PAPER NO. CT 11

SECTION 1

CERTIFIED

INFORMATION COMMUNICATION TECHNOLOGISTS

(CICT)

INTRODUCTION TO COMPUTING

STUDY TEXT

GENERAL OBJECTIVE

This paper is intended to equip the candidate with the knowledge, skills and attitude that will enable him/her to apply computing skills in an organization.

1.0 LEARNING OUTCOMES

A candidate who passes this paper should be able to:

- Select appropriate computer hardware and software
- Apply data processing principles
- Demonstrate competence in basic computer operations
- Select appropriate information systems in an entity
- Control information systems threats

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INTRODUCTION TO INFORMATION COMMUNICATION TECHNOLOGY

Information Technology covers a broad spectrum of hardware and software solutions that enable organizations to gather, organize, and analyze data that helps them achieve their goals. It also details technology-based workflow processes that expand the capacity of an organization to deliver services that generate revenue. The four main focuses of IT personnel are business computer network and database management, information security, business software development, and computer tech support.

As the IT industry evolves to meet the technology demands of today's workplace, different challenges are arising and IT professionals are striving to meet them. Network security is by far the greatest concern for many companies and they rely on their IT staff to prevent or stop these system breaches.

Data overload is becoming an increasingly important issue since many businesses are processing large amounts of data on a daily basis; with many of them not have the processing power to do so. Last, but not least, two of the most essential skills needed from IT professionals are teamwork and communication skills. Systems are complex and people are needed to help translate that task. Therefore, IT professionals are the ones responsible for helping others get their work done efficiently without the complex jargon of the technology world.

Elements of a Computer System:

A computer system is a set of six elements:

    (i)   Hardware,
    (ii)   Software,
    (iii)   People,
    (iv)   Procedures,
    (v)   Data and
    (vi)   Connectivity.

(i) Hardware:

The physical components of a computer constitute its Hardware. These include keyboard, mouse, monitor and processor. Hardware consists of input devices and output devices that make a complete computer system.

Examples of input devices are keyboard, optical scanner, mouse and joystick which are used to feed data into the computer. Output devices such as monitor and printer are media to get the output from the computer.

(ii) Software:

A set of programs that form an interface between the hardware and the user of a computer system are referred to as Software.

They are of six types:

(a) System software:

A set of programs to control the internal operations such as reading data from input devices, giving results to output devices and ensuring proper functioning of components is called system software.

(b) Application software:

Programs designed by the user to perform a specific function, such as accounting software, payroll software etc.

(c) Operating system:

A set of tools and programs to manage the overall working of a computer using a defined set of hardware components is called an operating system. It is the interface between the user and the computer system.

(d) Utility software:

Certain special purpose programs that are designed to perform a specialized task, such as functions to copy, cut or paste files in a computer, formatting a disk etc.

(e) Language processors:

Special software to accept data and interpret it in the form of Machine /Assembly language understandable by a computer. It also ensures the correctness of language syntax and errors.

(f) Connectivity software:

A set of programs and instructions to connect the computer with the main server to enable sharing of resources and information with the server and other connected computers.

(iii) People:

The most important element of a computer system is its users. They are also called live-ware of the computer system.

The following types of people interact with a computer system:

(a) System Analysts:

People who design the operation and processing of the system.

TOPIC 8

DATA PROCESSING CYCLE

Data-processing cycle refers to the process of transforming raw data into useful information. The cycle entails a process of sequential steps, including input, processing, output and interpretation. Preparation, feedback and storage often are included steps of the cycle.

Introduction to Data Processing

Definitions of data processing

- manipulation of data into a more useful form

- Includes; numerical calculation, *operations* (e.g. classification of data), *transmission* of data from one place to another

Organizations undertake data processing activities to obtain information with which to control and support the following;

- Production/operations e.g. manufacturing resource planning, manufacturing execution systems, process control
- Marketing activities e.g. customer relationship management, interactive marketing, sales force automation etc.
- Human Resource Management e.g. compensation analysis, employee skills inventory, personnel requirements forecasting
- Financial activities e.g. cash management, credit management, investment management, capital budgeting
- Accounting activities: order processing, inventory control, accounts receivable, accounts payable, payroll, general ledger

Stages of the Data Processing Cycle

1) Collection is the first stage of the cycle, and is very crucial, since the quality of data collected will impact heavily on the output. The collection process needs to ensure that the data gathered are both defined and accurate, so that subsequent decisions based on the findings are valid. This stage provides both the baseline from which to measure, and a target on what to improve.

Some types of data collection include census (data collection about everything in a group or statistical population), sample survey (collection method that includes only part of the total population), and administrative by-product (data collection is a byproduct of an organization's day-to-day operations).

2) Preparation is the manipulation of data into a form suitable for further analysis and processing. Raw data cannot be processed and must be checked for accuracy. Preparation is

about constructing a dataset from one or more data sources to be used for further exploration and processing. Analyzing data that has not been carefully screened for problems can produce highly misleading results that are heavily dependent on the quality of data prepared.

3) Input is the task where verified data is coded or converted into machine readable form so that it can be processed through a computer. Data entry is done through the use of a keyboard, digitizer, scanner, or data entry from an existing source. This time-consuming process requires speed and accuracy. Most data need to follow a formal and strict syntax since a great deal of processing power is required to breakdown the complex data at this stage. Due to the costs, many businesses are resorting to outsource this stage.

4) Processing is when the data is subjected to various means and methods of manipulation, the point where a computer program is being executed, and it contains the program code and its current activity. The process may be made up of multiple threads of execution that simultaneously execute instructions, depending on the operating system. While a computer program is a passive collection of instructions, a process is the actual execution of those instructions. Many software programs are available for processing large volumes of data within very short periods.

5) Output and interpretation is the stage where processed information is now transmitted to the user. Output is presented to users in various report formats like printed report, audio, video, or on monitor. Output need to be interpreted so that it can provide meaningful information that will guide future decisions of the company.

6) Storage is the last stage in the data processing cycle, where data, instruction and information are held for future use. The importance of this cycle is that it allows quick access and retrieval of the processed information, allowing it to be passed on to the next stage directly, when needed. Every computer uses storage to hold system and application software.

The Data Processing Cycle is a series of steps carried out to extract information from raw data. Although each step must be taken in order, the order is cyclic. The output and storage stage can lead to the repeat of the data collection stage, resulting in another cycle of data processing. The cycle provides a view on how the data travels and transforms from collection to interpretation, and ultimately, used in effective business decisions.

Data processing operations

Recording: is the transferring of data onto some form or document. The operation occurs during origination, and distribution steps, and throughout the processing cycle.

Duplicating: refers to reproducing the data onto many forms or documents

Verifying: since recording is usually done manually, it is important that the recorded data be carefully checked for errors. E.g. typed reports are reread for correctness

Classifying: refers to separating of data into categories

Sorting: is arranging data in a specific order

Merging: this operation takes two or more sets of data, all sets having been sorted by same key, and puts them together to form a single sorted set of data

Calculating: refers to performing numerical calculations on the (numerical) data

Types of Data Processing (DP) systems - Devices so far have evolved into three types

1. Manual mechanical devices; for calculation & processing data, *dark ages* (5000 B.C – 1890 A.D). Simple, motorized by human hand e.g. *Abacus* (5000 B.C.)
2. Electromechanical devices: powered by electric motor, switches and relays for control of processes e.g. desk calculators and punched card processing devices. The electromechanical devices; *middle ages* (1890 – 1944)
3. Electronic devices: *modern age* begun in 1944 - date. It includes the modern computer which have evolved into five generations with advancement of processing hardware; the vacuum tubes, transistors, integrated circuits and microprocessors.

Advantages of electronic data processing

- **Speed and Accuracy**

- **Automatic operations**

▪ Most important advantage of modern Electronic computer
▪ Cary out a sequence of many different data processing operations without human intervention
▪ Automation is possible through stored program

- **Decision making capability**

· Computer can perform certain decision instructions automatically
· Determining whether a statement is true or false
· Based on that results, choosing one or the other course of action out of alternatives

Types of Electronic Data Processing (EDP) systems

▪ Classification of EDP systems according to the *way data* is processed

- *Response time*, time elapse between data input/inquiry-result (online, offline & online real-time systems)
- *Number of users & Programs* e.g. time sharing programs
- *Degree of Integration* of subsystem e.g. DSS

- **Offline Data Processing System:**
- Input data or transactions grouped into batches, and then
- sorted sequentially before being subjected to computer processing

- **Online Data Processing System:**
- Characterised by:
- *Remote* Central processing unit (CPU)
- Two way communication between the CPU and the input or terminal devices
- Fast data processing responses
- Data is input as soon as it is available with files being update most of the time
- Usually expensive to operate, the processing speed faster than offline

· **Online Real – Time Data Processing System;**

- Insignificant time delay between creation of data and the actual processing.
- The time delay is insignificant when the processed data/information is generated at the appropriate time for managers to make timely decisions.
- Components; computer, software, terminals, communication network and database.

- **Time – Sharing Data Processing System:**
- Three basic characteristics; multiprogramming, online interaction & real-time response

- **Decision-Support System (DDS):**

- Provides interactive information support to managers and professionals during the decision-making process

- **Distributed Data Processing (DPP) System**

- Characterized by mini- or microcomputers (the satellites) for small scale localised based solution
- *Remote CPU or larger computer* for organisational processing or any larger applications for satellite computers. Examples include the hospital Distributed Data Processing

TYPES OF PROCESSING

- **Batch processing**

- Refers to processing of data or information by grouping it into groups or batches.
- The batches handled in sequence of separate stages of processing e.g. validation, sorting, computing etc., at pre-defined frequencies. E.g. a weekly factory payroll is naturally processed weekly.

- **Online processing**
- consist of terminals connected to a computer and

- Communication by lines that connect different department of the business/system to a computer

▪ **Interactive processing**
- Online order processing
- Online building society transactions
- Online payroll processing
- Online point of sale (supermarket) check out systems

▪ **Real-time processing**
- Airline seat reservation system
- Online warehouse stock control
- Online hotel accommodation system
- Online banking

▪ **Random processing**
- Online credit enquiries
- Online product availability enquiries
- Online account enquiries
- Online package holiday availability enquiries

File organization and Access Methods
File Access Method

The way by which information/data can be retrieved. There are two methods of file access:

1. Direct Access
2. Sequential Access

Direct Access

This access method the information/data stored on a device can be accessed randomly and immediately irrespective to the order it was stored. The data with this access method is quicker than sequential access. This is also known as random access method. For example Hard disk, flash Memory

Sequential Access

This access method the information/data stored on a device is accessed in the exact order in which it was stored. Sequential access methods are seen in older storage devices such as magnetic tape.

File Organization Method

The process that involves how data/information is stored so file access could be as easy and quickly as possible. Three main ways of file organization:

THESE ARE SAMPLE NOTES AND NOT FOR SALE.

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