BUS401 MANAGEMENT INORMATION SYSTEM SUMMARY

MODULE 1

UNIT 1: INTRODUCTION TO MANAGEMENT INFORMATION SYSTEM

Q. Discuss Information technology

Information technology (IT) offers an organization the means of accomplishing its business with highly increased efficiency, but it often results in rapid change with which employees and suppliers must deal. Information technology (IT) has vast potential for both good and bad uses in our society. This fact offers fruitful grounds for discussing issues such an individual's right to privacy versus the right of an organization to collect data on customer and employees, the means used to gather the data, the ethical use of information which has been collected, and other similar issues.

MANAGEMENT INFORMATION SYSTEM (MIS)

Management Information Systems (MIS) focus on the use of Information and Communication Technologies (ICT) in managing organizations. In the 21st century almost all organizations use Information and Communication Technologies to efficiently manage their operations, to help managers make better decisions and achieve competitive advantage, and to facilitate seamless internal and external communications with their employees, customers, partners, and other stakeholders.

Q. Summarize the Modern day Use of Information System

Today, companies have eliminated the inaccuracy of paper-based tracking by implementing ERP systems. In a recent study conducted by Panorama Consulting Solutions, 63 percent of companies used their ERP software to eliminate inefficiencies in processes such as order tracking. Instead of standalone computer systems, ERP uses a unified program that links various functional departments such as finance, HR, manufacturing, warehouse, planning, purchasing, inventory, sales, and marketing. While each department may have its own set of software modules, the software is interconnected so that information can be shared throughout the organization. Once one department is finished updating and processing the order, it is automatically routed to the next department so that everyone is alerted to changes made.

Q. Explain Businesses Pre-Information Systems.

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Until the 1990s, before the widespread adoption of personal computers and the Internet, companies were using information systems to manage data processing and record-keeping activities associated with business transactions like maintaining the general ledger (book keeping), payroll, billing, inventory management, etc. The focus was mainly on maintaining files and databases related to day-to-day operations. Communications, both internal and external, relied on paper, telephone, faxes, and other analog media. Information systems have evolved over the last 40 years, including the move from the mainframe computer of the 1970s to personal computers becoming an integral part of the tracking and organizational process in the 1980s. The arrival of the mainstream internet in the 1990s expanded business capabilities and the role of information systems to a global system of interaction.

Today, the main focus of companies is to stay globally competitive by leveraging the capabilities of modern information and communication technologies (ICT). Companies can use ICT to provide products & services of the highest quality at affordable prices and top-rated customer service, and help the companies to enter new markets through e-commerce. Globalization, collaboration, and integration have become the new drivers in this competitive arena. To remain competitive, companies are investing in modern information systems like Enterprise Resource Planning (ERP) software, which integrate the different functional areas of the business, and provide consistent real-time data for fast decision making. ERP systems help companies manage their operations seamlessly across the globe.

Q. What are the roles of Management Information Systems in Business-Decision Making?

1. **Information Storage and Analysis**

At the date of publication, many companies no longer manage their data and information manually with registers and hard-copy formats. Through the adoption of information systems, companies can make use of sophisticated and comprehensive databases that can contain all imaginable pieces of data about the company. Information systems store, update and even analyze the information, which the company can then use to pinpoint solutions to current or future problems. Furthermore, these systems can integrate data from various sources, inside and outside the company, keeping the company up to date with internal performance and external opportunities and threats.

2. **Assist with Making Decisions**

The long-term success of a company depends upon the adequacy of its strategic plans. An organization‘s management team uses information systems to formulate strategic plans and make decisions for the organization's longevity and prosperity. The business uses information systems to evaluate information from all sources, including information from external references such as Reuters or Bloomberg, which provide information on the general economy. This analysis of and comparison to market trends helps organizations analyze the adequacy and quality of their strategic decisions.

3. **Assist with Business Processes**

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Information systems aid businesses in developing a larger number of value added-systems in the company. For example, a company can integrate information systems with the manufacturing cycle to ensure that the output it produces complies with the requirements of the various quality management standards. Adoption of information systems simplifies business processes and removes unnecessary activities. Information systems add controls to employee processes, ensuring that only users with the applicable rights can perform certain tasks. Further, information systems eliminate repetitive tasks and increase accuracy, allowing employees to concentrate on more high-level functions. Information systems can also lead to better project planning and implementation through effective monitoring and comparison against established criteria.

4. Considerations

Implementing information systems within an organization can prove to be costly. Implementation costs include not only installation of the systems but also employee training sessions. In addition, employees may see the adoption of information systems as an unwarranted change and, thus, may resist this change. Resistance to change can hinder business operations and can cause employee turnover. Companies should have leadership in place to assess the adequacy of the decision to have an information system and to guide the company through the transition phase and weigh information systems cost against the potential benefits.

UNIT 2: THE SCOPE OF DATA PROCESSING

Q. Define and explain the terms: data and information

The word data refers to raw facts about and object. Data is meaningless until it subjected to manual or electronic processing by a computer to produce information used for decision making. Computers are used to process data because of their speed, reliability and other functionalities they offer.

Data exist in a variety of forms such as numbers or text on pieces of paper, as bytes in computer memory or as facts stored in a person's mind. Data is the plural form of the word datum and refers to basic facts about an object. An object refers to a person, place, or a thing. Data consist of numbers, words, images, etc.

Data is meaningless until it undergoes some forms of processing. The outcome of a processed data is information. Although the word data and information are often used interchangeably, there is an important distinction between them. In the strictest sense, data consist of the raw number that computers process to produce information. Data can be looked at as facts out of context. Table 1 captures basic facts about a matriculated student of National Open University of Nigeria. The data items consisting of Matriculation Number, Name, School, Department, Centre, Banker, Status and e-Email are used to hold the students details.

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S/no	Data item	Actual Details or value
1	Matriculation Number	NOU050010999
2	Name	Adebayo Musa, Ada
3	School	Science and Technology
4	Department	Computer Science
5	Centre	Lagos
6	Banker	Zenith Bank
7	Status	Returning
8	e-mail	ama@nou.edu.ng

Table 1: Student Registration

Q. Describe a computer system

A computer is a device which given a set of instructions or data can be used to perform given task or tasks. Also, a computer can be referred to as a programmable, multi-user device that accepts data, raw facts and figures, and processes, or manipulates, it into useful information Computer are used primarily to speed up the problems solving and increase the overall productivity of its users. The computer reads in data and instructions, does some processing, and stores or outputs desired results. The computer is designed with input mechanism for reading data into the computer, internal storage facilities, and mechanisms for communicating with the outside world (output for writing data out.) Computers are used to process data because of their speed, reliability and other functionalities they offer. Computers can be distinguished by their sizes, types and generation.

Q. Explain the meaning of data processing

Electronic Data processing (DP) is any computer automated process that converts raw facts i.e data into output i.e useful information. Data becomes more useful only when they have undergone some computer processing and well-presented to allow for decision making. Data processing systems have become indispensable in managing information in modern day organizations. Also, the term data processing can apply to any process of transforming data into information and also the converting of information back to data. Thus, data processing consist of those activities concerned with the systematic recording, sorting, computing, modifying, reporting displaying and printing of details relating to business transactions.

Conventional usage of the terms data processing and information systems restricts their use to refer to the algorithmic derivations, logical deductions, and statistical calculations that recur perennially in general business environments, rather than in the more expansive sense of all conversions of real-world measurements into real-world information. These include adding, multiplying, subtracting and dividing, and exponentiation (raising numbers to specific powers) etc.

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The basic data processing operations performed on business data include the following:

- Data Collection
- Data Capture
- Data Recording
- Data Entry
- Data Transmission
- Data Sorting
- Updating of Information
- Adding of Data
- Deletion of information
- Data Validation
- Data Verification
- Summarizing of data
- Printing of Results

Q. Distinguish between the different types of computer

Analog Computers

Analog refers to non-digital (non-computer-based), continuous variable forms of data transmission, including voice and video. An analog computer represents a datum as a voltage, distance, position, or other physical quantity. Analog - continuously varying in strength and /or quantity. For example, sound, light, temperature, and pressure values can fall anywhere along a continuum or range. Examples of analog devices are a thermometer, a speedometer, a clock (with hour, minute, and second hands that sweep around the dial), and a pressure sensor, which can measure continuous fluctuation.

Digital Computers

The term digital describes any system based on discontinues data or events. For example, electricity is either turned on or turned off. With a two-state on /off arrangement, one state can represent a 1 digit, and the other a 0 digit. Because computers are based on on / off or other two-state conditions, they use the binary system, which is able to represent any number using only two digits 0 and 1. Binary means having two components, alternatives, or outcomes. A digital computer represents a datum as a sequence of symbols drawn from a fixed alphabet. The most common digital computers use a binary alphabet, that is, an alphabet of two characters, typically denoted "0" and "1". Digital computers are more common than analog computers.

Mainframe

A mainframe is the largest and relatively most powerful computer, a powerhouse with large storage and very rapid processing power and speed. It is used for very large amount of business, scientific and engineering, military data. They are found in many data processing

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centers such as in Banks, military, airports, nuclear stations, universities, and other organizations where large amount of data are processed.

Minicomputer

A minicomputer is a mid-range, multi-purpose computer, about the size of an office desk produced by a number of manufacturers including Dell, Hewlett Packard, and IBMC often used in universities, factories, and research laboratories. Applications processed on minicomputers include, Accounting routines, banking, examination processing, hospital management systems, databases, geographical information systems and other management information systems.

Microcomputers

Microcomputers are sometimes referred to as personalcomputers (PCs). They are the computers that can be placed on desktops or carried fromroom to room. Some manufacturers of microcomputers include: IBM, Dell, Hewlett Packard, Apple, and Compaq. As the names apply PCs are used and operated by end users for their own particular processing needs such as payroll, inventory control, asset management, result verification, patient medical records, and other general accounting routines.

Workstation

A workstation is so much like a PC except that it is more powerful and has more capabilities for handling mathematical and graphics-processing than a PC. It can handle more complicated tasks than PC in the same amount of time. Workstations are used mainly in handling computing (number crunching and algorithmic) applications such as in science, engineering, and design work that requires powerful graphics or computational capabilities rather than data processing applications where arithmetic operation may be ideal.

Supercomputer

A supercomputer is highly sophisticated and powerful machine that is used for tasks requiring rapid and complex calculations with hundreds of thousands of variable factors. Supercomputers traditionally have been used in scientific and military work, but they are starting to be use in business as well. A supercomputer is especially sophisticated and powerful type of computer that is used primarily for extremely rapid and complex computations with hundreds of thousands of variable factors. Supercomputers traditionally have been used for classified weapons research, weather forecasting, and petroleum and engineering applications, all of which use complex mathematical models and simulation. Supercomputers can perform complex and massive computations almost instantaneously because they can perform hundreds of billions of calculations per second-many times faster than the largest mainframes.

Q. What are the main operations of computer systems?

The computer processes data by performing the following five main operations

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1) Input

2) Processing

3) Output

4) Storage

5) Communication

Input Operations

At this stage, data or instructions are captured electronically or entered by means of the available input device. An input device is hardware such as a keyboard that allows data from the external environment to be entered into the computer for processing. The data after it has been captured is transform into a form in which the computer can process it.

Processing Operations

At this stage, the already captured and transformed data is manipulated to generate desired result for the end user other processing systems. The data is worked on by the instructions in the form of programs or queries provided by the users. The instruction and the data determine what output is received from to the computer. The processing instructions may be to add, subtract, multiply, find total, summarize, group, select some data based on some condition etc.

Output Operations

At the stage the result or information obtained from the data is produced in a form acceptable by the user. An example of on output will be a list of all registered students in the department of accounting who are in their second year at National Open University, Lagos Centre. The output can be printed as printed text, played as sound, displayed as charts or graphs on the computer screen. Output is usually governed by the need to communicate specific information to a specific audience.

Secondary-storage Operations

At this stage of operations, data, information, and the instructions used for the processing of data are stored temporarily or permanently in primary or secondary storage devices. Data and instruction are stored in primary storage devices during processing to allow easy access and fast processing. Secondary storage devices are used for to store data or instructions more permanently. An example of a primary or internal storage device is RAM (Read Only Memory). While example of a secondary or external storage device is a flash disk.

Communication Operation

The communication operation of the computers performs these by using the communication hardware. This facilitates the connection between computer and between groups of connected

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computers called network. Computers linked together can share hardware, programs and data. Though, computers can operate as standard alone machines i.e. they may not be connected to anything else. By connecting them in a network more benefits are realized.

Q. List some benefits of using computer in business

- It leads to improved customer relations due to its reliability, generation of more timely reports, and speedier responses to enquiries regarding business operations
- Increases the productivity of staff in general be helping to handle boring and routine operations leaving the staff to be engaged in decision making
- Improved cash flows due to improved sales accounting systems particularly those relating to credit control, invoicing and statement preparation
- It guarantees an improved access to inform by means of online and real-time access to information system
- Allows for greater degree of systems integration on the basis that the output of one part of the system (sub system) provides the input to a related sub system, which has the effect of eliminating duplication and delay
- Makes the presentation of information for decision making easy to comprehend
- Helps in the simplification of problem solving by the use of problem solving software
- Makes the supply of information for improving managerial decision readily available

UNIT 3: BASIC HARDWARE COMPONENTS AND MEMORY CAPACITY MEASUREMENT CONTENTS

Q. Identify and describe the basic hardware components of a computer system

Input Device

An input device is used to communicate data and instructions or programs to the computer. The input device accepts the data and coverts them into machine understandable forms that can be processed by the computer.

The Central Processing Unit (CPU)

The CPU is the brain of the computer and it is the place where data is manipulated within the computer system. In a microcomputer, the entire CPU is contained on a tiny chip called a microprocessor which is usually mounted on a piece of plastic with metal wires attached to it. The processor consists of two functional units: the control unit and the arithmetic-logic unit.

The Control Unit

All the computer s resources are managed from control unit. The control unit of the processor coordinates all activities of the computer system. It directs the movement of electronic signals between arithmetic-logic units and main memory and also directs the electronic signals between main memory and the input and output devices.

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Arithmetic and Logic Unit

The computer can perform only two types of operations: arithmetic operations and logical operations. The arithmetic-logic unit is the electronic circuitry capable of performing these two basic logical operations. Arithmetic operations include addition, subtraction, multiplication, division and exponentiation. All data input into the computer system must first be converted into numbers (0 and 1) before they are processed. In addition to arithmetic operations the computer is able to perform logical operations on two or more numbers. Logical operations are comparisons operations. The ALU compares two pieces of data to see whether one is less than), the other. Other comparison operations are greater than or equal to (>=), less than or equal to (< =) or not equal to ()

Memory

The CPU main job is to follow instructions encoded in programs but it does not have the capability to store entire programs or large sets of data permanently. However, the CPU has registers which are devices capable of holding a few bytes of data or instructions at a time. CPU needs to have millions of bytes of space where it can hold programs and the data being manipulated while they are being used. This area is called memory. Computers use two types memory primary and secondary memory. A computer s primary memory is an electronic device that store information necessary for a program to run. This consists of the volatile memory (RAM) and the non volatile memory (ROM).

Random Access Memory (RAM)

RAM is an acronym for Random Access Memory. It is used for short-term storage of data or program instructions. RAM is volatile: Its contents will be lost when the computer s electric supply is disrupted by a power outage or when the computer is turned off. The purpose of RAM is to hold programs and data while they are in use.

Q. Explain the units of measuring computer memory

Bits: The term bit is a short form of binary digit. A bit is the smallest possible unit of data. To represent anything meaningful the computer needs groups of bits.

Bytes: A group of eight bits is called a byte. It is the next larger unit of data within a computer system. With one byte, the computer can represent up to 256 different values because it is possible to count from 0 to 255 with 8 binary digits. The byte is important unit because it can be adequately used to represent any character keyboard, including all the letters (uppercase and lowercase), number, punctuation marks, and other symbols.

Kilobyte: A kilobyte, abbreviated K or KB represents approximately 1000 bytes (or characters). The actual value of I Kilobyte is 1024 (2 10) bytes

Megabyte: A megabyte, abbreviated M or MB and sometimes called meg is used to refer to about 1 million bytes of data.

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Gigabytes: A gigabyte, G or GB, often pronounced gig-a-bite, is used to refer to about 1 billion bytes of data.

Terabyte: A terabyte, T or TB, is used to refer to about 1 trillion bytes, or 1000 gigabytes of data.

Petabyte: This is a new measurement which accommodates the huge storage capacities of modern database- It is used to refer to about 1 million gigabyte data.

Q. What are the main functions of the RAM chip?

The main functions of the RAM chip include:

- It holds data for processing
- It holds instructions (the programs) for processing
- It holds data that has been processed (useful information) and is waiting to be sent to an output device.

Q. Explain the meaning of the term RAM is volatile

RAM is volatile: Its contents will be lost when the computer s electric supply is disrupted by a power outage or when the computer is turned off. The purpose of RAM is to hold programs and data while they are in use. Physically, RAM consists of some chips on a small circuit board. A computer does not have to search it entire memory each time it needs to find data.

Q. Describe three variations of ROM

Read Only Memory (ROM)

This is a nonvolatile type of memory. Nonvolatile chips always hold the same data and cannot be changed. One what to do when the power is first turned on. Among other things, ROM contains a set of start-up instructions, which ensure that the rest of memory is functioning properly, check for hardware devices, and check for an operating system on the computer disks drives. Unlike the RAM, which is constantly being written on an erased, ROM cannot be written on or erased by the computer user. In addition ROM chips remember, permanently, information supplied by the manufactures such as the information about the manufacturer.

Three variations of ROM chips are used in special situation PROM, EPROM and EEPROM.

Programmable Read Only Memory (PROM)

This is an acronym for programmable read-only memory. These are blank chips on which the buyer, using special equipment, writes the programs. Once the program is written, it cannot be erased. Some microprocessor software packages come on PROM units. PROM chips are used by manufactures as control devices in their products.

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Electronically Erasable Read-Only Memory (EPROM)

EPROM stands for electronically erasable read-only memory. They are like PROM chips except that the contents can be erased, using special equipment and new materials can be written. EPROM chips are used for intelligent device control, such as in robots, where the program may have to be modified on regular basis. Programs in EPROM chip can be erased and reprogrammed.

EEPROM

The advantage of EEPROM chips is that they need not be removed from the computer to be changed.

Q. Explain the functions of a register

Registers are special, high-speed storage area within the CPU. All data must be represented in a register before it can be processed. For example, the control unit might load two numbers from memory into the registers in the ALU. Then it might tell the ALU to multiply the two numbers (arithmetic operations), or to see whether the number are equal (a logical operation). The number of registers that a CPU has and the size of each help determine the power and speed of a CPU. For example a 64-bit CPU is one in which each register is 64 bits wide. Therefore, each CPU instruction can manipulate 64 bits of data.

UNIT 4: BASIC SOFTWARE FOR DATA PROCESSING

Q. Explain the term software

Software consists of a group of related programs written in a specific code called programming language. Software is created by professional software programmer and comes on disk, CD-ROM, or downloadable online across the Internet. Software can generally be divided into two categories.

- System software
- Application Software

A. System Software

This is software designed to allow the computer to manage its own resources and run the hardware and basic operations. The may be complex to develop and are provided by the manufacturers of computer systems to complement computer hardware. However, others may be purchased from vendors. This software runs the basic operations; it lets the CPU communicate with the keyboard, the screen, the printer, and the disk drive. However, it does not solve specific problems relating to a business or a profession as applications software. Some examples of system software are operating systems and Language translators.

a. Operating System

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An operating system is the most important software for a computer. It is made up of many component programs and manages the overall operations of a computer system. Some popular operating systems are Windows, Operating System 2, Macintosh Operating System, Novell Netware, UNIX, and Linux.

b. Language Translator

This is software which translates a computer program written in a high-level programming language, or assembly language to a machine understandable form. If you write a program say in BASIC language, it cannot be executed directly without a translator. A program that is written in high level language is a source program. A source program in its translated form made up of machine codes is called object program. Highlevel languages are either translated from source code to object code by an interpreter or a compiler. An interpreter translate one line of a high-level instruction and immediate execute the code, proceeding to the next until the entire program is executed. A compile on the other hand, scans the entire program first and then translate it into machine (object) code.

c. Utilities

These are programs which are often required by man y application programs. Examples include programs for formatting or defragmenting a disk. Also we have the sort/merge utilities which are used for sorting and merging large volumes of data.

B. Application Software

Application software includes programs that are developed using systems software in order to achieve some tasks. There are two types of applications software: application programs that you purchase for solving special classes of problems and application programs that you write to solve your own problems. Some commercially available end- user programs (application software) which are developed by professional programmer teams can be used with little or no additional programming skills. Examples of application software include word processing and desktop publishing software; spreadsheet; database programs; graphics programs; communication software; and special-purpose programs suitable for accounting, scientific and engineering application, education, and entertainment and so onQ. State four main tasks of operating systems

Some of the tasks performed by the operating system are:

- It controls various input and output devices and coordinates input and output operations
- It manages the systems resources such as available memory space in the primary and secondary storage devices
- It allocate memory and processor time to programs
- It validates users and ensure that the resources a user is requesting is made available

Q. Describe some basic software for data processing

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a. Word processing software

This allows you to use computers to create, edit, sore and print documents. You can easily insert, delete, move word, sentences, and paragraphs without ever using the eraser. Of all computer applications, word processors are the most common. Word processing also offers a number of features for dressing up documents with variable margins, type sizes, and style. The user can do all these manipulations on a document or report on the screen before printing it. Some commonly used word processors are Microsoft Word, WordPerfect, AmiPro, etc

b. Spreadsheet Software

Traditionally, spreadsheet was simply grid of rows and columns on special paper that was used by accountant and others to produce financial projections and report. Electronic spreadsheets application allows users to enter data in rows and column, calculate means perform statistical analyses, create tables and produce other financial schedules.

Electronic spreadsheets have features that allow charts and graphs to be created from a table of numbers to show the significance of a selection of data which can be displayed in a number of ways: bar graphs, line graphs, and pie charts etc. A spreadsheet document is called a worksheet. Some commonly used Spreadsheet software are VisiCalc, Lotus 1-2-3, and Microsoft Excel etc.

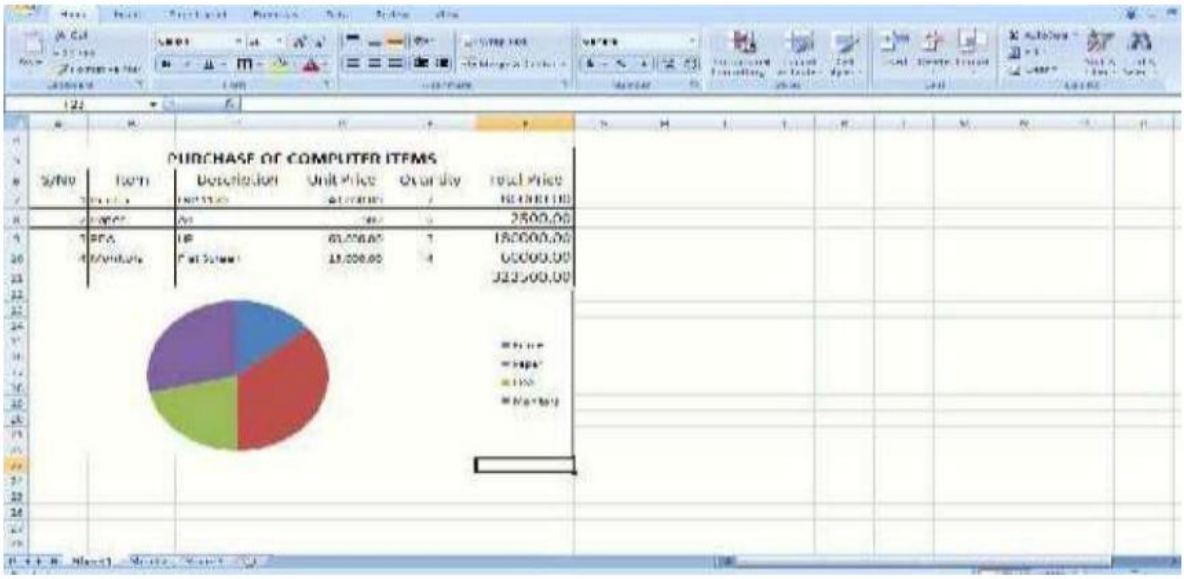

Figure 1: Microsoft Excel Chart

c. Database Software

A database management system (DBMS) is a collection of programs that allows you to store modify and extract information from a database. A database is a collection of interrelated files in a computer system. With a DBMS, activities such as updating, deleting, adding, and amending of records are easily performed. Databases can also be seen as electronic filing cabinets that allow systematic storage of data for easy access, reporting, and retrieval of

records. Some commonly used database software are MS Access, Informix, Sybase, Oracle, DB3

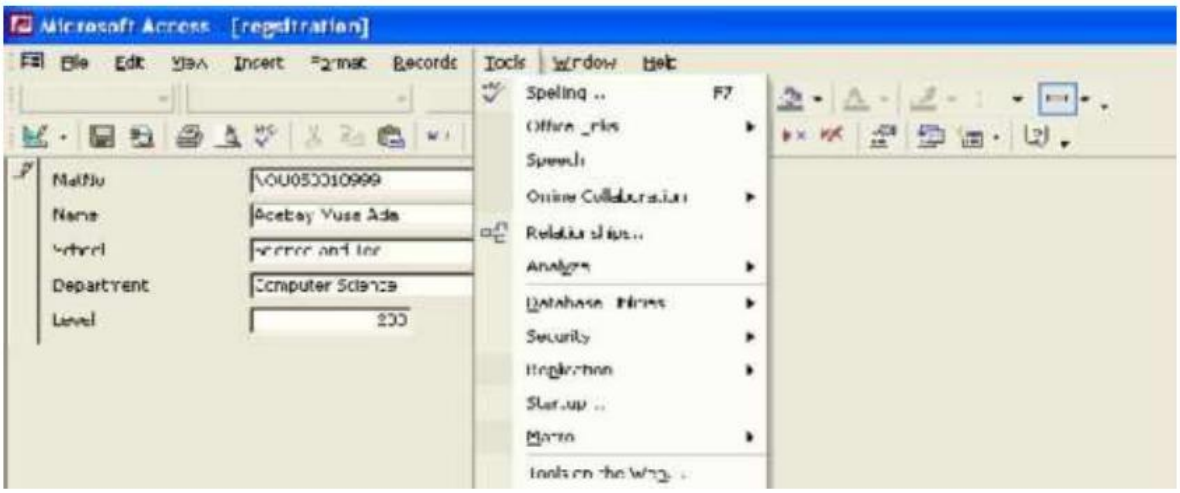

Figure 2: Microsoft Access Database

d. Presentation graphics

Presentation graphics enable users to create highly stylized graphics for slide show and report. Presentations software ma y make use of some analytical graphics (bar, line, pie chart) and also allow you to use electronic painting and drawing tools for creating lines, rectangles and others forms of shape. Some commonly used presentation graphics are Examples of well known presentation packages are Microsoft PowerPoint, Aldus Persuasion, Lotus Freelance Graphics, and SPC Harvard Graphics



Figure 3: Microsoft Power Point Presentation

MODULE 2

UNIT 5: DATA CAPTURING AND REPORTING DEVICES

Q. Identify and describe data capturing devices

Input Devices

For data to be processed, they are first to be captured via input devices and translated to computer understandable form. Input devices are use to capture and translate data into a form the computer can process. Input devices exist in the following categories:

Keyboard

Keyboard is used for entering text and numeric values into the computer. It is the most popular means of data entry in microcomputers. The keyboard may look like a typewriter but with some special keys added. The keyboard has facilities for converting letters, numbers and other characters into electrical signals that are machine-readable the processor of computers.

Pointing Devices

These constitute the second category of input hardware. These devices control the position of the cursor or pointer on the screen. Pointing devices include:

a. Mouse

A mouse is an input device that is popularly used with microcomputers. When used with desktop computers it is rolled about on a desktop to direct a pointer and select commands on a computer display screen. The point-and-click actions of the computer mouse is fast making it an alternative to keyboard and text-based commands since most of the commands executed with a keyboard can almost be done with a mouse. In addition, the mouse can be used to draw images on the screen.

b. Trackball

This is a variant of the mouse. It can be moved on top a stationary device that is rotated with the fingers or palm of the hand. Trackball are commonly used with hand held devices.

c. Touchpad Touch pads allow a user to control the cursor/point on the computer display screen with his fingers. It is about the same size as a mouse, but is usually, rectangular and flat devices that are uses very weak electrical field to be activated.

d. Joysticks A joystick is a pointing device that consists of a vertical handle like a gearshift lever mounted on a base with one or two buttons. Joysticks are used principally in video games, in some computer-aided design systems, and in computerized robot systems.

Pen-Based Devices

Pen-based computer devices use a pen-like stylus to capture a user s handwriting and marks into a computer. This is one of the means by which data is entered into small handheld computers such as personal digital assistants (PDAs).

a. Light Pen

This is a light-sensitive stylus, pen-like device that can be connected by a wire to the computer system. A stylus is a pen-like device with which a user sketches an image. When

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used to capture data, the user brings the pen to desired point on the display screen and presses the pen button, which identifies that screen location to the computer.

b. Digitizing Tablets

A digitizing tablet consists of a tablet linked by a wire to a stylus or puck. A puck is a copying device with which the user copies, or traces, an image. Digitizing tablets are used to capture data directly into the computer for processing.

Source-Data Entry

The following categories of devices are used:

a. Scanning Devices

Scanners use laser beams and reflected light to capture and translate hardcopy images of text, drawings, photos, and the like into computer understandable form for processing. Scanning devices include Mark and character recognition devices, Fax machines and Imaging systems.

b. Optical mark recognition

Optical mark recognition (OMR) uses a device that reads pencil marks and converts them into computer-understandable form. This technology is widely accepted by many examination bodies such Joint Admission an Matriculation Board (JAMB), West African Examination Council (WAEC), NECO (National Examination Council Organization) and other Scholastic Examination bodies across the world as a convenient way of processing their candidates results.

c. Optical Character Recognition

Optical character recognition (OCR) devices are used to translate designed marks character, and code into digital form for processing by the system. The most widely used optical code is the bar code, which is used in point-of-sale systems in supermarket, shopping mall, hospital, libraries, military operations, utility bills and price tags on departmental-stores merchandized and transportation facilities.

d. Magnetic ink Character Recognition (MICR)

This Technology is used in cheques processing by most banks and other financial institutions. An MICR device has facilities to interpret and translates magnetic ink character on Bank cheque which contains characters identifying the bank, cheques number etc into computer understandable form.

e. Fax Machine

A fax machine also referred to as facsimile transmission machine has facilities that scan an image on paper into electrical signal, transmit same over telephone lines and re-creates the image to a receiving fax machine on paper.

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Q. Identify and describe data reporting/output device

Output Devices

Outputs are the outcome of processed data. An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by a computer to the outside world. Some common output devices include: Visual display unit A visual display unit (also called VDU, monitor, or screen), Printers and Plotters.

a. Monitors

The first is the typical monitor that looks like the television screen and used uses a large vacuum tube, called a cathode ray tube (CRT). It operation is very similar to that of television picture tube, with an electronic gun shooting a beam of electrons to illuminate the pixels (picture elements) on the screen. The resolution is determined by the number of pixel per screen. The resolution of a monitor indicates how densely the pixels are packed.

b. Printers

Printer is a device that prints text or illustration on paper and in many cases on transparencies and other media. They are the most popular output devices beside monitors. The speed of early printers was measured in units of characters per second while that of modern printers are measured in pages per minute.

We shall only describe a few that you will find in a data processing center:

i. Dot-Matrix Printer

ii. Line Printer

iii. Thermal Printers

iv. Ink-jet Printer

v. Laser Printers

c. Plotter

A Plotter, though mainly used for engineering applications uses pen to draw picture or lines on paper based on commands from a computer. The can produce continuous lines, whereas printers can only simulate lines by printing a closely spaced series of dots.

d. Speaker

A voice output device such as a speaker converts digital output data back into intelligible speech. They are use to deliver audio output from animation, multimedia application from the web and music to the user.

e. Microfilms and Microfiche

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Microfilm and microfiche were used to store large quantities of output as microscopic filmed document, but they are now being replaced by optical disk technology.

UNIT 6: DATA STORAGE DEVICES

Q. Identify and describe data storage devices

The primary types of magnetic storage are:

Diskette

A diskette or floppy disk is a data storage medium that is composed of a disk of thin, flexible magnetic storage medium encased in a square or rectangular piece of Mylar plastic. Floppy disks are read and written by a floppy disk drive or FDD, the initials of which should not be confused with "fixed disk drive", which is another term for a hard disk drive. Floppy disk exist in the following sizes; 8-inch (200 mm), 5^-inch (133 mm), and the most common 3^-inch (90 mm).

Hard disks

In a data processing environment, a hard disk drive (HDD), commonly referred to as a hard drive, hard disk or fixed disk drive, serve as permanent storage device for large amount of data. A hard disk is really a set of stacked "disks," each of which, like phonograph records, has data recorded electromagnetically in concentric circles or "tracks" on the disk.

Q. When do you require a Secondary storage?

Secondary storage differs from primary storage in that it is not directly accessible by the Central processing unit. Secondary storage does not lose the data when power suddenly goes down i.e. it is non-volatile. Secondary storage is not as expensive as primary storage consequently, a higher magnitude of data are stored in secondary storage than primary storage in data processing centres.

Q. Explain the meaning of the term Latency

a. Rotational delay/Latency

This is the time it takes to position the proper sector under the read/write head. In general, it is used to refer to the period of time that one component in a system is spinning its wheels waiting for another component. Latency, therefore, is wasted time. It makes sense to separate read latency and write latency, and in case of sequential access storage, minimum, maximum and average latency. Consider a hard disk which rotates at about 5000 rpm i.e. one revolution per 12 msec.

The average latency can be calculated as follows:

Min latency = 0

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Max latency = Time for one disk revolution Average latency (r) = (min + max) / 2 = max / 2= time for V disk revolution typically 68 ms average

b. Throughput

This is the rate at which information can be read from or written to the storage. It is expressed in terms of megabytes per second or MB/s. A media accessed sequentially, as opposed to randomly, typically yield maximum throughput.

c. Seek time

This is the amount of time between when the CPU requests a file and when the first byte of the file is sent to the CPU. Seek times between 10 and 20 milliseconds are common.

UNIT 7: FILE ORGANIZATION

Q. Define the term a computer

A file is collection of data or information that has a name called the filename. Most of the information stored in a computer system is stored as files. A file is often stored with a user s given name and a system supplied extension. The name of the file should reflect the content of the data stored in the file. For example, payroll or result File. The extension of the file should reflect either the type of file (i.e. program file, image file, audio file etc) or the software used to create the file (e.g MS WORD document, MS EXCEL Worksheet, BASIC Compiler). For example;

S/No	Type of File/Software	Extension
1	Micro Soft Word Document	,doc
2	Audio File/Vidio.wav, axi	MP^3
3	Basic Compiler	.bas
4	Text	$.t_xt$
5	Microsoft excel	.xls
6	Image	$P^ng_xjp.gt$

Identify and describe file organization techniques

Q. Describe the type of data files used in a Data processing Environment

The different types of file stored in a computer system are as follow:

a. Program File

These are files that store sets of instructions written in a programming language. A source program file for examples contains the instructions written in a high level language such as BASIC or FORTRAN programming language by a programmer while the object file is the translated form of the source file in machine code after. The files that contain the machine code are called executable files (or binary files)

b. ASCII File

ASCII stands for American Standard Code for Information Interchange. ASCII files are text-based files. That is the characters are represented in ASCII code (without formatting such as underline, italics, boldface or graphics). Files stored in this format are used to to transfer documents between incompatible computer platforms, such as IBM and Macintosh.

c. Image File

Documents containing digitized graphics or images are stored in this format. Image files: Image files contain digitized graphics Audio and video files: Audio files contain digitized sound while video files contain digitized video images and animation.

d. Audio and Video File

This is a file that is used to store digitized sound or digitized video images and animation.

e. Data File

This refers to document files, contain data, not programs. Their content are using application software.

Q2. Explain three main techniques of file organization

Four common ways of file organization and access are:

a) Serial File Organization

In this method of file organization records are not arranged in any specific order. If magnetic tapes are used for the storage of data, it would be necessary to wind the tape forward and backward to access a given record since access can only be made in the sequence in which the records were physically stored on the tape, i.e serially. And if records are stored on disk, a full index will be required to access any given record. This method of file organization is therefore inefficient.

b. Sequential File

Organization In this type of file organization, data records are normally stored in ascending order of key field. Data must be retrieved in the same physical sequence in which they are stored. It is the only file organization method that can be used on magnetic tapes. Magnetic tape is a sequential storage device.

c. Indexed Sequential Organization

This technique of file organization uses both the sequential and direct access methods. It is widely applied to the storage of record on magnetic disk. It allows sequential file to be manipulated serially as the record are stored in ascending order of key field. In addition it allows direct access storage devices, to beaccessed directly using the indexed sequential

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access method (ISAM). This access method relies on an index or key fields to locate individual records. An index to a file is similarto how of a book can be used to locate it physical position //on a library shelf.

d. Direct or Random File Organization

This file organization is utilized with magnetic disk technology. Most computer applications today use this approach for storing records in computer files. In this approach, individual records are stored in a particular sequence of key fields. Thus allowing users to access records in a sequence they desire, without regards to actual physical order on magnetic tapes or disk. With this approach, every record has an address that makes it possible to locate it independently of other records on the storage media.

The Classification of Storage Devices

Storage devices can be classified generally as sequential access or random access.

Types of Data Files

Data stored in a data processing centre could be considered as transaction file and master file

a. Transaction file

This refers to a collection of transaction records. The transaction file is a temporary holding file that stores records that normally have a limited useful lifetime.

b. Master File

Master file is a collection of records that are relatively permanent records that are updated periodically. Thus once a record has been added to a master file, it remains in the system indefinitely. The value of fields for the record will change over its lifetime, but the individual records are retained indefinitely. Master files contain descriptive data, such as name and address, as well as summary information, such as students Cumulative, Grade Point Average in an examination processing system or total net pay, total tax deductions in a payroll system. Other examples of master file include: Customer, Product, Result or Supplier file.

UNIT 8: DATA PROCESSING TECHNIQUE

Definition and explanation of the terms - data and information

Meaning of Data Communication

Data communication refers to the process of transmitting data / information from a source via a telecommunications system in coded forms to a destination for the purpose of interchanging details of business transaction. The transfer of data require some forms of electromagnetic energy such as electricity, light, radio or waves which is transmitted through a physical medium such as the atmosphere, cable or wire.

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Telecommunication System

A telecommunication system refers to a collection of compatible hardware and software required to exchange information from one location to another. A telecommunication system is able to transmit text, graphic images, voice or video information. The major components of a telecommunication system are.

Q. Describe the basic components of a telecommunication system

The major components of a telecommunication system are.

- Computer: This is required for data processing
- Terminals: These are any input/output device that send or receive data
- Communication channel: This is the link by which data, graphic images, voice or video are transmitted between sending and receiving devices in a network. Communication channels use various communications media, such as telephone lines, cable, coaxial cable, fiberoptics and wireless transmission
- Communications software: This controls input and output activities and manages other functions of the communication network

Q. Explain the terms Batch Processing, Online processing, Transaction Processing, and Real-time Systems

Batch Processing

This used to be the dominant form of data processing. It is a method of data processing, in which transaction data such as data from time card is collected over a period say, a month for payroll processing, and then processed all at once as a batch to update the master file.

Online processing

This is a method of data processing method whereby data about a single transaction is processed immediately it is captured. This method of processing allows transactions to be entered directly to the system via terminals, PCs or workstations as they take place thereby updating the master file immediately as the transactions occur.

Transaction Processing

Transaction processing system (TPS) is an automated system that performs and records the daily or routine transactions necessary to conduct a business. A transaction may include an order or payment confirmation. Transaction processing entails the updating of appropriate database records as soon as a transaction is captured into the computer. The processing of a transaction may require that a confirmation be sent to the user or a customer immediately. Transaction processing systems are the backbone of an organization because they update constantly.

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Real-time Systems

These are systems designed to deal with dynamic situations in order to control a critical operation such as an airline reservation system which must be continually updated as events occur. Seat reservation in flight operations require communication-oriented Server computers supported by network of terminals or PCs serving as clients.

Distributed Processing

Many organizations that were used to centralized systems for data processing are now able to adopt Distributed data processing because of advances in computing technologies. A centralized system consists of a central multi-user computer (usually mainframe) which hosts all components of a data processing system. The users interact with this host via terminals or PCs serving as client, but virtually all of the actual processing and work is done on the host computer. All the devices in the centralized system such as PCs, terminals, network devices, and printer converge on one central computer, even though the users ma y work from remote locations via terminals.

Q. What are the advantages and disadvantages of Distributed Data Process?

Advantages of Distributed Data Processing Modularity Easy Integration

- Better response time
- Data processing is closer to the end user.
- Ability to share data
- Greater reliability
- Local control of data
- Lower cost
- Direct Users interaction

Disadvantages of Distributed Data Processing

- Technical problem of connecting and maintaining dissimilar systems
- Need for sophisticated communication system may incur addition cost
- Data integrity and security problem resulting from possible duplication of data on several systems along the network
- Interoperability issues- technical problem of connecting dissimilar machines
- Lack of skilled professional for systems support

Q. Explain the terms Batch Processing, Online processing, Transaction Processing: Real-time Systems

UNIT 9: TRADITIONAL FILE SYSTEM PROCESSING

Q. Explain the concept file system

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As an organization grows, computer systems and application become more complex. Take an example, a University s computer system that handles student s information. If the data of students are to be kept independently by the units that each student interacts with, for example, Registration, Hostel, Accounts, Examination and Records, Students Affairs, Health Centre etc. Worse still, of each department is allowed to keep students information independently in their application, a time comes, when multiple files containing the same records of students will exist in the different units.

As this process goes on for more than five years depending on the number of student s enrollment, the university is saddled with hundreds of programs and applications without adequate control on the data The University will be collecting the same information in more than one file. Some of the resulting problems are data redundancy, lack of data integrity and lack program-data dependence, inflexibility, and inability to share data among applications.

Q. Explain three main problems with the Traditional File System

a) Data Redundancy

This means the presence of duplicate data in multiple data files and often in different format. This is often the result, when different departments are allowed to collect the same piece of information about an object. When data fields are repeated in different files, storage spaces is wasted and a lot of time is spent trying to update the records.

b) Program-Data Dependence

Program-Data Dependence is the tight relationship between data stored in files and the specific programs that process the information in the files. Where computer programs become so data specific, any changes in data would also mean any modification of in the program the processes them. Such changes could be very expensive in terms of the time and cost of re-programming.

c) Difficulty of Data-Sharing

It is difficult to share data in a file environment because it ma y be difficult to relate the data in one file with that of another within one or several departments were files are kept. In addition, there is no control over the access to data which makes it further more difficult to retrieve the desired information.

MODULE 3

UNIT 10: DATABASE PROCESSING CONTENTS

Q. Explain the meaning of the term database

A database is a collection of more than one related files which are usually integrated. Also, a database can be seen as a collection of data organized to serve many applications efficiently

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by centralizing the data and minimizing redundant data. So, instead of storing data in separate files for each application, data are stored physically to appear to users as if they are being stored in only one location.

Q. Define the term Database Management System (DBMS)

A database is a collection of data stored in a standardized format, designed to be shared by multiple users. A database management system (DBMS) is software that defines a database, stores the data, support a query language, produce reports, and create data entry screen. Some of the most challenging problems in building applications arise in storing and retrieving data. Problem include conserving space, retrieving data rapidly, sharing data with multiple users at the same time, and providing backup and recovery of the data. The DBMS acts as an interface between application programs and the physical data files.

Examples common DBMSs include: Oracle, DB2, Sybase Adaptive Server Enterprise, Datawasp, FileMaker, Firebird, Ingress, Informix, Microsoft Access , Microsoft SQL Server, Microsoft Visual FoxPro, MySQL, PostgreSQL, Progress, SQLite.

Q. What are the components of a Database Management System?

a. A **Data Definition Language**

A data definition language is the component of a database management system that defines each data as it appears in the database. A data definition language is the formal language used by programmer to specify the content and structure of the database. The data definition language defines each element as it appears in the database before the data element is translated into the forms required by application programs.

b. **Data Manipulation Language**

A data manipulation language is a language associated with a database management system that is employed by end users and programmers to manipulate data in the database. Most DBMS have a specialized language called a data manipulation language that is used in conjunction with some conventional third or fourth generation programming language to manipulate the data in the database.

c. **Data Dictionary**

This is an automated or manual file that stores definitions of data elements and data characteristics such as usage, physical representation, ownership (who in the organization is responsible for maintain the data), authorization, and security. It is the third element of a DBMS.

Q. Identify the merits and demerits of DBMS

The Merits of a DBMS

- Data consistency

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- Sharing of data
- Improved data integrity
- Improved maintenance through data independence
- Minimal data redundancy
- Integration of data
- Improved integrity
- Consistent security
- Increased productivity
- Reduced application development and maintenance costs
- Improved flexibility of information systems
- Avoids duplicate data
- Increased access and availability of data and information

The Demerits of DBMS

- Complexity
- Cost of DBMS
- Cost of conversion
- Higher impact of a failure
- Additional Hardware Costs
- Take a long time to design and implement
- Performance
- Experts -Specialized Personnel
- Potential organizational Conflict

Q1. What do you consider as the major differences between hierarchical database and network database?

In hierarchical database, records are organized in a treelike structure by type. The relationship between records types is said to be a parent-child relationship, in which any child type relate only to a single parent type. A record is subdivided into segments that are connected to each other in one-to-many parentchild relationship.

On the other hand, The network model is a database model conceived as a flexible way of representing objects and their relationships. Network data model present a logical database model that is useful for depicting many-to-many relationship. Like the hierarchical structure, the network database structure is used in older mainframe system.

UNIT 11: DATA PROCESSING PERSONNEL

Q. Identify and outline the duties of various data processing personnel

Data Processing Manager

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The head of a data processing department: The duties of a data processing manager are summarized as follows:

- Interprets and executes the data processing policy as defined by management
- Controls immediate subordinate in the attainment of project objectives
- Participates in the formulation of data processing policy
- Ensures that security policies are enforced
- Coordinates all data processing operations and ensures the work flow is smooth.
- Ensures that computer operating instructions are modified when the need arises
- Assess and review the effectiveness of all data processing procedures
- Ensures that right software and hardware are purchased and used Monitoring test runs

Computer Programmers

The principal duties of computer programmers are summarized as follow:

- Liaise with system analyst to determine philosophy of proposed systems and establish the type of programming language to use high level or assembly code
- Reviews systems specification to establish the details of system requirements before actual implementation(coding)
- Converts systems specification and design documents to actual products
- Develops, implements and maintains computer software
- Deploys and configures software in the specified environments
- Handles integration and interoperability associated issues
- Develops software that are users friendly
- Chooses test cases and monitor test runs
- Reviews the performances of subordinates
- Reports status of program development to systems analyst

Operation Manager

The principal duties of the operations manager are summarized as follow:

- Controls all operations activities such as data preparation, capture and control, processing of data, report generation, storing of data, preservation of backup devices etc
- Develops the operating schedule for all jobs to be run on the computer
- Ensures that data is received on time from users department
- Maintains records on equipment utilizations
- Implements standard procedures to improve the efficiency of operations
- Keeps the inventory of data processing hardware supplies such as tapes, disk, hard drive, Monitors, etc
- Maintains log of computer operations for audit trails
- Reports to superior when system problems and other operational matters arise

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Database Administrator

The principal duties of database administrators are summarized as follows:

- Implements the specific policies and procedure through which data can be managed as an organizational resource.
- Plans for data usage
- Oversees the logical and physical database design and data dictionary development.
- Formulate information policy that specifies its rules for sharing, disseminating, acquiring, standardizing, classifying, and inventorying information in a organization
- Specifies rules governing the maintenance, distribution, and use of information in an organization
- Define and organizes database structure and content
- Develops security procedure to safeguard the database
- Develops database documentation
- Maintains the database management software

Q. What are the duties of a systems analyst?

The duties of System Analyst are summarized as follows:

- Liaises with the user departments to ensure their requirements and problem fully captured before systems design and implementation takes place.
- Interprets terms of reference before embarking upon systems projects
- Studies the feasibility report before embarking on a systems development project
- Supervises, Organizes and coordinates the activities of subordinate staff
- Reviewing Performance of subordinates for appropriate recommendations to the Data processing manager
- Organizes and reviews systems documentations to ensure its compliance with data processing standards
- Studies, reviews and report progress on projects to the data processing manager
- Coordinates the development and implementation alternative systems

UNIT12: TOOLS FOR CREATING DATA PROCESSING

Q. List some data processing software

Depending on the organization, one or more of the following software would be required for data processing:

- Accounting software
- Bank management software
- Retail point-of-sale software
- Financial planning software
- Legal and medical office

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- Management systems
- Medical diagnostic software
- Insurance claims processing system
- Report generator application

Q. Describe some programming languages

Machine languages

Machine Language: are the most basic languages for computer systems. Machine languages consist of strings of numbers defined by hardware design. Each type of CPU has its own machine language. The instructions in Machine language are written in 0 and 1. These binary digits, which correspond to the on and off electrical states of the computer, clearly are not convenient for people to read, write or use.

Assembler Language

Assembly languages were developed by using English-like mnemonics for commonly used strings of machine language. Assembly language makes use of certain mnemonics (e.g., LOAD, ADD) and assign address and storage locations automatically. A programmer can write instructions in assembly language more quickly and much easily than in machine language.

High-Level Language

High-level languages were developed to make programming easier. These languages are called high level languages because their syntax is closer to human language than assembler or machine language code. They use familiar words instead of communicating in the in machine codes which are not general and difficult to comprehend. In writing instructions in these languages, familiar arithmetic operators, such as the plus (+), or minus (-) sign that are used.

a. FORTRAN (FORmula TRANslator)

This is one of the early languages developed in 1950s to allow programmers write codes faster than using assembly languages. It was invented primarily for the development of scientific and engineering applications. It is a programming language intended for mathematical computation and allows programmer to express numerical equations directly.

b. COBOL (Common Business Oriented Language)

This language was developed in 1960 by a government-appointed committee under the leadership of retired Navy Commodore and Mathematician Grace Hopper. The committee was set out to address the problem of incompatibilities among computer manufactures. The committee came up with a platform independent language called COBOL.

c. BASIC (Beginners All-Purpose Symbolic Instructions Code)

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This language was developed by John Kemeny and Thomas Kurtz at Dartmouth College in the mid 1960 as an easy-to-learn, interactive alternative to FORTRAN especially for beginning programmers. It was a suitable tool for teaching programming to students. It was the first high-level language to be implemented on PCs because of its simplicity.

Q. Explain the meaning of the following terms

a) Structured Programming

Structured programming was developed in an attempt to overcome the use of GO TO statements in programming. Structured programming is a technique to make the programming process easier and more productive. A structured program doesn't depend on the GO TO statement to control the logical flow.

b) Object Oriented Programming

Object-oriented programming (OOP) is a programming approach that combines data and instructions for processing that data into a self-contained object that can be used in other programs. An object is a block of preassembled programming code that is a self- contained module. An object can be used several times in different applications and by different programmers, thereby leading to improved productivity of the software developers. Examples of OOP languages; Smalltalk, c++, Eiffel, C#, Java, etc

Q. What is the meaning of the term CASE?

CASE is an acronym for Computer-aided software engineering or Computer-aided systems engineering. It is the automation of the step-by-step methodologies for software and system development to enhance the developer s productivity. CASE tools provide automated graphics facilities for producing graphs, charts, and reports, data dictionaries, analysis and checking tools, code and documentation generators for easy software production.

Q. State three advantages of Object-oriented Programming

- Object-oriented programming leads to a reduction in the time
- It reduces the cost of writing software
- It makes maintenance easier.

UNIT 13: VISUAL AND EVENT PROGRAMMING

Q. Explain the term visual program and event driven programming

Visual programming is a method of creating programs by manipulating program elements graphically rather than by specifying them textually. The programmer makes connections between objects by drawing, pointing and clicking on diagrams. VB is termed an event-driven programming language because with it you can write program code that responds to events that are controlled by the system or users. Examples of event include:

- Clicking a button or menu.

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- Opening or Closing a form.
- Moving the mouse over the top of an object such as a text box.
- Moving from one text box to another.

Q. Explain the concept of object, properties and method

The definition of some terms that are required for us for to have a good understanding of the language.

Object

An object is a thing like a noun in English. Examples include Forms and Controls on forms such as Buttons, Text boxes, and Icons.

Property

Objects have properties like adjectives in English. Properties describe objects. Examples of properties include Text, Name, Back Color, Font, and Size.

Method

A method is like a verb in English It is an action word that objects exhibit. Examples include methods to Show and Hide Forms and methods to Print Forms.

Event

An event occurs when users takes an action, such as clicking a Button, pressing a key, scrolling, or closing a Window. Events can also be triggered by actions of other objects.

Form

A Form is the window and dialog box where you put all the things that people interact with as they use your program. Forms are the foundations you generally use to build programs. Forms are containers for Controls. Controls are the elements; you place inside a Form, such as Text boxes, Command buttons and List boxes.

Q. Define the term data types and explain the terms variable and constants

A variable is a temporary storage location for data. Variables are used for representing data of certain types. To use a variable, you will have to declare it. By declaring a variable you are asking the compiler to allocate appropriate memory space for the variable based on its data type. The different type of variables in VB and their storage requirements are in the Table 5.

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Table 5: Storage Requirements

Type	Value	Storage Size	Range
Boolean	Logical value	2Bytes	True or false
Byte	Whole number	1 Byte 0.255	
Currency (scale integer)	Numbers with up to 15 digits left of the decimal and 4 digits right of the decimal	8bytes	922, 337, 685, 477, 5808 to 922, 337, 203, 685, 477.
Date	Date and time information	8bytes	1 January 100 to December 9999.
Double	Decimal numbers(Double precision floating point	8bytes	1.797,69313486232E308 to – 4.9406564584124E - 324 for negative value; 4.94065645841247E308 for positive value
Integer	Whole numbers	2 bytes	- 32,768 to 32767
Long	Whole number(long integer)	4 bytes	-Bytes -2,147,481? 648 to 2,147,483,647.
Single	Decimal numbers	4 bytes	-3.4() 2823E38 to - 1.401298E-45 for negative values, 1.401298E-45 to

Q.Use simple assignment statements and expression

A statement is a line of code that makes a computer achieves a task. An assignment statement for example is used to assign a value to a variable. The syntax for assignment statement is as follows:

Variable = expression

Examples:

intNum1 = 5

from Main. Visible = False

fAvgScore = nTotal / nNumber of Papers

Q. Describe and use mathematical operators

Mathematical operations can be used to determine the total deductions or net pay to be paid to an employee when the payroll is processed. Similarly, customers bill, interest due, account balance, and the total score of student in an examination would need some mathematical operation to be performed by the computer. Mathematical operations are performed by mathematical operator. A list of the available Mathematics operator and their corresponding VB operator are provided in Table 7.

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Operation VB Operator	Symbol
Addition	+
Subtraction	-
Multiplication	*
Division	/
Integer division	\
Modulus	Mod
Exponentiation	^

Table 7: Math Operations

Q. Write sample program in Visual Basic

Question: Develop an application in VB to calculate the Total and Average scores of students in Four papers in an Examination Solution

To develop this application you need go through the following steps:

1. Plan and define your users interface (Create your forms and add the appropriate controls)

2. Plan and set the properties (Assign names to your objects. See Figure 5)

3. Plan and Write the Basic codes (Write codes to handle the events. Also see Figure5)

Source Code for command (Process)

Private Sub cmdProcess_Click()

Lbl total. caption = Val(txtPaper1.Text) + Val(txtPaper2.Text) + Val(txtPaper2.Text)+Val(txtPaper4.Text) lblavg.Caption = Val(lbltotal.caption) / 4 End Sub

UNIT 14: SYSTEM

System

A system is a set of interacting or interdependent component parts forming a complex or intricate whole. Every system is delineated by its spatial and temporal boundaries, surrounded and influenced by its environment, described by its structure and purpose and expressed in its functioning. The term "system" comes from the Latin word systēma, in turn from Greek σύστημα systēma: "whole compounded of several parts or members, system", literary "composition"

Q. Explain the term System concepts

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Systems theory views the world as a complex system of interconnected parts. One scopes a system by defining its boundary; this means choosing which entities are inside the system and which are outside part of the environment.

Natural and human-made systems

There are natural and human-made (designed) systems. Natural systems may not have an apparent objective but their behavior can be interpreted as purposeful by an observer. Human-made systems are made to satisfy an identified and stated need with purposes that are achieved by the delivery of wanted outputs.

Q. Discuss Subsystem

A subsystem is a set of elements, which is a system itself, and a component of a larger system. A subsystem description is a system object that contains information defining the characteristics of an operating environment controlled by the system.

Q. Give analysis of systems

Cultural system

A cultural system may be defined as the interaction of different elements of culture. While a cultural system is quite different from a social system, sometimes both systems together are referred to as the socio cultural system. A major concern in the social sciences is the problem of order.

Economic system

An economic system is a mechanism (social institution) which deals with the production, distribution and consumption of goods and services in a particular society. The economic system is composed of people, institutions and their relationships to resources, such as the convention of property. It addresses the problems of economics, like the allocation and scarcity of resources.

Q. What are the Applications of the system concept?

Systems in information and computer science

In computer science and information science, system is a software system which has components as its structure and observable inter-process communications as its behavior. Again, an example will illustrate: There are systems of counting, as with Roman numerals, and various systems for filing papers, or catalogues, and various library systems, of which the Dewey Decimal System is an example. This still fits with the definition of components which are connected together (in this case in order to

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Systems in engineering and physics

In engineering and physics, a physical system is the portion of the universe that is being studied (of which a thermodynamic system is one major example). Engineering also has the concept of a system that refers to all of the parts and interactions between parts of a complex project.

Systems in social and cognitive sciences and management research

Social and cognitive sciences recognize systems in human person models and in human societies. They include human brain functions and human mental processes as well as normative ethics systems and social/cultural behavioral patterns. In management science, operations research and organizational development (OD), human organizations are viewed as systems (conceptual systems) of interacting components such as subsystems or system aggregates, which are carriers of numerous complex business processes (organizational behaviors) and organizational structures.

Q. Explain the difference between close and open system.

An open system exchanges matter and energy with its surroundings. Most systems are open systems; like a car, a coffeemaker, or a computer while a closed system exchanges energy, but not matter, with its environment; like Earth or the project Biosphere 2 or 3.

UNIT 15: SYSTEM CLASSIFICATION

Q. Explain the term Control System

A system is a set of interacting or interdependent component parts forming a complex or intricate whole. All our tools and machines need appropriate control to work, otherwise it will be difficult to finish their designated tasks accurately. Therefore, we need control systems to guide, instruct and regulate our tools and machines. Common control systems include mechanical, electronic, pneumatic and computer aided. A system usually contains three main parts: input, process and output.

Q. Explain the mechanical, electronic, pneumatic and computer aided system

Mechanical system

A mechanical system is a device made up of various mechanical parts. Its input is provided by an effort. Once the effort and is applied, it can set off a motion to move a load. The force applied to the load is the output of the mechanical system. Examples of mechanical systems include levers, gears and shafts. Fig. 1 shows some examples of mechanical systems.

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Electronic system

An electronic system is a system that employs electronic signals to control devices, such as radios, calculators, video game machines, mobile phones, portable computers, etc (Fig. 2). The input of an electronic system is provided by electronic signals. Common examples of electronic devices include semiconducting diode, transistors, capacitors that they are usually welded onto electronic circuit boards.

Computer control system

A computer control system uses a computer to control its output devices according to different input signals. Its function is similar to that of an electronic system. Examples of computer control systems include computer numerical control press brakes, computer controlled home appliances, computer controlled underground railway systems, etc (Fig. 4).





Fig. 4 Examples of computer control systems

Pneumatic system

A pneumatic system is a system that uses compressed air to transport and control energy. Air is first pressurized to give energy in the cylinder. Then signals are input into the system through the use of switches. Next, air is transferred through sealed pipes to the pneumatic parts for processing. Finally, the force produced by the pneumatic parts is utilized to finish

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the designated task. The use of pneumatic systems is very extensive, for example, in controlling the movement of train doors, the operation of automatic production lines and mechanical clamps, etc

Q. What is Total Analysis System?

(TAS) describes a device that automates and includes all necessary steps for chemical analysis of a sample e.g. sampling, sample transport, filtration, dilution, chemical reactions, separation and detection. A new trend today is creating Micro Total Analysis Systems - μTAS.

Q. Describe the differences Open loop and closed loop control systems?

An open loop control system operation is very simple, when an input signal directs the control element to respond, an output will be produced. On the other side, a closed loop control system compares the output with the expected result or command status, then it takes appropriate control actions to adjust the input signal.

UNIT 16: FILE PROCESSING

A data file is a named collection of related records normally kept in external storage. Data stored in files are permanent until you decide to delete them. Data files once they have been created can be used as input for the same program for as many program run as you want without having to retype data. Data files facilitate the sharing of data by many applications

Q. What are the differences between a sequential file and a random file?

Random files allow data to be read in any order unlike a sequential file. Random files allow data to be accessed directly without starting from the beginning and moving from one record to the other until the data is found or one gets to the end of the file, while sequential files contains data elements stored one after the other according to a particular order and data are read from a sequential device in the same sequence that they were written.

Q. What is the purpose of the EOF statement?

This statement is used to mark the end of file. The general Syntax is: EOF (file number)

MODULE 4

UNIT 17: IT ARCHITECTS AND IT INFRASTRUCTURE

Q. Explain Job Requirements and Duties of an IT Architect.

The primary duties of an IT architect are to design and maintain computer networks. Architects use computer design software to model and test network plans prior to implementation. Additionally, they may use these programs to simulate adding new hubs, changing routers or making other modifications to existing networks.

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IT architects may act as managers and are responsible for scheduling technician assignments and assessing budgetary needs, which may include estimating upgrade costs or switching Internet services. Other duties may include conducting computer support personnel evaluations and coordinating future direction on technical issues, such as obsolete software.

Preparing for a career as an IT architect begins with completing a bachelor's degree program in information systems or a related field. Freshman and sophomore students begin with introductory classes, such as knowledge organization, database creation and operating system basics. Students who have progressed in the major may delve more deeply into intermediate and advanced topics including management support systems, network security and system design.

Definition of IT Infrastructure

IT infrastructure refers to the composite hardware, software, network resources and services required for the existence, operation and management of an enterprise IT environment. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is usually internal to an organization and deployed within owned facilities.

Q. What are the IT infrastructures Components?

- Typically, a standard IT infrastructure consists of the following components:
- Hardware: Servers, computers, data centers, switches, hubs and routers, etc.
- Network: Network enablement, internet connectivity, firewall and security
- Meat ware: Human users, such as network administrators (NA), developers, designers and generic end users with access to any IT appliance or service are also part of an IT infrastructure, specifically with the advent of user-centric IT service development.

UNIT 18: ELECTRONIC COMMERCE

Q. Account for the brief history of electronic commerce.

The need for electronic commerce emerged from the need to use computers more efficiently in banks and corporations. With the increasing competition there was a need amongst organizations to increase customer satisfaction and information exchange. Electronic commerce started with the introduction of electronic funds transfer (EFT) by banks. Over time many variants of EFTs within banks were introduced like debit cards, credit cards and direct deposits.

Q. Explain in clear terms the meaning of E-Commerce

Electronic commerce better known as e-commerce consists of the buying or selling of products via electronic means such as the internet or other electronic services. This type of trade has been growing rapidly because of the expansion of the Internet. Electronic commerce started with the introduction of electronic funds transfer (EFT) by banks.

Q. Discuss the types of E-Commerce

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There are 5 common types of E-commerce:

1. Consumer to business E-commerce

2. Business to business E-commerce

3. Business to consumer E-commerce

4. Consumer to consumer E-commerce

5. Intra organizational E-commerce

Q. What are the advantages and disadvantages of e-commerce?

The Advantages of E-commerce

- It can help increase profits; it can increase sales and decrease costs.
- It can help organizations do business 7 days a week and 24 hours a day.
- It can help organizations have customers all around the globe and not be limited to a specific region.
- It helps organizations bring higher return on advertisements, if managed properly.
- It helps organizations identify new suppliers, partners and customers.
- It increases flexibility and ease of shopping for the customer.
- It can help in low operational cost.
- It can provide personalized product and customer customization.
- Shoppers are given a broader range of products to choose from online.

The Disadvantages of E-commerce

- The buyer cannot touch or feel the product online.
- The customer has to wait for delivery of their product.
- Perishable goods bought online can get spoiled during delivery.
- It is difficult to know when an online site is safe to use.

Unit 19: E-Commerce Merits, Demerits and Technological Changes

Q. What did you understand by technological changes?

Technological change may be the most important source of entrepreneurial opportunities. While the accurate dating of the arrival of major technological innovations is difficult, it is reasonable to say that the genesis of our information society was in the mid to late 1950s and early 1960s. Transatlantic cable telephone service began. The Soviet Union launched Sputnik, suggesting the possibility of global satellite communications. Transistors replaced vacuum tubes in computers. Compilers opened the door to higher-level programming languages, and the development of the computer ―chip was under way.

Q. Discuss Electronic commerce

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Electronic commerce, or e-commerce, involves the use of electronic means to conduct business online. Although many of the simple ―dot.com‖ and ―e-commerce‖ business models of the late 1990s did not work, the Internet economy and e-commerce are here to stay. Simply put, we will never do business the same way we did before the Internet.

A simple example is online package tracking. Now, instead of using the phone to say a package is ―in the mail,‖ the sender is expected to provide a tracking number to be used on the Web so that the sender and the receiver can ascertain the veracity of this claim and follow the package along its route.

Q. Account for the advantages and disadvantages electronic commerce to economic agents.

Electronic Commerce Advantages for Traders

- The possibility of the small companies to compete with the large companies

Due to small expenses incurred by a virtual shop small companies are confronting with one less barrier in penetrating the markets already dominated by the large companies. More than this due to her flexibility and perception towards new the small company has a major advantage in comparison with a large one dominated by birocracy and conservatorism.

- Permanent contact with customers for 24 hours and 7 days

This is bringing an advantage, too in case of the expansion on the foreign markets when the hourly difference making more difficult the contacts between the companies. It also improves the communication with the customers that have not to observe a strict time table thus being able to obtain information and place orders any time.

- International markets penetration facilities

The world network is not limited by borders, it does not belong to anyone and the access and publication costs are extremely low. The communication with a customer positioned to the opposite pole of the world is as easy as the communication with someone in the next room.

- The decrease of the functioning costs

These costs may be drastically diminished by the automatics of the orders process. There is also the possibility of a total automatics by the integration with the administration system thus leading to the increase of the general productivity of the company.

- New possibilities for performing a direct marketing (one-to-one)

Comparing with a human being the computer may retain not only the name and personal data of all customers as well as their preferences being capable to adapt the offer and products presentation according to each customer‘s profile.

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Electronic Commerce Disadvantages for Traders

- The Fraud

As in any other activity field, the technology of internet created new fraudulent possibilities. In the lack of a direct contact a client may cheat the trader regarding his identity or his real payment possibilities.

- The Security

Another important problem is that regarding the security of the data. A company that has not access to internet does not have too many worry reasons as regards the integrity of her administration informatics systems.

- Launch and integration costs

A company that has not implemented yet an administration informatics system or those where the employees do not have minim technical knowledge may confront with an unexpected increase of the launch costs due to the necessity of the acquisition of training systems for the employees.

Electronic Commerce Advantages for Buyers

- Availability for 24 hours of 24 and 7 days of 7

This availability independent on a certain program represents a major advantage for the clients who can purchase during night too when they are not busy with other urgent problems (job, household).

- Facilities

Due to the electronic commerce there is no need to go to the commercial places or to the shop next to corner .Everybody may place orders from home sitting in front of the PC and thoroughly analyzing and comparing different products.

- Access to information and different products without any restrictions

Before buying the product the potential future buyer has more free and cheap access to the offers of the producers or trading companies.

Electronic Commerce Disadvantages for Buyers

- Security

The most important reason for which some persons hesitate to use internet for purchases-as resulted from most of the opinion polls – is that of being afraid to supply on line information regarding the credit card.

- Intimacy

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Another important problem is the attempt to the personal intimacy. The potential buyers are afraid that by internet the traders or a bad will person can collect thorough information and they will not realize this at all.

- Absence of human contact

This is the obvious inconvenient generated by the electronic commerce. The low launching and maintenance costs of a virtual shop derives of the advantages of the automatics of the processes and there is no need to employ additional personal, on one hand.

UNIT 20: GUIDELINES INFORMATION AND COMMUNICATION TECHNOLOGY IN NIGERIA

Q. Account for the Summary of Guidelines for Nigerian Content Development in ICT.

1. The purpose of this summary is to make it easier for professionals within the ICT sector to understand the Local Content guidelines put forward by NITDA which came into effect on December 3, 2013 by highlighting key details of the guidelines and how they affect each type of company operating within the sector. The Local Guidelines were created in collaboration with a wide range of stakeholders (include the stakeholders), taking into account best practices as well as realities on ground within the IT Sector in Nigeria, and aimed at creating success for all parties within the Nigerian IT sector. Nigeria has seen a lot of growth in the use and adoption of digital technology for communication and computing.

2. Area Strategic Goal Performance Measures Indigenous innovation Achieve a thriving ICT industry capable of contributing to national development goals

- Real economic value contributed by the industry to the Nation‘s GDP
- Number and quality of jobs created within the industry
- Quality standards among local ICT companies
- Self-sufficiency in the value chains of Indigenous companies in terms of indigenous value creation.
- Amount of funding/support available for Indigenous Companies
- Amount of Foreign Direct Investment in the industry

3. Purpose The Local Content guidelines were designed to

- Enable the local ICT companies to contribute towards national development targets.
- Enable indigenous companies to create and sell high quality IT products and services which will be consumed by the local and global market.
- Build and Equip Nigerians with the capacity to participate actively in the Local ICT Industry
- Provide opportunities to indigenous companies that will improve their ability to provide relevant products and services to the Nigerian market
- Provide a framework to regulate and legislate the on the creation, use and distribution of Information Technology in Nigeria

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UNIT 21: GLOBALIZATION/INTERNATIONAL INSTITUTIONS

Q. Demonstrate the understanding of global business

Today, organizations are conducting their businesses in the global environment. Many large firms have become multinationals doing business across national boundaries. Even small firms source their production inputs overseas. Overseas firms are producing their products here. The supply chain for many goods is global. United States firms, for instance, are acquiring firms abroad. The vogue is to shift to international market and acquire as much market shares as possible. Globalization goes with trade liberalization among nations and the removal of all trade barriers.

Q. What are the main issues that led to the demand for a New International Economic Order by developing countries?

The demand for a New International Economic Order (NIEO) especially by developing nations goes back to the first session of the UNCTAD in 1964. The various resolutions adopted in the subsequent sessions of the UNCTAD contain a systematic account of the various elements of a NIEO. At the root of the call for a New International Economic Order lies the dissatisfaction of the Less Developed Countries (LDCs) with regard to trading, financial, technological and other policies pursued by the developed countries towards the LDCs. The developed nations have oppressed the LDCs, discriminated against them, drained their income and denied them access to advanced technology. Such policies have obstructed their development efforts, perpetuated inequalities in wealth and incomes and increased unemployment and poverty in them.

List the major factors that gave impetus to the demand for New International Economic Order.

i. A severe energy crisis

ii. The breakdown of the Bretton Woods System in 1973

iii. The disappointment with development aid which was much below the United Nations target of 0.7% of Gross Domestic Product (GDP) of developing countries.

iv. The formation of the Organization of Petroleum Exporting Countries (OPEC) in 1973 and its success in raising oil prices.

v. The existence of high rates of inflation and unemployment in LDCs

Q. Discuss the advantages of international trade.

The New International Economic Order lays emphasis on a greater role of LDCs in international trade by adopting the following measures which aim at improving the terms of trade of LDCs and removing their chronic trade deficits;

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(i) establishment of LDC sovereignty over natural and especially mineral resources for export

(ii) promoting the processing of raw materials for exports

(iii) Increasing the relative prices of the exports of LDCs through integrated programme for commodities, compensatory financing, establishment of international buffer stocks and creation of a common fund to finance stocks, and formation of producers, associations

(iv) providing proper framework for establishing prices of raw materials and primary products so as to stabilize export income earnings

(v) indexation of LDC export prices to rising import prices of manufactured exports of developed countries

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