list of error data will be processed for checking.</p>

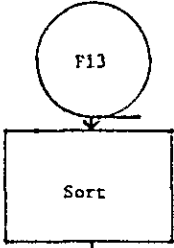
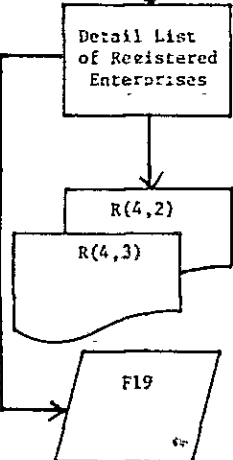
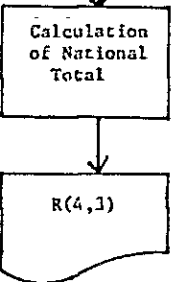
PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
MPI1	Monthly	 <pre> graph TD L10["L10-1,2"] --> MID["Matching of Input Data"] L8["L8 Approved Registration Form"] --> MID </pre>	<p>Matching of all input data will be performed for checking. Also, checking of error data recorded on F9 will be performed. The error data items of file will be modified by punched cards.</p>
CP12	Monthly	 <pre> graph TD F9["Punched Cards for File Modification F9"] --> MF["Modification of File"] MF --> F12((F12 TF)) </pre>	<p>Punched cards for file modification will be arranged in the order by regions and by registered numbers. F9 will be modified in accordance with this information to obtain the correct transaction file. This transaction file must be held until the monthly processing of the next month is completed. 27 reels of magnetic tapes will also be required for the transaction file since one reel will be used for each province.</p>
CP13	Monthly	 <pre> graph TD OldMF((Old MF)) --> UF["Updating of File"] F12((F12 TF)) --> UF UF --> F13((F13 New MF)) </pre>	<p>The master file will be updated by using the transaction file prepared on the data of the current month and the old master file of the previous month. This new master file will be used for the processing of the next month. This master file must be held until the next output is completed. Following are the data volume.</p> <p>(National Total) minimum: 430,000 transactions x 1,000 c/transaction = 430 MC maximum: 2,000,000 transaction x 1,000 c/transaction = 2 GC</p> <p>(Average Volume by Each Province) minimum: 16,000 transactions x 1,000 c/transaction = 16 MC maximum: 74,000 transactions x 1,000 c/transaction = 74 MC</p>

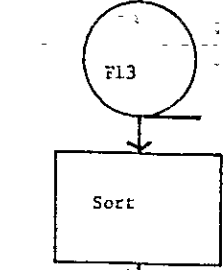
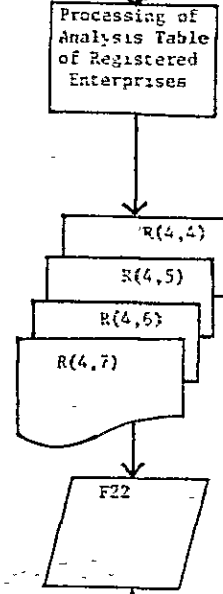
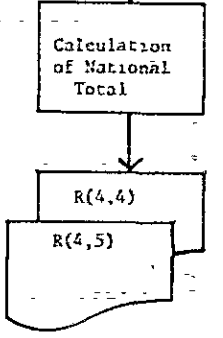
PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
MP14	On Demand	<pre> graph TD A[Specify Condition for Information Retrieval] --> B[Condition for Information Retrieval] B --> C((F13)) C --> D[Information Retrieval by Specific Items] </pre>	<p>To perform information retrieval of registered enterprises on demand. For this operation, specified conditions for the information retrieval must be determined positively by province and by items, and be punched to the cards.</p>
CP15	On Demand	<pre> graph TD A[Information Retrieval by Specific Items] --> B[R(4,1)] B --> C((F13)) </pre>	<p>Information retrieval of names of registered enterprises, etc., by specific items will be performed using magnetic tape for the latest master file prepared by each province. The results will be tabulated into a list. If output volume is not so large, the output can be obtained on CRT display in batch processing mode</p>
CP16	Monthly	<pre> graph TD A[Sort] --> B((F16)) </pre>	<p>To pick out the enterprises requiring renewal of license by provinces. The latest master file must be prepared sorted by regions and by registered data.</p>
CP17	Monthly	<pre> graph TD A[Processing List of Enterprises Whose License Will Expire] --> B[R(4,3)] </pre>	<p>To prepare a list of enterprises by provinces whose license will expire [R(4,8)].</p>

PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
CP18	Semi-annual		To sort latest master file by regions, purpose of application, and registration number.
CP19	Semi-annual		To prepare detail list of registered enterprise by province and districts [R(4,2)], and analysis table of registration by province and districts [R(4,3)]. The totals by the provinces for the output report R(4,3) will be temporarily recorded on a disk pack for the calculation of the National total.
CP20	Semi-annual		To tabulate National total and breakdown by provinces concerning R(4,3)

PROCESS CHART

Process Number	Processing Frequency	Process Flow	Remarks
CP21	Annual		To sort the latest master file by regions, size of enterprises, business activities, and date of establishment.
CP22	Annual		To prepare analysis table of registered enterprise classified by the different number of years in business [R(4,4)], analysis table of registered enterprise classified by business activities [R(4,5)], analysis table of registered enterprise classified by type of enterprise [R(4,6)], and analysis table of registered enterprise classified by commodities handled [R(4,7)], each by provinces and districts. The totals by the province for the output reports R(4,4) and R(4,5) will be temporarily recorded on a disk pack for the calculation of the National total.
GP23	Annual		To tabulate National totals and breakdowns by provinces concerning R(4,4) and R(4,5).

8-1-2. Considerations to be Made for the System Planning

This section summarizes the points which must be considered when establishing this system and also the problems to be solved in advance. It is advisable that these points be considered at the stage of planning of the system.

8-1-2-1. System Development Plan

(1) Systems Analysis

Following are the key items to be considered for the planning of systems analysis.

- a. The number of registration forms being generated must be obtained. The number of registration forms generated has direct influence on the work volume required for data entry and collating data check.
- b. The accuracy of the data obtained from registration forms submitted to the Head Office must be known. The data check being performed by each provincial trade office and district trade office must be surveyed, and the point of issue must be made clear.
- c. The type of information on which the decision for the approval of registration forms are made at provincial trade offices must be known. This will make clear which items obtained from the information system can support the licensing activity.
- d. The type of statistical information required by the Head Office must be known for their policy making

relating to the registration of enterprises, for example, administration guidance and business promotion of each industry, or industrial policy by regions. This will give more purposive and positive figures for the designing of the analysis tables.

- e. The required information and frequency of regularly prepared analysis tables must be known in detail by conducting interviews with the operation units utilizing the results.
- f. Relating to the above items b. and c., the required items of the information on enterprises for information retrieval, which will be performed irregularly on demand, must also be defined clearly by conducting interviews with the operation units utilizing the outputs.
- g. Taking the above points into consideration, the required items of the information on enterprises to be input to the computer must be made clear. It must be reminded that it would be most difficult to add new input data items afterwards. Therefore, the system must be designed at the first stage to be able to meet the future requirements so that it would not require any change in the input items.

(2) System Design

Designing of input/output documents, data entry, processing method, files, and codes are the major requirements for

the system design. Key points for the design are described below. These points must be considered when examining the work plan for the system design.

- a. First, the type of output reports to be processed, processing frequency, items to be mentioned in the output reports should be determined to design the definite layout of output reports. Systems engineers undertaking this work must consult in detail with the systems analysts who have conducted the systems analysis and have thorough knowledge of the operation.
- b. Next, the input data items must be determined. Not all of the items mentioned in the registration form need to be input for the information system. In order to reduce the redundancy of the system and improve the efficiency of the processing, only the items satisfying the minimum requirements should be carefully selected. The rough estimate for the capacity of the file can be obtained from the selected items and the expected number of input data.
- c. Check items and methods of the data mentioned in the registration form must be determined to enable data check to be performed at the provincial trade offices and district trade offices when they are received. Homogeneity and reliability of the data concerning the registration form being submitted to the Head Office can be secured by this.

- d. The registration form is already designed to enable the data entry without posting the mentioned items. However, overlay sheet must be designed and prepared to pick out only the items necessary for the data entry without any errors. Also, a preliminary test should be performed to examine the processing speed and the degree of errors arising from the data entry. Work volume and time required for accurate data entry can be estimated from this.
- e. There are many ways for the data entry when considering the selection of data entry devices. However, key-to-floppy disk unit would be most advantageous because of the following reasons. The data input to floppy disks can be checked on the display and corrected. Large volume of data can be recorded temporarily. And this temporary recording media can be used repeatedly.
- f. Some of the input data items are not expressed numerically. These items should be enclosed to be expressed numerically for the computer processing. For example, purpose of the registration is classified into six items expressed by alphabets a. to f., however, it would be better if these are converted and expressed in numerals 1. to 6. accordingly. Also, the address should use code numbers of province and district for the data entry to avoid using the actual names. Data entry of such data must be carefully examined in advance.

g. The selection of the storage media is one of the most important matters to be settled. If the economy of the processing is not considered, magnetic disk system storage media would be most suitable for the processing because of its data accessibility and high speed memory features. However, in order to record the data volume of 2GC (2,000 million characters) at the maximum, it is calculated that it would require eight disk packs with memory capacity of 300 MC (300 million characters) for the actual use. Also, it would require 27 reels if high recording density magnetic tapes were used for as the storage media for this operation.

Many magnetic disk packs must be utilized for this operation in order to make the best use of the advantage of the direct access function the magnetic disk system has. In the case of magnetic tapes, the turn around time can be improved to some extent by preparing the file by each province and selecting the file to be used for the input. From the overall point of view, magnetic tapes should be selected as the storage medium for the master file since other operations do not require the processing of data the size of this volume. However, to be exact, frequency of the requirement for direct access for data retrieval and the cost performance between the load of direct access and sequential access must be considered.

- h. A method to enable as much as possible the same type of processing to be performed consecutively must be considered for the efficient use of the hardware resources when examining the flow of computer processing. For example, annual reports should be totalized at the same time and printed out separately when tabulating. In this case, some certain reports may require re-processing. Therefore, the processing of only the required part must be made possible.
- i. The recent master files and transaction files must always be kept in case of trouble. That is, master file of the previous month and the month before last, and the transaction file of the previous month must be kept until the monthly processing is performed.

(3) Program Development

Of all of the programs required for this system, programs for data check, updating of files, information retrieval, and preparation of reports must be developed independently by the user. COBOL would be the suitable programming language for the development of these user programs. The development scale of such user programs can be reduced by the use of basic softwares and application programs. The possibilities for the use of these programs at the initial stage of development must be studied when planning.

Furthermore, the programs are to be modified and maintained to meet the requirements of the operation when there is a

change. Therefore, program design method, coding method, check method, and preparation of documents must be standardized thoroughly at the time of development planning. Standardization will restrict the work to be performed for the development and temporarily increase the development cost. But on the other hand, it will have great effect on the efficiency of maintenance work, which requires much more cost than the development. Therefore, this will result in reducing the life cycle cost of the software.

(4) File Preparation

The procedure taken for the preparation of the initial master file for registration of enterprises is performed in the following manner. Data entry, matching, and processing of the master file by computer. Especially, the first two procedures require large amount of work so that the work items and procedures should be standardized. The items which could be checked by the computer program and the items which could only be checked manually must be distinguished, and attention must be paid to the work plan on this point for the efficiency of the work.

8-1-2-2. System Operation Planning

(1) System Installaion

A test run of the developed programs is required under the same condition as the actual operation by performing monthly processing for a certain province according to the regular

procedures of the operation. When performing the test, rationality of the planned work procedure and differences in the actual and estimated processing must be examined. Furthermore, the output reports prepared by this test run should be checked by the users to confirm whether there were any problems with the developed program. Based on these results, review of work procedures and work plan for monthly processing shall be modified.

(2) System Execution

Frequency of the information retrieval to be performed on demand must especially be examined when shifting to full scale operation, since this frequency cannot be estimated at the stage of system installation. On-demand processing is an irregular processing so that if there are too many demands for this processing, it may have great effect on the regular weekly and monthly processing. Practical review for limiting the operations or measures relating to on-demand processing of this system can be performed for the first time at this stage.

8-1-2-3. System Maintenance Plan

(1) System Evaluation

Following points should be considered at this time.

- a. Reliability of the recorded data of the registration form.
- b. Adequacy of the data entry procedures.
- c. Effectiveness of the output reports and the recorded

items.

- d. Adequacy of the selection of key items (specified items) for the on-demand information retrieval.

Reference data must be gathered at the stage of system execution for the examination and evaluation of the above mentioned points. In accordance with this purpose, systems analysts must collect information concerning errors in output items, utilization of output reports, necessary output items which cannot be expected of this system, and the contents of the analysis tables, from the users of the output reports. Also, systems engineers must collect information from the manager of the computer room and operators concerning the data on work required by data entry and concrete requirements, etc., for the on-demand information retrieval. It is important to understand the system quantitatively based on this type of information.

(2) System Improvement

Modifications will be made to the program and operations procedures based on the existing operational problems, and newly raised requirements or requests for improvements from the users. Consideration must be made at the stage of planning to record the reasons, name of person who made the request for modification, and details of the modification whenever the system or program is modified.

8-1-3. Hardware

Following are the requirements concerning the configuration of the hardware.

- a. Floppy disk reader unit is suitable as a data entry device.
- b. Minor modifications of the master file and transaction files will be performed by punched cards.
- c. Files will be recorded on magnetic tapes.

Basically, updating of the file will also be performed by using magnetic tapes.

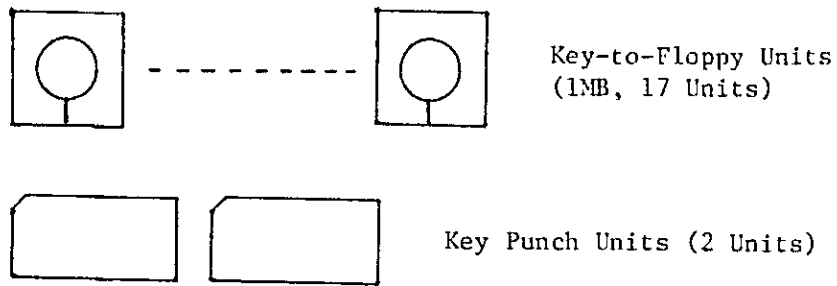
- d. Disk packs are suitable as intermediate files for computer processing.
- e. Output on CRT display unit will be made possible for on-demand processing of information retrieval by specified items.
- f. The development of user programs will be performed not only by batch processing but also by real-time processing using TSS terminals.

Of the above mentioned processing, data entry will require many key-to-floppy units. The initial data volume is 400MC on a national scale which will require data entry of a maximum of 33MC per month at the stage of system execution. The minimum number of key-to-floppy units required to perform data entry of 33MC per month will be considered. It will be assumed that a well trained floppy operator will be able to perform data entry of 50KC per day on a five-hour day. If 20 work days are assumed per month, data entry of 1MC can be performed by one operator. Therefore, the total number of operators required for this work is 34, and 17 key-to-floppy disk units will be necessary if performed in two shifts.

And the period required for the initial data entry under this condition is 12 months. This time period could be shortened if more floppy operators and key-to-floppy disk units could be used.

Following figure shows the minimum requirements for the hardware for the execution of this system. The installation of the hardware can be referred to section 4-3.

(Off-line Data Entry Device)



(Computer and Interface Devices)

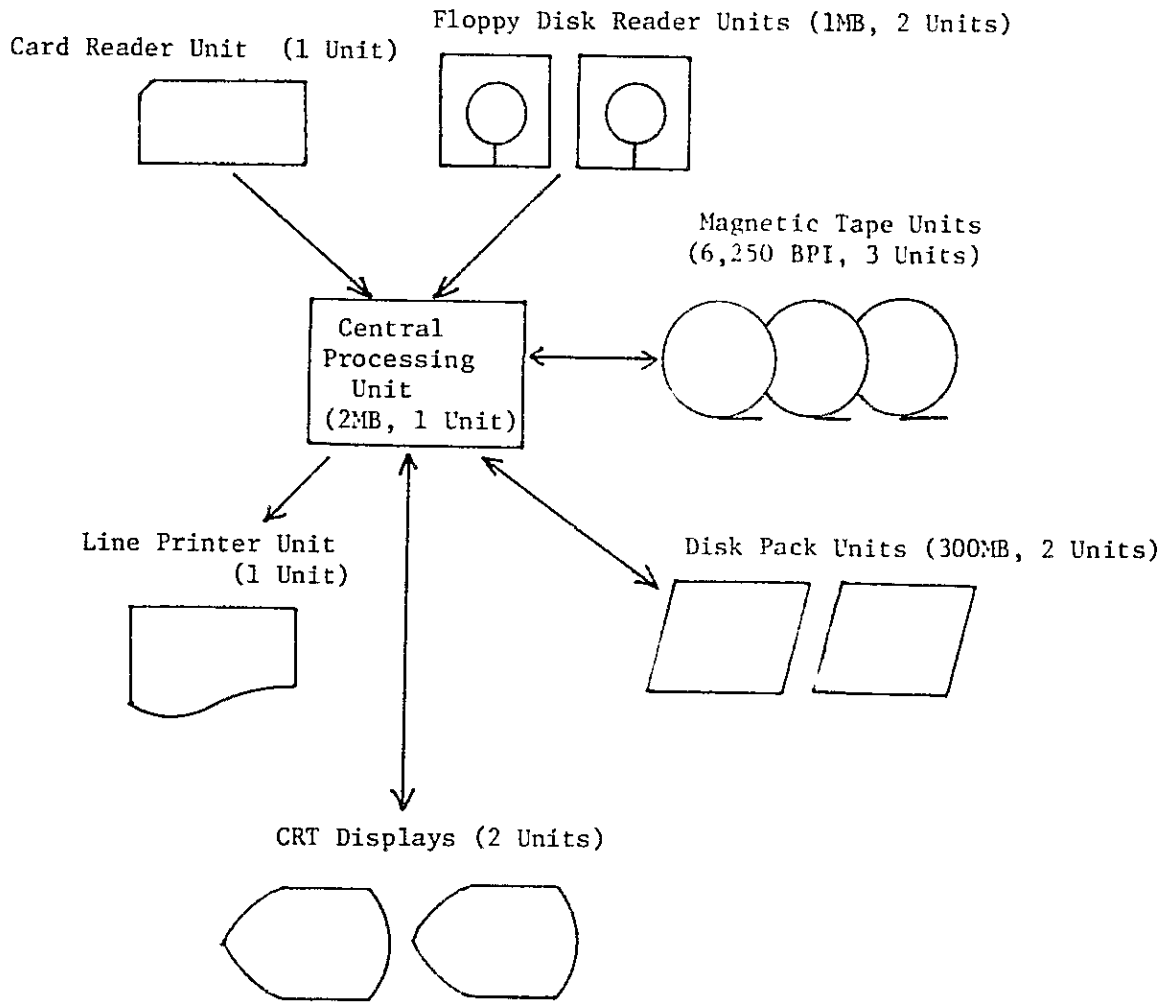


FIGURE: Minimum Configuration of Hardware

8-1-4. Software

Following software must be prepared for this system.

(1) Basic Software

- a. Operating System.
- b. COBOL Compiler

(2) Application Program

- a. Linkage Editor.
- b. Editor/Screen Editor.
- c. Program Source Code Management System.
- d. Screen Image Definition Program.
- e. Software Testing/Evaluating Tool.
- f. SORT/MERGE Program.
- g. FILE UTILITY.

(3) Programming Language

COBOL should be used for the programming language in the development of user programs.

(4) User Programs

User programs must be developed for processing required for data check, preparation/updating of the file, information retrieval, processing of reports described in the process flow of section 8-1-1-3. COBOL will be used as the programming language of the user programs. It is estimated that 13 user programs with a total of approximately 20,000 steps will be required.

8-1-5. Staff Training Plan

Manpower requirement and training curriculums generally required for the system installation is as already mentioned in Chapter 5. Therefore, the characteristics of the work required for the development and operation of this system module will be mentioned here, although the curriculum and the method of staff training does not differ from those explained in Chapter 5. so that these programs can be applied. Summary of the curriculum for the staff training will be described next by each job description.

(1) Systems Analyst (SA)

Systems analyst must perform the systematization of the registration of enterprises by placing stress on the following points. Close contact with the system engineer is required, and if necessary, systems engineer may hold this job concurrently.

- a. To check and analyze the generation conditions of transactions.
- b. To possess knowledge of the conditions for checking of the registration forms when they are received, and its standardization.
- c. Also to standardize the checking required for data entry.
- d. To understand and analyze the required information for giving approvals, policy making matters and decision making.

- e. To select the input items for computerization and possess knowledge of the degree of their importance.
- f. To conduct hearing with the users concerning the claims for the execution of the system, newly raised requirements and requests for improvement, and also conduct their analysis.

The above-mentioned items mainly relates to systems analysis and system maintenance. A person having thorough knowledge of the operations concerning the registration of enterprises should be in charge of the systems analysis. The required number of staff is one.

(2) Systems Engineer (SE)

After completion of the systems analysis, systems engineers must conduct system design. Also, evaluation and designing for the improvement of the system in operation must be performed in close cooperation with the systems analyst. Systems engineer must proceed with their work by placing emphases on the following points.

- a. Designing of data entry method.
- b. Examination of data check method for data entry using computers and the overall reliability of the data.
- c. Examining the methods for preparation/maintenance of the files, file recovery measures, and extension of the files.

- d. Code design and standardization of input data items.
- e. Processing method of on-demand information retrieval.
- f. Estimation of computer load when the system becomes operational.
- g. Data collection, analysis, and evaluation for system improvement.

One system engineer on a full time basis will be enough for this operation.

(3) Programmers (P)

Programmers are to develop programs in accordance with the system designed by the systems engineer. Following points must be considered.

- a. Program design and description for efficient data entry.
- b. Programming for efficient preparation of regular output reports.
- c. Programming for efficient file retrieval for the reports prepared by on-demand information retrieval.

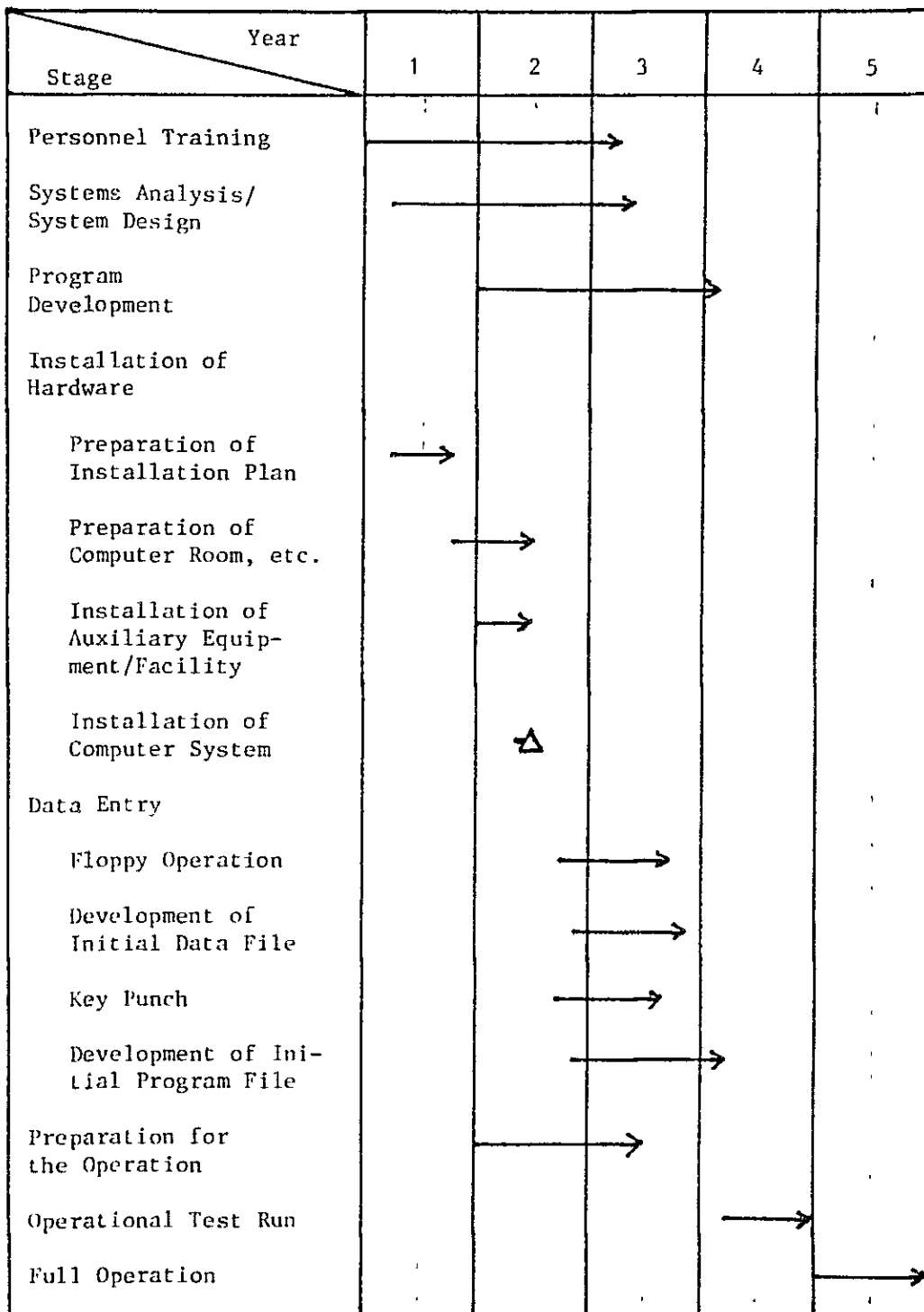
Two programmers will be necessary considering the scale of development required for this operation.

8-1-6. Implementation Schedules

When the plan for this system is formed based on the above considerations, implementation schedule of the information system can be planned as shown in the following bar chart.

The operations relating to the installation of hardware are scheduled in the same manner as that mentioned in the master plan study. The schedule of other operations were determined in reference with the operations relating to the installation of the hardware.

FIGURE: Installation Schedule



This operation will be the first on-the-job training to be provided for the systems analysts, and key punchers.

The following is the detailed schedule for staff training.

Year Staff Member	1	2	3
(): persons		Δ	
a. Development Manager (1)	[]	(Computer Installation)	
b. Systems Analyst (1)	[]		
c. Systems Engineer (1)	[]		
d. Programmer (2)	[]	[]	
e. Operations Manager (1)	[]	[]	[]
f. Scheduler (1)		[]	[]
g. Librarian (1)		[]	[]
h. Resources Handler (1)		[]	[]
i. Computer Operator (2)		[]	[]
j. Key Operator			
Floppy Operator			
1): (13)		[] []	
2): (13)		[] []	
3): (8)		[] []	
Key Puncher (1)		[] []	

FIGURE: Staff Training Schedule

Legend: [] : Staff Training Curriculum

[] : On-the-Job Training

8-1-7. Cost Estimates

(1) General

Costs incurred in the introduction of this system module will be estimated in this section. The following cost estimates are all based on the current export prices effective in Japan. The table below summarizes the rough estimates of the costs.

TABLE: Cost Estimates

Item	Initial Cost	Operating Cost (Annual)
Hardware	¥664,000,000 (\$2,656,000)	¥21,000,000 (\$84,000)
Software		
Basic Software	¥10,000,000 (\$40,000)	¥700,000 (\$2,800)
Application Software	¥12,000,000 (\$48,000)	¥890,000 (\$3,560)
Personnel Training		
Instructor Fees	¥23,750,000 (\$95,000)	-
Teaching Material Costs	¥692,100 (\$2,768)	-
Others		
Development Cost of User Programs	¥1,486,000 (\$5,944)	
Development Cost of Data Files	¥2,400,000 (\$9,600)	¥1,411,500 (\$5,646)
Furnishings	¥1,256,000 (\$5,024)	-
Total	¥715,584,100 (\$2,862,336)	¥24,001,500 (\$96,006)

Breakdown of each item is as shown hereinafter.

The conditions for the estimation are the same as in Chapter 7.

(2) Hardware

Following are the costs incurred in the purchase, installation, and operation of the hardware. Costs concerning the space for the installation of the hardware and other internal fees such as the personnel expenses will not be included.

TABLE: Cost Estimates for the Hardware

Item	Number	Initial Cost (Purchase Price)	Operating Costs (Annual)	Remarks
	(Unit)			
Central Processing Unit	1	¥86,000,000 (\$344,000)		2MB
Card Reader Unit	1	¥11,000,000 (\$44,000)		
Floppy Disk Reader Unit	2	¥10,000,000 (\$40,000)		1MB/floppy
Line Printer Unit	1	¥38,000,000 (\$152,000)		
Disk Pack Unit	2	¥42,000,000 (\$168,000)		300MB/unit
Magnetic Tape Unit	4	¥59,000,000 (\$236,000)		6,250BPI
Key-to-Floppy Disk Unit	17	¥25,000,000 (\$100,000)		1MB/floppy
Key Punch Unit	2	¥7,000,000 (\$28,000)		
CRT Display Unit	2	¥5,000,000 (\$20,000)		
	(Set)			
Constant Voltage Device	1	¥80,000,000 (\$320,000)		
Air Conditioning Equipment	1	¥31,000,000 (\$124,000)		
Construction Cost of Computer Room, etc.	1	¥244,000,000 (\$976,000)		
Cost for Transportation, Installation, and Adjustment	1	¥20,000,000 (\$80,000)		
Ocean Freight and Insurance	1	¥6,000,000 (\$24,000)		
Maintenance Fee for Equipment	(Set) 1		¥21,000,000 (\$84,000)	
Total	-	¥664,000,000 (\$2,656,000)	¥21,000,000 (\$84,000)	

(3) Software

Costs of only the softwares introduced from external organizations will be estimated so that the costs of the user programs developed internally will not be included.

TABLE: Cost Estimation of Softwares

Software	Initial Costs (Purchase Price)	Operating Costs (Annual Maintenance Fee)
Basic Software	¥10,000,000 (\$40,000)	¥700,000 (\$2,800)
Operating System	¥8,000,000 (\$32,000)	¥550,000 (\$2,200)
COBOL Compiler	¥2,000,000 (\$8,000)	¥150,000 (\$600)
Application Program	¥12,000,000 (\$48,000)	¥890,000 (\$3,560)
Linkage Editor	-	-
Editor/Screen Editor	¥2,000,000 (\$8,000)	¥150,000 (\$600)
Program Source Code Management System	¥2,000,000 (\$8,000)	¥150,000 (\$600)
Screen Image Definition Program	¥4,000,000 (\$16,000)	¥300,000 (\$1,200)
Software Testing/Evaluation Tool	¥2,000,000 (\$8,000)	¥150,000 (\$600)
SORT/MERGE Program	¥1,000,000 (\$4,000)	¥70,000 (\$280)
FILE UTILITY	¥1,000,000 (\$4,000)	¥70,000 (\$280)
Total	¥22,000,000 (\$88,000)	¥1,590,000 (\$6,360)

(4) Staff Training

Only the initial cost incurred in the personnel training curriculum will be examined. If foreign instructors are to be invited, the travelling expenses and the living expenses must also be considered.

TABLE: Fees for the Instructor and Cost for Textbooks

Curriculum	Fee for the Instructor					Cost for the Textbooks	
	Duration of One Course	Number of Attendants	Fee per Course	Number of Courses Required	Total Fee	Unit Price	Amount
Basic Mathematics/ Statistics	4 (weeks)	4 (person)	¥1,000,000	3	¥3,000,000 (\$12,000)	¥10,000	¥40,000 (\$166)
Systems Engineering	2	3	¥500,000	3	¥1,500,000 (\$6,000)	¥5,000	¥15,000 (\$ 60)
Introduction to Information Processing	1	46	¥250,000	7	¥1,750,000 (\$7,000)	¥2,500	¥115,000 (\$460)
Systems Analysis, Design, Evaluation Techniques	2	3	¥500,000	3	¥1,500,000 (\$6,000)	¥5,000	¥15,000 (\$ 60)
Programming Language/ Programming Techniques	8	4	¥2,000,000	3	¥6,000,000 (\$24,000)	¥20,000	¥20,000 (\$320)
Introduction to Hardware	1	46	¥250,000	7	¥1,750,000 (\$7,000)	¥2,500	¥115,000 (\$460)
Concept of the Operating System	1	8	¥250,000	5	¥1,250,000 (\$5,000)	¥2,500	¥20,000 (\$ 80)
Production Management of Software	2	6	¥500,000	5	¥2,500,000 (\$10,000)	¥5,000	¥30,000 (\$120)
Project Management Techniques	2	3	¥500,000	3	¥1,500,000 (\$6,000)	¥5,000	¥15,000 (\$ 60)
Management of Computer Room and Resources	1	4	¥250,000	1	¥250,000 (\$1,000)	¥2,500	¥10,000 (\$ 40)
Operation of the Computer System	2	3	¥500,000	2	¥1,000,000 (\$4,000)	¥5,000	¥15,000 (\$ 60)
Key Operation	1	41	¥250,000	7	¥1,750,000 (\$7,000)	¥2,500	¥102,500 (\$410)
Total	-	-	-	-	¥23,750,000 (\$95,000)	-	¥572,500 (\$2,290)

TABLE: Costs for Programming Exercise

Item	Unit Price	Volume	Amount
Coding Sheet	¥200	8 volumes	¥1,600 (\$6.4)
Punch Card	¥1.5	8,000 sheets	¥12,000 (\$48)
Form Sheet	¥4,000	1 package	¥4,000 (\$16)
Floppy Disk	¥3,000	34 sheets	¥102,000 (\$408)
Total	-	-	¥119,600 (\$478.4)

(5) Others

Following tables show the costs of the fixtures and computer supplies necessary for the development of user programs and initial data files.

If the programming of the user programs are to be sub-contracted to an external organization, an additional ¥60,000,000 (only for the personnel expenses) would be necessary.

TABLE: Other Initial Costs

Item	Unit Price	Development Cost of User Program		Development Cost of Initial Data File		Cost Fixtures	
		Volume	Amount	Volume	Amount	Volume	Amount
Coding Sheet	¥200	40	¥8,000 (\$ 32)	-	-	-	-
Punch Card	¥1.5	40,000	¥60,000 (\$240)	-	-	-	-
Form Sheet	¥4,000	2	¥8,000 (\$320)	18	¥72,000 (\$288)	-	-
Floppy Disk	¥3,000	-	-	405	¥1,215,000 (\$4,860)	-	-
Disk Pack	¥700,000	2	¥1,400,000 (\$5,600)	1	¥700,000 (\$2,800)	-	-
Magnetic Tape	¥5,000	1	¥5,000 (\$ 20)	81	¥405,000 (\$1,620)	-	-
Document File	¥1,000	5	¥5,000 (\$ 20)	8	¥8,000 (\$ 32)	-	-
Card Cabinet	¥150,000	-	-	-	-	1	¥150,000 (\$600)
Magnetic Tape Cabinet	¥110,000	-	-	-	-	1	¥110,000 (\$440)
Floppy Disk Cabinet	¥42,000	-	-	-	-	3	¥126,000 (\$504)
Disk Pack Cabinet	¥170,000	-	-	-	-	1	¥170,000 (\$680)
Document Cabinet	¥70,000	-	-	-	-	1	¥70,000 (\$280)
Shredder	¥630,000	-	-	-	-	1	¥630,000 (\$2,520)
Total	-	-	¥1,486,000 (\$5,944)	-	¥2,400,000 (\$9,600)	-	¥1,256,000 (\$5,024)

TABLE: Other Running Costs

Item	Unit-Price	Volume	Amount
Coding Sheet	¥200	10 volumes	¥2,000 (\$ 8)
Punch Card	¥1.5	9,000 sheets	¥13,500 (\$ 54)
Form Sheet	¥4,000	19 packages	¥76,000 (\$304)
Floppy Disk	¥3,000	81 sheets	¥243,000 (\$972)
Disk Pack	¥700,000	1 unit	¥700,000 (\$2,800)
Magnetic Tape	¥5,000	27 reels	¥135,000 (\$540)
Document File	¥1,000	2 volumes	¥2,000 (\$ 8)
Ink Ribbon	¥5,000	40 pieces	¥240,000 (\$960)
Total	-	-	¥1,411,500 (\$5,646)