

- d - To represent the Kingdom before the Arab, regional and international institutions and bodies concerned with science and technology.

There is a wide perception of science and technology. These two terms are quite often mixed up. However, "science" remains to cover all activities that aim at increasing scientific knowledge, while "technology" is, simply, the application of science. Scientific and technological activities are of three kinds: scientific research and development, higher education and scientific and technological services. Following is a brief account of each of these activities in Jordan:

First, Scientific Research and Development:

This activity comprises basic research and applied research and development. The Royal Scientific Society (RSS) is one of the leading institutions involved in this activity in Jordan, especially in regard to the aspects of application and development. RSS covers about 60% of the size of this activity, while Jordanian universities cover about 30% leaving the remaining 10% to be covered by other institutions working in the field.

Second, Higher Education:

Higher education means all educational and training activities that start after the secondary stage. This includes education at the universities and community colleges, which together carry out not less than 80% of this activity, whereas the other institutions cover the remaining part, especially on the training side.

Third, Scientific and Technological Services:

These services include activities related to the laboratory tests carried out on products, imported goods and their ingredients, services pertaining to natural resources surveys, activities of collecting, processing and documenting statistical information as well as drafting standards and specifications.

The Royal Scientific Society is the major body involved in this field of activities in Jordan, though universities, ministries and other public institutions and banks have their share in it. It is worthy to mention that scientific services related to data collection, processing and retrieval require optimum care and Jordan is still in need of several data banks. Perhaps most important among these banks stand the socio-economic data bank and the technological and scientific data bank which were recently established, within the National Information System, at the Ministry of Planning and the Royal Scientific Society, respectively. Data banks are considered as an indispensable necessity for the formulation of development policies and plans since information and statistical data needed for this function cannot be easily obtained in the absence of such banks. To achieve its goal of becoming the desired centre of excellence in the Arab region, Jordan needs to develop its scientific and technological capabilities in all fields, especially those in which specialized manpower is scarce in the Arab countries, in general, and in the Arab oil-exporting countries, in particular.

This Report:

Article seven of the law of the Higher Council for Science and Technology states that the Royal Scientific Society shall be one of the Council's scientific and research centres, and that the powers and authorities of the Society's Board of Trustees as prescribed in its articles of association shall be assumed by the Council. The situation became as such starting from October 17, 1987, when the aforesaid law was put into effect.

The following pages of this report give some information about the Royal Scientific Society, its aims, functions and capabilities, shed more light on its activities within the role it plays in the field of science and technology in Jordan and provide a summary of those activities performed in 1987 according to the sectors it interacted with during the year.

As I present this report to those who are concerned with the Society and its progress, I would like to express my deep thanks and gratitude to His Royal Highness the Chairman of the Higher Council for Science and Technology, the patron of this progress, for his relentless efforts in support and encouragement to the Society and its employees since it came into existence. My sincere thanks are also due to the honourable members of the Board of Trustees and the Higher Council for Science and Technology for their kind support and to all other people who deal with the Society and encourage it to achieve its goals in the service of our beloved Jordan.

Jawad Anani
President

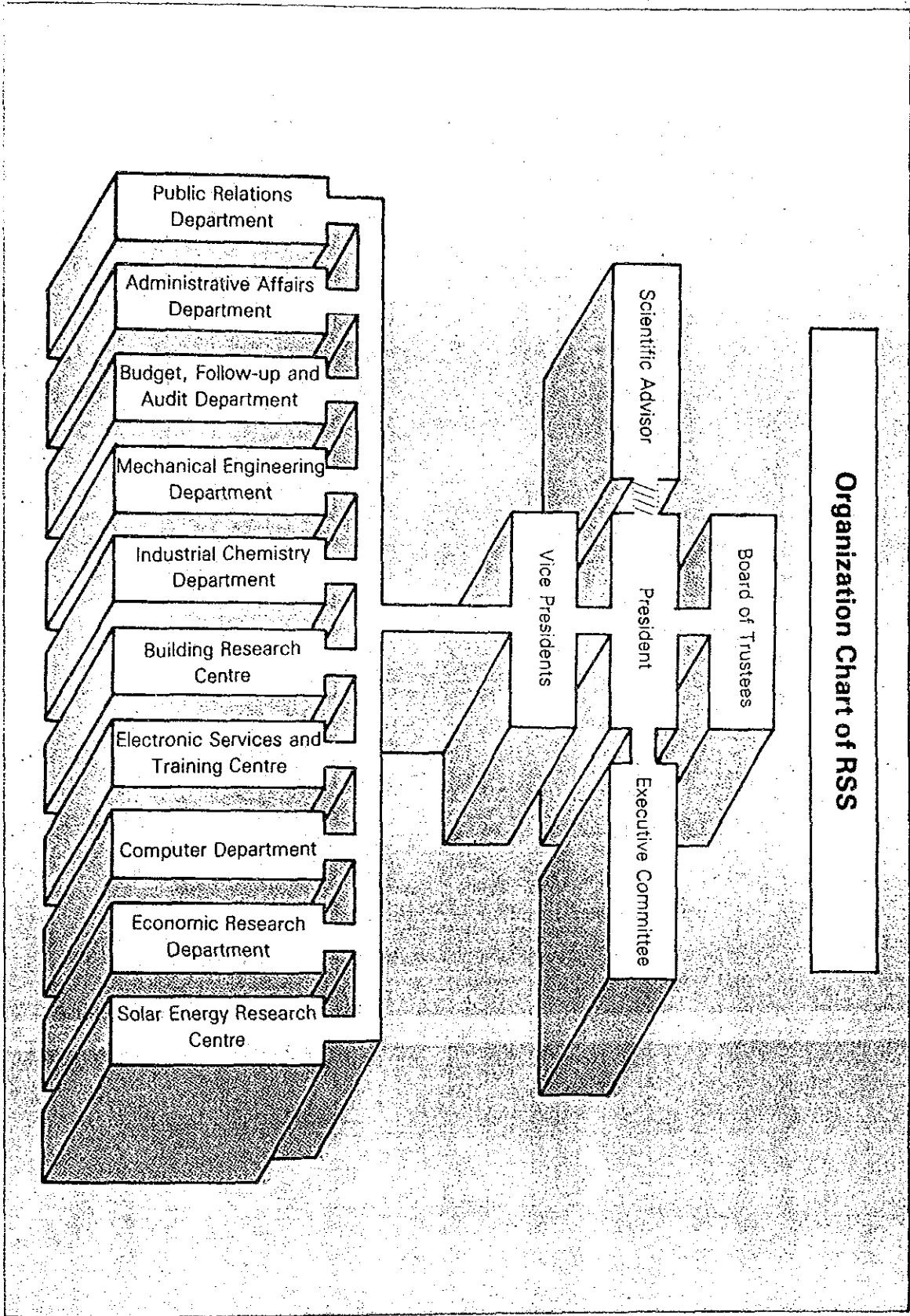
* Late in the year the Department of Budget, Follow-up and Audit was established and the Department of Information and Budget was reorganized to be known as the Department of Public Relations.

General Information

- The Royal Scientific Society was established in 1970 as a research and development institution to work in fields related to the development process in Jordan.
- RSS is a national institution enjoying financial and administrative independence.
- RSS has been made one of the scientific and technological centres of the Higher Council for Science and Technology, established in 1987 under the chairmanship of His Royal Highness Crown Prince El-Hassan, with the following eminent persons as members:
 - . The Commander-in-Chief of the Jordanian Armed Forces
 - . The Minister of Planning
 - . The Minister of Industry and Commerce
 - . The Minister of Finance
 - . The Minister of Higher Education
 - . The Minister of Energy and Mineral Resources
 - . The Minister of Agriculture
 - . The President of the Royal Scientific Society
 - . The Chairman of Amman Chamber of Industry
 - . The Council Secretary General
- In addition, there are three other qualified and experienced persons chosen by the chairman for four years.
- RSS is administered by a President, four Vice-Presidents and department directors.
- RSS started its activities at the offices of the Central Bank of Jordan. It then moved to a rented building in Amman before acquiring its present permanent site at Jubaiha, near Amman, which it occupied in February 1972.
- The area of the permanent site is 342,000 square metres.
- The buildings and laboratories cover a floor area of 28,127 square metres.
- The budget of RSS is derived from self-generated revenues from technical services and consultations, research contracts, an annual grant from the Government of Jordan, grants and donations from local institutions, and technical assistance from a number of industrial countries as well as from international and regional organizations.
- RSS consists of the following departments and centres:
 - . Mechanical Engineering Department

- . Industrial Chemistry Department
- . *Electronic Services and Training Centre*
- . Economic Research Department
- . Administrative Affairs Department
- . *Solar Energy Research Centre*
- . Building Research Centre
- . Computer Department
- . *Budget, Follow-up and Audit Department*
- . Public Relations Department

- RSS cooperates with a number of research institutions, universities, organizations, councils, centres and establishments at the Arab, regional and international levels through agreements, memoranda of understanding and contract research and studies.
- RSS is a member of several Arab, regional and international unions, federations, councils, associations, organizations and societies.

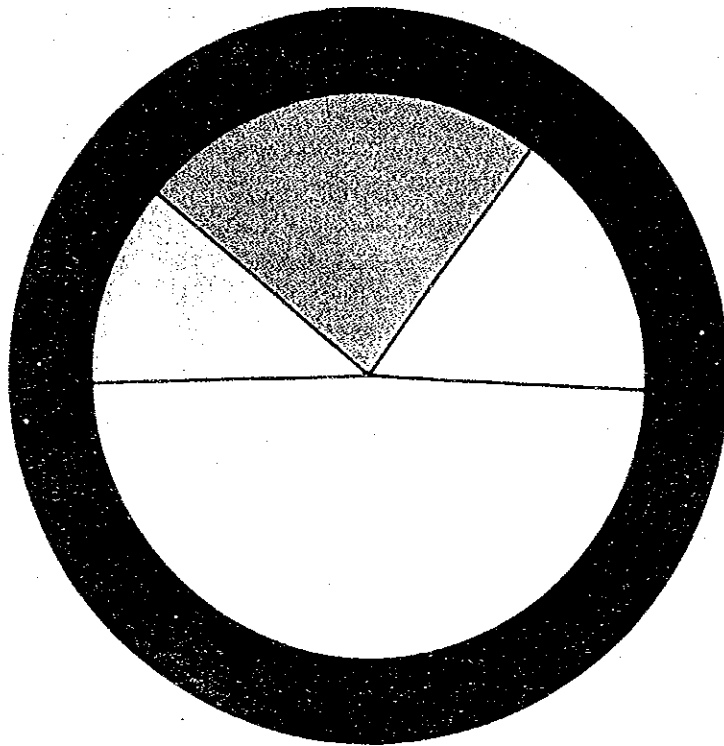


Organization Chart of RSS

Employees* , their Specializations and Departments

No.	Department or Centre	Ph.D.	M.A. & M. Sc.	Diploma	B.Sc. & B.A	Engineer Grad	Community College	General Secondary	Below Secondary	Total	Daily Workers
1	President Office	5	1	2	1	-	1	-	5	15	1
2	Mechanical Engineering	3	7	4	7	3	3	2	14	43	1
3	Industrial Chemistry	10	9	3	19	-	10	5	3	59	1
4	Building Research	5	11	4	22	1	16	11	17	87	2
5	Electronic Services and Training	2	4	5	12	2	6	9	20	60	1
6	Solar Energy Research	4	2	1	8	2	4	3	4	28	-
7	Computer	1	6	5	10	-	12	14	7	55	-
8	Economic Research	5	9	2	5	-	3	-	1	25	-
9	Administrative Affairs	-	2	1	12	-	8	6	42	71	8
10	Information and Budget	1	3	-	10	-	1	5	9	29	-
	Total	36	54	27	106	8	64	55	122	472	14

* Fifteen more employees are seconded to different institutions.



RSS employees according to their degrees

Aims And Functions

Aims

The Royal Scientific Society aims at conducting scientific and technological research and development work related to the development process in Jordan with special attention to industrial research and services. It also aims at disseminating awareness in the scientific and technological fields and at providing specialized technical consultations and services to the public and private sectors. It seeks to develop scientific and technological cooperation with similar institutions within the Arab world and internationally.

Functions

1. Carrying out studies and conducting applied scientific research related to industry in particular and to the various areas of development in general
2. Conducting economic and technical feasibility and analytical studies with regard to development projects which fall within the Society's scope of interest
3. Carrying out studies and research in the field of vocational and industrial education and producing books and publications in support of training and the industrialization process
4. Conducting research on a contract basis with institutions within Jordan and abroad
5. Carrying out joint research with scientific, production-oriented and service institutions at the national, Arab and international levels
6. Conducting research and development work leading to the production of prototypes for possible application in industry
7. Developing its laboratories, providing them with up-to-date equipment and orienting them towards serving the objectives of scientific and technological research and the needs of the public and private sectors
8. Carrying out tests and experimental work on materials as well as on finished and intermediate goods and providing related technical consultations to the users
9. Contributing to the solution of technical problems facing the various organizations, particularly industrial establishments
10. Cooperating with agencies concerned with the establishment of national technical standards and specifications and providing technical services

which would facilitate their application and ensure proper quality control of goods and materials

11. Attracting qualified Jordanian and Arab personnel and providing them with favourable working conditions
12. Upgrading human capabilities and technical skills through the provision of distinctive training opportunities
13. Producing books and other publications in the areas of science and technology which contribute to the effective dissemination of scientific and technological concepts
14. Preparing and servicing information systems in addition to processing, programming and implementing computer systems
15. Contributing to the transfer and adaptation of technology and selecting appropriate technologies related to the Society's scope and field of expertise
16. Cooperating in science and technology with local, Arab and other organizations for the purpose of exchanging information and expertise and conducting joint research
17. Developing the instruments of scientific and technological management, the methods of setting up national science and technology policies and providing consultations in this regard at the national and Arab levels
18. Contributing to the development of the Arab region through providing technical services and consultation and creating opportunities for highly specialized technical training

RSS Cooperation Relations with Arab and International Organizations and Institutions

RSS is connected with a good number of Arab and international organizations and institutions through:

A . Agreements or Protocols of Cooperation, with the following institutions:

- Arab Industrial Development Organization/Iraq
- Arab Organization for Standardization and Metreology/Jordan
- Islamic Foundation for Science, Technology and Development, Organization of Islamic Conference/Jeddah
- Scientific Research Council/Iraq
- Kuwait Institute for Scientific Research/Kuwait
- Academy of Scientific Research and Technology/Arab Republic of Egypt
- King Abdul Aziz City for Science and Technology/Kingdom of Saudi Arabia
- The Academy of Sciences of the USSR
- Scientific and Technical Research Council of Turkey/Turkey
- Renewable Energy Development Centre (Centre de Developpement des Energies Renouvelables) /Morocco
- National Technical Information Service/USA
- Council of Scientific and Industrial Research/India
- Council of Scientific and Industrial Research/Pakistan
- Friedrich Ebert Stiftung/West Germany
- German Agency for Technical Cooperation (GTZ)/West Germany
- Cambridge Applied Nutrition, Toxicology and Biosciences Group (CANTAB)/United Kingdom

B . Membership in the following organizations:

- Federation of Arab Scientific Research Councils/Iraq
- Intergovernmental Bureau of Informatics (IBI)/Italy
- World Association of Industrial and Technological Research Organization (WAITRO)/ Denmark
- International Council of Scientific Unions (ICSU)/ France
- International Foundation of Science (IFS)/ Sweden
- International Association for Housing Science/ USA
- The International Federation of Institutes for Advanced studies (IFIAS)/ Canada
- International Measurement Confederation (IMEKO)/ Hungary

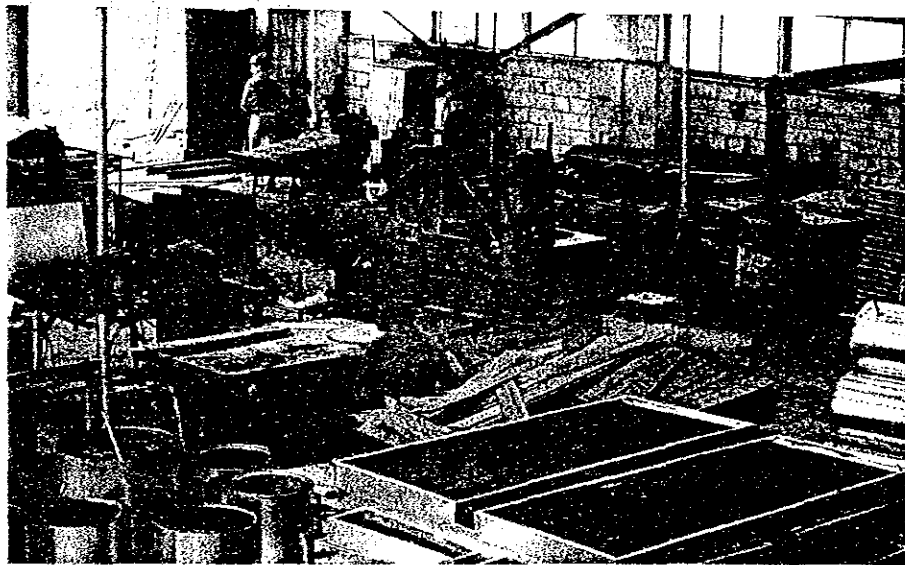
**Major Activities
in 1987**

Projects

Research and Development

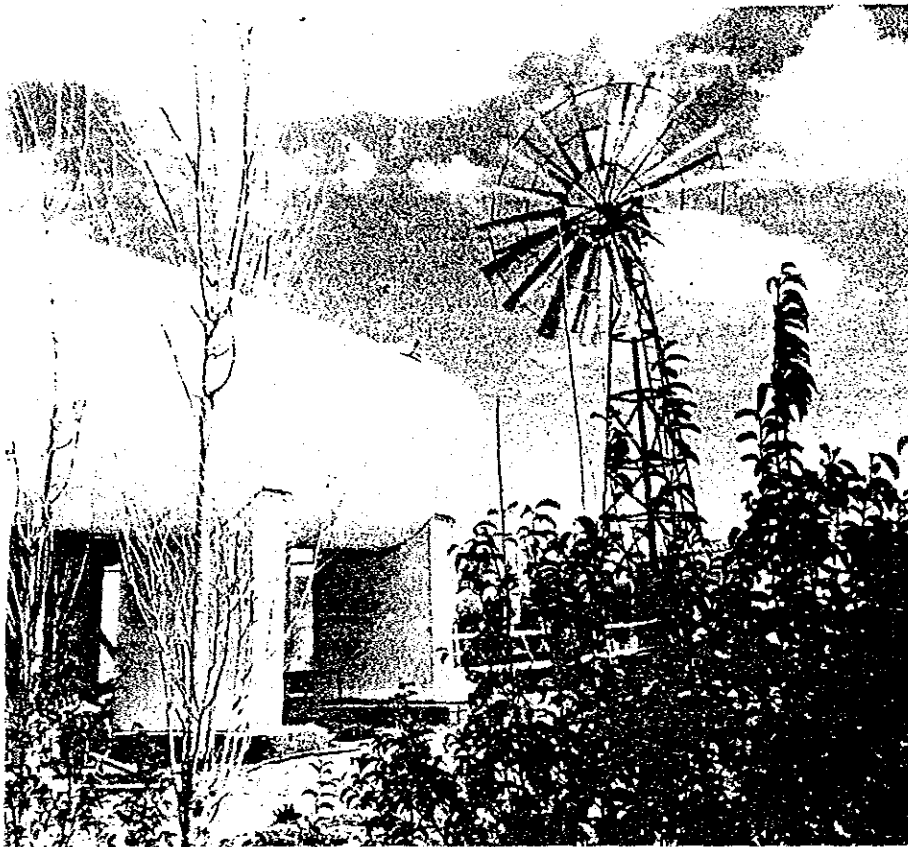
In the Field of Energy

In 1987, RSS worked on several activities in this field including the utilization of renewable sources of energy, photovoltaic applications, power conservation, insulating materials and architectural climatic design. Under these activities, RSS worked on projects for supplying remote areas with electricity, deep-well water pumping, developing solar water heaters for both domestic and industrial purposes and drafting manuals on insulating materials and architectural climatic design. The most important projects in this field were as follows:



Manufacturing Solar Water Heaters according to RSS Designs

- 1 - Passive Solar Systems
- 2 - Climatic Design Manual
- 3 - Handbook of Thermal Insulating Materials
- 4 - Development of Solar water Heaters for Domestic use
- 5 - Development of Water Pumping Systems by Solar Energy - in cooperation with the Scientific Research Academy in the Arab Republic of Egypt
- 6 - Electrification of Remote Areas by Solar - and - Wind Energy
- 7 - Deep - Well Water Pumping by Wind Energy
- 8 - Deep - Well Water Pumping by Solar Energy
- 9 - Photovoltaic Applications for Remote Areas
- 10- Development and Improvement of Solar Water Heaters
- 11- Industrial Applications of Solar Water Heaters
- 12- A Feasibility Study for Developing Thermal Insulating Materials from Local Raw Materials



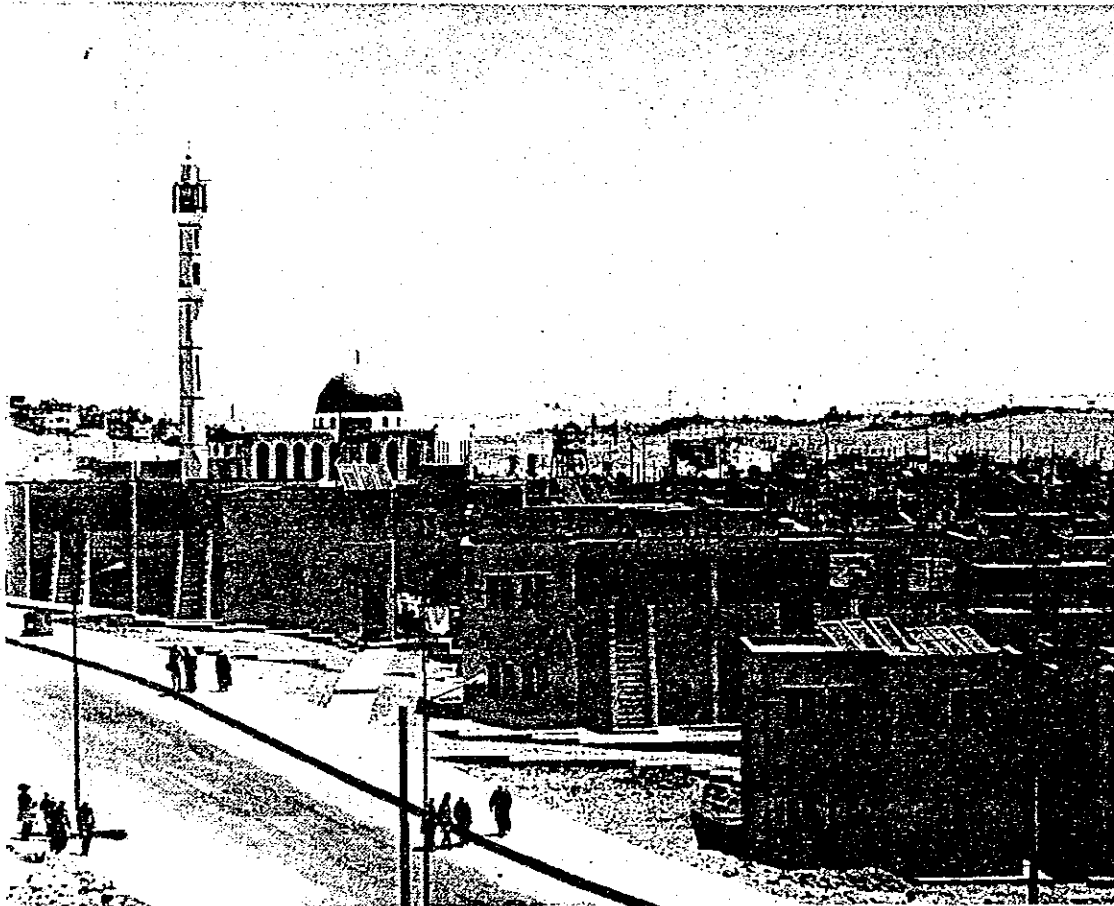
Solar and Wind Energy Water Pumping Station-Jurf Al-Darawaash

In the Field of Construction:

RSS activities in this area cover a wide variety of aspects pertaining to construction with the aim of improving and upgrading the building and construction industry in Jordan. In 1987, these activities included developing building systems for low-income people, studying the Jordanian aggregate used in concrete mixes, preparing the National Building Code and conducting studies on concrete mixes and on safety at project sites.

Following are the major projects that RSS worked on during this year:

- 1 - A Study on Concrete Mixes Produced from Gap - Graded Aggregate
- 2 - A Study on the Effect of Aggregate and its Gradation on the Mineral Voids in Asphalt Mixes
- 3 - Manual of Safety at Construction Site - in cooperation with the Iraqi Council for Scientific Research
- 4 - Jordan National Building Code



Building System No.5 Applied in Prince Talal Housing Project - Ruseifeh

- 5 - Building System No. 5 (a building system for low-income people developed by RSS)
- 6 - A Study on the Potential Alkali Reactivity of Chert when Employed as Aggregate in Concrete

In the Field of Industry and Standards and Specifications

Conducting applied industry-oriented scientific research and studies is one of the basic functions of RSS. Its activities in this field in 1987 included developing new products of better quality, designing and producing electronic systems and equipment, participating in drafting standards and specifications, ensuring compliance of foreign and local products with local and international standards and conducting quality control tests.



Applying Quality Control on Paint Industry in Jordan

In this field, RSS worked on the following major projects:

- 1 - A Study for Developing Exterior Paints
- 2 - A Research Study for Developing and Producing Multilayer Plastic Films by Utilizing Recycled Materials - in cooperation with Mc Gill University
- 3 - Quality Control on Concrete Products
- 4 - The Effect of Weather and certain Surfaces on Paints
- 5 - Arabization of the Flight Information Display System at Queen Alia International Airport
- 6 - Development and production of Traffic Light Controllers
- 7 - Design and Production of Prayer-Call Receivers and Amplifiers
- 8 - Production of Various Electronic Devices, namely:
 - 145 amplifiers
 - 25 Street-Light Activated Switching Units

- 10 Microprocessor Trainers
- 9 - Production of Portable Telecommunication Systems
- 10- The Development of Jordanian Specification No. 96 "Concrete Aggregate"

In the Field of Information and Computer Applications

RSS continued in 1987 conducting research and studies in the computer field and disseminating computer technology and applications. Its activities in this field during this year included establishment of data banks for various purposes, computerization of operations and designing and programming information systems.

In addition, RSS has become the scientific and technical arm of the National Information System, and thus the authorized centre of scientific and technological information in Jordan which coordinates and manages data, and makes it available to decision makers and researchers.

The major projects that RSS worked on this year in this field are as follows:

- 1 - The Establishment of RSS Scientific and Technological Data Bank
- 2 - The Establishment of the Employment Data Bank for the Ministry of Labour and Social Development
- 3 - The Establishment of an Alphabetical Estate Index for the Lands and Survey Department
- 4 - Computerization of the Activities of the General Union of Welfare Societies
- 5 - Computerization of the Activities of the Prime Ministry
- 6 - Establishment of the Housing Data Bank for the Housing Corporation
- 7 - Designing and Programming Information Systems for the Industrial, Commercial and Agricultural Company
- 8 - Computerization of the Activities of the Civil Service Commission and the Institute of Public Administration.

Research and Studies

In the Field of Energy

RSS research and studies in the field of energy in 1987 centred around promoting the utilization of renewable energy sources and finding out means for energy conservation and consumption rationalization. One of the major studies carried out by RSS this year was "The Thermal Performance and Properties of a Fibre Glass Solar Screen Used for Window Shading".

In the Field of Construction

In 1987, RSS proceeded in carrying out research and studies in the various fields of the construction industry with the aim of upgrading the efficiency of buildings and bringing about new designs and systems. The projects that RSS worked on this year included, *inter alia*, a Handbook of Architectural Heritage in Jordan and a Study on the Locally Made Concrete Pipes.

In the Field of Industry

RSS carries out research and studies dealing with the various aspects of the industrial sector. In 1987, activities in this field included conducting technical and economic feasibility studies, market surveys, finding solutions for technical problems as well as studies for upgrading quality of products.

Following are the major studies that RSS worked on during 1987 in this field:

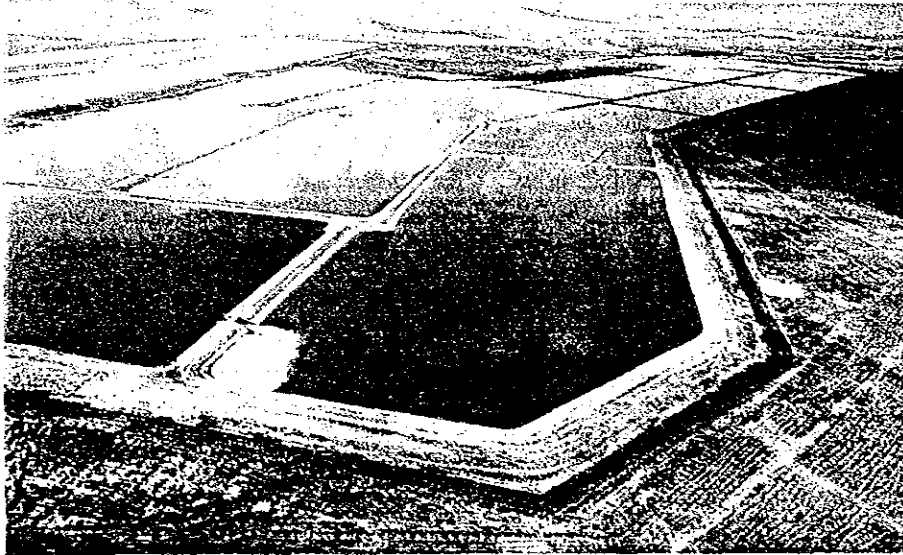
- 1 - A Feasibility Study for Establishing an Orange and Grapes Juice Industry in Hebron
- 2 - A Feasibility Study for Establishing a Vegetable Oil Industry in Bahrain
- 3 - A Survey of the Textile Industry in Jordan
- 4 - A Study of the Vegetable Oil Sector in the Sudan
- 5 - The Effect of Weather and Chemicals on the Anodized layer of Aluminium Sections
- 6 - Pneumatic-Type Conveying Systems

In the Field of Environment and Public Safety

Environment monitoring is one of the main priorities of the Royal Scientific Society. Within this context, RSS regularly conducts research and studies aimed at monitoring Jordan's environment and identifying the pollutants affecting it. In this regard, RSS pays special attention to water and air environments and keeps close control on water basins and waste water treatment plants.

Another area of interest to RSS in this field is public safety. In 1987, RSS worked on research and studies covering a variety of issues such as dangerous chemicals, medical gases and the quality of bread. Following are the major projects which RSS worked upon during this year:

- 1 - The National Project for Monitoring Water Pollution in Jordan
- 2 - A Study on Al-Khirba Al-Samra, Waste Water Stabilization Ponds
- 3 - Monitoring Water in King Talal Dam
- 4 - Monitoring Air Pollution
- 5 - Monitoring Waste Water Treatment Plants
- 6 - A Study on Handling Dangerous Chemicals
- 7 - A Study on Medical Gases
- 8 - A Study of Bread Quality in Jordan



Al-Samra Stabilization Ponds

In the Field of Information and Computer Applications

RSS carries out research and studies pertaining to all aspects of computer applications and assists other institutions in computerizing their activities.

In 1987, RSS completed the following projects:

- 1 - A Study of the Requirements of the Prime Ministry
- 2 - Reviewing a Study for the Computerization of the Activities of the Ministry of Public Works.

In the Field of Economy and Manpower

In 1987, RSS proceeded in undertaking applied economic research and studies in support of the socio-economic development process in Jordan. The studies it worked on this year included feasibility studies for productive projects, activities of the economy of Jordan and its relationship with the other Arab and world economies, socio-economic studies as well as studies on the local labour market and unemployment.

Following are the major studies that RSS worked on this year:

- 1 - Feasibility Study of an Integrated Manufacturing of Solar Water Heaters between Jordan and Egypt
- 2 - Import Capacity and Economic Growth in Jordan (1973-1985)
- 3 - Institutionalization of the Export Promotion Strategy
- 4 - The Perception of Jordanians Doing Business with the United States
- 5 - Pre-Feasibility Study for Expanding the Offloading Machinery Capacity of Aqaba Grain Silos
- 6 - Organization and Management of Agricultural Services for Small Farmers in Jordan
- 7 - Status and Prospects of the Jordanian Labour Market
- 8 - Unemployment Problem in Jordan: Characteristics and Prospects
- 9 - The Economic and Social Status of Baq'a Camp
- 10 - A Study of the Scientific and Technological Potential in Jordan
- 11 - The Experience of the Royal Scientific Society as a Research Institution: Analysis and Evaluation.

In the Field of Science Education and Popularization

RSS produces and publishes reliable and well-authenticated science books in Arabic for child and adult levels. To achieve this function, it runs four programmes under which various books are issued.

These four programmes are:

- 1 - Simplified Science and Technology Popularization Books
- 2 - Science Books for Children and Young Adults
- 3 - Science and Mathematics Translations
- 4 - Scientific Studies.

Within these programmes RSS worked on the following books in 1987 (all in Arabic):

- 1 - Computer Applications
- 2 - Domestic Maintenance
- 3 - Tortoises and Turtles
- 4 - The Mammoth
- 5 - Blood
- 6 - The Computer
- 7 - Nuclear Reactors and the Chernobyl Incident
- 8 - The Process of Unification in Field Physics
- 9 - Space Travel

Reports and Studies

In 1987 RSS issued around (36) studies and reports covering the various activities it performed within its different fields of competence. The studies and reports prepared in Arabic include economic surveys and feasibility studies, monitoring water treatment plants and water environment in Jordan, handling hazardous chemicals, quality of bread in Jordan, renewable energy technologies and concrete pipes.

Meanwhile, the studies and reports prepared in English were as follows:

- A report on the installation of two different large solar water heating systems (GTZ)
- 2 reports on the improvement and development of flat plate collectors (GTZ)
- A report on testing and evaluation of solar water heating systems (GTZ)
- A report on the determination of national standards of flat plate collectors (GTZ)
- A report on the design of various large systems (GTZ)
- A report on manufacturing of solar water heaters for industrial applications (UNDP)
- A report on testing and evaluation of wind energy converter systems
- A report on the selection and purchase of windmills equipment and instruments
- A report on the utilization of solar and wind energy to supply basic needs in remote areas (UNDP)
- A report on the selection and purchase of photovoltaic systems components
- A report on outdoor testing of photovoltaic modules and systems (EEC)
- A report on the assessment of solar radiation (GTZ)

Technical Services

RSS rendered more and more of its distinct technical services in 1987 to various institutions from both the public and private sectors. These services covered conducting tests and analyses with the aim of applying quality control on materials and identifying their conformity with local and international standards and specifications. The various fields of competence of RSS were involved in these services as follows:

In the Field of Energy

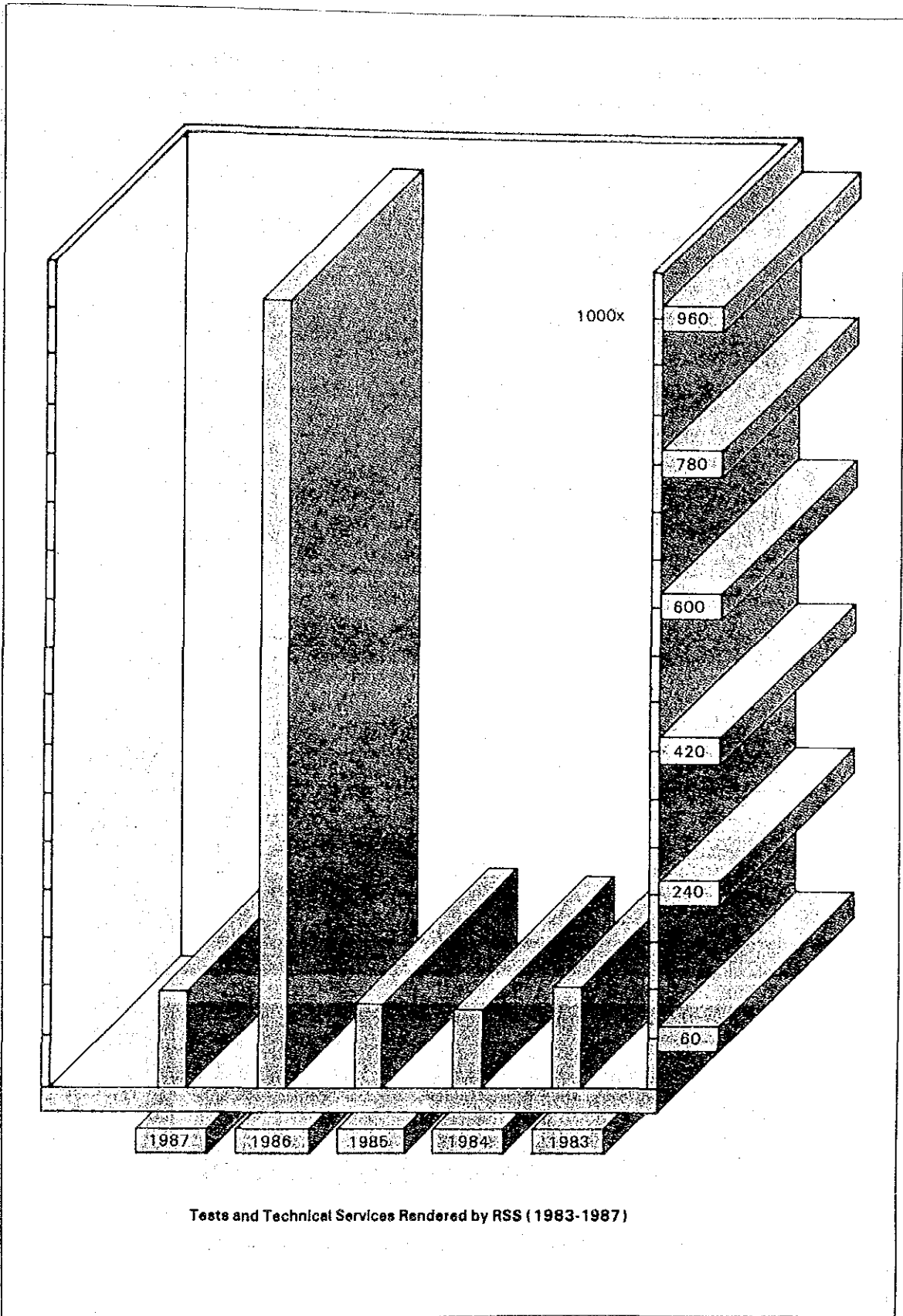
- (76) tests on a number of imported and locally made solar collectors
- (5) tests on solar water heating systems for some local companies

In the Field of Environment and Public Safety

- (75) tests on insecticide samples for (15) institutions
- (1233) tests on the aflatoxin compounds in feedstuffs and nuts
- (23496) chemical tests on various water samples
- (75) tests to identify metal elements in flour and bread
- (25) analyses on samples of tomato sauce to check the availability of detrimental elements and insecticides therein
- (6400) tests on foodstuff samples to make sure that they are free from radiation

In the Field of Construction

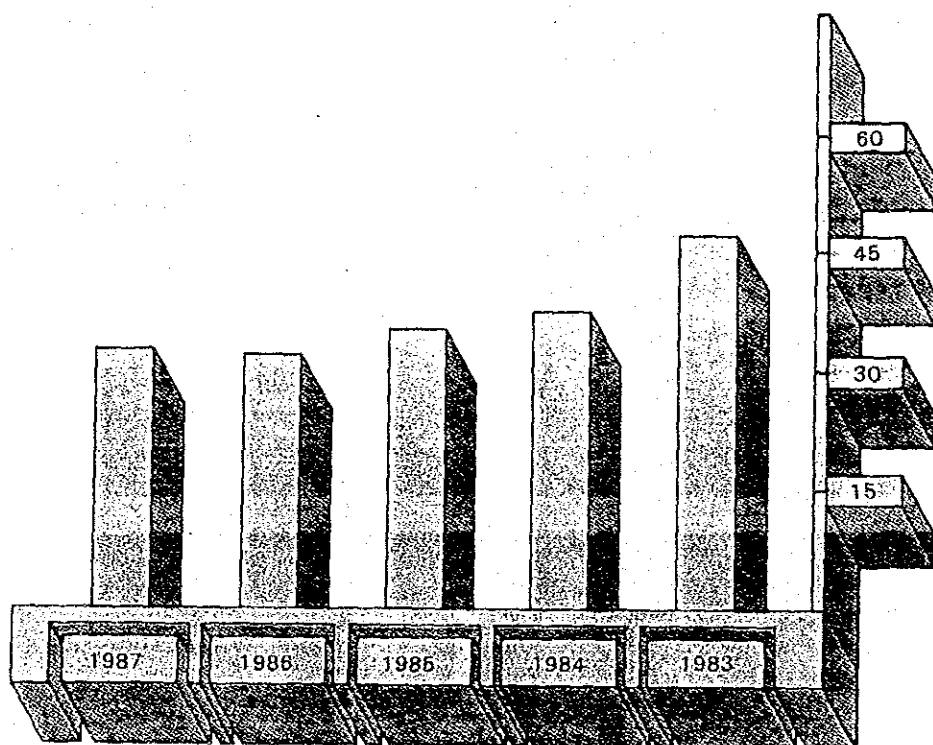
- (3) building models for some local companies. Work has also been commenced on producing models for all RSS buildings
- (2833) tests on aggregates and stone building blocks for (312) establishments
- (17698) tests on cement and concrete products for (1381) establishments
- (202) tests on various constructional elements and materials.
- (66) technical services in the field of calibrating and maintaining building materials laboratory equipment
- (3525) tests on the soil and foundations of damaged buildings to identify the causes for such damages and to propose possible remedial works. These tests also included soil testing and classification.
- (14022) tests for the application of quality control on concrete products for (2687) establishments
- (1457) laboratory tests in the field of bituminous material services
- (2149) tests on samples of cement, sand, aggregates and other building materials



Tests and Technical Services Rendered by RSS (1983-1987)

In the Field of Industry and Standards and Specifications

- (12154) tests on different sorts of foodstuffs and detergents for more than (375) establishments
- (5100) tests on samples of fresh and used lubricants for (83) establishments
- (9239) tests on samples of various types of paints and intermediary materials used in the paint industry
- (1278) tests to check the quality of imported and locally made electrical and electronic equipment
- (4515) tests on samples of ceramic, tiles and sanitary fittings
- (6327) tests on locally made metal materials, such as reinforcement steel bars, mesh steel bars, steel pipes, steel heat radiators, metal alloys and cast iron sanitary pipes and fittings.
- (1551) chemical tests on samples of alloys and some minerals for (37) establishments
- (247) metallography tests
- (200) Industrial radiography tests on joints of welded pipes and tanks
- (211) tests on samples of locally made and imported lead-acid batteries
- (565) tests on leather, paper and textile samples
- (1400) tests on samples of plastic and rubber materials and products
- (500) tests on different industrial materials and products



National Specifications Committees in which RSS Participated (1983-1987)

Moreover, RSS rendered the following maintenance services:

- Repair and calibration of (120) testing and maintenance apparatus for the Telecommunications Corporation, the Civil Aviation Authority, Royal Jordanian, Iraqi Airlines, the Iraqi Standardization Centre, the Royal Jordanian Geographic Centre and some other local companies
- Repair and maintenance of (2578) medical, telecommunications, electrical and electronic equipment for the Ministry of Health, Natural Resources Authority and Civil Registration Department

In the Field of Information and Computer Applications

- Actuarial statistics for the Social Security Corporation, through issuing statistical reports pertaining to the actuarial studies about social security
- Health education statistics, through issuing statistical reports on the findings of the survey of the primary health care coverage in Jordan
- Telephone directories for Amman and the other governorates, through preparing the basic lists required for production and a telephone exchange directory including the continuous updating thereof
- Supervision of the Computer Centre of the Ministry of Health and the maintenance of its application systems programmes
- Issuing about (3) million telephone and telex bills for the Telecommunications Corporation
- Issuing the monthly payrolls of the Telecommunications Corporation, the Ministry of Labour and Social Development, the Ministry of Transport, Marriott Hotel, the Royal Scientific Society and the pensions of the retired
- Issuing the results of the Jordanian Medical Council Examinations
- Following up the updating of the Social Security Corporation data bank
- Following up the updating of the Alphabetical Estate Index of the Lands and Survey Department

Technical Consultation

Throughout the year, RSS provided technical consultation to various institutions from the private and public sectors. Following is a summary of the consultations provided within RSS various fields of competence:

In the Field of Construction

- (23) consultations on architectural, constructional and electro-mechanical works
- (2) consultations for the evaluation of the paints used in housing projects of the Electricity Authority and the Fertilizers Company in Aqaba

In the Field of Environment and Public Safety

- (6) consultations on bread quality and foodstuffs contaminated with heavy metals, aflatoxin or insecticides
- (36) consultations in the field of water and pollutants of soil and surface and underground water
- (1) one consultation to measure the radiation level at the X-ray and Gamma ray unit of the Islamic Hospital

In the Field of Industry and Standards and Specifications

- (3) consultations in the fields of raw materials and construction industry
- (4) consultations on paints
- (12) consultations on the standards and specifications of different electronic equipment
- (20) consultations for identifying the suitability of some materials and products and finding out the causes for any technical problems therein

Furthermore, RSS participated in four technical committees in the field of industry evaluation.

In the Field of Information and Computer Applications

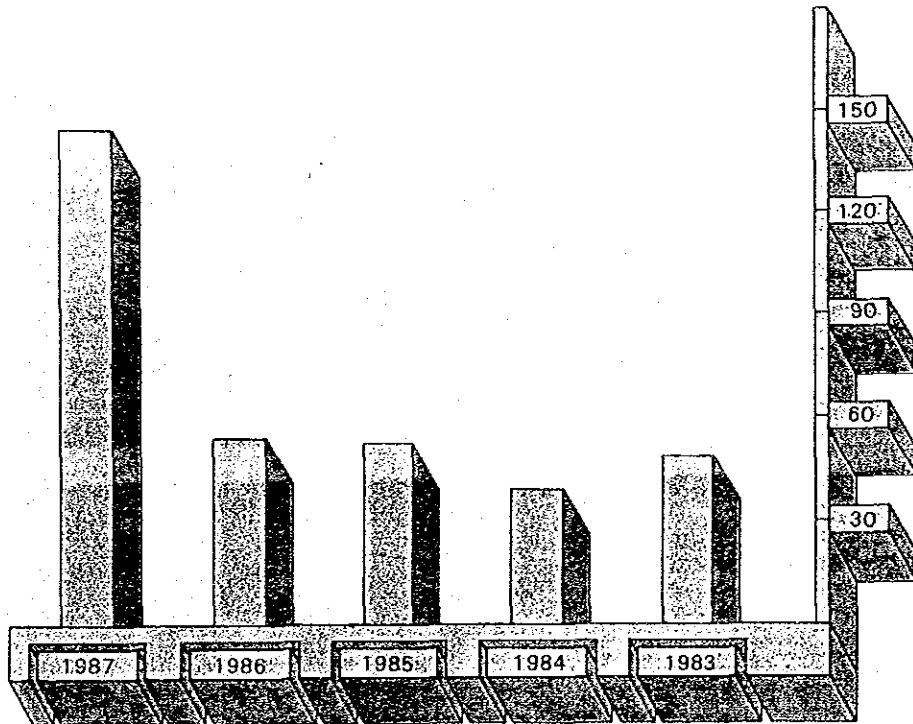
- Technical consultations to Jordan Valley Authority
- Reviewing the works of two contractors establishing a socio-economic data bank as well as irrigation administrative data system in the Jordan Valley
- Supervising the establishment of a computer centre in the Jordan Valley.

Training

The importance of intermediate and advanced technological training has emerged in consequence of technological developments achieved during the last twenty five years, which required a new type of experienced technician. Hence, the training system at present faces a considerable challenge of setting up specialized training programmes devoted to providing highly qualified technicians.

Modern specialized training, whether technical or otherwise, contributes effectively to technology transfer since most modern technical equipment represents scientific systems which consist of different technological elements.

The user ought to familiarize himself with these elements in order to operate easily the equipment, maintain it and solve its problems when they occur. Taking this into consideration, RSS concentrates on highly specialized professional training which depends on the modern approach in respect to subject, style and method of execution.



Training Courses Attended by RSS Employees (1983-1987)

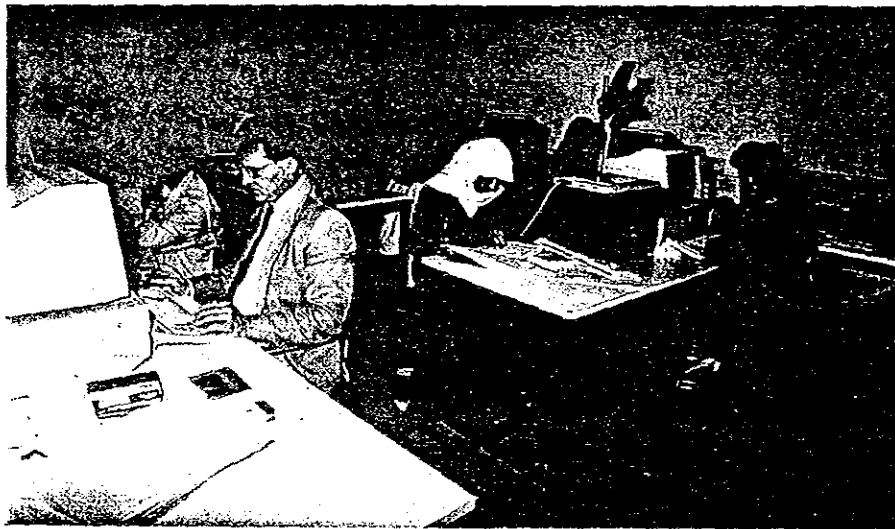
To put all this into practice, RSS has established a specialized training unit to function within the context of the following principles:

- To relate specialized technological training to industry
- To formulate training programmes that respond to the needs of manpower and labour market, in cooperation with relevant public and private institutions in Jordan and other Arab countries
- To produce training and educational packages for advanced fields in accordance with the latest technological systems
- To train in new and advanced technologies.

Most prominent among the training fields which RSS concentrates upon are the following:

- Specialized top management training in the fields of industrial management, information systems and data bank management, project management and management of negotiation, contracts and contract formulation
- Engineering and industrial design with the aim of building up a local technological capability to decrease the country's dependence on imported technology and its products.
- Maintenance of electronic equipment
- Advanced technology and the latest developments in the field.
- Other technical specializations in the fields of energy, building, industrial chemistry, mechanical engineering and computer applications
- Computer programming and systems analysis

The following categories benefited from the specialized training activities held by RSS in 1987:



Practical Training-Princess Sumaya College for Informatics

- (14) students from Jordanian universities, community colleges and the Geologists Association were trained in the construction field
- (50) students were graduated from Princess Sumaya College for Informatics
- (352) persons were trained in different areas of computers through (22) training courses organized by RSS
- (34) university and community college students were trained in the field of industrial chemistry
- (17) students from Jordanian, Saudi and Iraqi universities were trained in the field of mechanical engineering
- (127) students from community colleges and educational centres were trained in the field of administration

At the same time RSS never forgot the development of its own employees, but it kept training and providing them with new skills in the different fields of their specializations and created appropriate opportunities for that. In 1987 a total number of (142) employees were trained, as follows:

- (55) employees in the field of administration
- (25) employees in the field of computer applications
- (14) employees in the field of technological equipment
- (13) employees in the field of environment and public safety
- (13) employees in the field of quality control
- (6) employees in the field of energy
- (16) employees in the fields of construction, engineering design and others

Conferences and Seminars

In accordance with its objectives to disseminate knowledge in the field of science and technology, promote cooperation with other institutions inside and outside Jordan and address development needs and problems, RSS held and participated in the organization of the following conference, meetings and seminars during 1987:

- The Near East Regional Conference on Access to Scientific and Technical Information, held on January 26-28 in cooperation with the National Technical Information Services of the U.S. Department of Commerce
- The Second Seminar on Handling and Dealing with Hazardous Chemicals, held on March 4
- Seminar on Mitigation of Earthquake Risks in Jordan, held on July 11-15 in cooperation with the Ministry of Planning and UNESCO



Regional Meeting on National Informatics Policies and Strategies in the Arab States

- Seminar on the Marketing Problems Facing Arab Fertilizers and Petrochemical Products and their Effect on the Future Investment in this Industry, held on September 22-25
- Seminar on Energy in Rural Areas and Woman Needs, held on October 5-8 in cooperation with the United Nations Food and Agriculture Organization (FAO)
- Expert Group Meeting on Strengthening Research and Development Capacity and Linkages with the Production Sectors in Countries of the ESCWA Region, held on November 15-19 in cooperation with ESCWA
- Expert Group Meeting on Low-Cost Building Materials, held on November 16 in cooperation with ESCWA
- International Seminar on the Transfer of Computer Technology, held on November 23-25
- Seminar on Economic Integration and Jordan-EEC Relations, held on November 28-29 in cooperation with Yarmouk University, University of Jordan and Oxford University
- Regional Meeting on National Informatics Policies and Strategies in the Arab States, held on December 7-9 in cooperation with UNESCO Regional Office for Science and Technology in the Arab States
- Seminar on the Unemployment Problem in Jordan: Characteristics and Prospects, held on December 14
- Seminar on Import Capacity and Export Promotion Strategy in Jordan, held on December 28.

In addition, RSS participated through its employees in a number of conferences, seminars, meetings and workshops in relation with its fields of specialization held at the national, regional and international levels in Jordan and outside.

Visitors

As usual, RSS received a good number of visitors during the year. In addition to the official guests and visitors listed below, a large number of individuals and groups from local institutions, such as schools, colleges, universities, societies, companies and government departments paid visits to RSS either to get an idea about the Society's activities and projects or for scientific purposes.

Following is a chronological listing of the most eminent guests and visitors:

- | | |
|---|--------------|
| — Her Majesty Queen Noor | January 1 |
| — The Deutch Ambassador to Jordan | February 2 |
| — The Swiss Ambassador to Jordan | February 2 |
| — Marshal (R.) Abdelrahman Swar Eldahab, the Former Sudanese President | February 2 |
| — A Canadian parliament delegation | February 23 |
| — A delegation from the Overseas Development Mission in Amman | March 10 |
| — The East German Minister of Higher Education | April 6 |
| — The Belgian Foreign Minister | April 15 |
| — The Crown Prince of Bahrain | August 11 |
| — The West German Minister of Economic Cooperation | August 8 |
| — The Chairman of the European Council for Science | September 15 |
| — General Mohammad Zia Ul Haq, the President of Pakistan | October 5 |
| — The Crown Prince of Liechtenstein Principality | October 28 |
| — The Governor of North Sinai | October 28 |
| — A Japanese delegation representing the Export-Import Bank of Japan | October 30 |
| — The Chairman of Mc Millan Publishing House, U.K. | October 31 |
| — The Danish Minister of Energy | November 30 |
| — The President of the Scientific Union and International Relations Institute of the Academy of Science in the Soviet Union | December 1 |
| — The Norwegian Minister of Petroleum and Energy | December 28 |

Future Outlook

The Royal Scientific Society, as an effective research and development institution in the field of science and technology, feels that it has to keep up with the latest developments and innovations in that field. In accordance with this perception, it had, first, to rearrange its priorities, upgrade its scientific and technical capabilities and develop its specialized personnel in order to become better prepared for the new work areas it intends to enter. Within this context come, for example, the efforts it exerts to upgrade the function of scientific research it carries out, to give it more attention and maintain a more efficient balance between research and specialized technical services. Another example is the practical steps which have been taken to introduce computer into the operations of the Society's departments and centres in order to make it the common language for handling these operations, especially in relation with scientific research. Necessary equipment has been acquired and suitable training has been conducted while studies and the required programmes have been prepared.

Prominent among the new specialized areas, which RSS is looking forward to entering, are biotechnology, computer-aided engineering design, informatics, computer manufacturing, fibre optics, applied systems analysis, highly specialized professional training, project formulation for industrial purposes, patents and investment in science and technology.

RSS has undertaken considerable measures towards achieving these aspirations. A patent office, an applied systems analysis unit, a unit for highly specialized professional training have been established at the Society in addition to a technology development fund that serves as an investment outlet for turning technological accomplishments into feasible investment projects that enable RSS to reinforce its effective role in the development of Jordan and the Arab region. Moreover, contacts have been conducted and agreements have been signed with the relevant bodies inside and outside Jordan. Efforts are being exerted to secure assistance and expertise through specialized foreign agencies for establishing a biotechnology research centre and a computer-aided engineering design centre. Measures are underway to establish a standards and specifications centre in cooperation with the Ministry of Industry and Trade, an environment research centre in cooperation with the Ministry of Municipal and Rural Affairs and the Environment and a radiation protection centre. Furthermore, RSS has secured a nearby plot of land for the establishment of a science park which will, in cooperation with the universities and industrial sector, convert the findings of scientific and technological research into industrial projects.

RSS believes that these aspirations and efforts exerted to achieve them will enhance its endeavour to become an advanced scientific and technological centre which serves the development purposes in the region, starting with Jordan, of course. In accordance with this endeavour, RSS has recently established, in cooperation with the concerned Yemeni parties in Sana'a, a Jordanian - Yemeni technical centre for investment to act as an appropriate communication and cooperation channel through which the services required in the two sister countries can be fulfilled.

RSS also believes that to cover and get involved in the fields of investment, industrialization and services in cooperation with the private sector is an integral part of its work. Therefore, it has established the Technology Development Fund to be its investment arm that adopts promising ideas and converts them into feasible investment opportunities reassuring the linkage between investment and research and development.

All this shows that numerous steps have been taken to reinforce the leading role RSS plays in Jordan and the rest of the Arab world to maintain its dynamism and continuous efforts for the good of the community and its growth in Jordan.

6. RSS情報システム局概要

COMPUTER SYSTEMS DEPARTMENT





Introduction

The Royal Scientific Society (RSS) aims at conducting scientific and technological research and development work related to the development process in Jordan, with special attention to industrial research and services. It also aims at disseminating awareness in the scientific and technological fields and at providing specialized technical consultations and services to the public and private sectors. It seeks to develop scientific and technological cooperation with similar institutions within the Arab world and internationally.

The RSS was established in 1970, as a non-profit institution enjoying financial and administrative independence. It is presided over by a Board of Trustees chaired by HRH Crown Prince Hassan; it is administered by a President assisted by two vice presidents, an adviser and department directors.

The departments at RSS are: Mechanical Engineering Department, Solar Energy Research Center, Industrial Chemistry Department, Building Research Center, Electronic Services and Training Center, Computer Systems Department, Economic Research Department, Information and Budget Department, Administrative Affairs Department, and the Printing Press. The RSS encompasses 31 specialized technical laboratories distributed at the following departments: Mechanical Engineering Department, Building Research Center, Electronic Services and Training Center, and the Industrial Chemistry Department. These laboratories conduct industrial applied research and tests on all materials and products and provide technical consultations to the various sectors.

The RSS has 454 employees: 35 Ph.D., 40 M.Sc. and M.A., 28 post-graduate diploma, 88 B.Sc. and B.A., 18 Ing. Grad. and 73 technicians. The area of the permanent site of RSS is 94 acres and its premises comprise 12 buildings with a total floor area of 24300 square meters.

The RSS cooperates with a number of research institutions and universities at the Arab, regional and international levels through a system of agreements, memoranda of understanding, research support schemes and joint research projects.

This brochure includes information on the Computer Systems Department at the Royal Scientific Society. The Department was established in 1971 with the objective of introducing the technology and utilizing computer systems in the various administrative and scientific fields in Jordan. The Department has succeeded in realizing this target to a great extent; many major firms in Jordan possess computer systems used in administrative applications. The Computer Systems Department is willing to cooperate with any Jordanian or Arab Institutions in this field.

The President

Dr. Fakhruddin Daghestani

Aims and Functions

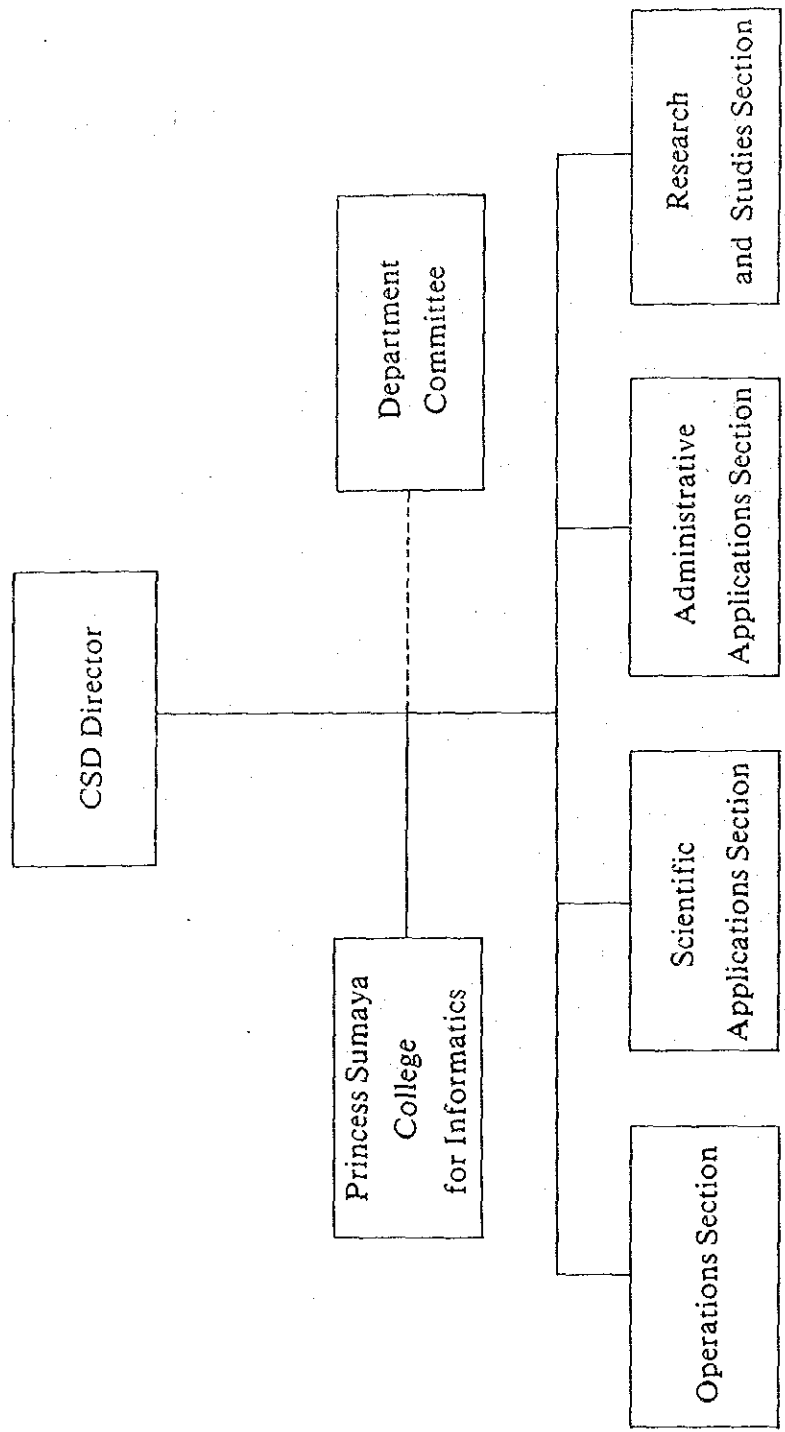
Aims

The Computer Systems Department (CSD) of the Royal Scientific Society (RSS) was established with the aim of developing computing capabilities in Jordan, and providing services and consultations to both the public and private sectors in the various fields of electronic data processing in the country.

Functions

- 1- Undertake management consultancy studies to establish integrated computerized management information systems for various organizations.
- 2- Establish and supervise the operation of local computer Centres.
- 3- Provide services and technical consultations in the gathering, storing and processing of data to provide the required information to the various organizations served.
- 4- Design, program and develop application systems compatible with Jordan's needs and applicable to its projects.
- 5- Perform research and development in the field of data processing.
- 6- Define and prepare specifications for computer hardware and software applications.
- 7- Participate in the preparation of national standards in the field of computers and their applications.
- 8- Develop and train personnel in the electronic data processing area and make them available to other Jordanian organizations as well as to other Arab countries.
- 9- Exchange of information and expertise in the field of data processing with similar organizations, both locally and outside Jordan.

Organizational Structure of the Computer Systems Department



The Department Sections

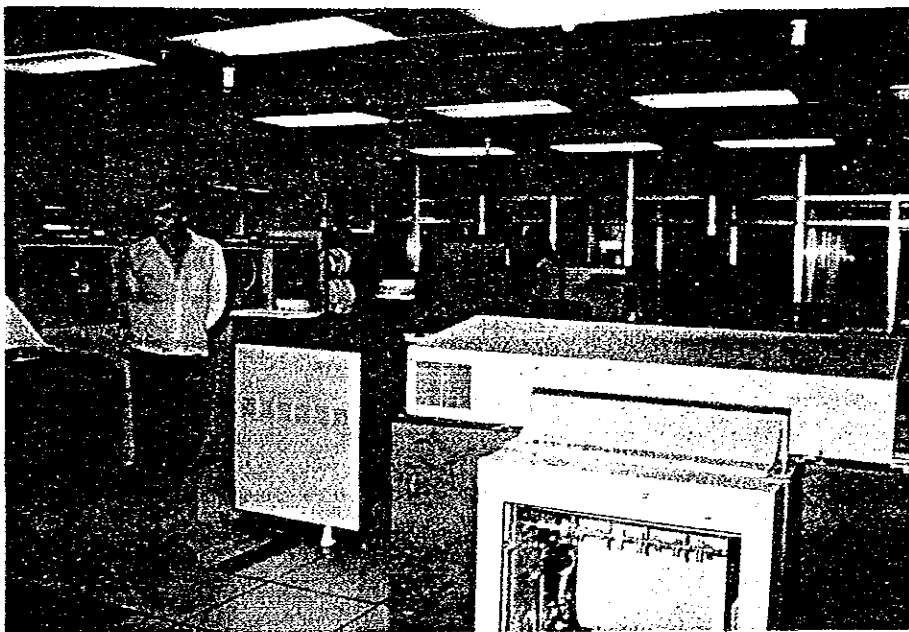
Research and Studies Section

Aims

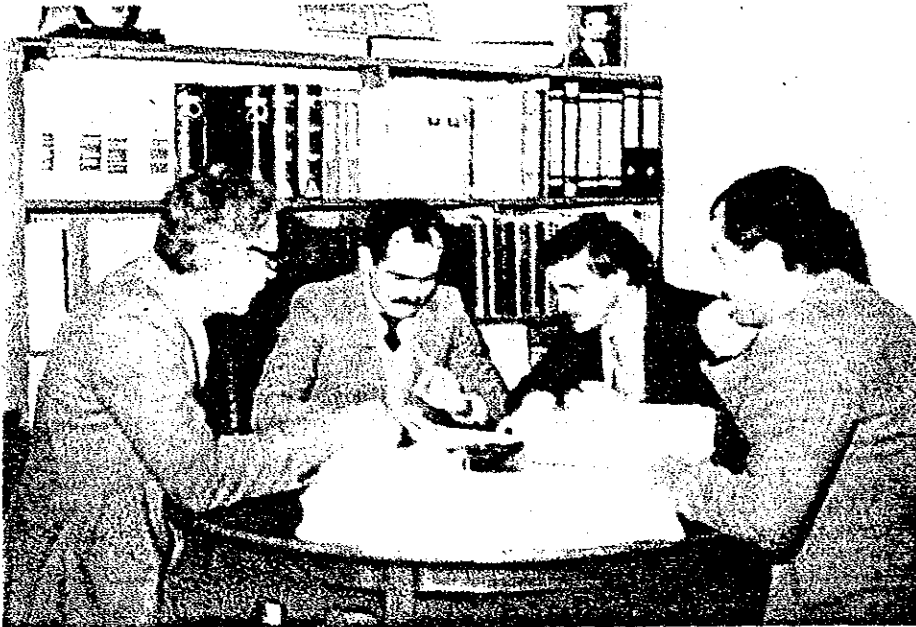
Perform scientific research to develop computer software to meet the requirements of applications and technical services provided by the department, and undertake studies to define the requirements and specifications of integrated management information systems.

Functions

- 1 - Developing computer software to assist systems analysts and programmers to design and implement application systems efficiently.
- 2 - Undertaking research in programming and analysis techniques.
- 3 - Undertaking consultancy studies to establish computerized integrated management information systems.
- 4 - Undertaking feasibility studies to establish computer centres.
- 5 - Designing and implementing data base systems and data banks.



Main Frame Computer Site



Systems Design and Analysis

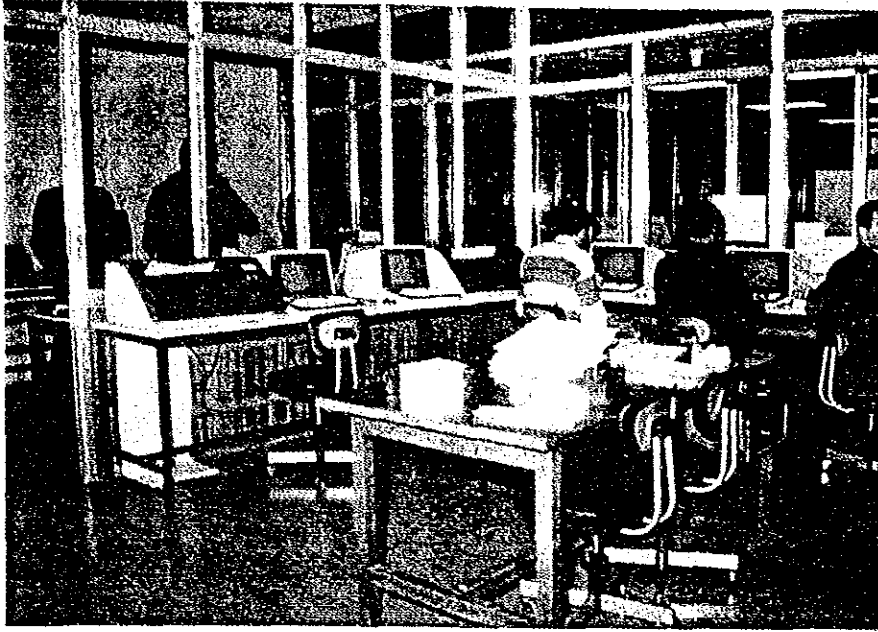
Administrative Applications Section

Aims

Design and implement computerized information systems for business and administrative applications.

Functions

- 1 - Analysing and designing information systems according to management requirements of user departments.
- 2 - Developing and implementing systems.
- 3 - Updating and maintaining current information systems.
- 4 - Participating in developing manpower capabilities and skills in business computation.



Programs Design and Development Laboratory

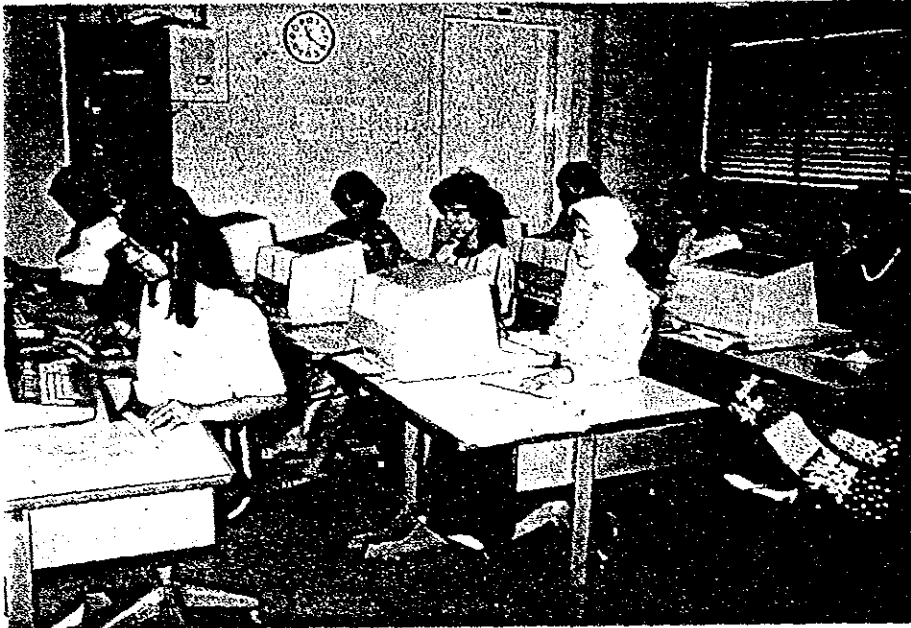
Scientific Applications Section

Aims

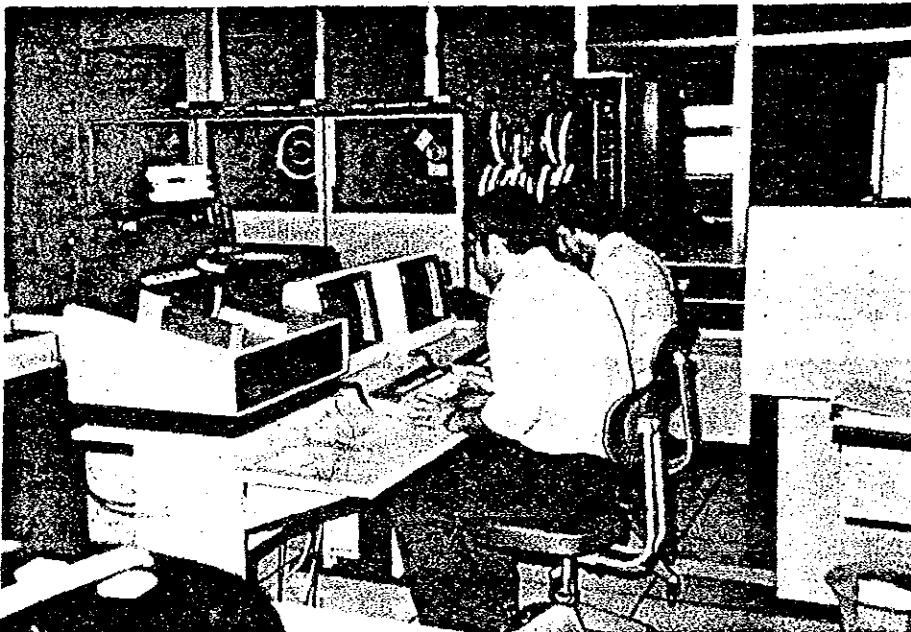
Design and implement computerized scientific applications and develop packages for local users.

Functions

- 1 - Developing utility software for efficient data processing operations.
- 2 - Developing general purpose scientific packages according to user requirements and local needs.
- 3 - Developing and implementing on-line application systems and data transmission operations.
- 4 - Participating in developing manpower capabilities and skills in scientific computation.



Data Entry Unit



Computer Operating Consoles

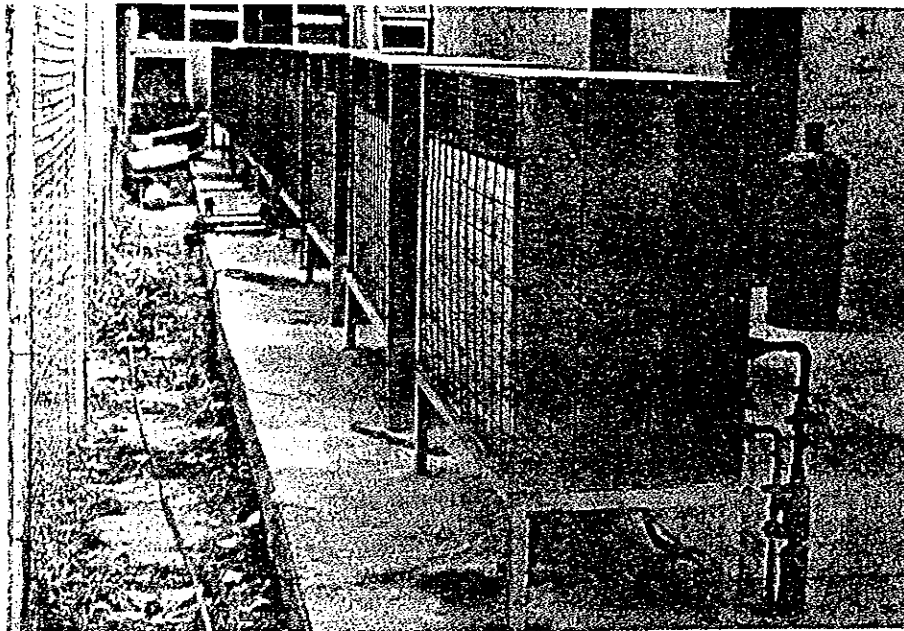
Operations Section

Aims

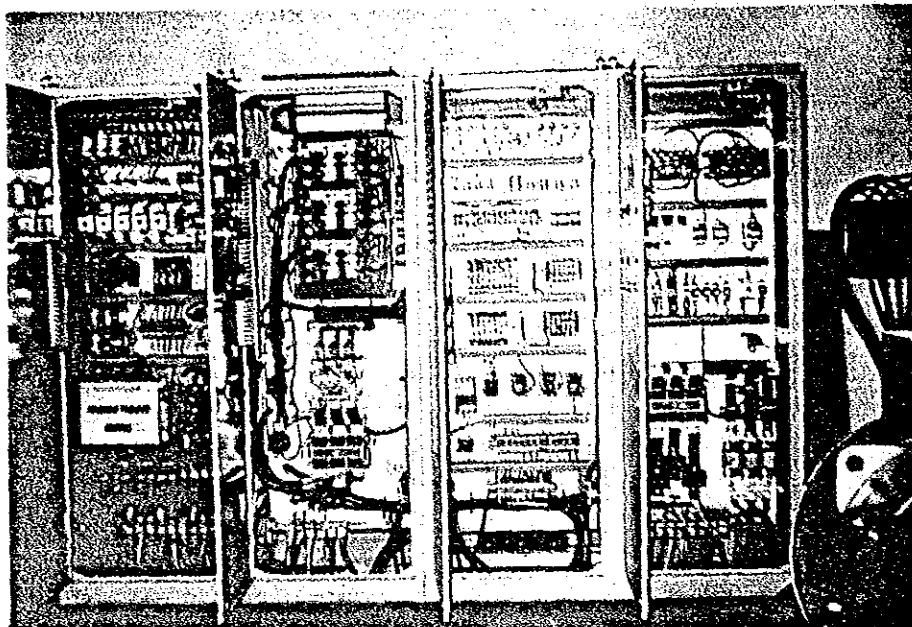
Follow up projects and systems implementation, data preparation, validation and correction of both input data and output reports.

Functions

- 1 - Receiving initial data for implemented projects and preparing it for computer processing.
- 2 - Keying-in data to the computer.
- 3 - Allocating and scheduling computer time according to user requirements.
- 4 - Validating and correcting results before submitting them to users.
- 5 - Executing programs required for on-going projects.
- 6 - Participating in developing the capabilities of computer operators and data entry staff.



Computer Site Air-Conditioning Units



Electric Power Supply-No-Break System Central Board

Activities of the CSD

The activities of the CSD can be categorised as follows:

- a. Consultancy services.
- b. Software development services.
- c. In-house computing services.
- d. Training services.

a. Consultancy Services

- Technical consultations.
- Feasibility studies for establishing computer centres.
- Pre-investment studies for the establishment of computerized management information systems.
- Hardware specifications and evaluation.
- Software specifications and evaluation.
- Supervision of computer centres and computerized applications implementation.

Users and some of the more important projects.

- (i) **The Central Bank of Jordan.**
Pre-investment study for the establishment of a computerized management information system. Duration: six months.
- (ii) **The Public Security Directorate and Police Directorates of Jordan.**
Pre-investment study for the establishment of a computerized management information system. Duration: six months.
- (iii) **The Arab Mining Company**
Pre-investment study for the establishment of a computerized management information system. Duration: three months.
- (iv) **The Saving Bank of Jordan.**
Pre-investment study for the establishment of a computerized management information system. Duration: three months
- (v) **Ministry of Health**
Feasibility study for the computerization of administrative and financial applications.
- (vi) **Intergovernmental Bureau for Informatics, Rome.** Feasibility study to establish a regional centre for computer training for the Arab region.
- (vii) **Department of Civil Registration.**
Technical specifications (hardware/software) and supervision of their computer centre.

(viii) **Ministry of Transport**

Technical study and tender documentation for the computerization of all financial and inventory control systems for the Ports Corporation, the Civil Aviation Authority, and the Public Transport Corporation. The study was carried out over a period of two months.

(ix) **Water and Sewerage Authority.** Technical study for the computerization of all main activities of the Authority. The study was carried out over a period of two months.

(x) **Department of Lands and Survey**

Technical study for the computerization of the Department activities.

(xi) **General Passport Department**

Technical study for the computerization of the Department activities.

(xii) *Technical evaluation of computer hardware/software offers presented to various public and private organizations.*

b. Software Development Services

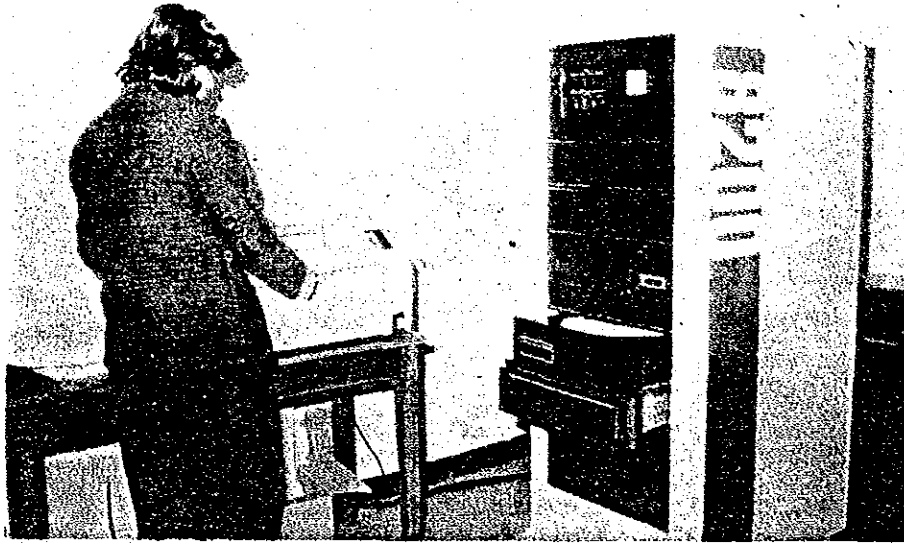
These services entail designing and programming of application software to be implemented on users own computer facilities. Users and some of the more important projects:

(i) **Royal Jordanian Airline - ALIA**

- . Payroll System
- . Revenue System
- . Accounting System.

(ii) **Ministry of Health**

- . Payroll System
- . Personnel System
- . Accounting System
- . Medical Statistics System.



Mini-Computers Site

c. In-house Computing Services

- Designing, programming and implementing application systems using CSD computer facilities.
- Data Preparation, including data entry and verification of user data.
- Input/output data control.
- Periodic execution of user application systems (production runs).
Users and some of the more important projects.

(i) Financial Systems:

(a) Payroll Systems: developed and implemented for:

- 1 - Ministry of Education Employees.
- 2 - Ministry of Finance-Civil and Military Pensioners.
- 3 - Jordan Electricity Company Employees.
- 4 - Ministry of Communications Employees.
- 5 - Royal Scientific Society Employees.
- 6 - Telecommunication Corporation Employees.
- 7 - Ministry of Public Works Employees.
- 8 - Marriot Hotel Employees.
- 9 - Ministry of Social Development Employees.

(b) Billing Systems: developed and implemented for:

- 1 - Telecommunication Corporation.

- 2 - Jordan Electricity Company,
- 3 - Irbid Electricity Company,

(c) Accounting Systems: developed to cater for:

- 1 - Al-Ittihad Al-Watani Insurance Company , General Accounting
- 2 - Marriot Hotel, General Ledger.
- 3 - Royal Scientific Society, Accounts Receivable System.
- 4 - Royal Scientific Society ,Budget Accounting.
- 5 - Jordan Medical Co. , Shareholders Accounting
- 6 - Central Bank,Public Debt Bonds Accounting.

(ii) Personnel:

Personnel systems have been developed and implemented for the following establishments:

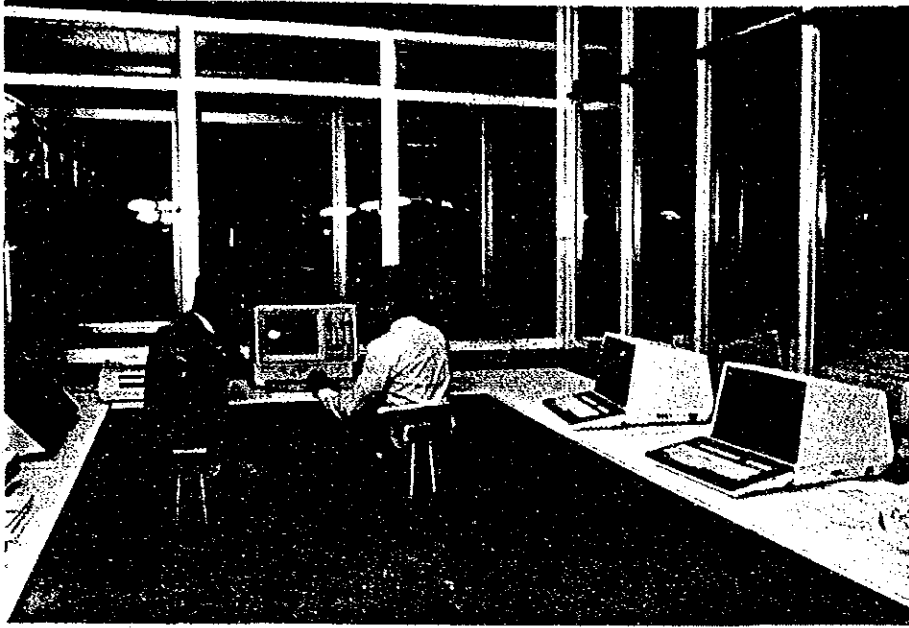
- 1 - Ministry of Education .
- 2 - Ministry of Health
- 3 - Public Security Directorate.
- 4 - Ministry of Public Works .

(iii) Inventory Control Systems: developed and implemented for:

- 1 - Royal Scientific Society.
- 2 - RSS Library.
- 3 - Royal Armed Forces-Engineering Division.

(iv) Information Systems : developed for:

- 1 - Department of Lands and Survey-Land Indices.
- 2 - Social Security Corporation-Subscribers Information System.
- 3 - Amman Chamber of Commerce-Subscribers Information System
- 4 - Council of Arab Economic Unity-Foreign Trade Bulletin.
- 5 - Housing Bank-Savings Account Lottery.
- 6 - Public Security Directorate-Driving Licences Information System and Accidents Statistics.
- 7 - University of Jordan-Students Registration System .



Micro-Computers Laboratory

(v) **Scientific Applications** : developed to cater for:

- 1 - Engineering.
- 2 - Statistical Analysis.
- 3 - Mathematical Modelling.
- 4 - Planning and Scheduling.
- 5 - Demographic Analysis.
- 6 - Survey Data Tabulation.
- 7 - Project Monitoring-CPM.

d. Training Services

Regionally, the supply of trained technical manpower is less than the demand, especially in the computer science profession. This shortage is an economic handicap in implementing and running of projects. Because of the shortage in this level of skill, the gap is often filled by the higher caliber scientists or by the low caliber skilled workers. Both cases result in a loss.

Identifying the training needs in the computing field, the RSS established, in October 1977, a computer training institute which was annexed to the CSD. This institute has been recently named Princess Sumaya College for Informatics. Participants spend two academic years following up the different courses and practical workshops. One hundred and fifty-nine students have already graduated from this College during the last five years, and have joined the public and private sectors of the community.

Through the College, the CSD organizes specialized training courses for local and external organizations.

The College's two-year program consists of the following courses:

Module	I.1	Basic Knowledge of Informatics (1)
Module	I.2	Basic Knowledge of Informatics (2)
Module	L.1	COBOL Programming & Workshop
Module	L.2	FORTRAN Programming & Workshop
Module	L.3	BASIC Programming & Workshop
Module	M.1	Mathematics
Module	M.2	Applied Statistics
Module	M.3	Operation Research
Module	S.1	Documentation
Module	S.2	Systems Analysis & Workshop (1)
Module	S.3	Systems Analysis & Workshop (2)
Module	S.4	Operating Systems
Module	S.5	Data Processing
Module	S.6	Project
Module	G.1	English Language
Module	G.2	Economics
Module	G.3	Administration
Module	G.4	Accounting
Module	G.5	Humanities
Module	G.6	General Education



Princess Sumaya College for Informatics Lectures Hall

Available Computer Facilities

1- Mainframes Computers:

(a) NCR CRITERION V-8575-11

- Dual Processor.
- Four Megabytes memory.
- Dual console units.
- Two disk drive controllers.
- Six removable disk drives, each with storage capacity of 200 Megabytes.
giving a total of 1200 Megabytes
- One tape unit controller.
- Four tape drive units.
- Two fast line printers, Arabic-Latin with speeds of 2000 and 1300 lines per
minute.
- Four matrix printers Arabic-Latin with speed of 70 lines per minute.
- Twenty-four Arabic-Latin CRT terminals, twelve of which are remote.
- Two card reader units.
- One card punch unit.
- One multiplexor unit.
- Ten Modems.
- Six card key punch machines.

(b) NCR CENTURY 251

- Single processor.
- 256 Kilobytes of memory.

2 -Minicomputers:

(a) NCR 8270

- 384 Kilobytes of memory.
- Dual disk drive unit with storage capacity of 10 Megabytes
- Eight CRT terminals.
- One Arabic-Latin matrix printer.

(b) NCR 8270

- 256 Kilobytes of memory.
- Two dual disk drive units, each with storage capacity of 10 Megabytes giving a total of 20 Megabytes.
- Twelve Arabic-Latin CRT terminals.
- One Arabic-Latin matrix printer.

3 - Microcomputers:

(a) NCR DM5

- 256 Kilobytes of memory.
- Two floppy disk drive units.
- Colour Screen.
- One Arabic-Latin matrix printer.
- One flat bed colour plotter.

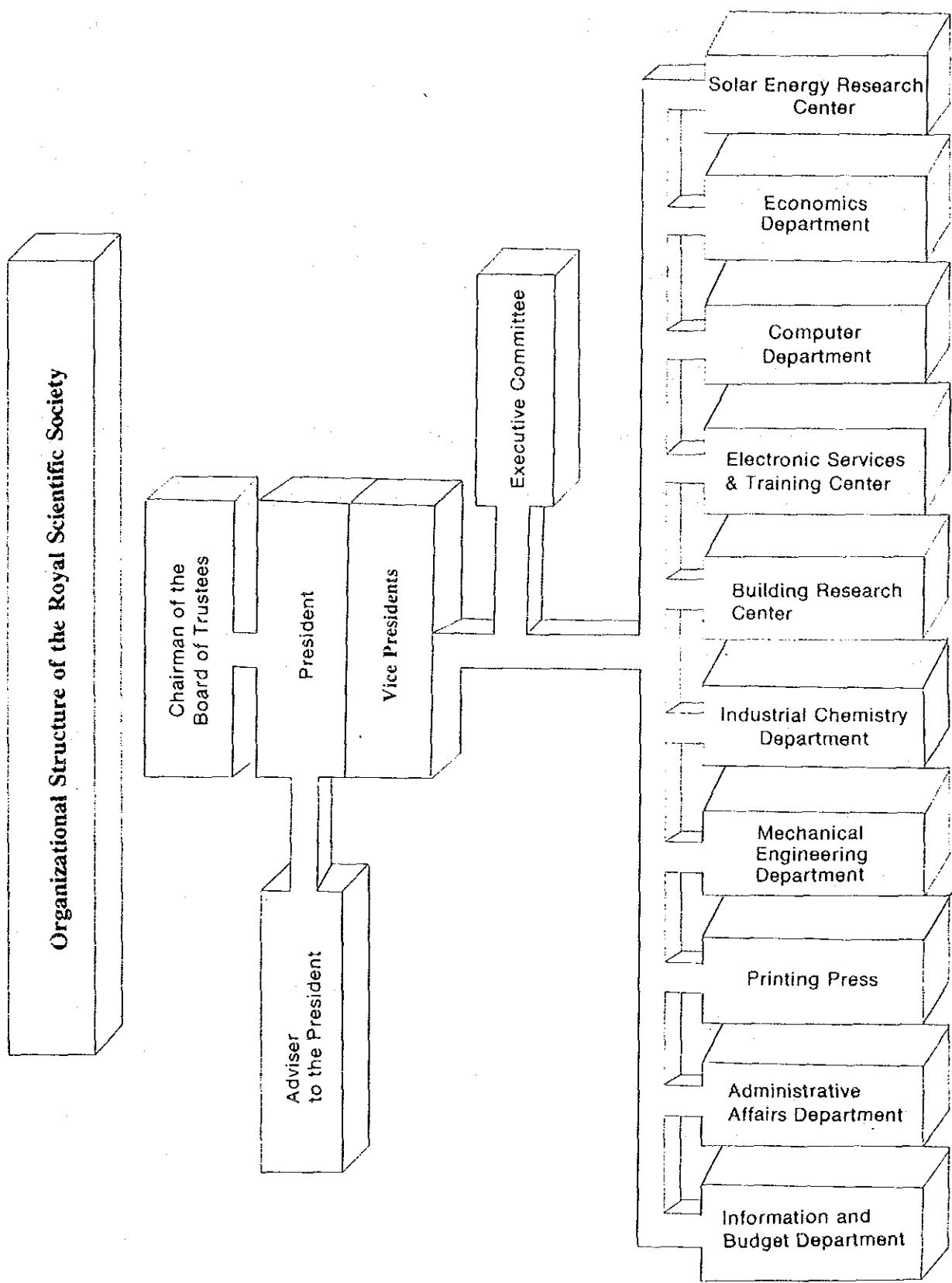
(b) NCR DM5

- 256 Kilobytes of memory.
- Two floppy disk drive units.
- Colour screen.
- One Arabic-Latin matrix printer.

Manpower

The manpower available at the Computer Systems Department could be classified as follows:

Category	Number
- Systems Analysts	6
- Analyst/Programmer	3
- Programmer	8
- Computer Operator	5
- Data Entry Operator	14
- Input /Output Controllers	2
- Technician	1
- Administrative Staff	3



7. R S S 情報システム局

機材内訳

1-Mainframes Computers :

NCR CRITERION V-8575-II

- Dual Processor
- Eight Megabytes Memory
- Dual Console Units
- Two disk drive controllers
- Eight removable disk drives, each with storage capacity of 200 megabytes giving of total of 1600 megabytes.
- One disk unit 1 Ggabytes
- One tape unit controller
- Four tape drive units
- Two fast line printers, Arabic-Latine with speeds of 2000 and 1300 lines per minute.
- Four dot matrix printers Arabic-Latine with speed of 70 lines per minute
- Twenty-four Arabic-Latine CRT terminals, twelve of which are remote
- One multiplexor unit
- Ten Modems.

2-MINICOMPUTERS

(a) NCR TOWER

- Single Processor
- Two Megabytes of meomry
- One terminal
- Three disk units with 100 megabytes of storage each
- One tape drive unit, one streamer tape unit
- One floppy disk drive.

(b) NCR 8270

- 384 kilobytes of memory
- Dual disk drive unit with storage capacity of 10 megabytes
- Eight CRT terminal
- One Arabic-Latine matrix printer

(c) NCR 8270

- 256 kilobytes of memory
- Two dual disk drive units, each with storage capacity of 10 megabytes giving a total of 20 megabytes
- Twelve Arabic-Latine CRT terminal

(d) Micro VAX 3600

- 32 Megabytes of memory
- One terminal
- One stremer tape unit
- One tape drive unit
- Two disk drive with total capacity of 300 megabytes.

3-MICROCOMPUTERS

(a) NCR PM5

- 256 Kilobytes of memory
- Two floppy disk drive units
- Colour screen
- Two Arabic-Latin matrix printers
- One Flat bet colour plotter.

(b) IBM PC/XT

- 650 k memory
- 20 Megabytes hand disk drive with each computer
- Two 360 knytes floppy disk drive

(c) IBM A star

- One megabytes of memory
- twenty megabytes hard disk
- Two 1.2 megabyte floppy disk drive

(d) IBM PS2 386/80

- Two MB memory
- 70 Mega hard disk
- 1.2 Megabytes 3.5 floppy drive

(e) IBM PS2/50

- 1 MB memory
- 40 Megabytes hard disk
- 1.2 Mega 3.5 floppy drive
- 360 M 5.25 floppy drive.

(f) ACOR

- 640 Mbytes memory
- 20 M. hard drive
- Two 360 floppy drive

(g) SYNCOMP

- 640 M.bytes memory
- Two 360 Kbytes drive

(h) MAC

- 640 K memory
- Two 360 drive

8. R S S 情報システム局研修コース概要

INTRODUCTION TO COMPUTERS AND THEIR APPLICATIONS

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
-Information coding			
-Computer components and operations			
-Peripheral devices and data carrier			
-Firmware			
-Internal organization of computer			
-Basis of programming and using computer			
-Organizing data preparation			
-Computer uses			
-Practical training			

MICROCOMPUTERS AND THEIR APPLICATIONS

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
1 - Introduction to basic components of computers			
2 - History of computer development			
3 - Computer classes and uses			
4 - Microcomputers			
- basic components			
- Operating system			
- Types, Classes and sizes			
- Usage			
- compatibility with software packages			
- Ways of usage			
- introduction to BASIC			

PROGRAMMING IN BASIC

CONTENTS	HOURS		
	Total	Lecture	Workshop

60 24 36

- 1 - Introduction to BASIC
- 2 - Study of the language elements and how to prepare instructions
- 3 - Techniques used in programming
- 4 - Translation of programs in BASIC
- 5 - Practical application on the usage of BASIC

ADVANCED PROGRAMMING IN COBOL

CONTENTS	HOURS		
	Total	Lecture	Workshop
	60	24	36
1 - Review of COBOL and its components			
2 - Using of multidimensional array			
3 - Retrieving information from files in different methods according to the organization of files			
4 - Advanced methods in searching for records in files			
5 - Practical application on advanced usage of COBOL			

ADVANCED PROGRAMMING IN PASCAL

CONTENTS	HOURS		
	Total	Lecture	Workshop
	60	24	36
1 - General introduction on Pascal			
2 - Study of language elements and components and how to construct specific instructions			
3 - Syntax structure for pascal			
4 - Mathematical and logical operations			
5 - Input output statements			
6 - Conditional and unconditional control statements			
7 - Conditional and unconditional iteration statements			
8 - Multidimensional arrays			
9 - Functions and subroutines (Function and Procedure)			
10 - Records (definition, data types, variable records)			
11 - Files (define, create, read, copy modify, text files)			

- 12--Sets(define, create, operations and comparisons)
- 13--Pointers and lists
- 14--Practical application on programming with Pascal

ADVANCED SYSTEMS ANALYSIS TECHNIQUES

CONTENTS	HOURS		
	Total	Lecture	Workshop
	45	18	27
1 - Introduction			
2 - Traditional method			
interviewing			
study and analysis			
analysis aiding tools			
system size estimate			
3 - Group processing method			
aims			
procedures			
benefits			
4 - Participation method			
participating in taking steps in work			
participating in taking decisions			
5 - Project scheduling methods			
introduction			
critical path method			
evaluation and reviewing method			

COMPUTERS AND INVENTORY MANAGEMENT SYSTEMS

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
1 - Inventory management, its value in organizing managements and its relation with other managements			
2 - Responsibilities of inventory management and its role			
3 - Organizing stores -centralization and decentralization in storing			

- 4 - Internal organization of stores
- 5 - Duties and responsibilities for store workers
and behavior duties for store managers
- 6 - Store identification guide
- 7 - Document cycle in inventory management
- 8 - Inventory control
- 9 - Using and applying computer on inventory management and
prepare related systems

OFFICE AUTOMATION

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
1 - Historical overview			
2 - Introduction to automated office information system			
3 - System components			
- word processor			
- spreadsheet			
- graphics			
- electronic mail			
- document transfer			
- local and international communication network			
- project followup and scientific meeting			
- drawing			
- telephone and exchange			
- office information system under management usage			
4 - Practical application			
- word processor			
- spreadsheet			
- printing and drawing			

DATA BASE MANAGEMENT SYSTEMS DESIGN

CONTENTS	HOURS		
	Total	Lecture	Workshop

- 1 - Introduction
 - data base definition and advantages of using data base
- 2 - File structure
 - sequential
 - random sequential
 - random
 - data bases
- 3 - Data base design
 - Logical design
 - data collection
 - data analysis
 - data forms
 - Natural design
 - storage device
 - main memory
 - communication network
 - Design criteria
 - security
 - benefits
 - continuity of work
- 4 - Practical application
 - case study
 - system performance evaluation

DATA BASE III PLUS

CONTENTS	HOURS		
	Total	Lecture	Workshop
	45	18	27

- Using DBASE III+ under MS-DOS
- Properties of this system
- File creation
- File building and organizing

- Basic instructions and system functions
- Report generation
- Programming and its usage
- Advanced instructions and functions
- Advanced programming

SPREAD SHEETS

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
- Using spread sheets under MS-DOS			
- Properties spread sheet			
- Basis of spread sheet			
- Using spread sheet with examples			
- Using mathematical equations in spread sheets			
- Logical relations in spread sheet			
- Graphs in spread sheets			

WORD PROCESSING

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
Using word processor and keys under MS-DOS			
- Using arabization software			
- Word processor basis and usage			
- Storage devices and printers			
- Configuring word processor			
- page preparation			
- Text writing and saving			
- Files and its usage			
- Retrieving texts, updating and enhancing			
- Printing and using all related functions			
- Dictionary			
- Advanced functions in word processing			

WORD PROCESSOR

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
Using word processor and keys under MS-DOS			
— Using arabization software			
— Word processor basis and usage			
— Storage devices and printers			
— Configuring word processor			
— Page preparation			
— Text writing and saving			
— Files and its usage			
— Retrieving texts, updating and enhancing			
— Printing and using all related functions			
— Dictionary			
— Advanced functions in word processing			

COMPUTER METHODS OF STRUCTURAL ANALYSIS AND DESIGN

CONTENTS	HOURS		
	Total	Lecture	Workshop
	30	12	18
— Introduction to computers and computer languages			
— Introduction to structural engineering computation			
— The BASIT language (introduction)			
— Some beam calculations			
— Solution of simultaneous equation			
— The stiffness method			
— Truss analysis			
— Continuous beams			
— Plane frames			
— Three dimensional frames			
— Grillage frames			
— Finite element analysis			

- Analysis of three dimensional building systems
- Reinforced concrete structural design

Computer & Information Department

• GOALS

- Develop policies & strategies for the evaluation, introduction and use of relevant improvements & advances in computer and information technology in the JEA.
- Provide information and computer services for the end user community in JEA.
- Provide consultancy services and technical assistance for the various governmental departments.

• ACTIVITIES

To achieve those objectives, the C.I.D. assumes the following functional responsibilities which are classified under the following five major types of activities:

I. Applications Development Activities

- The development of corporate information systems in accordance with approved plans.
- The determination of technical, operational and economic feasibility of proposals.
- The design, development and implementation of approved systems.
- Maintain existing systems and ensure continuous adherence of those systems to changing user requirements.

II. Operations Activities

- Implement new applications.
- Provide operations production support for all applications.
- Installation and maintenance of system software.
- Hardware/software performance monitoring, tuning and reporting.
- Technical support for all centralized (and decentralized) computer operations and services.
Management of the computer communications network.
Provision of a batch data processing service, i.e. data entry.
Backup and recovery of data.

III. Information & Technology Activities

- Support and advise management in selection, and subsequently the introduction and use, of relevant advances in information technology in the JEA.
- Evaluate and introduce ready-made packages and end-user automated tools and aids.
- Provide a 'Help Desk' service for users of ready-made software packages, both on PCs and the main computer.
- Support of the department's external activities in accordance with agreed arrangements.

IV. Training Activities

With the dispersal of computing facilities all over JEA sites and the proliferation of the application systems, and the consequent increase in the number of potential users, training has become of utmost importance. Consequently, a computer training laboratory had been established and equipped with powerful personal computers and terminals connected to the main computer; in addition to the necessary visual aids which help in holding effective training sessions.

Training courses spanning the different subjects in computer and information technology and meeting the differing needs of users for training are being held continuously in the laboratory by the C.I.D.'s own staff. Topics cover the range from computer basics and introductions to the more advanced topics of database design, office automation, etc..

V. External Activities

Having achieved the advanced status and recognition as a pioneer in computing at the national level, JEA's C.I.D. continuously participates in studies and projects leading to the introduction and/or augmentation of computer technology and staff capabilities in the different governmental departments.

• COMPUTING FACILITIES

I. HARDWARE

The C.I.D. manages a sophisticated, long-haul computer communications network which links the main computers in the headquarters with the different JEA sites. This network contains the following:

Hardware	Operating System	Location
VAX 8530	VMS	HQ
VAX 8530	VMS	HQ
μVAX II	μVMS	Hussein Thermal Power Station
μVAX II	μVMS	Aqaba Thermal Power Station
μVAX 2000	Ultrix	HQ
VAXstation	μVMS	HQ

In addition to those main systems, there are the necessary auxiliary devices needed to connect and manage the network, storage devices with capacity of 5 GigaByte, around 200 terminals and 40 personal computers of different types and sizes most of which are usually connected to the network.

II. SOFTWARE

A. Existing Applications

There is a wide spectrum of application systems currently running under the different operating environments meeting the different demands of users. They are classified as follows:

1. Financial/commercial systems serving the different application areas (i.e. Billing, Inventory, Manpower, Financial Forecasting/Analysis, etc..)
2. Engineering/Technical applications serving the engineering user community at JEA.
3. Office Automation applications.
4. Computerized Maintenance Management System.

In addition to the above spectrum of software, there are some applications which run on the PCs where packages such as

dBASE III+, LOTUS 1-2-3, WordStar, AutoCAD and similar programs are used extensively by end users to serve requirements specific to that user.

B. Future Applications

In addition to the department's plan to computerize as many application areas as found feasible, there is an ambitious plan in the making. This plan will lead to the introduction of the following information processing technologies:

1. Computer Graphics:
 - a. in business applications
 - b. in engineering/design applications.
2. Image & Document Processing on a larger scale than what is already existing.
3. Desktop Publishing.
4. Expert systems/ Decision Support Systems.

Computing Facilities at Jordan Electricity Authority

The following is an overview of the computer hardware currently available in JEA

JEA/HQ Computer Hardware

- Two VAX 8530 (Clustered) running under VMS (V-4.7)
- Eight RA81 Diskd (456 MB each)
- Two TU81 Tape Units (1600/6250 TP1)
- VAX station GPX with three MB. And 19 " Munochrome Graphis Monitor.
- MVAX 2000 running under ULtrix-32 (V-2.2)
- 150 A/L terminals (VT 220,VT 240 and Compatibles) distributed all over the kingdom and connected to ethernet via terminal servers and other comm. equipment.
- Five VT 340 colored graphic terminals
- HP 7570A/HP7475 plotters (Ao/A4)
- Six CI-600 Line printers (600 Lpm)
- 24 CI-1570 Dot Matrix Printers
- 9 CI-751C Dot Matrix Printers

JEA/ATPS Computer HW Include

- MVAX-II with 9 MB running under VMS
- 500 MB Disk Storage
- 15 terminals
- One CI-600 line printer
- Two CI-1570 Dot Matrix printer
- TK50 tape cortridge (95 MB)

JEA/HTPS Computer HW Include

- Same as in JEA/ATPS above

ENGINEERING APPLICATION

Software Title	Computer	Operating System
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PTI Software:

- PSIM/P (Calculation of generation and operations costs)	VAX 8530	VMS
- PSS/E (Network studies and generation system performance)	VAX 8530	VMS
- EMTP (Electro-magnetic transient programs)	VAX 8530	VMS
- ERACLES (Load flow and short circuit calculation)	UVAX-2000	ULTRIX
- PRAO (Electricity distribution management and planning)	UVAX-2-000	ULTRIX
- CMMS (Computerised Maintenance Mngmt. Sys)	UVAX-II	UVMS

10. ジョルダン大学のカリキュラム

36100 Introduction to Computer Science

Computer and society, computer structure main functions, internal data representation human interface, principles of flow-charting and program development introduction to BASIC Computer application (Business, office automation).

36101 Introduction to Computer Science

Introduction to computers, number systems. Input/Output Devices, data storage devices. The processor. Internal data representation, introduction to operating system, system programming and translators. Practical applications, systems analysis and data base. Principles of flow-charting and program development. Introduction to BASIC programming.

36211 Programming Language FORTRAN

Introduction to FORTRAN programming language. Constants and variables. READ, WRITE and FORMAT statements. Arithmetic if and logical if, do loop, nested loops. Conditional and unconditional branching, DIMENSION statement and matrices. SUBROUTINES AND FUNCTIONS. COMPLEX, REAL INTEGER AND DOUBLE PRECISION statements. EQUIVALENT statement. Files.

36212 Programming Language PASCAL

Prerequisite: 36211

Problem solving, syntax semantics and Pascal programs. Design methodology: Modules, top-down design. Scalar types and operations. Expressions and statements. Control structures. Procedures and Functions. Data types. Arrays, records and variants. Pointers and lists. Sets. FILES.

36214 Programming Language COBOL

Introductory concepts, overall organization of COBOL detailed description of the IDENTIFICATION DIVISION, ENVIRONMENT DIVISION AND PROCEDURE DIVISION main statements COBOL such as, open close, read, write, move, go to, if, add, multiply, divide, subtract, stop and run, FILES.

36221 Digital Logic Design

Positional number systems (Binary, octal and hexadecimal). Boolean algebra and logic gates; axioms, properties, truth tables, K-maps. Minimization of boolean function; algebraic visual, Q-M methods. Combinational circuits. Sequential circuits. H/W structure and design. Register. Transfer logic.

36222 Computer Organization and Programming (Assembly)
Prerequisites: 36221, 36211

Introduction to Assembler language. Computer languages, machine language instruction formats. Introduction to Assembler concepts. Fundamentals of Assembly language instructions and addresses. Constants and data area, directives. Fundamental techniques: Decimal arithmetic-integer and non integer. Binary integer arithmetic. Byte and string manipulation. Comparison and transfer of control. Input/Output.
Subroutines and Macros REAL MACHINE (VAX)

36323 System Programming
prerequisite: 36222

Review of Assembly language concepts Assemblers, Macro language and Macro processors, loaders, formal systems and programming language, introduction to compilers.

36325 Computer Architecture I
Prerequisite: 36222

Historical survey of computer system architectures. description of computer systems: Digital logic level, Microprogramming level conventional machine level and operating system level. Building blocks and their interaction. Arithmetic algorithms, central processors, memory hierachy, control unit and microprogramming, Input/Output.

36326 Microcomputers and Microprocessors
Prerequisite: 36325

Microcomputer fundamentals. Basic hardware concepts. Adress decoding. Memories and peripherals. Typical microprocessor I/O techniques. 8-bit and 16-bit microprocessors and microcomputers and interface chips. Fundamentals of Microcomputer development systems.

- 36331 Data Structures and File Organization
prerequisite: 36212
- Basic concepts and notation. Mathematical background stacks and queues. Trees. Tables. Lists. Multilinked structures. String. Arrays files organization techniques sequential filwa, direct access files, indexed sequantial files. Sorting and searching.
- 36333 Data Base
Prerequisite: 36331
- Introduction to data base systems: What is a data base? Objectives of data base organization. Entities and attributes. Data models. Data base management system. Topes of logical data structures. Tree structures. Plex structures. Data description languages. Data base design physical organization.
- 36335 Computation Theory
Prerequisite: 36221
- FINITE AUTOMATA, Formal language (CFG) Turing machine charch's thesis, uncomputability.
- 36337 Computer Lab
Prerequisites: 36222, 26331
- Practical Applications.
- 36341 Numerical Analysis I
Prerequisite: 36211, (31241 or dept. approval)
- ERRORS. Roots of equations. Direct and indirect solution of systems of linear equations. Solution of nonlinear systems applications and interpolation. Numerical inte-gration. Fortran or Basic programs go parallel with material.
- 36343 Operations Research I
Prerequisite: 36341
- Specified mainly to linear programming (LP). Introduction and some convex geometry. Solution methods of linear program. Graphical method, simplex method, dual simplex method, and Revised simplex method. Sensitivity analysis. Applications of LP: Transportation and assignment prob-lems, Network problems.

- 36345 Graph Theory
Prerequisites: 36241, 36331
- Basics of graph theory. Representation of a graph: Pictures, Matrices (Adjacency, and Incidence). Connectivity and matching: Trees, Networks and Distance matrices. Max-flow Min-cut theorem. Coloring. Search of a graph: Depth-first search, breadth-first search. Applications: Some graph algorithms scheduling, Network analysis.
- 36346 Mathematics of Computer Science
Prerequisite: 3d year level
- Mathematical Models, Mathematical Reasoning, Sets, Binary Relations, Functions, Counting and Algorithm Analysis, Infinite Sets, Algebra, Graph and Trees.
- 36320 Computer Network
Prerequisite: 36325
- Basic technology, components and functioning of a computer and information network, Topological consideration, routing and control of information flow in networks, methods of transmission error control and message protocol.
- 36421 Computer Architecture II
Prerequisite: 36325
- Overview of computer systems: Computer systems design criteria computer system principles. Uniprocessor, multi-function pipeline and parallel computation. Theoretical background: Tree-height reduction, Recurrence relation program dependence and transformation, computer system capacity. Computer systems: Medium size computers, mini-computers stack architecture. Microprocessing, array processors. Multiprocessing systems, Interconnection networks.
- 36431 Design and Implementation of Programming Languages
Prerequisites: 36331, 36323
- Introduction and BASIC approaches to language implementation. Informal syntax and semantics of expression and statements from typical higher level languages. Comparison of language features (Data, operations, control structures, storage management and operating environment). Syntax and translation syntactic elements of a language. Formal definitions of syntax, stages in translation.

36432 Operating System
prerequisites: 36231, 36325

Introduction and overview review of preliminaries; BASIC system resources. Operating system development and technological background. Processes: Sequential and concurrent, operating system functions and concepts: Processor management: Multiprogramming, time-sharing and scheduling memory management: Dynamic storage allocating, protection segmentation paging and virtual memory. I/O device allocation and files. A case study: Operating principles of an existing system. Implementation of operating system techniques.

36433 Compiler Construction
Prerequisites: 36431, 36325, 36335

Grammers and languages, scanners, Top-down processing. Simple precedence grammars. Run-time storage organization. Organizing symbol tables. Internal forms of source program. Semantic routines. Allocation storage to Run-time variables. Code generation. Error recovery.

36434 System Analysis
Prerequisites: 36333, 36325

Development of information systems: TASK, lifecycle, components. System representation tools. Data dictionary. Implementation and design consideration. Logical and physical design. System evaluation.

36435 Computer Graphic
Prerequisite: 36331

This course will offer 'computer graphic fundamentals and techniques': Geometry and line generation. Graphics primitives. Polygons. Mathematical transformation. Segments. Windowing and clipping. Interaction. Three dimensions with clipping. Hidden surfaces and lines. Shading. Curves. Some graphics language. The graphics facilities at the University will be discussed and used.

36436 Software Engineering
Prerequisite: 36432

Software crisis and software engineering principles. Software design. Heirarchical ordering, structured programming, modularity verification and validation. Portability and adaptability. Reliability. Project management. Performance prediction and measurement. Security and privacy.

- 36437 Artificial Intelligence
Prerequisite: 36331
- Defining AI and AI fields. Search-oriented automated problem solving and planning techniques. Knowledge representation. Computer vision. Natural language processing. Speech recognition and speech understanding.
- 36438 Automate Theory and Formal Languages
Prerequisite: 36335
- Algebraic background, deterministic and nondeterministic finite automata. Regular expressions. Recognizers. Two-way automata: Moore and Mealy machines with application regular sets and closure properties, the pumping lemma. Myhill-Nerode theorem. Context free grammars and context free languages. Turing machines and transducers.
- 36441 Numerical Analysis II
prerequisite: 36341
- Numerical solution of initial-value problem for ordinary differential equations using the following methods: Taylor's series, Euler and modified Euler, Runge-Kutta, multistep and Runge-Kutta. Boundary value problem for ODE. Numerical solutions to partial differential equations.
- 36442 Theory of Algorithms
Prerequisite: 36331
- Introduction: Definitions of writing and analyzing of an algorithm. Design techniques and analysis of an algorithm: Divide-And-Conquer Greedy method, ... etc. Some graphs and networks algorithms. An idea about polynomial reducibility.
- 36443 Operations Research II
Prerequisite: 36343
- Integer programming. Dynamic programming. Scheduling stochastic models: Queuing theory. Decision theory and games, Inventory theory, simulation.

36445 Special Topics in Computer Science I

36446 Special Topics in Computer Science II

36490 Project

11. 質問書及び回答

Subject : Questionnaire for the Proposed Technical Cooperation
Project on a Regional Computer Training and Research
Center in Jordan

To : the Authorities concerned of the Government of the
Hashemite Kingdom of Jordan

Date : 12.Jul. 1989

A. Background on the establishment of a Regional Computer Training
and Research Center (herein-after referred to as "the Center")
in Jordan

A-1. Government policy for computerization in Jordan

- (1) Government policy for computerization in Jordan
- (2) Government assistance to the private and public sectors
related to computer industries
- (3) Government policy for the domestic production of computers
and the related machinery and equipment

A-2. Present situation and future prospects on computer utilization
in Jordan

- (1) Number of computers installed by type, capacity, usage and etc.
- (2) Market share of computer makers
- (3) IBM compatibility of computer installed
- (4) Number of computers imported in recent several years

A-3. Present situation and future prospects on computer related
man-power

- (1) Operators (Number, qualification, supply and demand)
- (2) Programmers (Number, qualification, supply and demand)
- (3) System engineers (Number, qualification, supply and demand)

A-4. Present situation of education and training activities for computer technology development

- (1) Educational activities at Universities, Colleges and High schools
- (2) Other training activities

B. Conception on the Center

B-1. Establishment of the Center

- (1) Objectives
- (2) Relation between objectives of the Center and the regional training for other Arabian participants
- (3) Activities
- (4) Priority and urgency of the Center in the National Development Plan
- (5) Relations with other organizations concerned (for example National Information Center)

B-2. Organization of the Center

- (1) Organization chart
- (2) Function and duties of each sections
- (3) Staff allocation

B-3. Budgetary condition of the Center

- (1) Present budgetary condition
- (2) Budgetary allocation plan

B-4. Building condition of the Center

- (1) Proposed site (Map)
- (2) Drawing of the building
- (3) Schedule of the building preparation

B-5. Manpower condition of the Center

- (1) Lecturer and instructor for training in the field of software technology
- (2) Technician and operator for operation and maintenance of the Center
- (3) Secretaries and clerks for management of the Center

C. Conception on the Proposed Project by the Government of Jordan

(When the Government of Japan judge the Proposed Project whether to take it up as the Project-type Technical Cooperation, we should get more detailed information about following matters)

C-1. Purpose of the Proposed Project (herein-after referred to as "the Project")

C-2. Scope of the Project (Scope of technology transfer)

C-3. Program for training courses

- (1) Training field (for example, COBOL programming, system engineering, etc.) and target
- (2) Duration and frequency
- (3) Number of trainees
- (4) Sorts and qualification of trainee

- (5) Collection of training fee
- (6) Kind of certificate to be given to the trainees upon finishing the training courses
- (7) Enterprises which adopt those graduates (demand)

C-4. Duration of the Project

C-5. Implementation schedule of the Project

- (1) Schedule for manpower allocation by Jordanian side
- (2) Schedule for budget allocation by Jordanian side

C-6. Request from Jordanian side for the Project

- (1) Dispatch of the Japanese experts
(Specific fields with terms, number, role, qualification, etc.)
- (2) Counterpart training in Japan
(Specific fields with terms, number, qualification, etc.)
- (3) Provision of machinery, equipment and materials
(Specification and quantity)

C-7. Management of the Project

- (1) Implementating agency (responsible organization) of Jordanian side
- (2) Steering committee (to be organized by Jordanian and Japanese sides)

C-8.Undertaking of Jordanian side

In case the Government of Japan decides to conduct the Project as the Project-Type Technical Cooperation Project, the Government of Jordan is expected to undertake the following matters.

If Jordanian side has some comments or questions on those matters, please answer.

- (1) Preparation of building and facilities for the Project
- (2) Securing of counterpart personnel for the Project
- (3) Securing of operational cost for the Project
- (4) Preparation of machinery, equipment and materials necessary for the Project except for those items provided by Japanese side
- (5) To provide the necessary facilities to the Japanese experts based on the Agreement on Technical Cooperation between Jordanian and Japanese Governments signed at Amman on 16 July, 1985.

D.Others

D-1.Useful other information for the Project

A-1:

The Higher Council for Science and Technology is in the process of formulating a policy for Information Technology through the Sectorial Committee of Information Technology. The Jordanian government has taken in the past years major steps to encourage the use of computers in the Kingdom. Some of those steps include:

- Removing all tariffs imposed on import of computers to the country.

- Introducing computer education in the school curriculum.

- Initiating the Private Sector Development Project. This project will enhance the private sector capabilities in such fields as Software development which the government has targeted as an export industry.

- creating the National Information System which will broker information for both private and public sectors.

Additionally there are no restrictions on the import of any computer equipment. Presently there are two local firms that assemble Personal Computers in Jordan with a limited production of about 100 units per month.

(A-2)

Computers were introduced in Jordan in 1969. Only IBM and NCR Types were introduced in only 5 centres until the year 1977.

Due to wide growing interest and to the depreciation of Computer equipment prices, the number of computer centres increased .

Both Public and private sectors acquired Main Frames, Minis and Microcomputers, with a noticeable concentration of larger machines in the public sector, and the smaller machines in the private sector. The Diagram below will give a view of the numbers and distribution.

Over 80 computer vendors opened shop in Jordan . The bulk of the computer market went to acquiring Microcomputers (IBM/compatibles) and most of the manufacturers are situated in USA, Japan and South East Asian countries.

More than 800 software applications systems more developed covering more than 25 types of applications.

The applications types are :

Finance, General Accounting, Budget, Payroll, Banking, Billing, LABOR FORCE and Personnel, Housing, Statistical Analysis, Indices, Inventory Control and Stores, Trading, Engineering Design, Mathematical Models, Scientific Application packages, Educational and Training Software, Library Information Software, Documentation, Hospitals, Production Monitoring and Control, Project Monitoring, E-mail, Databases, Registration.

The Total estimated number of Computer in Jordan are 5979. The distribution of which is as follows :

Computer Manufactures	Type	Main fraim	MINI	MICRO	Total	Marke Share
	Memory	2 - 16 MB	1 - 32 MB	640KB - 4MB		
	Storage	.5 - 5GB	100 - 500 MB	360KB - 170MB		
IBM	3		7	300	310	5.184
NCR	3		145	100	248	4.147
DEC	7		53	200	260	4.348
Data General			100	20	120	2.007
Boroghs	2		6	10	18	0.030
WANG			60	60	120	2.007
IBM/ Compatable				4500	4500	75.263
HP			3	90	93	1.555
Apple				250	250	4.181
Others			10	50	60	1.003
Total	15		384	5580	5979	

95.811% Imported Devices

4.198% Micro Computers assembled locally, components imported

(A-3)

Manpower is estimated to be about 2000 strong. It is estimated that 15% of the manpower are employed to perform Data entry document preparation and editing duties.

Next 5 years

Job Title	Qualification	Supply	Present Training Level (average)	Additional Demand Jordan	Demand Other Arab Countries
Administrative Jobs	PHD, MSC, B.S.C	150	%60	100	200
Systems Analysts	PHD, MSC, B.S.C	150	%70	200	500
Engineers Maintenance (H/W)	MSC, B.S.C	100	%60	100	300
Programmers	MSC, B.S.C.	500	%75	300	3000
Operators	Diploma School Certificate	250	%85	250	1000
Data Entry and Document Preparation	Diploma, School Certificate	300	%95	200	1000
Computer Courses Instructors	PHD, M.S.C., B.S.C.	250	%60	5000	15000
Marketing	M.S.C., B.S.C. Diploma	100	%75	50	100
Support	Highschool, Diploma, B.S.C.	200	%60	300	1500
Total		2000		6500	22650

A-4:

Jordan has realized that the world is entering the information age, and it is extremely important to be always on the edge, of science and technology, so as to insure a continuity of social and economic development. Indeed Jordan is moving towards establishing itself as a regional base for, and service of, information technology.

Presently there are four universities in Jordan. Jordan University is located in Amman, Yarmouk University and Jordan University for Science and Technology are in Irbid in the North, Moatta University is located in the South. All four universities have undergraduate degrees in Computer Sciences. About 200 students graduate with a degree in Computer Science each year from the four universities. Besides the aforementioned universities a number of community colleges offer two-year courses in Computer Science. About 800 students graduate yearly from community colleges with a degree in Computer Science. Unfortunately less than 15% of those find employment in their field since they are considered insufficiently prepared. A number of Jordanian students also graduate in Computer Science from various international colleges and universities around the world. However none of the institutions in Jordan offer computer courses to students who are not majoring in Computer Science except to those majoring in engineering and in this case in a very limited curriculum. This trend is very true also in neighboring countries. It is obvious that a need for vocational training is necessary first to close the gap between the academic and the applied, and secondly to create computer awareness in professionals in various disciplines.

Jordan is now embarking on a project to introduce computers in the primary and secondary schools' curricula. Such a project, the first in the region, will require the training of teachers to the use of the new technology. Educational software for schools in Jordan as well as others in the region will be in great demand.

B-1:

The Center is to comprise the necessary Hardware, Software, Communications equipment and trained staff to:

- Provide training at all levels of the public and private sectors to help the country appreciate, absorb and use Information Technology.
- Carry the training necessary to strengthen the capabilities of Jordanian and participants from other Arab Countries in computer science.
- Encourage the development of appropriate solutions for local as well as regional needs using the latest techniques of software engineering.
- Strengthen the Jordanian capabilities in research and development in such fields as Artificial Intelligence, Arabization and S/W development.
- Strengthen the Jordanian capabilities in using computers in research and development in all sectors.
- Present new scientific and technological services that were previously unavailable to the Region.

The present stage of development of the countries in the Arab World goes well beyond the satisfaction of basic needs. More emphasis on industrialization and agriculture is required to

diversify single product economies, and contribute towards stability and peace in the region.

Information Technology provides an opportunity for progress with more efficient use of limited resources. However, Information Technology can only be used to a good advantage, if a large base of educated and trained people at various levels of decision and execution does exist.

Addressing local and regional needs also calls for developing indigenous solutions using the latest software and hardware techniques.

The education and training parts of the project are to address high levels, in Jordan and indeed in the Arab region, according to their actual and future needs. The Objectives of the project is to give vocational training to holders of degrees in Computer Science and also to give training to professionals in other disciplines in the use of Information Technology.

The National Development Plan has called for human resources development in all sectors, In the education sector projects are underway to upgrade the qualifications of all school teachers including their ability to use computers in teaching their courses. In other sectors planners and researchers are requested to use the National Information System to enhance the results of their studies. Furthermore and due to decline of the value of Jordanian Currency and the high number of skilled and educated Jordanians, the government has targeted the computer software industry as an export industry.

(B-2)

Functions and duties of each section,

Planning Section:

- Perform the short range and long range planning.
- curriculum evaluation and revision.
- Equipment advancement and up date.
- Research projectors planning and evaluation.
- Software development planning and evaluation.

Administrative section:

Carry out Administrative and other responsibilities such as secretariat duties, trainees registration and orientation following-up, registration fees and financial matters, procurement, etc.

Training section

Made up of two subsections:

A. Basic Training :

Conduct basic introductory Courses for local and regional trainees to promote computerization and use of computers.

b. Advanced Training:

Conduct advanced training courses for local and regional trainees to elevate the technical knowledge and skills and implement systems engineering concept and methodology.

Technology Developed Section:

Is divided into three subsections:

A. R&D:

Performs research projects that are required and could have an impact on local and regional computerization developments.

B. Scientific and technical services:

Performs the duties pertaining to scientific and technical services requested locally or regionally in fields of competence of the Centre.

C. Software Development:

Develop Arabised software for Jordan and the region in subject areas that are pertinent to the needs.

Library :

Perform its duties pertaining to library services.

Staff allocation :

Title	No	Section
Director	1	Director
Planning	5	Planning
Library	2	Library
Administrative support	5	Administration and administrative Support
Technical Support	10	Software development (7) Technical services (3)
Trainers	16	← Basic (8)
Operators	5	Advanced (8) Operations

Total full- Time	44	

(B-5)

- 1- Lecturers should be experienced in both computer application Development (Programming, Systems analysis and Design, networking, etc...) and in conducting and lecturing in the field, At least two years experience in Training with a minimum of a University degree.
- 2- Technicians should be well experienced in supporting and maintaining hardware and software with at least a community college Diploma.
operators should be well experienced in operating computers and related peripherals. High school certificate or community collage diploma is a minimum.

Both with a minimum of two years experience.

- 3- Secretaries should have high-school Diploma and a secretariat course, and should have a minimum of two years experience.
Clerks should have the same qualifications as secretaries.

(C-2)

Scope of the project (scope of technology transfer)

Sophisticated expertise is required as a token of technology transfer. Jordanian staff have good experience in the computer field, but they need expertise know-how in the advanced techniques that covers the following:

- 1- Software Engineering Methodology
- 2- Advanced Software development techniques
- 3- Curriculum preparation and planning
- 4- Networking technology and management
- 5- Advanced Instructor training methodology
- 6- Latest computer technology
- 7- Latest advances in computer management techniques.
- 8-

(C-3)

Courses are to be tailored according to the Trainees cross-section so that each level should be catered for.

In general we can subdivide the training curriculum into two major parts.

- Computer Utilization technology
- Advanced training for professionals.

The first category will cover the following :

(High-School diploma to PHD)

- Management.
- Teachers.
- Technicians, Engineers, clerks and Information handling personnel.
- Secretaries.
- Computer personal with very little experience.

The second category will cover the following :

(B.SC., M.SC., PHD)

- Computer personal with two years experience
- Computer Instructors
- Professionals (emphasis on a specified specialization field such as RDBMS Design techniques, Networking , CAD, etc...)
- Software developers.

(1) The courses will cover:

First categories

Course	Duration	No/class	Frequency
- Introduction to Computer Technology	3W	20	2
- Programming languages	4W	20	2
- Office Automation and utilization of P.c	8W	25	2
- Basic System Design	4W	15	2
- Introduction to Networking and communications	6W	20	2
- Introduction to RDBMS	6W	20	2

Second category

Course	Duration	No/class	Frequency
- Advanced Systems analysis	4W	15	2
- Programming languages	4W	20	2
- Advanced Networking and communication	8W	20	2
- Network management	4W	20	2
- RDBMS Design	8W	20	2
- Database Administration	4W	20	2
- C Language	8W	20	2
- Pascal Language	8W	20	2
- PROLOG	4W	20	2
- Graphics	4W	20	2
- Computer Management	4W	20	2

Course	Duration	No/class	Frequency
- Computer Project Management	6W	20	2
- Instructors Training	4W	20	2
- Operations Research	8W	20	2

- 5- Training fees will be set, reviewed and revised according to type and duration of courses , and will be scheduled according to training sessions and collected from authorities sponsoring trainees or directly from individuals.
- 6- An approved certificates of completion will be awarded to training course graduates after successful completion of the course requirements.
- 7- - Public and private organizations which will introduce computerization to their activities.
- Regional public, and private institutions.
- Individuals who are interested in computer technology .

C-6:

This request for technical assistance is submitted by The Higher Council for Science and Technology with the hope of establishing a Computer Training Center in Jordan. This aid will strengthen the research and technical capabilities of Jordanians and other Arabs in the region.

The technical assistance needs are:

- Experts
- Training
- Equipment

Japanese Experts

Experts will play a vital role in the transfer of know-how and state of the art in computer software technology. The success of the project will heavily rely on the Japanese experts giving technical assistance in the form of consultancy and lectures to Jordanians and participants from countries in the region. Cooperation with research Institutes in Japan and transfer of technology in the computer field will require a heavy involvement from Japanese experts .

Required Experts

- . Chief Advisor (3 years)
- . Coordinator (3 years)
- . OS and computer Language Advisor (2 years)
- . Database Advisor (2 years)

Counterpart Training

Training of local staff to enable them as trainers will be emphasized to bridge the gap between academic and actual training needs in Jordan .

4 persons for 6 months, 4 times (in Japan)

Equipment

For budgetary purposes the required equipment and materials may be divided in two phases.

Phase 1:

One Main Frame Computer consisting of:

- CPU at least 16 MB of Main storage.
- Two Giga Bytes of on-line disk Drives (at least 3 Drives)
- Two 9-track tape units with 6250/1600 BPI density.
- One Hundred personal computers attached as work stations.
- One Hundred slave printers (132 Columns).
- 2 line printers minimum speed 1000 Lines per Minute.
- 10 very high resolution graphics terminals (1024X1024).
- 2 Plotters.
- Communication devices: Modems and networks.
- UPS

Basic Software

A multi-user, multi-tasking operating system with:

- Electronic mail facility
- Dynamic dispatching
- Dynamic assignment

- Time slicing
- Batch swapping
- Library access
- User administration

Facilities to manage and check the system resources and user access authorization as well as project and user budget allocation.

Editor

Advanced Query language

Advanced Bilingual Relational Data Base

COBOL

FORTRAN

Pascal

Other languages.

Personal Computers

Additionally 100 Personal Computers (stand alone) with printers and networking facility.

Miscellaneous Hardware

Audio visual and other equipment required for the site, such as UPS, stabilizers, air conditioners, generators, cabling and fire extinguishers are to be provided.

Phase 2:

One Main Frame Computer consisting of:

- CPU at least 16 MB of Main storage.
- Two Giga Bytes of on-line disk Drives (at least 3 Drives)
- Two 9-track tape units with 6250/1600 BPI density.
- One Hundred personal computers attached as work stations.

- One Hundred slave printers (132 Columns).
- 2 line printers minimum speed 1000 Lines per Minute.
- 2 laser printer
- 10 very high resolution graphics terminals (1024X1024).
- 2 Plotters.
- Communication devices: Modems and networks.
- UPS

Basic Software

Same as Phase 1

Personal Computers

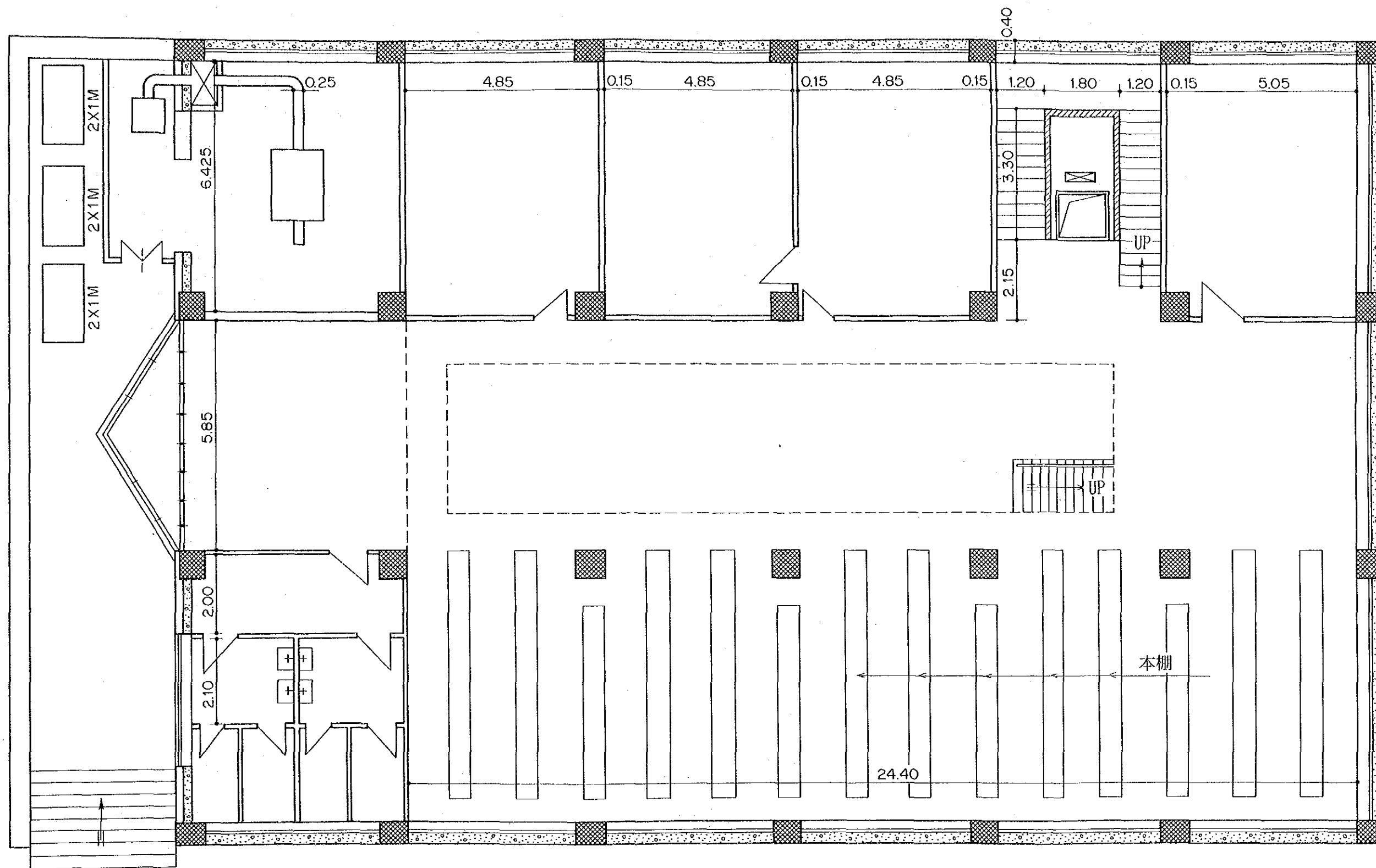
Additionally 100 Personal Computers (stand alone) with printers and networking facility.

C-7:

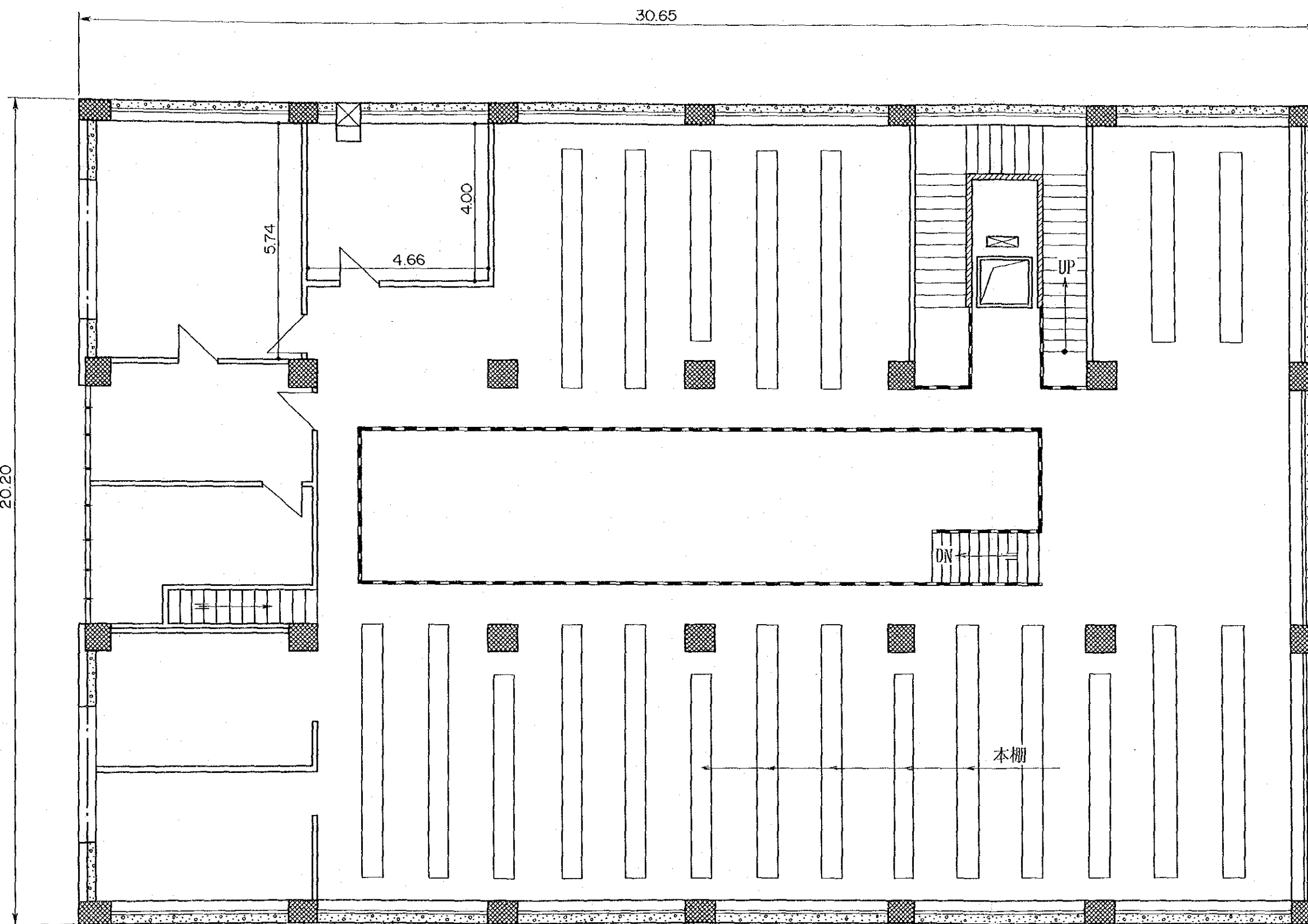
The agency in Jordan responsible for implementation of project will be the General Secretariat of the Higher Council for Science and Technology. A steering committee of Jordanian experts has been identified. The Committee headed by Dr. Ghassan Mufleh/ Director of Information Technology Sector at Higher Council for Science and Technology also includes the following members:

- Mr Afram Jamil/ Telecommunications Corporation
- Dr. Marwan Moasher/ Ministry of Planning
- Dr. Mazen Armouti/ Higher Council for Science & Technology
- Dr. Taleb Sarei/Jordan University
- Dr Yusef Nusseir/ Royal Scientific Society.

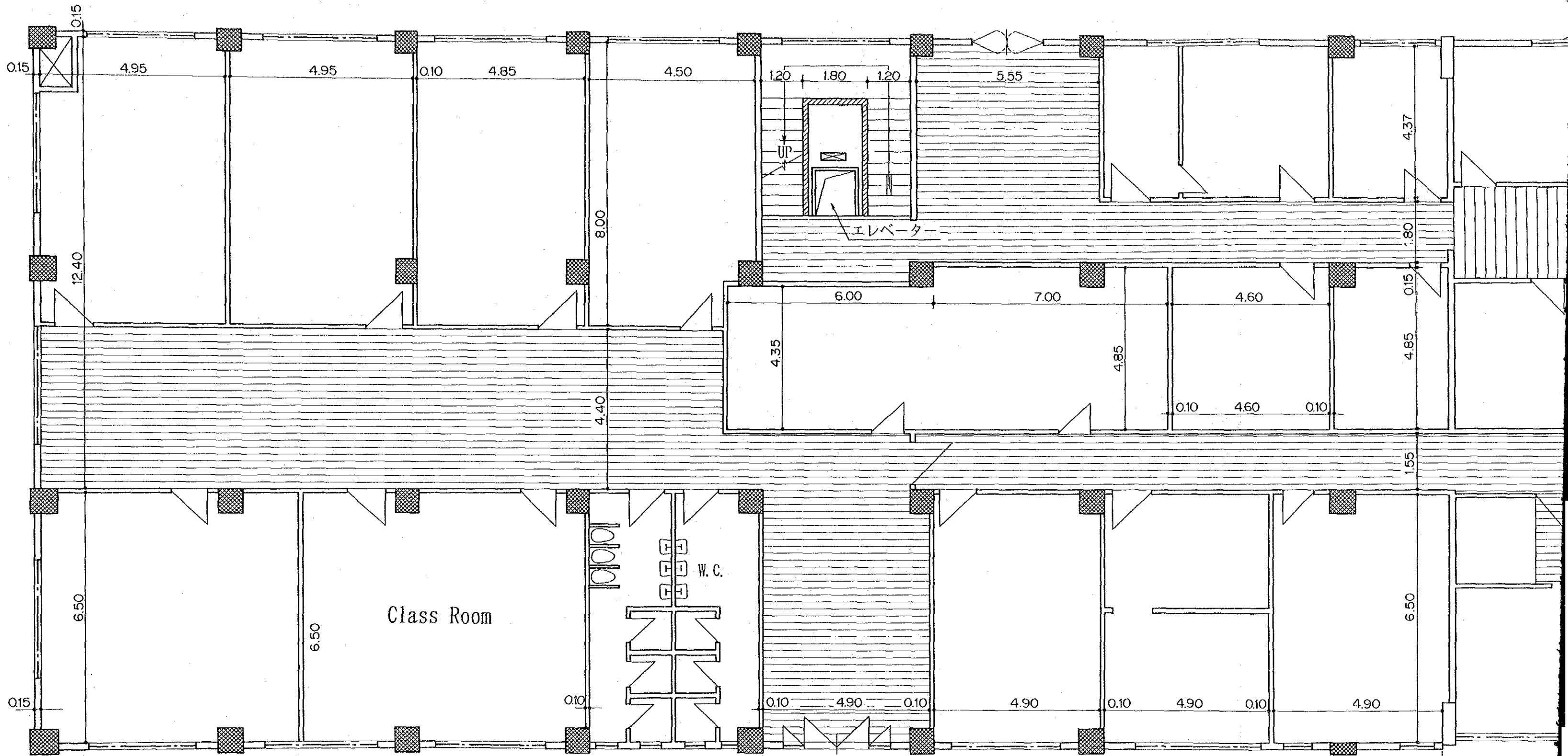
12. プロジェクトサイト建物図面

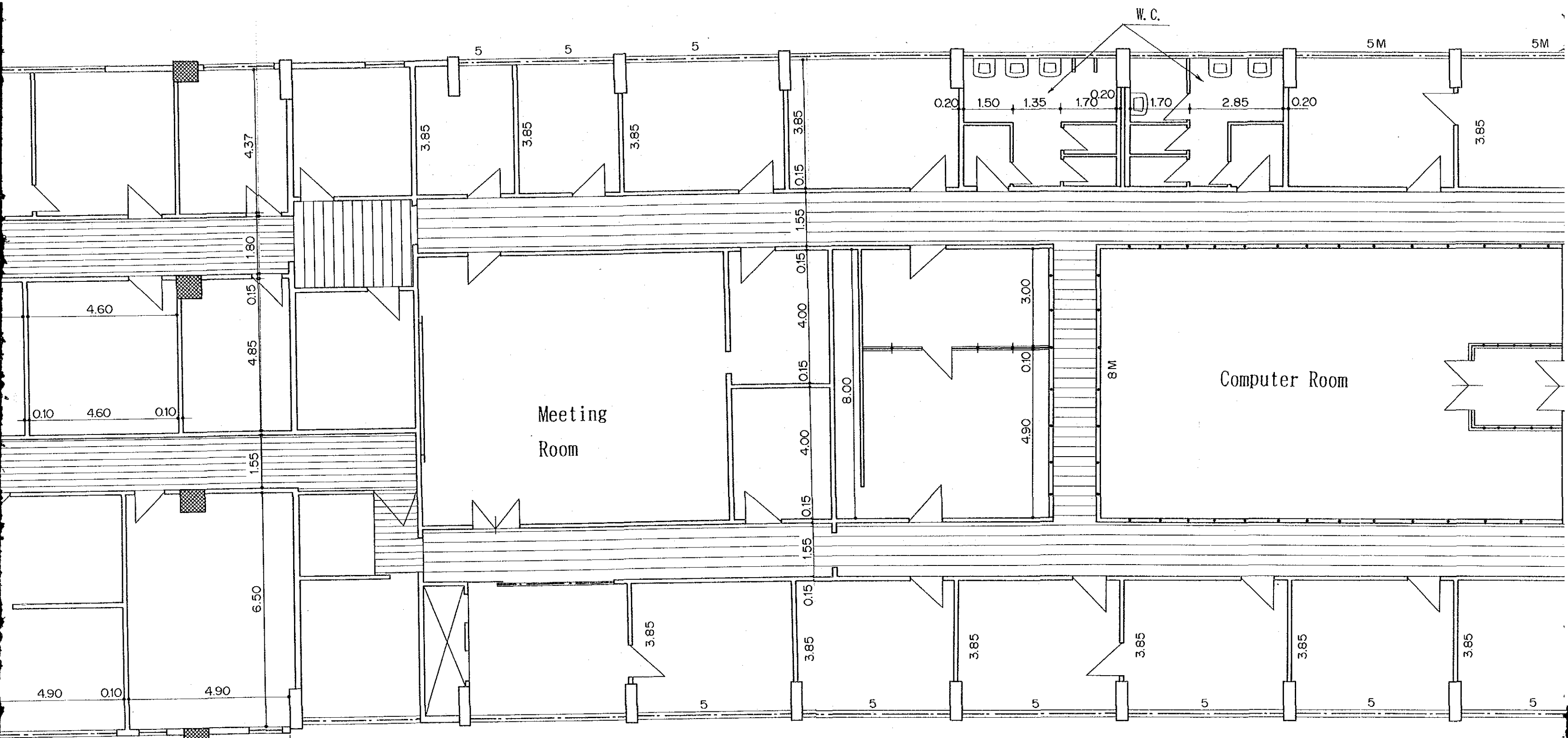


地下2階 (図書室)



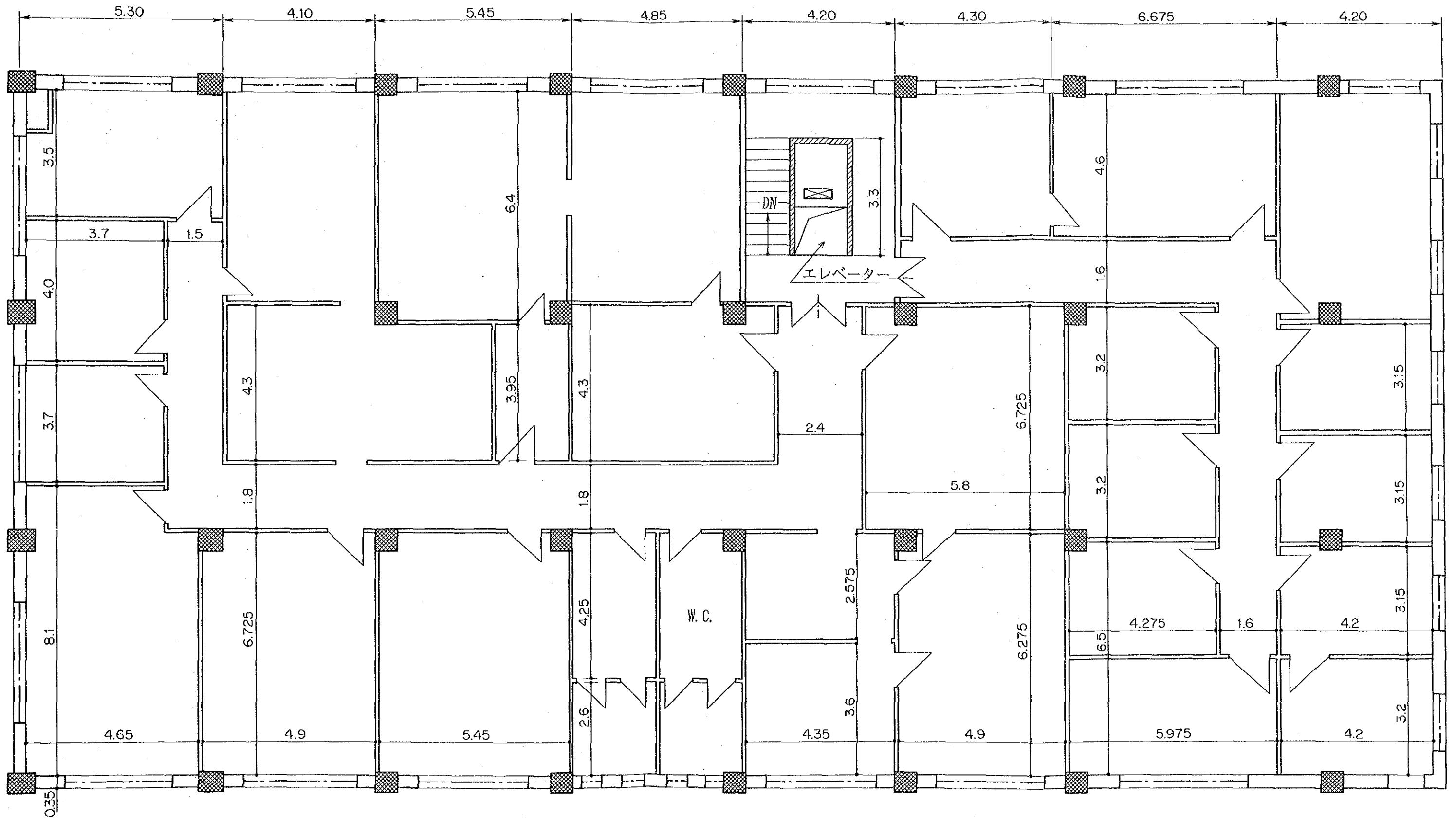
地下1階 (図書室)





Ground Floor (日本流では1階部分)

50.35



First Floor (日本流では2階部分)

JICA