SCHEME OF WORK

Lesson One: COMPUTER SOTWARE

Lesson Two: Units of Storage in Computer

Lesson Three: Secondary memory or Auxiliary memory

Lesson Four: Computer program solving Skill

Lesson Five: BASIC programming

LESSON ONE
COMPUTER SOFTWARE

Computer Software is defined as step-by-step instructions used to instruct the computer on what to do.

It could also be defined as set of instructions and procedures passed to the computer to perform certain activities or tasks.

Software can also be called programs or instructions. Software acts as a communication link between the user and the computer.

Types of Software

Software can be divided into the following:

- (i) System Software
- (ii) Application Software

SYSTEM SOFTWARE

These are software that control the way the different computer components communicate with one another. It is the software that consists of all the programs, languages and documentations supplied by the computer manufacturer.

System software can be further classified into the following:

- i. Bootstrap loader
- ii. Operating system
- iii. Utility program
- iv. Translator
- v. Executive

UTILITY PROGRAM: This is also known as service program. It is a common tool for file and computer management. These are software that is used for general housekeeping functions on

the computer such as repairing the computer, back file up, copying, sorting and printing of data. Examples are Norton utilities, antivirus, scandisk, defragment, windows explorer etc.

TRANSLATOR: This is software that translates programs written by users into machine language. Examples include MS DOS (Microsoft Disk Operating System), Windows 7, Windows 8, Windows XP, Linux Redhat, Linux Mandrake.

| Program | → | Translator | → | Machine language |
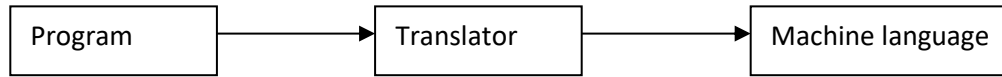
EXECUTIVE: This is a master program that is permanently held in the internal storage of the computer.

BOOTSTRAP LOADER: This is a program that loads other programs and imports parts of the operating systems into the main memory.

OPERATING SYSTEM

These are software that supervise input and output operations and control communication that exists among the different components of the computer system. This is a set of programs that manage the computer resources. It is a set of routines and procedures that govern the operation of a computer.

FUNCTIONS OF OPERATING SYSTEM

1. It controls and monitors access to the computer system by different user.
2. It organizes how data are stored temporarily in RAM or permanently in disks and tapes
3. It responsible for allocating computer system resources.
4. It starts the control of all input and output resources.
5. It informs the user of any hardware and software errors in the system.
6. It contains utility programs such as scandisk, and the disk manager which are used to solve system hardware problems.
7. It controls all operations of the system.

Examples of Operating Systems

1. Microsoft Disk Operating System (MS DOS)
2. Microsoft Windows (MS Windows)
3. Linux
4. Unix
5. Others examples are Windows,
6. NT OS/2
7. Apple Macintosh OS

Microsoft Windows

Microsoft Windows are a series of software operating systems and graphical user Interfaces produced by Microsoft. They are Windows 7, Windows 8, Windows 10, Windows XP, Windows 2000, Windows ME, Windows 98, Windows NT, Windows 95 and Windows Vista

APPLICATION SOFTWARE

These are software that is used to perform a specific task or job on the computer.

Examples are Microsoft Word, CorelDraw, PageMaker, Dac Easy, Peachtree, Dbase, Oracle, AutoCAD etc

Classification of Application Software

i. Word Processing application Software: These software packages are used in achieving word processing job objectives, such as typing letters, memos, reports, and projects. Examples are: Ms-Word, Notepad, Word pad, Word Perfect, PageMaker

ii. Data Processing/ Spreadsheet application Software: They are used for calculation, statistics and data analysis. Example: MS-Excel, Lotus 1-2-3, Sage, Dac Easy and Peachtree

iii. Database Management System (DBMS) application Software: These are software packages that are used for database creation and manipulations. Examples of packages of these group are: MS-Access, Dbase and Oracle.

iv. Graphic application Software: These software packages are used for drawing, creating logos, letterheads, editing photographs etc. Examples are Ms-Paint, CorelDraw, Instant Artists, Paintbrush etc

v. Presentation application Software: It is used for information presentation, especially in seminars, conferences and workshops. It is used to create slides. Examples include Ms-PowerPoint, Easy worship etc

vi. Entertainment application Software: It is used as a means of relaxation. Examples include: Power DVD player, Windows media player, WinDVD, Ayo, Yahoo, bow and Arrow etc

vii. Architectural/Engineering application Software: It is used for architectural designs and engineering work such as measurements and calculations examples are: AutoCAD, ArchiCAD

viii. Learning application Software: It is used for learning in schools and homes. Examples include Marvin Beacon Tutors and Encyclopaedia etc.

LESSON TWO

UNITS OF STORAGE IN COMPUTERS

Before the invention of the computer, people stored information in various means such as the brain, books (textbooks and notebooks), plates and leather. There were many limitations of these means which the computer has corrected. Computer has ability to store data and large information for a very long period of time. The computer also stores information in various units.

The various units of storage in computer science are the means of representing, storing and measuring data and information in the computer.

The common units' of storage include:

1. Bit: This means(**B**inary Dig**it)** either 0 or 1 in the binary number system. In computer processing and storage, a bit is the smallest unit of information handled by a computer.
2. Byte: This consists of eight bits. In computer processing and storage, a byte is the equivalent of a single character, such as a letter, a numeral, or a punctuation mark.
3. Nibble: This consists of four bits.
4. Character: This is not necessarily visible, either on the screen or on the paper.

5. Word: A word is a string of bits stored in computer memory; large computers use words up to 64bits long.
6. Kilobyte (KB): This is 1024 bytes or 2^{10} bytes. It is equivalent to one thousand bytes
7. Megabytes (MB): This is 1,048,576 bytes or 2^{20} bytes i.e. 1024 X 1024 bytes. It is equivalent to one million bytes
8. Gigabyte (GB): This is 2^{30} bytes i.e. 1024 X 1024 X 1024 bytes. It is equivalent to one billion bytes.
9. Terabyte (TB): This is 2^{40} bytes i.e. 1024 X 1024 X 1024 X 1024 bytes. It is equivalent to one trillion bytes
10. Petabyte: This is a unit of information that is equal to 1024 terabytes i.e. 1024 X 1024 X1024 X 1024 X 1024 bytes

Conventional capacities of known storage media and their drive notations

	Storage media name	Notation Letter	Size
1	3½ floppy disk or Diskette	A:	1.44MB
2.	5¼ Floppy disk or Diskette	B:	1.44MB
3.	CD-ROM/DVD ROM	D:	12MB to 700 MB and above
4	Hard Disk	C:	4GB to 300GB and above
5.	Flash Drive	E: or F:	218MB to 2GB and above
6.	Zip disk	E: or F:	100MB to 2GB and above
7	Jas disk	Any letter	1GB and more

CONVERSION FROM ONE UNIT TO ANOTHER

Unit of storage	Size
1 kilobyte (KB)	1024 bytes
1 megabyte (MB)	1024KB (approximately 1000kilobyte)
1 Gigabyte (GB)	1024MB (approximately 1000 Megabyte)
1 Terabyte (TB)	1024GB (approximately 1000 Gigabyte)
1 Petabyte (PB)	1024TB (approximately 1000 Terabyte)

CONVERSION EXAMPLES

1. Convert 50KB to Megabyte (MB)

1024KB = 1 MB

Therefore 50KB = $\frac{50KB}{1024KB}$ x 1MB

$$= 0.0488MB \text{ or } 0.05MB$$

2. Convert 0.15MB to Kilobyte

   I MB =1024KB

   Therefore 0.15MB $= \frac{0.15MB}{1MB}$ X 1024

   $\qquad\qquad\qquad = 153.6KB$

3. Convert 2000KB to Gigabyte

   1024 X 1024KB =1 GB

   Therefore 2000KB $= \frac{2000KB}{(1\,024\,X\,1024)KB}$ X 1KB

   $\qquad\quad = \frac{2000}{1\,048\,576)}$ x 1GB

   $\qquad\quad =0.0019GB \text{ or } 0.002GB$

4. Convert 0.00005GB to Kilobyte

   1 GB = 1024 X 1024KB

   Therefore, 0.00005GB $= \frac{0.00005}{1}$ X (1024 X 1024)KB

   $\qquad\qquad\qquad\qquad =0.00005 \text{ X } 1\,048\,576KB$

   $\qquad\qquad\qquad\qquad = 52.428KB \text{ or } 52.4KB$

5. Convert 10240GB to terabyte (TB)

   1 TB = 1024GB

   Therefore, 10240GB $= \frac{10240}{1024}$ X 1TB

   $\qquad\qquad\qquad = 10 \text{ TB}$

6. Convert 0.17TB to Gigabyte (GB)

   1 TB = 1024 GB

   Therefore, 0.17TB $= \frac{0.17TB}{1TB}$ X 1024GB

   $\qquad\qquad\qquad = 174.08GB \text{ or } 174GB$

7. Convert 1024bits into bytes

   If 8 bits = 1 byte

   1bits = 1/8 bytes

   Then 1024bits $= \frac{1}{8}$ X 1024 bytes = 128bytes

LESSON THREE

SECONDARY MEMORY OR AUXILIARY MEMORY

Secondary Memory also known as the auxiliary storage .It holds large amount of information on a long term basis. It is the safest and most secured form of storage. Whenever the computer is switched on the required data and program from the auxiliary storage or memory are easily transferred into the main memory (primary memory)

Also, secondary memory are the device on which data or programs could be recorded until when they are required for processing.

Common types of secondary storage devices are:

1. Magnetic Tape
2. Magnetic Disk
3. Compact Disk
4. Flash Drive
5. Diskette or Floppy Disk

Uses of Auxiliary storage
i.   It is used to retrieve information from the system
ii.   it is transferable
iii.   It is used in holding information for a very long term
iv.   It is cheap
v.   It is durable

Care for Auxiliary memory
1. Do not bend or twist it
2. Do not use sharp pen to write on the diskette
3. Do not place heavy object on it.
4. Protect it from dust, smoke and duty materials
5. Never touch the magnetic head surface
6. Protect diskette from sunlight extreme heat or close
7. Reject the flash drive before removing it from the drive

LESSON FOUR

COMPUTER PROGRAM SOLVING SKILLS

LANGUAGE is a system of communication by written or spoken word which is used by the people of a particular country or area.

COMPUTER LANGUAGE: This is a system of instructions and commands for operating a computer.

A PROGRAM: This is a series of instructions which enable the computer to carry out some laid down procedures to accomplish a given task or solve a problem.

PROGRAMMING: This is the act of giving the computer a set of instructions or codes to carry out, or perform a specific task.

COMPUTER PROGRAMMING LANGUAGE is a large number of steps required to carry out a procedure.

Types of Computer Languages
1. Low level language
2. High level Language

Low Level Language (LLL)

Unlike human beings, the computer understands codes of digital binary numbers. These binary digits are made up of zeros (0) and ones (1), for examples, 11000111, 101001101. These digits are called low level language and it is the language the computer understands since the CPU operates by responding to electrical signals. There are two types of low level languages. They are:

(a) Machine Language
(b) Assembly Language

Machine Language: This is the only language understood by computers. It is almost impossible for humans to use because it consists of only 1 and 0 (i.e. binary number).

Assembly Language: This language contains the same instructions as the machine language but the instructions have names (mnemonics) instead of number. Assembler is the translator to translate assembly language to machine language

High Level Languages (HLL)

High level languages are human understandable languages. They allow programmers to write programs that are not dependent on the design of the CPU.

Compiler and interpreters are responsible for translating high-level language into machine language.

Compiler translates entire program into machine language before execution while Interpreter translates and executes one instruction at a time into machine language.

Examples of high level language include
   BASIC (Beginners All-purpose Symbolic Instruction code)
   FORTRAN (Formula Translation)
   ALGOL (Algorithmic Language)
   APL (A Programming Language)
   C++
   JAVA
   COBOL (Common Business Oriented Language)

Advantages of High Level Language
   1. It is user-friendly
   2. Similar to English with vocabulary of words and symbols
   3. It is easier to learn
   4. They require less time to write
   5. They are easier to maintain
   6. It is independent of the machine on which it is used

Disadvantages of high level language
   1. A high-level language has to be translated into the machine language by a translator and thus a price in computer time is paid.
   2. The object code generated by a translator might be in efficient compared to an equivalent assembly program.

Very high- level language/ Fourth generation languages:

This is a programming language with a very high level of abstraction, used primarily as a professional programmer productivity tool. Example is Logo.
QUERY LANGUAGE: These languages are used to make queries into databases and information systems. Examples are SQL, MDL.

	Programming Language Level	Examples
1	Machine Language	Binary or Decimal code
2.	Low level Language	Assembly Language
3.	High Level Language	BASIC, PASCAL, COBOL, FORTRAN, C++, LOGO, SNOBOL etc
4.	Fourth Generation Language (4GL)	SQL, QBE, MDL

LESSON FIVE

BASIC PROGRAMMING

BASIC is an acronym for Beginners All-purpose Symbolic Instructions Code. It a programming language.

RULES FOR BASIC PROGRAMMING

1. The first character for your data name must be alphabet (A-Z)
2. Each statements must begin with a line number
3. There must not be a full stop after each line of statement
4. Each program must be terminated by END or STOP statement
5. Each line must contain only one BASIC program statement
6. All expression must be written in capital letters.

OPERATORS IN BASIC

Operators are symbols used in carrying out operation in any program. There are three types of operators in BASIC. These are:

(i) Arithmetic Operator: These are symbols used in carrying out arithmetic operations. The program execution follows the rule of BEDMAS (Bracket, Exponentiation, Division, Multiplication, Addition and Subtraction).

Arithmetic operator	Meaning	example
+ (plus sign)	Addition	43+33+12
- (Minus sign)	Subtraction/negation	43-67
* (asterisk)	Multiplication	4*6*7
/ (forward slash)	Division	6/5
% (percent sign)	Percent	8%
^ (caret sign)	Exponentiation	8^2

(ii) Relational operators: These operators can operate on at least two operands in order to achieve a true value.

Comparison operator	Meaning	Example
= (equal sign)	Equal to	C4 = B2
> (greater than sign)	Greater than	C1> D3
<(Less than sign	Less than	C1<D3
>= (greater than or equal to sign)	greater than or equal to	C1>=D3
<= (less than or equal to sign)	less than or equal to	C1<=D3
<>(not equal to sign)	Not equal to	C1<>B2

(iii)Logical operators: These operators perform tests on multiple relation. Example are 'AND', 'OR'.

KEYWORDS/RESERVE WORD

The keywords or the reserved words are the tools that we use in writing BASIC programs. They are instructions that are carried out by the program translators i.e, the compiler and the interpreter. The Reserved words include: PRINT, READ, CLS, REM, DATA, GOTO, FOR…NEXT, IF…ELSE, LIST, LOAD/OPEN, END, STOP

KEY BASIC STATEMENTS

1. Remark statement: This is a remark. It does not affect the program in terms of instruction or command line.
   REM statement: It is used in explaining what the program is all about.
   Example
   10 REM "Calculate area of rectangle"

2. Assignment statement: This keyword is used in assigning values to variable, e.g. READ, DATA, LET, INPUT.
   (a) READ statement: This is a statement used in giving values to variables. Usually RAED statement has DATAA statement with it.
   Example:
   10 READ A, B, C
   20 DATA 20, 10, 40
   (b) DATA statement: This statement is used in attaching strings of fixed characters and numeric data in BASIC.
   Example
   10 READ A, B, C, D
   20 DATA 6, 7, 15, 10
   30 PRINT SUM=A+B+C+D

   Result will be 38
   (c) LET statement: This statement is used in attaching strings of fixed characters and numeric data in BASIC.
   Example
   5 LET A=50

10 LET B=10
            15 LET C=A+B

Here, C=60

(d) INPUT statement: This statement is used in assigning values to variables.
Example
10 INPUT L
20 INPUT B
30 LET SUM =L*B

3. Program Terminator statement
   (a) STOP statement: This is used to terminate a program
   (b) END statement: This is used to terminate a program
4. Output statement: This keyword is reserved to display output from the computer e.g. Print

   PRINT statement is used to transmit or display output data from the computer.
   Example:
   10 PRINT A, B, C
   20 PRINT "x"=; "Y"=Y
5. Other keyword statements
   (a) CLS: This statement is used to clear the screen.
   (b) GOTO statement: This is used for branching from one line to another. It can be conditional or unconditional.

SIMPLE BASIC PROGRAMS

(i)   Write a program to calculate area of rectangle
        5 CLS
        10 REM "program to calculate area of rectangle"
        20 INPUT Length
        30 INPUT Breadth
        40 LET Area= Length * Breadth
        50 PRINT Area
        60 END

(ii)   Write a program to calculate simple interest
        10 CLS
        20 REM "program to calculate simple interest"
        30 INPUT R, R, T
        40 LET SI=(R*R*T)/100
        50 PRINT SI
        60 END

(iii)   Write a program to calculate are of a circle
        10 CLS
        15 REM "program to calculate are of a circle"
        40 LET Area= 3.142*r^2

```
50 PRINT Area
60 END
```