

CSC 301: COMPUTER CENTER MANAGEMENT

CSC 301

- The essential objective of this course is to explore those technological and management tools which can help computer center managers to optimize computer systems performance.
- The course is devoted to the study of analytical and empirical tools for arriving at decisions and guidelines to improve the administration of computer center functions.
- Course materials
 - no specific textbooks
 - Notes, online materials and publications.
- In addition to the available materials, you are expected to read extensively from current literature and embark on field trips if necessary to complete your assignments and projects.
- Registration page
 - <http://teaching.yfolajimi.com/register.html>
- Course page:
 - <http://teaching.yfolajimi.com/csc301.html>

Course outline

- **1. Introduction to Computer Centre**
- 2. Overview of Computer Centre Management
- 3. Administration and functions of computer center.
- 4. Planning and organizing computer operations
- 5. Computer Center Staffing and personnel management
- 6. Computer selection and performance evaluation
- 7. Software evaluation and management
- **MID SEMESTER EVALUATION**
- 8. Microcomputer and office automation management
- 9. Data Centre structure and administration
- 10. Data centre network architecture, management and security
- 11. Introduction to IT Service Management
- 12. IT service management metrics
- 13. Case study and Project

Topic 1: Introduction to computer center

- Computer Center
 - an enterprise designed to perform complex and labor-consuming computational work using electronic computers
 - general-purpose computer centers,
 - computer centers for processing economic information,
 - computer centers for controlling manufacturing processes.
- A general-purpose computer center
 - performs mathematical, scientific-technical, and economic calculations, as well as operations dealing with the programming of problems.
 - assists in formulating and preparing problems and carries on consultations on questions of the organization of users' own computer centers or laboratories.
 - conducts scientific research work in the field of automation of programming and numerical methods of mathematical and technical digital computer operation.

Computer Center

- Computer centers for processing economic information
 - are usually the central elements of automated control systems for enterprises or sectors of the national economy and are administratively subordinate to the corresponding control bodies (ministries, central boards, plant managements, and so on).
 - They perform regulated work on plan calculations, processing of reports, financial and book-keeping calculations, and also single technical and economic calculations. To perform this work, such computer centers constantly store large volumes of normative and reference data (in the form of machine archives).
- Computer centers for controlling production processes
 - work in real time, automatically receiving raw data from a large number of sensors of the parameters of processes and issuing control instructions (in a rigidly assigned cycle) to the operating members (propulsion, heating, and other units).
 - Special requirements for speed and reliability of operation are demanded of these computer centers.

Computer Center

- Depending on the volume of work, the three types of computer centers may have various equipment and may be distinguished according to their productivity.
 - 1. centers that have six to eight large digital computers with speeds of 20,000-50,000 operations per second (the Minsk-32, M-220, BESM-4, and so on) or two to three computers with speeds of 600,000-800,000 operations per second (the BESM-6). In addition, these computer centers have six to eight systems of punched card equipment, keyboard computers, document duplicating equipment, and communications equipment. A computer center of the first category has 50-100 scientific workers, 100-200 engineers, and 200-300 technicians, laboratory workers, and auxiliary workers.
 - 2. centers that have approximately one-half of the equipment and personnel of the first-category center,
 - 3. The third-category computer center has about one-third.
- In certain cases the equipment of the computer center includes analog computers, which are designed primarily to solve problems of modeling dynamic processes (rocket flights, the operation of power systems, and so on).

Computer Center

- **computer centers are distinguished according to structure.**
- **The general-purpose computer center** has three primary subdivisions: a sector for mathematical preparation of problems and programming; a sector for the technical operation of electronic computers; and a sector for auxiliary operations (punching, duplication, power supply, and material support).
- **A computer center for processing economic information** has subdivisions that are specialized according to the types of economic problems (planning of production, material-technical supply, financial and bookkeeping service, and so on), as well as subdivisions for receiving all input information and for sorting results. In addition, these computer centers usually have specialized subdivisions for product classifiers, for managing the norm system, and for collecting and processing operational information arriving through communications channels (the so-called automated data control point).
- **Computer centers for controlling production processes** do not have large subdivisions of programmers or economists, since the sets of problems and programs of these centers are predetermined and do not change during the process of operation. Here most of the employees are engineers and technicians who run the computers and equipment for automatic communications with the controlled systems.

Computer Center Planning

- the development of information processing resources over a specified period of time in a manner that supports organizational growth and development
- must include :
 - an objective
 - an estimate the information processing requirements over the plan period.
 - An estimate of the computing resources requirements over the same period, as well as alternatives and trade-offs and recommendations for the cost of the acquisition of these resources.
 - criteria and milestones to evaluate the execution of the plan.
- Organizations require Strategic, Tactical and Operational plans
- Planning:
 - shapes the objectives and goals of the organization.
 - seldom changes over time.
 - It should identify the general path, or intents, of the organization.
 - Each department should have its own strategic plan which satisfy and support the organization's.
 - A system plan must fit the business plan. This is one of the most important concepts in a Computer Center. Without full knowledge of the expected long range changes in the organization, no computer center can effectively and efficiently satisfy the computational needs.
 - E.g:
 - Commitment to utilize latest technological offering
 - commitment to reach a paperless organization.
- Each plan must consider three major items: Software, Hardware and Manpower Requirements

Issues to be included in a plan

- 1) Evaluate the current system's performance and capability.
- 2) Determine the current workload and resource utilization.
- 3) Develop a current workload profile.
- 4) Estimate future data processing requirements.
- 5) Identify resources expected to be available in future.
- 6) Develop a plan to cost/effectively meet the requirements.
- 7) Document and communicate the planning results.

The planning process

- 1) Survey the work processed by time of day, week, and month.
- 2) Determine resource utilization.
- 3) Identify peak and non-peak periods.
- 4) Choose periods for workload profile preparation.

organization of the Computer Center

- Computer Center is divided into three main groups
 - Operations, User Services, and Systems Support
- Operations
 - responsible for all processing services and the efficient operation of the equipment
- The user services Group
 - staffed by professional programmers who are responsible for providing technical assistance to the Center's users
 - E.g. Consulting, Program Libraries, Documentation, Programming Assistance, Educational Services, and Microcomputer Support & Services.
- The Systems Support Group,
 - responsible for providing technical assistance and maintenance of system software

COST JUSTIFICATION OF CURRENT AND FUTURE COMPUTER RESOURCES

- justification methodologies have concentrated on labor cost savings, i.e., manpower reduction
 - This type of argument is no longer relevant
 - the Information Systems improve the productivity of employees instead of reducing the manpower
- Cost justification method:
 - classify employees into categories,
 - e.g., Managers, Senior Professionals, Junior Professionals, Administrators, and Secretaries.
- Identify the type of activities each category executes

Cost justification method

- Work Profile without New Office Automation System

	Mgmt & Supv	Spec Prof.	Rout. Prof.	Admin Supp.	Cler'l	Non Prod.
Managers	30%	16%	13%	16%	7%	18%
Sr. Prof.	2	35	26	13	12	12
Jr. Prof.	1	10	50	13	14	12
Admin.	0	0	1	58	27	14
Secr.	0	0	0	10	76	14

- Work Profile with New Office Automation System

	Mgmt & Supv	Spec Prof.	Rout. Prof.	Admin Supp.	Cler'l	Non Prod.
Managers	35%	20%	15%	15%	5%	10%
Sr. Prof.	2	42	29	11	8	8
Jr. Prof.	1	15	55	11	10	8
Admin.	0	0	1	65	25	10
Secr.	0	0	0	12	78	10

Cost justification method

- calculate the cost of labor prior to the implementation of the new information system
- calculate the increase in productivity due to the information system.
- If the cost of the new system is greater than the increase, then the system should not be implemented.

EVALUATION OF EXISTING SYSTEM / IDENTIFICATION OF NEW SYSTEM REQUIREMENTS

- The computer center is responsible for providing the user the best performance possible in the most efficient manner.
 - i.e satisfying user requirements and needs. The user
- satisfaction is usually measured in time units and the ease with which he/she can achieve their objectives.
 - E.g. turn around time, response time, time since the requested addition of new software till the time the software is available, and how easy it is to use this software-man machine interface.
- Performance evaluation, when effectively employed, has contributed substantially to bringing down the cost of data processing while increasing the level of user satisfaction
- Unfortunately, only a small fraction of the organizations are using performance evaluation effectively.

EVALUATION OF EXISTING SYSTEM / IDENTIFICATION OF NEW SYSTEM REQUIREMENTS

- Factors that determine whether the potential benefits of performance evaluation can be realized:
 - 1. The organization of the data processing department.
 - 2. The position of the data processing department within the organization.
 - 3. The knowledge, effectiveness and interest of the senior data processing manager and/or the top level managers within the organization.
 - 4. The human and computer resources dedicated.
 - 5. The effectiveness of communications within the data processing department and between it and the users of services.
 - 6. We may classify performance evaluation into two areas;
 - identification of new system requirements and ;
 - attributes and the second studies the existing system performance.
- Performance evaluation of existing systems is a continuous process which has to be performed on a periodical basis. The computer is a dynamic environment, new users are added practically on a daily basis, existing users utilization pattern changes as more programs become available and as user requirements changes.

IDENTIFICATION OF NEW HARDWARE REQUIREMENTS

1. Identify both requirements and attributes of the system

- Requirements are constraints that the system must satisfy. They specify what the system must be able to do.
- Attributes are constraints or options and user desires that a good system should (not must) satisfy.
- The process of identifying requirements is divided into two phases:
 - requirements analysis and requirements synthesis.
- Each user needs and application functional requirements are analyzed, projection of future needs, and the important functions identified

IDENTIFICATION OF NEW HARDWARE REQUIREMENTS

2. Translate the identified needs into requirements and attributes.

- Requirements may be defined in terms in computational speed, *I/O* and memory requirements

3. calculate the computational, processor speed and memory requirements of the system.

- The main memory space for a user programs is estimated using the average residence requirement per user program and the maximum level of multiprogramming needed to achieve the required performance.

IDENTIFICATION OF NEW HARDWARE REQUIREMENTS

- 4. combine these calculations based on the time of day and number of users, etc.
 - The result identify the specific system computational requirements.
 - The same process is repeated for other requirements and trade offs are made.
 - Issues to be addressed:
 - Processor Speed.
 - *I/O* capabilities.
 - Percentage Utilization of resources.
 - Cost/Performance ratio.
 - Memory Size.
 - Availability of Software.
 - Availability and Capability of Operating System.
 - Type and Availability of Peripherals.
 - Flexibility.
 - Expandability.
 - Bus Complexity.
 - Executive Complexity.
 - Availability.

IDENTIFICATION OF NEW HARDWARE REQUIREMENTS

- 5. identify those characteristics that the system must have (Requirements) and those that the system should have (Attributes)
- A technical specification is developed and used in the request for bids

HARDWARE UTILIZATION EFFICIENCY

- The efficiency of hardware utilization is performed using specialized software packages, called monitors, which not only identify areas requiring reviews in the software and hardware, e.g., reorganization of disks, but also system utilization charts which may be used to investigate growth pattern and to recommend updates.
- A system performance analysis requires carrying out the time, space and allocation analysis.
 - It is usually advantageous to carry out the time analysis first.
 - Typical measurements are the percent busy of the processor and other devices, the systems throughput, average throughput rate, and turn around time
 - The space analysis measure the ability of the main memory and secondary storage to simultaneously store the data, the software code, and the user program code needed to meet the performance requirements
 - The allocation analysis measure the efficiency of allocation of the system.
- Other typical measurements:
 - work load to be processed
 - turn around times to be met **by** month, day and hour.
 - Periods of heaviest processing loads and shortest turn around time requirements are of special importance.

VENDOR EVALUATION AND FACILITY DESIGN

- Early computers were stand alone systems.
- Today there is a strong
- trend towards cooperative computing or distributed computing.
- Current trend is intelligent allocation of resources in cloud computing
- The decision to choose a computer must be altered to a decision to choose a family of computers.
- The consequence is that a choice of vendor must now be determined not only on the characteristics on a specific machine a vendor is offering, but also on his line of machines.

COMPUTER-FAMILY SELECTION METHODOLOGY

- Computer systems have become more complex and in many cases require periodic reconfiguration to upgrade them. Management and DP staff must, therefore, adopt a new philosophy and techniques to adapt the selection process to the information systems policy.
- It is necessary to change from "conventional" selection procedures to new methodologies that are more flexible and lead to a better solution of the organization's information problems.
- One such method is the selection of a computer family.

COMPUTER-FAMILY SELECTION METHODOLOGY

- basic definition of a computer-family:
 - A family of computers of the same type, consisting of several models from the same manufacturer's product line, ranging from microcomputer to mainframe, with full compatibility in the operating system and the system's software, to enable transfer of application software from one family member to another without changes
- Selecting a computer-family will enable the organization to better implement its DDP policy, and provide it with more capabilities

COMPUTER-FAMILY SELECTION METHODOLOGY

- Selecting a Computer-family: evaluation and selection methodology
 1. Identification of possible vendors and manufacturers.
 2. Primary elimination of irrelevant candidates.
 3. Determination of mandatory requirements.
 4. Examination of vendors' compliance with mandator requirements.
 5. Setting quantitative and qualitative criteria and respective weighing scale.
 6. Writing the RFP to be addressed to selected vendors.
 7. Receiving, comparing and analyzing bids.
 8. Concluding final list of vendors.
 9. Performance of hardware and software benchmarks.
 10. Drawing final conclusions and selection of best family.

SELECTION PROCEDURES

- Factors affecting the computer center manager's decision on hardware and software acquisition:
 - External: armies of salesmen from the various vendors
 - Internal: demands of users for processing power and from the technical staff for the latest advancements.
- The computer center manager must not delegate responsibility for establishing acquisition policy, determining the evaluation criteria, and controlling the thoroughness of the evaluation
- acquisition should not deviate from the strategic/tactical objectives of the Center
- Management control should assure that the entire acquisition process is done with more precision and thoroughness than it customarily receives

SELECTION PROCEDURES

- acquisition procedure
 - 1. Preparatory steps: forming an evaluation team.
 - 2. Obtaining proposals: including (a) Prepare if necessary, request for information, (b) prepare request for proposals, (c) conduct bidders conference.
Evaluating proposals: how to select vendor?
 - 4. Financing the acquisition.
 - 5. Negotiating the contract procedure
- In actual practice, financing and contract agreements affect evaluation and selection

SELECTION PROCEDURES (Acquisition)

1. Preparatory Steps

- Selecting computing equipment is a process of matching the desired functions to be performed against the capabilities of alternate configurations:
 - Identify users' needs
 - study what vendors offer.
 - state your needs to vendors.

2. Obtaining Proposals

- requests for proposals (RFPs) are prepared **by** users and submitted to vendors

SELECTION PROCEDURES (Acquisition)

- 2. Obtaining Proposals (Contd)
 - Some vendors are likely to be eliminated due to:
 - doubts about their reliability or
 - their inability to provide services wanted.
 - Other vendors are eliminated **by** considering their ability to meet mandatory requirements
- RFPs must include:
 1. Statement of purpose.
 2. Deadline for proposals.
 3. Date for the bidders conference.
 4. Mandatory requirements.
 5. Desirable requirements.
 6. Request for proposal specifics.
 7. Request for user-support requirements
- If too many vendors still qualify, they can be narrowed further **by** obtaining more information **by** issuing a request for information.

SELECTION PROCEDURES (Acquisition)

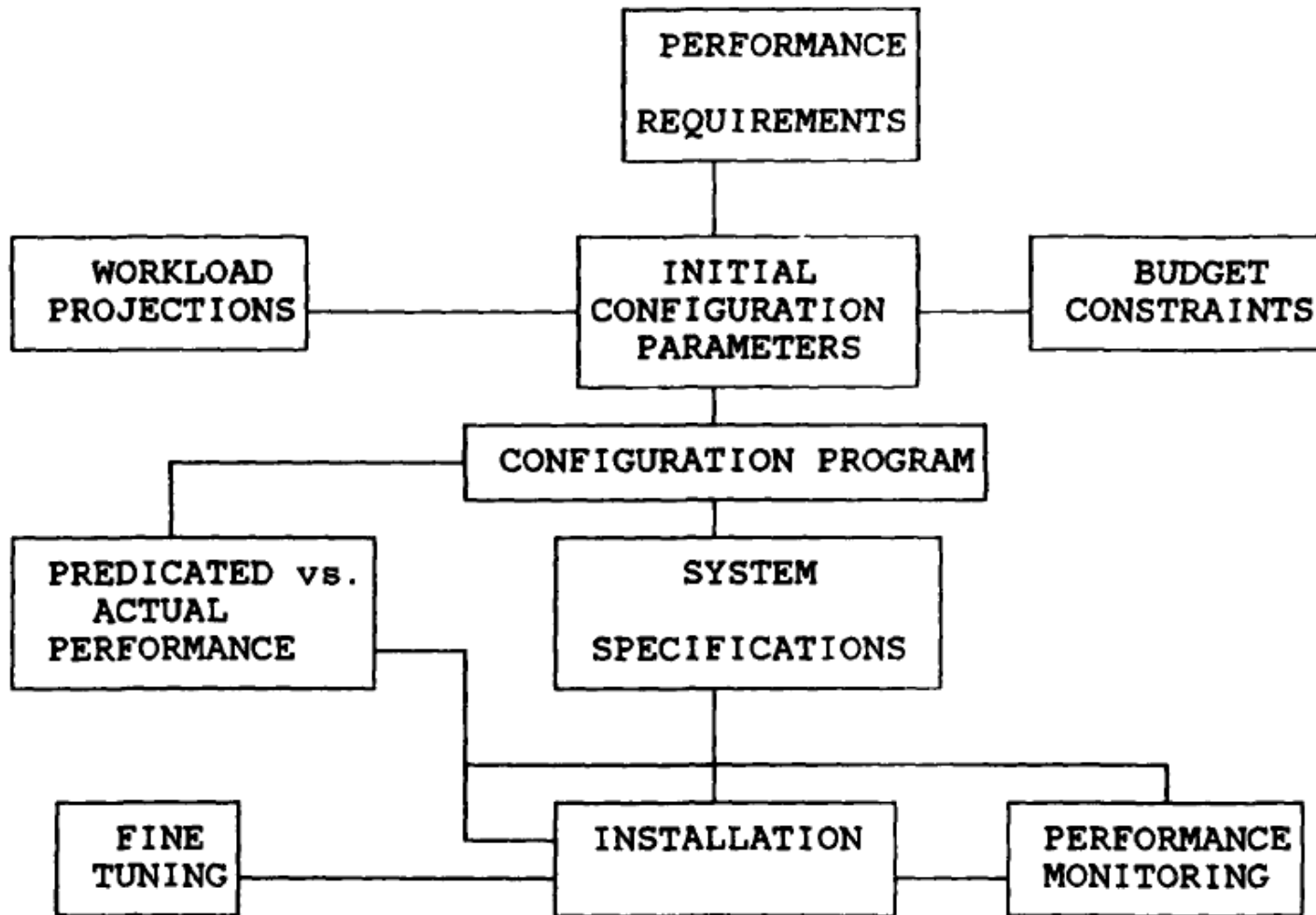
3. State Your Needs to Vendors

- Ensure that vendor proposals in response to the procurement specification serve as the basis for sound decisions.
- The specification must be as clear as possible
- spell out clear procurement specifications to give bid guidance to suppliers, making sure to include coverage of areas of usage, job schedules, hardware, software communications, maintenance support, education/training and bid terms.

HOW TO EVALUATE VENDOR PROPOSALS

- review proposals on the basis of such factors as pricing, fit of proposed equipment to specific needs, future growth potential, vendor qualifications, equipment maintenance, installation, assistance and delivery, etc.
- Rating analysis:
 1. Vendor qualifications.
 2. Differences in hardware implementation.
 3. Software architecture.
 4. Software availability.
 5. Reliability and field engineering support
 6. Price/performance
 7. Future growth
 8. Equipment compatibility.
 9. Risk factors.
 10. Scoring system and the preferred alternative.
 11. Rent, lease, purchase decision.

A process view of system configuration



FACILITIES DESIGN

- Facility design involve preinstallation planning, building requirements, environmental requirements, magnetic recording media storage, safety and fire precautions.
- In some cases, vendor will support proposals to help customer design their facilities

FACILITIES DESIGN

1. Preinstallation Site Planning

a) Establish Planning Group

- includes computer vendor representatives, engineering consultants, and other consultants
- This group will consult with and advise the Computer center manager on the course of action, objectives, and progress of installation.
- The manager will be in charge of overall operation and will coordinate the physical planning with the procedures and general planning.

b) Location

- User must be decided on a suitable location for the computer area.
- In the real world, location always decided **by** the manager of Computer Center
 - unadvised decision will affect the operation of whole systems

c) Schedule

- computer center manager should take note of discrepancies and prepare an adequate schedule.

FACILITIES DESIGN

2. Building Requirements

- Factors to consider in selecting a location for the computer installation:
 1. Availability and location of proper and adequate power (including standby power where required).
 2. Space to house air conditioning equipment (compressor and air handling location and placement of cooling tower or evaporative condenser).
 3. Ceiling height, outside wall area, and glass area
 4. Work flow to other areas such as academic department, etc.
 5. Proper safety and fire prevention procedures

FACILITIES DESIGN

3. Environment Requirements

- Temperature and humidity in the computer room must be controlled within the limits given **by** the manufacturer.

4. Magnetic Recording Media Storage

- manager he should set up a cost-effective policy about back up requirements

5. Safety and Fire Precautions

- choice of a computer location, building materials used, fire prevention equipment, air conditioning and electrical systems, and personnel training.

OPERATIONS

- the operations of a computer center are so complex and highly diverse activities.
- For most computer centers the problem is how to control operations effectively
- Two most important operations within a computer center are:
 - operations documentation and
 - production control.

OPERATIONS DOCUMENTATION

- **Uses of documentation**

1. Management Tool--As a management tool to provide the necessary material to review a new system or program.
2. Communication Linkage--Simplify program revisions **by** providing details in support of each program, and since the most cost **(80%)** is the maintenance cost, program documentation can reduce the whole cost.
3. Reference--Provides the communication necessary for presenting a clear and detailed picture of the new system to all effected personnel.
4. Aids in instructing new personnel.
5. Documentation Standards--Serves as one basis for an evaluation of internal controls.

OPERATIONS DOCUMENTATION

- Levels of Documentation
 - Policy
 - Policy statement should cover the general policy, computer equipment use, and how the policy will be applied
 - Procedures
 - Implement a standard operating procedure manual which specifies for all personnel the standard methods to be used in the center. This will include standard procedures for system analysis, programming, and operations.
 - Standards
 - A standard is a rule for the measure of quality in a computer center.
 - Performance standards aid in planning, controlling costs, and in evaluating performance.
 - Computer center should set standards for
 1. Common program language.
 2. Equipment selection procedures.
 3. Print character sets.
 4. Flowcharting.
 5. Documentation procedures.
 6. Tape labeling.

OPERATIONS DOCUMENTATION

- **Operating Documentation Requirements**
 1. A cover letter which describes the benefits of the system to management.
 2. A table of contents which allows a quick reference to an individual area of concern.
 3. Narrative that states objectives and constraints of the system.
 4. Flowcharters, data flow diagrams, or data dictionary, etc.
 5. File specifications that describe the master file creation, edits, updates, output creation, file clean up, and utility programs.
 6. Test procedures including data that will be its alternatives.
 7. Performance criteria.

OPERATIONS DOCUMENTATION

- **Control**

- a. Review and Approval Cycle**

- To assert effective management control over a system and its documentation, checkpoints must be developed where either a management design review or a technical design review take place.
 - The reviews are to provide planning visibility, assure technical quality, and insure timely resource allocation.
 - No system or **job** should be put into the production environment without total operational acceptance of the system.
 - **A** sign-off sheet with signatures from each managerial level within the computer center, should be forwarded to the Director before he accepts the system.
 - Within implementing a system, time for the documentation to flow through this loop must be planned.

- b. Audit**

- minimum acceptable set of documentation in auditing**

1. Problem statement.
2. System flowchart.
3. Operator instructions.
4. Record layouts.
5. Processing time.
6. Approval and change sheet.
7. Set-up information.

PRODUCTION CONTROL

1. Nature of Production Control

a. Objectives

1. Plan and control computer center resources.
2. Provide service at reasonable cost.
3. Be responsible to user needs.

b. Functions

1. Forecast demand.
2. Schedule.
3. Monitor.
4. Control must be established over the basic operations that need to be performed to process a **job**. These include: Job initiation, set-up, routing, dispatching and follow-up.

c. Relationship with Input/output

- Operations means that you are involved in an input/output situation; therefore, we must exercise control over:
 1. set guidelines on user input.
 2. provide the user information on computer resources.
 3. establish effective lines of communication within the organization and with the user.
 4. establish a control system which provides job and resource status at regular intervals.

PRODUCTION CONTROL

- 2. Understanding the Product
 - identify your products so that you will know where to place
 - Look for deliverable end items; these are your products.
 - Your products may be: time, reports, or service, or their combinations
- 3. User Interface with Operations
 - Define the User
 - Identify user Interfacing Area
 - Controlling User Requests

PRODUCTION CONTROL

4. Distribution

- **1.** The end of the line for all the data preparation, processing both human and computer, and control is here in the distribution area. If they do not perform their tasks correctly and on time, the effort of all other areas is wasted. The primary functions are: decollating, bursting, packaging.
- Distribution must be prepared to communicate with the user community and with the *I/O* control, scheduling, and programming departments. The primary question will concern **job** status and final quality checks **by I/O** control.

5. Quality Control

- The center's standards should cover programming practices as well as operating and control procedures.
- Procedural standards define clearly how each task is to be done.
- Performance standards are used to aid planning and to evaluate performance.
- The production control function consists of activities which monitor the processing and insure that no data is lost or mishandled.

PRODUCTION CONTROL

6. Responsibility

- The primary responsibility rests with top management who must review organization and control practices, and evaluate the performance of the computer center. You as computer center managers, must keep top management informed as to your needs and the state of the art so that wise decisions can be made.
- Systems and programming have the responsibility of defining the type of controls and the check points for each new system they install.
- Quality control does pay off in improved and satisfied users.
- The responsibility in the computer center starts when data is received in the input area, where it is logged and batched, and then moves to data preparation, and then back to input control, processing, output, and to distribution. Usually the input and data preparation areas are the most vulnerable to error.

STAFFING

- The Computer Center must project a professional, wellrounded image. This is done primarily **by** its staff
- Important influences on individual behavior and motivation:
 - Individual characteristics.
 - Individual motivation.
 - Rewards.
 - Stress.

STAFFING: positions required

1. Organization structure

- The successful running of a computer center, and even its survival, is dependent upon staffing at all levels with the highest quality personnel that is obtainable.

a. Supervision and Administration

- Good utilization of equipment is a constant concern since meeting schedules is very important.
- A combination of rigid detailed operations and creative development work must often be simultaneously supervised.
- Supervision of data processing work is very difficult without a thorough knowledge of its technical details and technical skills used.

b. Reporting

- Data processing management faces two special problems:
 - Translation of technical measures of process and performance into commonly understands.
 - 2. Continual reporting on planning and on project performance.

STAFFING: positions required

c. Long-range Planning and Project Control

- Project must be scheduled and developed within the long-range plan, available budgets, and personnel availability; often in the face of conflicting pressures from the other departments served.
- Data processing management must keep constantly
- abreast of new developments in equipment and techniques to see how these may alter planning.

d. Maintenance of Standards

- Establishment of standards and the maintenance of high-quality level demand constant attention to:
 1. Recruitment of qualified personnel.
 2. Continual training of new employees and updating the training of old employees.
 3. Development of a quantity and quality evaluation system, based on meaningful standards.
 4. Definition and publication of **job** descriptions.
 5. Constant review of individual and group performance.

d. Liaison

- The unusual position of the data processing activity within the larger organization--half service, half operating--greatly heightens the importance of the liaison function at the management level.

STAFFING: positions required

2. Position Descriptions and Qualifications of Personnel

- a) External Compensation Comparison
 - Position descriptions provide a foundation on which to compare jobs inside the organization with others outside in order to take full advantage of industry, community, interorganization, interdivision, and other compensation surveys.
- b. Internal Compensation Comparison
 - Position descriptions provide a basis for job evaluation and represent an internal part of a soundly aligned salary administration program, since they crystallize the meaning of the jobs in the minds of the evaluators

STAFFING: positions required

- **c. Performance Appraisal**
 - Position descriptions provide a way to measure how completely and how well the employees is carrying out the responsibilities of the job, his areas of strength and weakness can be located, and he can be counseled accordingly.
- **d. Management Development**
- Position descriptions are a necessary part of a management development program because they permit more accurate analysis of the requirements for satisfactorily filling a supervisory position. These "target" requirements then serve as a guide for selecting, training, and developing the men **and** women who may later fill the **job**.
- **e. Recruiting, Hiring, and Placement**
- Position descriptions are an aid to recruiting, hiring, and placement since they form the basis for written specifications listing the requirements for satisfactorily filling a **job**.
- **f. Orien**

STAFFING: positions required

- **f. Orienting New Employees**
- Position descriptions quickly and efficiently orient new personnel to the **job** and its requirements. They are particularly helpful and comforting to two groups of newly promoted or hired employees: First, those who are placed in freshly created jobs with a description as their blueprint of responsibility and authority, and second, those who have been promoted into new posts embodying duties with which are not familiar.
- **g. Evaluation of Position Descriptions**
- Descriptions should be evaluated to pre-established guidelines such as:
 - Education
 - Experience
 - Previous qualifying experience on related work or less jobs, either within the organization or outside.
 - The "breaking-in-time" or period of adjustment and adaption on the specific **job** itself.
 - Complexity of duties
 - Contacts with others
 - Proprietary data

- Qualification of Personnel
- the manager must have the position blueprints, called "position descriptions" before he can hire the right employees for the right positions and decide on the proper rates of pay.

RECRUITING--SOURCES OF PERSONNEL

- 1. Employees--Employees who are seeking advancement and new career paths look for opportunities within their organization. Posting job requisitions gives the Personnel Department the communication link to employees and provides them with avenues for greater growth potential.
- 2. Data Processing School and Other Schools--Schools are excellent sources for entry level jobs and those positions which require specialized training.
- 3. Advertisements.

CAREER PROGRESSION

- Upward mobility in the work force is desirable and necessary, and organization sponsored training programs will probably result in upward mobility of employees, so the systematic training programs are very important to a computer center, it can provide assistance in the following areas:
 - 1. Ability to ensure a valuable supply of qualified personnel.
 - 2. Provide progression to employees thereby avoiding career dead-ends.
 - **3.** Providing upward mobility, thereby, aiding in development of employee morale.
 - 4. Lowering employee turnover, expanding and raising the caliber of the staff.

MOTIVATION

- **A practical definition of motivation might be the following:**
 - The art of getting people to recognize what needs to be done, to want to do it, to apply their skills in doing it will, and to want to do it willing, cheerfully, and with enthusiasm.
- **role of the supervisor in motivating employees**
 - a. Broadly stated, it is the role of the supervisor to maintain the morale of his unit.
 - **b.** Since within the framework of any organization and within the makeup of each employee there are both positive and negative motivating factors, this is not an easy matter.
 - c. But **by** recognizing and interpreting the positive factors of the organization and **by** identifying the personal goals of the individual employee, the goals of the organization and the goals of the employee can be made more compatible.
 - **d.** This in turn, should improve morale. Through improved morale, the organization in the general and the supervisor's department in particular should benefit from increasing employee efficiency and effectiveness.

MOTIVATION

- conditions which promote motivation in most people:
 - b. Proper placement;
 - b. Participation;
 - c. Challenge;
 - d. Competition;
 - e. Leadership;
 - f. Understanding.

MOTIVATION

- **What a supervisor can do to improve morale**
 - a. Develop a positive attitude toward your organization and your employees. Work on yourself first, get yourself straightened out.
 - b. Recognize the negative motivating factors of your organization and the negative emotions, feelings, and personal attitudes of your employees.
 - c. Tell your employees why and give them reasons.
 - d. Do your utmost to make jobs safe and healthful.
 - e. Make a conscientious effort to improve working conditions.
 - f. Place your employees where their training and experience can be used best.
 - g. Use your employees' ideas, ask their opinion and what they think, develop a "we" attitude.
 - h. Always give credit when it is due.
 - i. Represent your organization and your employees fairly.
 - j. Build up the job, show its importance, show the employee the end product of their efforts, where it goes, what it is used for

SUMMARY

- Ten axioms for a successful information center (Kutnick, **1985**, pp. **15-171**)
 1. Obtain top management support.
 2. Run the information center as a business within a business.
 3. Develop a microcomputer strategy.
 4. Chargeback all costs.
 5. Consider education critical to success.
 6. Staff well.
 7. Track success.
 8. Carefully consider the product set.
 9. Develop good relations with end user groups.
 - 10.** Learn from the past with an eye to the future.