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FIRST YEAR SECOND SEMESTER EXAMINATION FOR
THE DIPLOMA IN BUSINESS ADMINISTRATION

BBM 2126: BUSINESS SYSTEM ANALYSIS

Date: Time: 2 Hrs

INSTRUCTIONS:

- Answer ALL questions in section one and any other TWO questions from section two.
- Section two questions carry the same marks.
- Workings should be appropriately shown.

SECTION ONE

Question one

1. Define system. Give examples. 3Mrks

   System may be referred to any set of components, which function in interrelated manner for a common cause or objective. A system exists because it is designed to achieve one or more objectives.

   Examples: transportation system, the telephone system, the accounting system, the production system, and, the computer system.

2. Discuss the characteristics of a system with lineage business. 10Mrks

   i) Organization;

   Organization implies structure and order. It is the arrangement of components that helps to achieve objectives. In the design of a business system, for example, the hierarchical relationships starting with the president on top and leading downward to the blue – collar workers represents the organization structure. Such an arrangement portrays a system – subsystem relationship, defines the authority structure, specifies the formal flow of communication and formalizes the chain of command. Like – wise, a computer system is designed around an input device, a central processing unit, an output device and one or more storage units. When linked together they work as a whole system for producing information.

   ii) Interaction;

   Interaction refers to the manner in which each component functions with other components of the system. In an organization, for example, purchasing must interact with production, advertising with sales and payroll with personnel. In a computer system, the central processing unit must interact with the input device to solve a problem. In turn, the main memory holds programs and data that the arithmetic unit uses for computation. The interrelationship between these components enables the computer to perform.

   ***iii)* Interdependence;**

   Interdependence means that parts of the organization or computer system depend on one another. They are coordinated and linked together according to a plan. One subsystem depends on the input of another subsystem for proper functioning: that is, theoutput of one subsystem is the required input for another subsystem. This interdependence is crucial in systems work.

   ***iv)* Integration**

   Integration refers to the holism of systems. Synthesis follows analysis to achieve the central objective of the organization. Integration is concerned with how a system is

tied together. It is more than sharing a physical part or location. It means that parts of the system work together within the system even though each part performs a unique function. Successful integration will typically produce a synergistic effect and greater total impact than if each component works separately.

v) **Central objective**

The last characteristic of a system is its central objective. Objectives may be real or stated. Although a stated objective may be the real objective, it is not uncommon for an organization to state one objective and operate to achieve another. The important point is that users must know the central objective of a computer application early in the analysis for a successful design and conversion. Political as well as organizational considerations often cloud the real objective. This means that the analyst must work around such obstacles to identify the real objective of the proposed change.

3. With examples identify and explain the THREE types of systems 15Mrks

i) Physical or abstract systems

Physical systems are tangible entities that may be static or dynamic in operation. For example, the physical parts of the computer center are the officers, desks, and chairs that facilitate operation of the computer. They can be seen and counted; they are static. In contrast, a programmed computer is a dynamic system. Data, programs, output, and applications change as the user's demands or the priority of the information requested changes.

Abstract systems are conceptual or non-physical entities. They may be as straightforward as formulas of relationships among sets of variables or models the abstract conceptualization of physical situations. A model is a representation of a real or a planned system. The use of models makes it easier for the analyst to visualize relationships in the system under study. The objective is to point out the significant elements and the key interrelationships of a complex system.

ii) Open or Closed Systems

Another classification of systems is based on their degree of independence. An open system has many interfaces with its environment. It permits interaction across its boundary; it receives inputs from and delivers outputs to the outside. An information system falls into this category, since it must adapt to the changing demands of the user. In contrast, a closed system is isolated from environmental influences. In reality, a completely closed system is rare. In systems analysis, organizations, applications and computers are invariably open, dynamic systems influenced by their environment.

iii) Man – Made Information Systems

An information system is the basis for interaction between the user and the analyst. It provides instruction, commands and feedback. It determines the nature of the relationships among decision-makers. In fact, it may be viewed as a decision center for personnel at all levels. From this basis, an information system may be defined as a set of devices, procedures and operating systems designed around user based criteria to produce information and communicate it to the user for planning, control and

performance. In systems analysis, it is important to keep in mind that considering an alternative system means improving one or more of these criteria.

Many practitioners fail to recognize that a business has several information systems; each is designed for a purpose and works to accommodate data flow, communications, decision making, control and effectiveness. The major information systems are formal, informal and computer based.

SECTION TWO

Question Two

1. In no field are models used more widely and with greater variety than in systems analysis. Outline the varous types of system models in business 5Mrks

a) Schematic Models.
A schematic model is a two – dimensional chart depicting system elements and their linkages. Different arrows are used to depict information flow, material flow and information feedback. Various elements of the system are depicted in boxes.

b) Flow system Models.
A flow system model shows the flow of the material, energy and information that hold the system together. There is an orderly flow of logic in such models. A widely known example is PERT (Program Evaluation and Review Technique). It is used to abstract a real world system in model form, manipulate specific values to determine the critical path, interpret the relationships and relay them back as a control. The probability of completion within a time period is considered in connection with time, resources and
performance specifications

c) Static system models.
This type of model exhibits one pair of relationships such as activity – time or cost – quantity. The Gantt chart, for example, gives a static picture of an activity- time relationship. Planned activities (stamping, sanding etc.) are plotted in relation to time are shown in figure 1.3. The date column has light lines that indicate the amount of time it takes to complete a given activity. The heavy line represents the cumulative time schedule for each activity. The stamping department, for example, is scheduled to start working on order number 25 Wednesday morning and complete the job by the same evening. One day is also scheduled for order number 28, two days for order number 28, two days for order number 22 and two days (May 10-11) for order number 29. The heavy line opposite the stamping department represents the total of six days. The

broken line indicates that the department is two days behind schedule. The arrowhead indicates thedate when the chart is to be in effect.

d) Dynamic System Models.

Business organizations are dynamic systems. A dynamic model approximates the type of organization or application that analysts deal with. It depicts an ongoing, constantly changing system. It consists of (1) inputs that enter the system, (2) the processor through which transformation takes place, (3) the program(s) required for processing and (4) the output(s) that result from processing.

2. The computer is now a required source of information. Systems analysis relies heavily on computers for problem solving. 7Mrks

Management Information Systems (MIS)

The computer has had a significant impact on the techniques used by management to operate a business. The level of the manager in the organization is also a factor in determining the kind of information needed to solve a problem. Lower – level management needs detailed internal information to make day – to – day, relatively structured control decisions. Higher – level management, for whom long – range objectives are the primary concerns, requires summarized information from a variety of sources to attain goals. In either case, management action is based on information that is accurate, relevant, complete, concise, and timely. MIS has been successful in meeting these information criteria quickly and responsively.

MIS is a person – machine system and a highly integrated grouping of information – processing functions designed to provide management with a comprehensive picture of specific operations. It is actually a combination of information systems. To do the job, it should operate in real time, handling inquires as quickly as they are received. Management information must also be available early enough to affect a decision. Operationally, MIS should provide for file definition, file maintenance and updating, transaction and inquiry processing and one or more databases linked to an organizational database. Within a MIS, a single transaction can simultaneously update all related data files in the system. In so doing, data redundancy (duplication) and the time it takes to duplicate data are kept to a minimum, thus insuring that data are kept current at all times.

A key element of MIS is the database – a non-redundant collection of interrelated data items that can be processed through application programs and available to many users. All records must be related in some way. Sharing common data means that many programs can use the same files or records. Information is accessed through a data base management system (DBMS). It is a part of the software that handles virtually every activity involving the physical database.

There are several advantages to a data base system:

1. Processing time and the number of programs written are substantially reduced.
2. All applications share centralized files.
3. Storage space duplication is eliminated.
4. Data are stored once in the database and are easily accessible when needed.

3. What are the five important characteristics of open systems? 8 Mrks

i. Input from outside: Open systems are self – adjusting and self-regulating. When functioning properly, an open system reaches a steady state or equilibrium. In a retail firm, for example, a steady state exists when goods are purchased and sold without being either out of stock or overstocked. An increase in the cost of goods forces a comparable increase in prices or decrease in operating costs. This response gives the firm its steady state.

ii. Entropy: All dynamic systems tend to run down over time, resulting in entropy or loss of energy. Open systems resist entropy by seeking new inputs or modifying the processes to return to a steady state. In our example, no reaction to increase in cost of merchandise makes the business unprofitable which could force it into insolvency – a state of disorganization.

iii. Process, output and cycles: Open systems produce useful output and operate in cycles, following a continuous flow path.

iv. Differentiation: Open systems have a tendency toward an increasing specialization of functions and a greater differentiation of their components. In business, the roles of people and machines tend toward greater specialization and greater interaction. This characteristic offers a compelling reason for the increasing value of the concept of systems in the systems analyst's thinking.

v. Equifinality: The term implies that goals are achieved through differing courses of action and a variety of paths. In most systems, there is more of a consensus on goals *than on paths to reach the goals.*

Question Three

1. Outline the Stages of system development Life cycle 10 Mrks

i. Project Selection

One must know what the problem is before it can be solved. The basis for a candidate system is recognition of a need for improving an information system or a procedure. This need leads to a preliminary survey or an initial investigation to determine whether an alternative system can solve the problem. It entails looking into the duplication of effort, bottlenecks, inefficient existing procedures, or whether parts of the existing system would be candidates for computerization.
If the problem is serious enough, management may want to have an analyst look at it. Such an assignment implies a commitment, especially if the analyst is hired from the outside. In larger environments, where formal procedures are the norm, the analyst's first task is to prepare a statement specifying the scope and objective of the problem. He/She then reviews it with user for accuracy. At this stage, only a rough " ball park" estimate of the development cost of the project may be reached. However, an accurate cost of the next phase- the feasibility study – can be produced.

ii. Impetus for system Change

The idea for change originates in the environment or from within the firm. Environment-based ideas originate from customers, vendors, government sources, and the like. For example, new unemployment compensation regulations may make it necessary to change the restructures. Customer complaints about the delivery of orders may prompt an investigation of the delivery schedule, the experience of truck drivers, or the volume of orders to be delivered. When investigated, each of these ideas may lead to a problem definition as a first step in the system life cycle process.
Ideas for change may also come from within the organization- top management, the user, and the analyst. As an organization changes its operations or faces advances in computer technology, someone within the organization may feel the need to update existing applications or improve procedures. Here are some examples:
• An organization acquires another organization.
• A local bank branches into the suburbs.
• A department spends 80 percent of its budget in one month.
• Two departments are doing essentially the same work, and each department head insists the **other department should be eliminated.**
• A request for a new form discloses the use of bootleg (unauthorized) forms.

Serious problems in operations, a high rate of labor turnover, labor intensive activities, and high reject rates of finished goods, also prompt top management to initiate an investigation. Other examples are:
• A report reaches a senior vice president and she suspects the figures.
• The company comptroller reads an IRS audit report and starts thinking.
• An executive read about decision support systems for sales forecasting and it gives him an idea.

iii. Feasibility Study

Depending on the results of the initial investigation, the survey is expanded to a more detailed feasibility study. A feasibility study is a test of a system proposal according to its workability. Impact on the organization, ability to meet user needs, and effective use of resources. It focuses on three major questions:
1. What are the user's demonstrable needs and how does a candidate system meet them?
2. What resources are available for given candidate systems? Is the problem worth solving?
3. What is the likely impact of the candidate system on the organization? How well does it fit within the organization's master MIS plan?
Each of these questions must be answered carefully. They revolve around investigation and evaluation of the problem, identification and description of candidate systems, specification or performance and the cost of each system and final selection of the best system.
The objective of feasibility study is not to solve the problem but to acquire a sense of its scope. During the study the problem definition is crystallized and aspects of the problem to be included in the system are determined. Consequently, costs and benefits are estimated with greater accuracy at this stage.
The result of the feasibility study is a formal proposal. This is simply a report- a formal document detailing the nature and scope of the proposed solution. The proposal

summarizes what is known and what is going to be done. It consists of the following:
1. Statement of the problem – a carefully worded statement of the problem that led to analysis.
2. Summary of findings and recommendations- a list of the major findings and recommendations of the study. It is ideal for the user who requires quick access to the results of the analysis of the system under study.

Conclusions are stated followed by a list of the recommendations and a justification for them.
3. Details of findings- an outline of the methods and procedures undertaken by the existing system followed by coverage of the objectives and procedures of the candidate system. Included are also discussions of output reports, file structures, and costs and benefits of the candidate system.
4.Recommendations and conclusions- specific recommendations regarding the candidate system including personnel assignments, costs, project schedules, and target dates.

iv. Analysis

Analysis is a detailed study of the various operations performed by a system and their relationships within and outside of the system. A key question is, what must be done to solve the problem? One aspect of analysis is defining the boundaries of the system and determining whether or not a candidate system should consider other related systems. During analysis, data are collected on the available files, decision points, and transactions handled by the present system. Data flow diagrams interviews, on – site observations, and questionnaires are examples of the analysis tools. The interviews is a commonly used tool in analysis, it requires special skills and sensitivity to the subjects being interviewed. Bias in data collection and interpretation can be a problem. Training, experience, and common sense are required for collection of the information needed to do the analysis.

Once analysis is completed the analyst has a firm understanding of what is to be done. The next step is to decide how the problem might be solved. Thus, in systems, design we move from the logical to the physical aspects of the life cycle.

v. Design

The most creative and challenging phase of the system life cycle is system design. The term design describes a final system and the process by which it is developed. It refers to the technical specifications (analogous to the engineer's blueprints) that will be applied in implementing the candidate system. It also includes the construction of programs and program testing. The key questions here is: How should the problem be solved?

vi. Implementation

The implementation phase is less creative than system design. It is primarily concerned with user training site preparation, and file conversion. When the candidate system is linked to terminals or remote sites, the telecommunication network and tests of the network along with the system are also included under implementation.
During the final testing, user acceptance is tested, followed by user training. Depending on the nature of the system, extensive user training may be required.

Conversion usually takes place at about the same time the user is being trained or later.

2. Identify why a system project may be dropped at any time prior to implementation also outlining reasons a new system may not meet user requirements 10 Mrks

projects are dropped if, after a review process, it is learned that:

- ***Changing objectives or requirements of the user cannot be met by the existing design.***
- ***Benefits realized from the candidate system do not justify commitment to implementation.***
- ***There is a sudden change in the user's budget or an increase in design costs beyond the estimate made during the feasibility study.***
- ***The project greatly exceeds the time and cost schedule.***

There are many reasons a new system does not meet user requirements:

- ***User requirements were not clearly defined or understood.***
- ***The user was not directly involved in the crucial phases of system development.***
- ***The analyst, programmer, or both were inexperienced.***
- ***The systems analyst (or the project team) had to do the work under stringent time constraints. Consequently not enough thought went into the feasibility study and system design.***
- ***User training was poor.***
- ***Existing hardware proved deficient to handle the new application.***
- ***The new system left users in other departments out of touch with information that the old system had provided.***
- ***The new system was not user-friendly.***
- ***Users changed their requirements.***
- ***The user staff was hostile.***

Question Four

1. In today's business, there is more demand for computer services than there are resources available to meet the demand, Support. 5Mrks

The demand is made up of the following:
1. Operations of existing system.
2. Maintenance that focuses on "patching" programs – often representing over 50 percent of maintenance.
3. Enhancements that involve major modifications in program structure or equipment.
4. Requests for candidate systems.

All these demands require resource – human, financial, and technological. On the human side, the computer department has to provide the following:

- ***Computer operators to run equipment.***
- ***Data entry personnel.***
- ***Systems analysts to define and design specifications.***

- ***Application programmers to convert system specifications to computer programs***
- ***Maintenance programmers to repair errors.***
- ***Supervisors, project leaders, and managers to coordinate the jobs with the users.***

Thus, the basic problem is to match the demands for service with the available resources. How much one project is favored over another depends on technical, behavioral, and economic factors.

2. What are the Strategies for Determining Information Requirements 15 Mrks

There are three key strategies or general approaches for eliciting information regarding the user's requirements: (1) asking, (2) getting information form the existing information system, and prototyping.

i. Asking: ***This strategy obtains information from users by simply asking them about therequirements. It assumes a stable system where users are well informed and can overcome biases in defining their problems. There are three key asking methods:***

1. Questions may be open-ended or closed. An open-ended question allows the respondent to formulate a response. It is used when feeling or opinions are important. For example, "How do you evaluate the latest addition to your hardware?" In contrast, a closed question requests one answer from a specific set or responses. It is used when factual responses are known. For example, "How long have you been manager of the computer centre?"

2. Brainstorming is a technique used for generating new ideas and obtaining general information requirements. This method is approach to brainstorming asks each participant to define ideal solutions and then select the best feasible one. It works well for users who have system knowledge but have difficulty accepting new ideas.

3. consensus asks participants for their expectations regarding specific variables. In a Delphi inquiry, for example, each participant fills out a questionnaire. The results are summarized and given to participants along with a follow- up questionnaire. Participants are invite to change their responses. The results are again summarized and fed back to the participants. This debate by questionnaire continues until participants' responses have converged enough. This method is an advantage over brainstorming in that participants are not subjected to psychological pressure from others with presumed authority or influence.

ii. Getting Information from the Existing Information System.

Determining information from an existing application has been called the data analysis approach. It simply asks the user what information is currently received and what other information is required. It relies heavily on the user to articulate information needs. The analyst examines all reports, discusses with the user each piece of information

examined, and determines unfulfilled information needs by interviewing the user. The analyst is primarily involved in improving the existing flow of data to the user. In contrast to this method is decision analysis. This breaks down a problem into parts, which
allows the user to focus separately on the critical issues. It also determines policy and organizational objectives relevant to the decision areas identified and the specific steps required to complete each major decision. Then the analyst and the user refine the decision process and the information requirements for a final statement of information requirements.
The data analysis method is ideal for making structured decisions, although it requires that users articulate their information requirements. A major drawback is a lackof established rules for obtaining and validating information needs that are not linked toorganizational objectives.

ii. Prototyping:

The third strategy for determining user information requirements is used when the user cannot establish information needs accurately before the information system is built. The reason could be the lack of an existing model n which to base requirements or a difficulty in visualizing candidate systems. In this case, the user needs to anchor on reallife systems from which adjustments can be made. Therefore, the iterative discovery approach captures an initial set of information requirements and builds a system to meet these requirements. As user gain experience in its use, they request additional requirements or modifications (iterations), in the system in essence, information requirements are discovered by using the system. Prototyping is suitable in environments where it is difficult to formulate a concrete model for defining information requirements and where the information needs of the usr are evolving, such as in DSS.

Which of the three strategies is selected depends on uncertainties in the process of determining information requirements – that is, uncertainly with respect to the stability of information requirements, the user's ability to articulate information requirements, and the ability of the analyst to elicit requirements and evaluate their accuracy. Thus, the asking strategy is appropriate for low- uncertainty information requirements determinations, whereas the prototyping strategy is appropriate for high uncertainty information requirements determination.

Question Five

1. What is structured analysis and some of the primary steps involved 10 mrks

Structured analysis is a set of techniques and graphical tools that allow the analyst to develop a new kind of system specifications that are easily understandable to the user.
Analysts work primarily with their wits, pencil, and paper. Most of them have no tools. The traditional approach focuses on cost/benefit and feasibility analysis, project management, hardware and software selection and personnel considerations. In contrast,

structured analysis considers new goals and structured tools for analysis. The new goals
specify the following:
1. Use graphics wherever possible to help communicate better with the user.
2. Differentiate between logical and physical systems.
3. Build a logical system model to familiarize the user with system characteristics and interrelationships before implementation.
The structured tools focus on the listed earlier- essentially the date flow diagram data dictionary, structured English, decision trees, and decision tables. The objective is to build a new document, called system specifications. This document provides the basis for design and implementation.

The primary steps are:
Process 2.1: Study affected user areas, resulting in a physical DFD. The logical equivalent of the present system results in a logical DFD.
Process 2.2: Remove the physical checkpoints and replace them with a logical equivalent, resulting in the logical DFD.
Process 2.3: Model new logical system. So far no consideration is given to modifying methods called for in the feasibility report. This step incorporates the changes the begins to describe the candidate system. It is essentially a paper model system to be installed.
Process 2.4: Establish man/ machine interface. This process modifies the logical DFD for the candidate system and considers the hardware needed to implement the system. The combination results in the physical DFD of the candidate system.
Process 2.5 and 2.6: Quantify costs and benefits and select hardware. The purpose of this step is to cost- justify the system, leading to the selection of hardware for the candidate system.

2. Identify the attributes of structured analysis 5 Mrks

- ***It is graphic. The DFD for example, presents a picture of what is being specified and is a conceptually easy-to – understand presentation of the application.***
- ***The process is partitioned so that we have a clear picture of the progression from general to specific in the system flow.***
- ***It is logical rather than physical. The elements of system do not depend on vendor or hardware. They specify in a precise, concise, and highly readable manner the working of the system and how it hangs together.***
- ***It calls for a rigorous study of the user area, a commitment that is often taken lightly in the traditional approach to systems analysis.***
- ***Certain tasks that are normally carried out late in the system development life cycle are moved to the analysis phase. For example, user procedures are documented during rather than later in implementation.***

2. In data Flow Diagram explain what a square, an arrow, a circle or a “bubble”, an open rectangle signifies. 5 Mrks

A square defines a source (originator) or destination of system data.
An arrow identifies data flow- data in motion. It is a pipeline through which information flows.
A circle or a "bubble" (some people use an oval bubble) represents a process that transforms incoming data flow(s) into outgoing data flow(s).
An open rectangle is a data store- data at rest, or a temporary repository of data.