

1.0 OVERVIEW OF THE COMPUTER SYSTEM

DEFINITION OF COMPUTER:

What is a Computer?

The computer is an electronic machine that accepts, processes data, stores data to give an output result called information. The computer consist of input unit which receives *data*, output unit which gives out meaningful and output result called *information*, but before then the processing unit processes these raw facts (DATA) with the aid of the C.P.U in the system unit.

A computer system is different from a computer because it consists of not only hardware and software but also data and user i.e computer operators.

Diagrammatically the computer mode of operation is thus:

Figure 1.0: Mode of operation

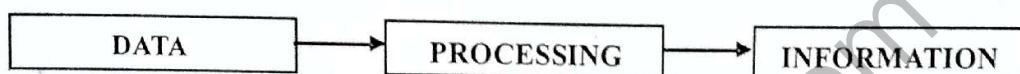
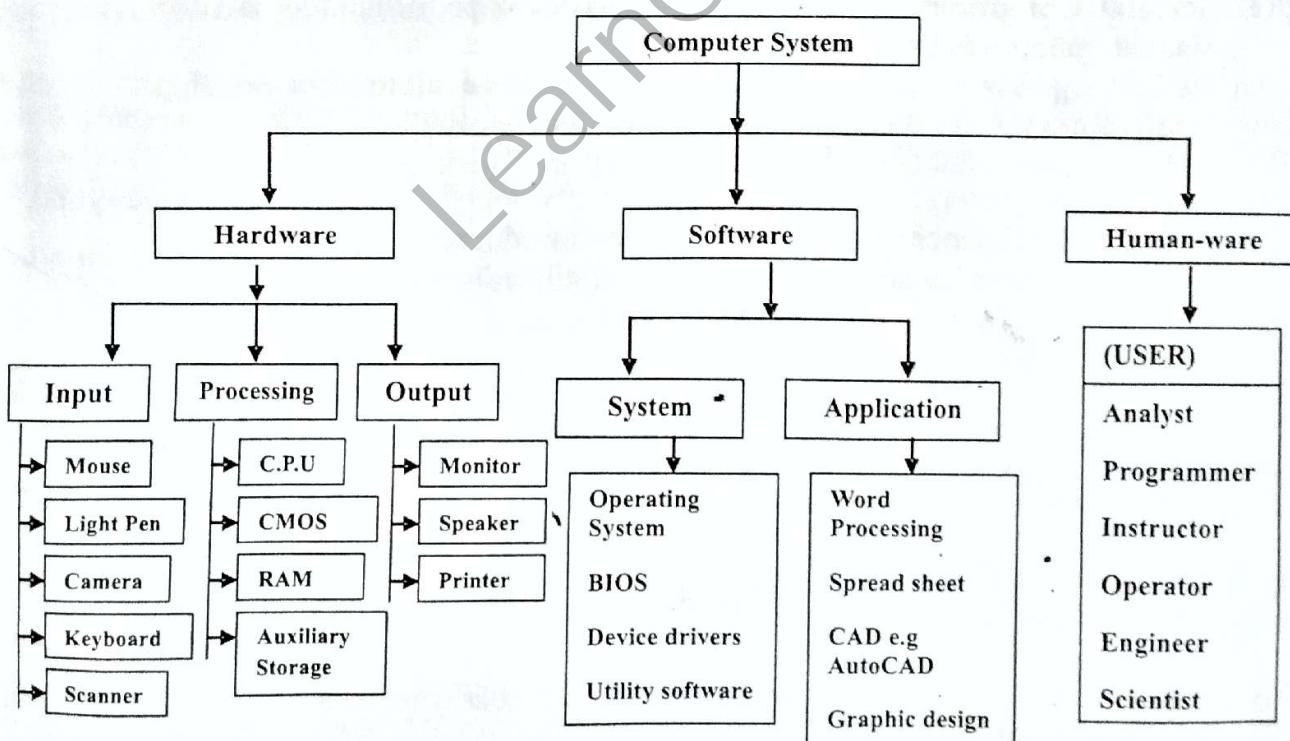


Figure 1.1: PC-Block & its components



2.0 CLASSIFICATION OF COMPUTER

Classification by age: This is also referred to as generation of computer is briefly explained thus

First Generation Computers: This era involve the development of computer between 1944 and 1955. They made use of valve as memory banks and their characteristics are;

- Vacuum tubes thermionic valves
- Very slow execution speed
- They were not reliable
- Larger in size.

Second Generation Computers: There are computer that were developed between 1956 and 1963. Characteristics include;

- Transistors were used for PC manufacturing.
- Magnetic drums where used as memory.
- Computers at that age were faster than first generation computers.
- Very expensive though and big but not as that of first generation.

Third Generation Computers: These computers were developed around 1964 and 1971.

- Computer made use of Integrated Circuit (IC) and faster execution time.
- Very low power requirement and less heat dissipation
- Parallel processing, Multi-programming, and Multi-processing
- They capable of using operating system (O/S)

Forth Generation Computers: These were computers developed around 1970-1985

- Uses programming languages
- Use of Large Scale Integrated Circuit (LSI) & VLSI i.e micro processor chip.
- Smaller in size and very fast compared to its predecessors.
- Cheaper, more reliable and dissipated less it than 3rd generation PC.

Fifth Generation Computers: These were computers developed in 1990s till date and beyond.

- Artificial Intelligence (A.I) i.e. Robotics was introduced.
- Computer system became smaller in size and still reducing till date.
- Multitasking computers were manufactured.
- Expert system came into existence.
- Computer became easily affordable, faster, and more reliable than previous inventions.

Classification by size, speed: Computer is known to have several sizes such as mini, macro, mainframe, super computer. (See your textbook for details).

Classification by mode of operation, signal type: This classification is divided into two;

1. Digital computer: This kind of computer is used for counting or calculating basically e.g. Digital wrist watches calculators etc
2. Analog computer: This kind of computer is used for measuring basically e.g. Speedometer analog clock, scale etc.
3. Hybrid computer: This kind of computer is capable of carrying out both functions done by the digital as well as the analog computer sys e.g. Smart phones, PCs etc.

Characteristics of computer

- | | | | | |
|----------|-------------|----------------|----------------|------------|
| 1. Speed | 2. Accuracy | 3. Versatility | 4. Reliability | 5. Storage |
|----------|-------------|----------------|----------------|------------|

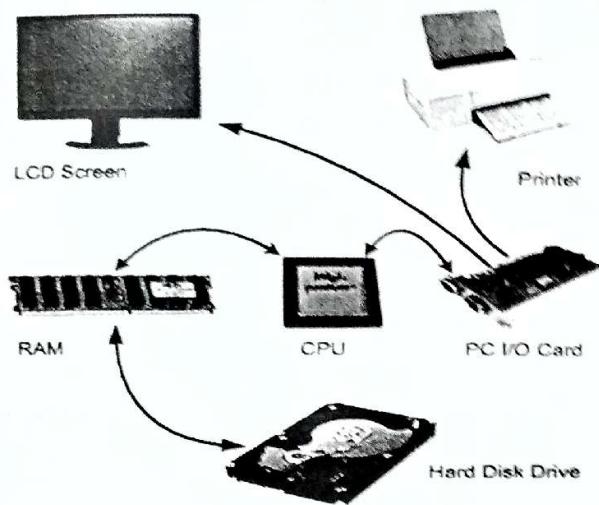
3.9 COMPUTER HARDWARE

The physical devices that a computer is made of are referred to as the computer's hardware. The programs that run on a computer are referred to as software.

Hardware: The term *hardware* refers to all of the physical devices, or *components*, that a computer is made of. A computer is not one single device, but a system of devices that all work together.

Understanding what these different components do might be challenging but I've easy explanation. As shown in;

Figure 1.2, a typical computer system consists of the following major components:



Sub-divisions of computer hardware

- i) Input: Receives *Data*
- ii) Output: Gives *Information*
- iii) Processing: *Processes* as the name implies

NOTE: Backing-storage or secondary storage devices such as: HDD, CD-ROM, FDD, DVD etc are sub-division of processing device

The central processing unit (CPU):

When a computer is performing the tasks that a program tells it to do, we say that the computer is *running* or *executing* the program. The *central processing unit*, or *CPU*, is the part of a computer that actually runs programs. The CPU is the most important component in a computer because without it, the computer could not run software.

Main memory:

You can think of *main memory* as the computer's work area. This is where the computer stores a program while the program is running, as well as the data that the program is working with. Main memory is commonly known as *random-access memory*, or *RAM*. It is called this because the CPU is able to quickly access data stored at any random location in RAM. RAM is usually a *volatile* type of memory that is used only for temporary storage while a program is running.

Secondary storage devices:

Secondary storage is a type of memory that can hold data for long periods of time, even when there is no power to the computer. Programs are normally stored in secondary memory and loaded into main memory as needed. Important data, such as word processing documents, payroll data, and inventory records, is saved to secondary storage as well.

Remarks:
USB drives are small devices that plug into the computer's USB (universal serial bus) port, and appear to the system as a disk drive or PnP i.e Plug n Play.

People become successful the minute they decide to.

4.0 COMPUTER SOFTWARE

This is a debugged program written by a programmer to solve a given problem. There are two general categories of software: system software and application software. Most computer programs clearly fit into one of these two categories. Let's take a closer look at each.

1. System Software

The programs that control and manage the basic operations of a computer are generally referred to as *system software*. System software typically includes the following types of programs:

Operating Systems An *operating system* is the most fundamental set of programs on a computer. The operating system controls the internal operations of the computer's hardware, manages all of the devices connected to the computer, allows data to be saved to and retrieved from storage devices, and allows other programs to run on the computer.

Utility Programs A *utility program* performs a specialized task that enhances the computer's operation or safeguards data. Examples of utility programs are virus scanners, file compression programs, and data backup programs. others are memory tester, registry cleaner, system profiler.

Software Development Tools *Software development tools* are the programs that programmers use to create, modify, and test software. Assemblers, compilers, and interpreters are examples of programs that fall into this category.

2. Application Software

Programs that make a computer useful for everyday tasks are known as *application software*. These are the programs that people normally spend most of their time running on their computers. Examples of commonly used applications: Microsoft Word, a word processing program, and Adobe Photoshop, an image editing program. Some other examples of application software are spreadsheet programs, email programs, web browsers, and game programs.

Classes of Application Software

- *Shareware: Trial or nominal charge
- *Freeware: Totally free (Open-Source)

Classifications of O/S

- a. Multiuser
- b. Multiprocessing
- c. Multitasking
- d. Real-time

Two major O/S function

*Multitasking: is the ability of a PC to run multiple tasks at the same time, e.g: web-browser & VLC

*Multithreading: is the ability of a central processing unit or a single core in a multi-core processor to execute multiple processes.

Summary

Computer system software: These are sets of codes or written instructions that controls the hardware & provide a platform for running application software.

Good things come to those who hustle while they wait.

Microsoft windows are of various versions and editions. Thus;

YEAR (MICROSOFT)	WINDOWS VERSIONS	EDITIONS
'95	WINDOWS 95	Professional
'98	WINDOWS 98	Professional
'99	WINDOWS ME	Professional
2000	WINDOWS 2000	Professional
2002-2005	WINDOWS XP	Service pack 1,2,3 Professional
2007	WINDOWS VISTA	Home, Business, Premium, Ultimate
19 th September, 2009	WINDOWS 7	Starter, Home, Business, Premium, Ultimate
10 th March, 2012	WINDOWS 8, 8.1	Pro
1 st June, 2015	WINDOWS 10	X64 bits_Upgrade

COMMAND PROMPT (MS-DOS)

What are Commands?

These are set of instructions which instruct the computer on what to do in an MS-DOS environment.

It is used to execute various commands for a given operation such as preparing the drives for use, programming and even by-passing security.

There are two (2) basic categories of DOS Commands

- Internal DOS command
- External DOS command

INTERNAL DOS COMMANDS

These kinds of commands are those that reside in the system RAM (memory) which is used to carry out a specific task.

Such task may involve creating a directory, it examples are thus:

Dir = check content

Copy: Copy files from source to destination

Cls = Clear screen

Del: Deleting files from specific folder

Cd = Call directory

Cd.. = Return to the previous

Md = Make directory

Cd\= Return to the root.

Syntax: C:>Time (Enter key) where other examples are: Ver, Time, Date etc.

EXTERNAL DOS COMMANDS

The external DOS command are used to activate a program or used as diagnostic tool in the DOS prompt.

Such command allows partitioning of hard disk and formatting of storage devices it examples are:

-Format: Erase all data in an volume this is also used to prepare the hard disk for use.

-Backup: Back files in a giving device.

-Fdisk: Fix disk

-Xcopy: Copy all files and sub-folders

-Deltree: Delete files and sub-folder

-Scandisk: Check for bad sector

-Checkdisk: check errors

Other examples are: Restore, Diskcopy, Print, Sys etc.

Difference between MS-Windows and MS-DOS

S/N	MS-WINDOWS	MS-DOS
1.	It support multi tasking including networking	It doesn't support multi tasking
2.	It allows a user to pass data from one application to another without shutting down any package.	It doesn't support this operation.
3.	It has the control box; minimize, maximize and close button.	It doesn't have this facility.
4.	The control center in the MS-Windows is the Start button.	It has no control point.
5.	It uses Icons to represent commands and files i.e GUI	It uses command-prompts for execution.

i.e GUI: Graphics User Interphase vs CLI: Command Line Interphase

FUNCTIONS OF O/S

- User Interface: GUI / CLI
- Booting: This mean starting-up the device thus; Boot strap-processor initiating BIOS chip.
- Printing control: -
- Mastermind: Organizing file on various allocation tables such as: FAT, NTFS file system.
- Error handling
- Memory & Storage management

Mobile Device O/S

- Andriod
- Blackberry
- iOS
- Windows mobile
- Symbian O/S
- Bada

Servers O/S

- Linux
- Windows server 2008
- Windows server 2012
- Unix

PC O/S

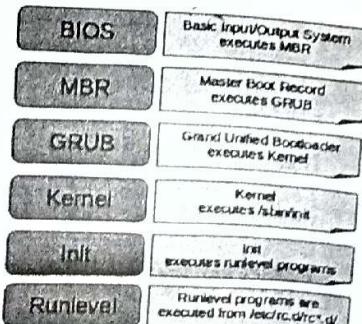
- Linux
- Windows
- Mac (Apple)
- Ubuntu

Kernel: This is a central part of an operating system that loads first & remains in main memory.
Interrupts: an interrupt is a signal to the processor emitted by hardware or software indicating an event that need immediate attention. Types are hardware & software interrupt (IRQs)

Boot process:

There 6 main boot processes which are:

NOTE: Here are stages which occurs in Linux



Learn not only plan, but also believe.

5.0 COMPUTER NETWORKING

These the connection of two or more computer system by communication links. Such as: cable, satellite, radio waves i.e wireless.

Benefits of Computer network

- It allows users to share resources such as; printer, modem, drives
- It allows users to share applications such as; Antivirus, and other third parties.
- It allows users to share internet services

Components of computer network

For an appropriate computer network connection to take place the following are considered:

NIC: Network interface card is an hardware device that communicate at a given network signal

Media: These consist of links: satellites, cables or radio waves use for network connections.

NOS/Protocols: These are software or set of rules use to configure network system e.g IP

History of network

Networking is as old as computer itself, it all started from the USA, mainframe systems were allowed to run over dedicated lines in some cases longer distance. The modern computing network began to emerge with the development of two computer networks which is the semi automatic ground environment SAGE in 1955, which linked US and Canada radar stations.

Modes of network

1. **Client/Server Network:** This is a network system in which two or more terminals or workstations are connected together through a central system called sever.

2. **Peer-to-peer Network:** This is a computer to computer network system in which two computers are connected together directly and share services with each other, this network can be expanded with the use of hub.

Topology

This is simply the arrangement of terminal or network in a workstation or network system. Terminals or node can be arranged or linked together in various ways of the network. Such as:

1. BUS / Linear topology
2. Ring topology
3. Star topology
4. Mesh/ Hybrid

Types of Network

- LAN: Local area network is the connection of two or more computers connected together with the aid of a cable configured with an O/S.
- WAN: Wide area network is the connection of two or more computers connected together with the aid of a wireless media configured with an O/S.

Protocols

TCP/IP: Transmission Controlled protocol / Internet Protocols

FTP: File Transfer Protocol HTTP: Hyper-Text Transfer Protocol

SMTP: Simple Mail Transfer Protocol VOIP: Voice Over Internet Protocol

IMAP: Internet Message Access Protocol

Network terminologies

VPN: Virtual Private Network

NIC: Network Interphase Card

NOS: Network Operating System

Remarks

Server: A server is a system or workstation or terminal that is dedicated to the network service.

Protocols: These are rules for networking computers i.e a set of technical rules for the

Courage is facing your fears....

6.0 Computer Memory

The computer memory is divided into small array called bits which is the smallest unit of information or location in a File allocation Table (FAT) of a memory.

The memory of a computer is measured in bytes. A byte consists of 8 bits, a bit of data to be processed or stored is equivalent to 1 and 0 i.e binary digits this system is achieved because computer is powered by electrical impulse signals which makes it to recognize ON and OFF signals.

Calculations:

$$1 \text{ bytes} = 8 \text{ bits}$$

$$1 \text{ Kilobytes} = 1 \text{ KB} = 1024 \text{ bytes}$$

$$1 \text{ Megabytes} = 1 \text{ MB} = 1024 \text{ KB} = 1024^2 \text{ bytes}$$

$$1 \text{ Gigabytes} = 1 \text{ GB} = 1024 \text{ MB} = 1024^3 \text{ bytes}$$

$$1 \text{ Terabytes} = 1 \text{ TB} = 1024 \text{ GB} = 1024^4 \text{ bytes}$$

Questions

1. Converts 24 KB to bytes
2. How many bits makes 12 KB
3. 1024 bits gives how many bytes
4. Given that a page is 2 KB how many bytes does it occupy

Solution

$$1. \text{ Since: } 1024 \text{ bytes} = 1 \text{ KB}$$

$$\text{Hence } 24 \text{ KB} = 24 \times 1024 = 24,576 \text{ bytes}$$

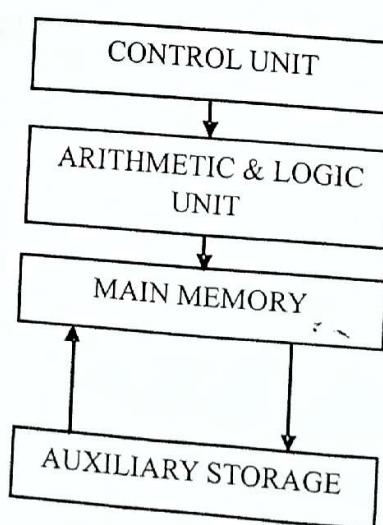
$$2. 12 \text{ KB} = 12 \times 1024 \times 8 = 98,304 \text{ bits since 8 bits is 1 byte}$$

$$3. 1024 \text{ bits} = 1024 / 8 = 128 \text{ bytes}$$

$$4. \text{ Same as question 1 try it yourself. Checkout } = 2,048 \text{ bytes}$$

Try this: If I was given 3GB from Glo blackberry subscription. How many KB have I gotten?

Figure: C.P.U block



Remarks

Memory can be stored in various file allocation table such as:
...Stupidity is fearing nothing.

7.0 NUMBER SYSTEM

Introduction:

The Romans has the Roman numeral, the Arab has the Arabic numeral. The Chinese introduced Abacus. When we count in tens we say we are counting in decimal or base ten. If we count in twos we call it binary or base two. When we count in tens; we have ten digit: 0,1,2,3,4,5,6,7,8,9, when we count in 16 i.e Hexadecimal 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F. The largest is 9 and F respectively. Where A, B, C, D, E, F are 10,11,12,13,14,15 respectively.

1 Bit	0 or 1
Nibble= 4bits	0101
Bytes= 8bits	01010101
Half word= 16bits	01010101010101
Word= 32bits	010101010101010101010101010101

CODED NUMBER SYSTEM

Binary Coded Decimal Codes (BCD): Binary digits can be used to represent number, letters and symbols

DECIMAL	BCD	HEXADECIMAL
0	000	0
1	001	1
2	010	2
3	011	3
4	100	4
5	101	5
6	110	6
7	111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Standard Numbers: There are four basic standard numbers including the BCD in number system namely;

1. Decimal i.e. Base ten
2. Binary i.e. Base two
3. Octal i.e. Base eight
4. Hexadecimal base sixteen
5. BCD (Since 1=On & 0=Off)

N.B: Number systems are building blocks of computer and information technology.
There is always a better way...

PLACE VALUE OF NUMBER

The value of each digit in number is determined by its position in a given number system.

Conversions of number bases

From Decimal to binary: This conversion can be done in two ways;

- ✓ Repeatedly and consistently dividing by number 2 and collecting its remainder until the quotient is zero.
- ✓ The other is known as the sum of weight.

For example: Convert 50_{10} to binary.

Solution:

2	50
2	25 R 0
2	12 R 1
2	6 R 0
2	3 R 0
2	1 R 1
	0 R 1

LSB

MSB

LSB=Least Significant bit

MSB=Most Significant bit

So; $50_{10} = 110010_2$

Sum of weight method:

$$50 = 32 + 16 + 2 = 2^5 + 2^4 + 2^1$$

ii. Some of weight method

The whole number 50 can be expressed as follows,

$$\begin{aligned} 50 &= 32 + 16 + 2 \\ &= 2^5 + 2^4 + 2^1 \end{aligned}$$

Placing 1s in the appropriate places $2^5, 2^4, 2^1$ and 0s in the position $2^3, 2^2, 2^0$ yield the binary number for 50

That is: $2^5 2^4 2^3 2^2 2^1 2^0$

$$110010 \quad \text{So; } 50_{10} = 110010_2$$

Conversion from decimal to octal and hexadecimal: In converting from decimal to any other base except the binary system, you can only use the repeated division method. The sum of weight method is not allowed.

Convert the following decimal numbers to hexadecimal

16	305
16	19 R 1
16	1 R 3
	0 R 1

$$305_{10} = 131_{16}$$

16	4531
16	283 R 3
16	17 R 11
16	1 R 1
	0 R 3

$$4531_{10} = 11B3_{16}$$

8	305
8	38 R 1
8	4 R 6
	0 R 4

$$305_{10} = 461_8$$

As you can see 11 was made B for more details on Hexadecimal table see page 9

Converting denary number with decimal places to Binary, Octal and Hexadecimal:

The conversion is in two parts. First, the integral portion is converted using the repeated division method. To convert the fractional part of any base, we multiply the fractional part consistently by the given base and collect any resulting whole number parts.

The process is stopped when the fractional part is zero or the desired accuracy is attained. This is the repeated multiplication method.

QUESTIONS: Find the value of X in the following

$$1.) 43.37_{10} = X_2 \quad 2.) 512.86_{10} = X_{16} \quad 3.) 334.095_{10} = X_8$$

Solution: We first convert 43 to binary, then multiply 2 by 0.37 & add up.

2	43
2	21 R 1
2	10 R 1
2	5 R 0
2	2 R 1
2	1 R 0
	0 R 1

$$43_{10} = 101011_2$$

2	0.37
2	0.74
2	1.48
2	0.96
2	1.92
2	1.84
2	1.64
2	1.36
	0.72

$$0.37_{10} = 0.0101110_2$$

MSB

Note: For decimal part multiply and take the whole number part as remainder, till you get to the nearest decimal place.

Thus; $(0.37 \times 2) = 0.74$, hence the MSB is 0

Conversion from any base to base ten: There are two methods, the place value method and the repeated multiplication and addition.

QUESTION: Convert 357.121_8 to base ten

i. Using place value method {Best practice }

$$357.121_8 = (3 \times 8^2) + (5 \times 8^1) + (7 \times 8^0) + (1 \times 8^{-1}) + (2 \times 8^{-2}) + (1 \times 8^{-3}) \\ = 192 + 40 + 7 + 1/8 + 1/32 + 1/512 \\ = 239.15820_{10}$$

ii. Using repeated multiplication and addition

(3×8)	$(5+24)$	$(7+232)$ Integral part
24	$29 \times 8 = 232$	239
(1×8)	$(2+8)$	$(1+80)$
8	$10 \times 8 = 80$	81 Decimal part

In 0.121_8 the place value of the last digit is $8^{-3} = 1/512$. So the denary equivalent of 0.121_8 is $81 \times 1/512 = 0.1582$.

Therefore: $357.121_8 = 239.1582_{10}$

These same methods are used for converting hexadecimal and binary to denary

Use of Octal numbers as intermediate step

Given a number in octal and it is required to convert this number to binary then to hexadecimal, use the method below;

- i. Write the binary equivalent of each digit in groups of three binary digits. This gives the required binary equivalent.
- ii. Then starting from the binary point and working left or right, regroup the same binary digits in four, completing the other end by addition of extra zeros as necessary.

QUESTION: Convert 637.4254_8 into its binary and hexadecimal equivalent

- I. To binary, BCD or its equivalent
- ii. To hexadecimal

Solution: To base two

6 3 7 . 4 2 5 4
110 011 111 . 100 010 101 100

So: 637.4254_8
 $= 11001111.100010101100_2$

To base 16. Regrouping we have;

0001	1001	1111.1000	1010	1100
1	9	15 .8	10	12
1	9	F .8	A	C

ARITHMETIC OPERATIONS (See your textbook)

Addition and subtraction in base eight, base two or hexadecimal is similar to that in base ten. Multiplication in binary is similar to that in decimal. In dividing one binary number by another, we must note that just like in the decimal division, division by zero is not permitted.

Negative numbers; In a computer, a sign bit is included in the word or register to indicate whether a number is negative or positive. If we have a sign bit of 0, then the number is positive otherwise it is negative.

Complements; Negative numbers are stored in complement form, enabling the computer to treat subtraction and addition. Thus, there is no need to provide a separate logic circuit for doing subtraction in the computer. The two basic complements; 2s and 1s complement in the binary system and 9s and 10s complement in the decimal system.

Subtraction using 10's complement: If we want to subtract a positive number (The Subtrahead) from another positive number (The Minuend). We form 10's complement of the subtrahead and add to minuend. If there is a carry at the most significant position, it indicates positive. i.e. The carry must be discarded. However, if there is no carry, the result is negative the 10's complement must form a (-) prefix.

Success is more attitude than aptitude.

Example:

1.) 73-21

The 10's complement of 21 is 79,
since $73+79=152$

The carry 1 is discarded. Thus the result is 52

It is very obvious you are lost @ this point get a glass of water.

Do you know?>>Rumour has it that robots are
going to take over the world
come 2050, call it cyber-cracy<<
(lol)**Era of Android**

2.) Try this your self: 43-85

Remarks:

Since the subtrahend is 85

Its 9's Complement is thus; $99-85=14$ Then its 10's Complement is $14+1=15$

Next you add up the 10's complement to the minuend thus;

$$15+43=58$$

There is no carry. The result is negative and we must find the 10's complement of 58 and make it negative.

Finally it is -42 i.e $(99-58)=41$ then add one (1) to its LSB, you have 42; -42 is the answer since there is no carry.

For 9's complement, we find the 9's complement of a number; subtract each digit of the number from 9. Any carry, often called end-around-carry must be added to the right most digit of the result that is the least significant digit. Same technique is applicable to the 1's complement.

For 2's complement: To form the 2's complement of a binary number, flip all the bits in the number, i.e change all 0's to 1's and all 1's to 0's and then add 1 to the result. For instance, to form 2's complement of 011011001, flip the bits to get 100100110, then $100100110+1=100100111$

NB: If asked to solve using 2's compliment then adding the 2's complement of the subtrahend to the minuend. Any carry generated indicates that the result is positive, the carry is discarded. If there is no carry, the result is negative; the 2's complement of the result is formed and prefixed with minus sign.

Do you know?

Addition	
	1011
	1010
+	10101
Subtraction	
	1011
	1010
-	0001

Division	
10	110
	1100
10	10
	10
/	00

Multiplication	
*	1011
	10
*	0000
	1011
+	10110

Add-HEX	
ACD.FF	
	1E.9F
	12F.CF
+	C1C.6D

NB: F=15 Hence; $(15 \times 3) = 45$, Since it's in base 16 $\Rightarrow 32+13=45$
write: D as in 13 carry 2 where: $\{2 \times 16 = 32\}$

Examples: i. Subtract 1010_2 from 1101_2 ii. 10110_2 from 1101_2 Using 2's Complement

Solution:

i. 1101_2 (minuend) - 1010_2 (subtrahend)

Step1: Flipping of bits i.e obtaining the 1's complement of subtrahend: 0101_2

Step2: Adding 1 to the LSB of previous result to get its 2's complement: $0101 + 1 = 0110$

$$\begin{array}{r} & & 1 \\ + & 0110 \\ \hline = & 0110 \end{array}$$

Step3:

Adding your previous result to the minuend: $1101 + 0110$

Carry discarded \longrightarrow (1) 0011
Final result is 0011_2

ii. Solve $1101_2 - 10110_2$,

Before you follow the previous step remember to;

Pad up the minuend to achieve a similar number of bits by adding 0s behind it = 01101_2

2's Complement of $10110_2 = 01001 + 1 = 01010_2$

Hence: $01101 + 01010 = 10111$ since no carry then get the 2's complement and fix a (-) sign

That is 2's complement of $10111 = 01000 + 1 = 1001$

Therefore answer is -1001

Exercise



- ABC₁₆ to Binary
- Add 10110_2 and 11011_2
- Convert FAB9.BAD₁₆ to BCD, 11110111_2 to base 10 and octal
- Convert 456.45₁₀ to binary $334.095_{10} = X_8$
- Convert 765.357₈ to Binary and Hexadecimal

Google's Android 6.0; Marshmallow release is full of fresh new features and flavors. The detailed FAQ has everything you need to know.

1. *Google Now on Tap*. A new connective tissue tying all of Android together with potent Google intelligence. Just tap and hold your Home key anywhere in the system to get contextual info related to what's on your screen. It's wildly impressive -- some of the time.

2. *Better stamina*. Marshmallow more intelligently manages power consumption so your device will last longer on each charge. First, anytime your phone or tablet is unplugged,

3. *Better permissions*. You know how when you install a new Android app, you see a huge list of permissions (also known as "that giant screen of text you never actually read")?

4. *Fingerprint support*. Sure, some manufacturers have been adding their own fingerprint support to Android devices for a while now, but with that capability becoming part of the platform itself as of the 6.0 release, it'll be available on far more devices -- and it'll be able to do a heck of a lot more.

5. *USB Type-C*. Starting with Marshmallow, those maddening little micro-USB connectors are being replaced by a newer and better standard.

Don't ever compare yourself with anyone in this world

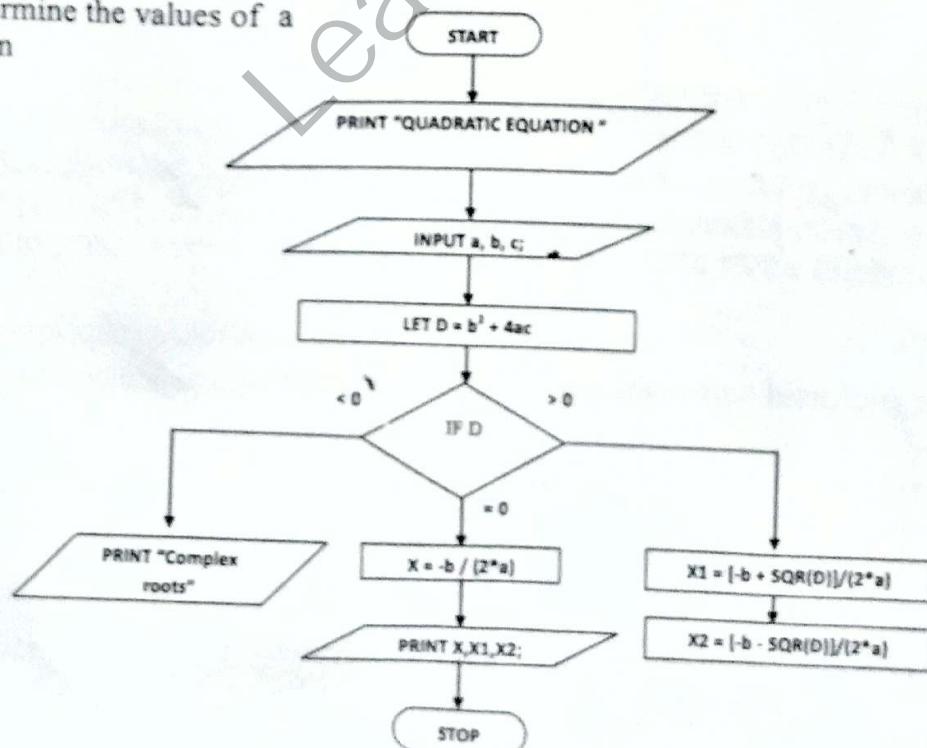
Flow chart is a step by step process for solving computational problems using symbols. Once a flow chart is done it becomes easier to write the program in any high level language. FORTRAN, Basic, Java, C, C++, C# e.t.c.)

Types of Flowchart

1. System flowchart
2. Program flowchart

Flowchart symbol	Name	Description
	Oval	Start or Stop
	Rectangle	Process
	Parallelogram	Input or Output
	Diamond	Decision
	Circle	Connect
	Arrows or Lines	Direction of Flow of Data

Flowchart to determine the values of a quadratic equation



If you do you are insulting yourself.

9.5 COMPUTER LANGUAGE

Classification of computer deals with writing of code and instructions which the computer understands under locality of given program.

Translator:

A translator of a programming language is simply a language processor. It is capable of translating one language into another language.

Keywords:

The codes for Assembly language is called **Instruction**.

Two kinds of translator:

- Compiler: It takes a source program & converts the program into Machine language (equivalent object program).
- Interpreter: It is a translating program which interprets and directly executes a source language instruction & doesn't produce an object code.

Programming Languages:

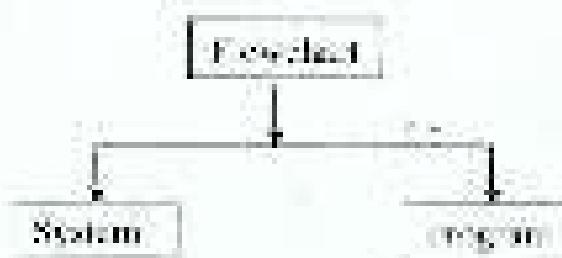
- Machine Language (Object code)
- Assembly Language
- High-level language (Source code)

ALGORITHM: An algorithm is a finite series of directions which when followed properly will solve a problem to a given problem.

PSEUDO CODE: It is simply the combination of simple English and some special symbols used in programs.



FLOW CHART: This is a pictorial representation of an algorithm.



System flowchart is used to explain the process or system which.

Program flowchart gives the step by step instructions relative to a given problem in symbolic representation.

10.0 BASIC Programming

Beginners All Purpose Symbolic Instruction Code is a high level programming language which is allows a computer user to write instructions to the computer. We shall be considering programming involving QBasic in this note:

My first QBasic program

Write a program to display “Hello World”.

PRINT “Hello World”

END

Then you can **Run** the program

Mathematical Arithmetical Operations

Name	Symbol	Syntax
Addition	+	PRINT $5 + 10 = 15$
Subtraction	-	PRINT $6 - 5 = 1$
Multiplication	*	PRINT $5 * 2 = 10$
Division	/	PRINT $10 / 2 = 5$
Square root	SQR	PRINT SQR(25) = 5
Absolute Value	ABS	PRINT ABS(-5) = 5
Modulus	Mod (%)	$5 \% 2 = 1$
Power	^	$2^3 = 8$
Note: Order of Operations are followed; BODMAS		
$5 * (2 + 10) = 60$		$5 * 2 + 10 = 20$

Data Variable types

Some data types are:

(\$) String: this holds text values & always in double quotations

(%) Integer: Integer variables holds non floating point variable e.g: -2, 2 etc

(&) Long: Long integer variable non floating point variable with larger value e.g: 1, 243

(!) Single: Single precision variable holds numbers with decimals points e.g: A = 3.5

(#) Double: Double precision variable, they are variable with more decimals part e.g: A = 3.14

Non declared or implicit variables e.g: A = 3

Declared or implicit variables e.g: Dim A as integer; A = 3.

Variables: These are abbreviated words use to declare a functions or parameters

They hold data in memory, are assigned a data type, the data can be changed throughout the program's operation; the data entered must be the same data type as assigned to the variable.

Statement

This allow one to do complex computations in programming such as; If, Do while loop, While, For e.t.c.

Character set in Qbasic

Letters: A-Z

Digits: 0-9

Symbols: -, +, /, *

Keywords: Goto, Input, Print e.t.c.

Constants in QBasic

1. Numeric: Integer e.g: 2, -5 Real eg 5.0
2. Exponential Form e.g 3.0 E8 (Speed of light)
3. Strings constant "Cyanide"

Practical examples:

Simple calculations

CLS

PRINT "5 - 2 ="; 5 - 2

END

Output result will be 3

User Input on QBasic

DIM Num1 AS INTEGER

DIM Num2 AS INTEGER

CLS

INPUT "Enter First Integer: ", Num1

INPUT "Enter second Integer: ", Num2

PRINT Num1; "+"; Num2; "="; Num1 + Num2

If Statement

IF <Condition> THEN

Do Something

Elseif <Condition> THEN

Do something

Else

Do something

END IF

Example

IF 5 > 2 THEN

PRINT "5 Is Greater Than 2"

END IF

WHILE Loop

Dim X as Integer

CLS

X = 1

WHILE X < 11

PRINT X

X = X + 1

WEND

DQ Loop Syntax (Result Count from 10)

Do Until or Do while Loop

Dim X as Integer

CLS

X = 1

Do WHILE X > 11 OR Do UNTIL X = 10

PRINT "HELLO"

X = X + 1

LOOP

FOR LOOP SYNTAX

FOR Counter = Start to End

Computer does something

Next Counter

Example

DIM X AS INTEGER

CLS

FOR X = 1 TO 10

PRINT "Cyanide Tutorial"

Next x

To Display just even number

For x = 10 to 20 STEP 2

NOTE: Do, While and For Loop are used for repetitions.

Summary

Where String consists of text & characters, Integer and long consist of Non-floating-point, single and double consist of floating point (decimal numbers).

11.0 FORTRAN Programming

```

My first program
Program hello
Implicit none
Write (*, *) "Hello_world"
Read (*, *)
End program hello

```

Addition of two variables

```

Program tutorial
Implicit none
Integer :: var1 = 12
Integer :: var2 = 3
Write (*, *) "this is simple computation
made in fortran 77"
Write (*, *) var1 + var2
Read (*, *)
End program tutorial

```

Calculating unknown variables in
FORTRAN

```

Program calc
Implicit none
Integer :: num1 = 0
Integer :: num2 = 0
Integer :: sum1 = 0
Write (*, *) "Enter a number"
Read (*, *) num1
Write (*, *) "Enter a number"
Read (*, *) num2
Sum1= num1 + num2
Write (*, *) "Your result is" + sum1
Read (*, *)
End program calc

```

If Statement basically used for condition
thus; *if* then *elseif* finally *else*

```

Program quiz
Implicit none
Integer :: input = 0
Write (*, *) "What is your CGP"
Read (*, *) input
If (input == 4.5) then
Write (*, *) "You are a first class material"
Elseif (input < 4.5 ) then
Write (*, *) "You are not a first class
material"
End if
Read (*, *) End program quiz

```

```

Do while loop
Program loop
Implicit none
Integer :: i = 0
Do while (I <=10)
Print*, "I is equal to", i
I = i + 1
enddo
Read (*, *)
End program loop

```

Concatenation: This is simply the addition of strings with an integer using “+” symbol to form a single unit.

Relational Operators

- < Less Than
- <=Less Than Or Equal To
- > Greater Than
- >= Greater Than Or Equal To
- = Equal To
- <>Not Equal To

Other Mathematical Expressions

- SIN for Sine functions
- COS for Cosine functions
- TAN for tangent functions .
- ARTAN tangent inverse
- ALOG10 Natural Logarithm
- SQRT Square root

Advantages of Flowchart

1. It provides easy communication.
2. It gives room for effective analysis.
3. It provides proper documentation.
4. It serves as a blueprint for effective coding
5. It helps in proper debugging process.

Disadvantages of Flowchart

1. Complex logic may be difficult to present.
2. Any slight alteration may lead to total redrawing.
3. Symbol reproduction problem.
4. Essential details may not be provided.

12.0 INTRODUCTION TO INTERNET

The internet was previously known as ARPANET started in the USA in late 1960s by the advance research project agencies (ARPA) which brought about networking different campuses together, which led to the development of internetworking.

Applications of Internet

1. Mobile-phone
2. Newsreader
3. Privacy
4. Security
5. Web-browser

Terms used in Internet

URL: Universal resource locator, e.g; <http://www.yahoo.com>, facebook.com, google.com.

HTML: Hypertext markup language i.e codes the web browser understands

HTTP: Hypertext transfer protocol, the protocol used to visit web addresses.

TCP/IP: Transfer control protocol / Internet protocol.

SIGNUP: This refers to as registration mainly done when you are not a member of a website. It allows you to input your name, date of birth, password which are latter sent to a database for future reference purposes.

LOGIN: This refers to as term which tells a member to input his/her username, e-mail and password so one can be able to view his/her details.

WWW: This is known as World Wide Web.

E-mail: This symbolizes electronic mails or messages

Download: This is the collection or retrieving of file from the internet for a particular purpose. Such files are; music, pictures, games, apps, word documents, e-books etc.

Upload: This is the sending or exporting of file from the internet for a particular purpose. Such files are; music, pictures, games, apps, word documents, e-books etc.

INTERNET PROTOCOLS & TERMS USED IN WEB

FTP: File Transfer Protocol

ISP: Internet Service Provider

GPS: Global Position System

VOIP: Voice Over Internet Protocol

SMTP: Simple Mail Transfer Protocol

IPV6: Internet Protocol Version 6

GPRS: General Packet Radio Service

HTTP: Hyper Text Transfer Protocol

DLINK: Packets being received

ULINK: Packets being sent.

VIRUS: Vital Information Resource Under Siege.

URL ANATOMY

For example given <http://www.cyanidetutorials.com/index.html>

Protocol: http

Host: www

Domain: cyanidetutorials

Domain ext.: .com, .gov, .mil, .net, .edu, .org etc

File_Name: index.html

13.0 DATABASE SYSTEM & IT'S PROCESSING ACTIVITIES

Data file: collection of data items relating to a particular procedure. *Data* are raw fact and figures.

Data base: collection of files, while file is a collection of records, record is a collection of fields or data elements and fields is a collection of characters.

The term **database**, refer to data storage and retrieval techniques that do not organize data into files & records. Rather, they store and retrieve individual data elements field in a suitable manner.

Sketch: Data base → files → records → field (data elements)

A **DBMS** is a collection of programs that allow users to specify the structure of a database, to create, query and modify the data in the database and to control access to it.

A data base management system is a program designed to store and retrieve data as effectively as possible.

Types: Manual, automatic (mechanical) Electronic Data processing

THE CONCEPT

Data: plural of datum, which means fact e.g: letters, numerical figures and special symbols

Data processing: this is simply the manipulation or transformation of data into information ie the process through which facts and figures are collected, a signed meaning communicated to others and retained for future use.

Data processing system: A system that uses data as input and processes it to produce information as output

Data processing system Activities

(1) Collection (2) Conversion (3) manipulation (4) storage

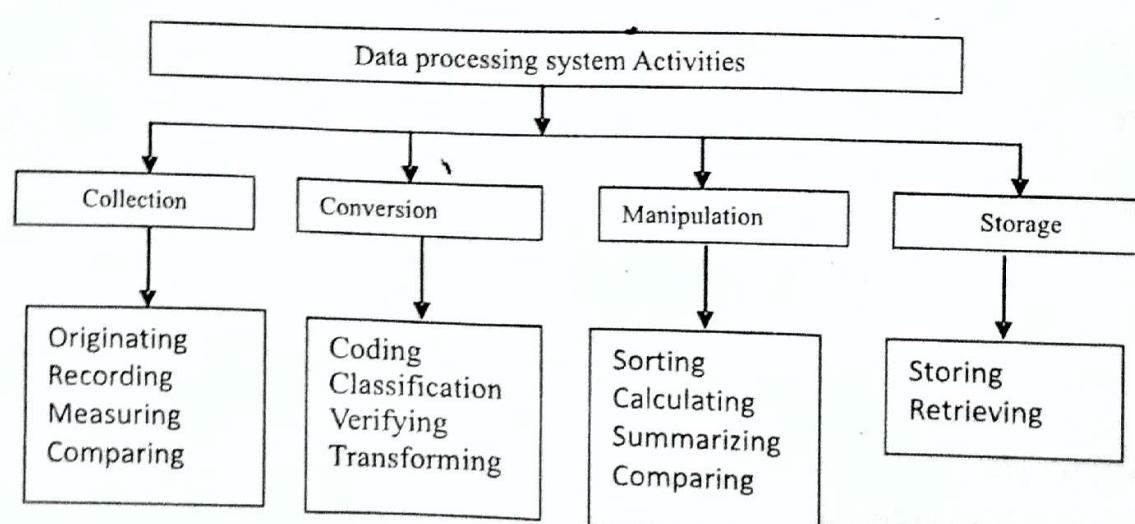
Collection is termed data capture

Conversion after collection, data are converted to source documents usable for processing

Manipulation

- Sorting; data arrangements in a desired sequence alphabetically or numerically order.
- Calculating: this is the arithmetic data manipulation.
- Summarizing this is the reduction of large data in a concise form.
- Comparing: to compare data is to perform an evaluation in relation to some known measures

Storage: *Storing:* keeping data for later use. *Retrieving:* refers to as data recovery.



14.0 EXPERT SYSTEM & IT'S APPLICATIONS

Artificial Intelligence (AI): This is a branch of computer science that is concerned with enabling computers perform functions that require intelligence when performed by humans.

Expert System: This can be defined as a branch of AI that makes extensive use of knowledge to solve problems at the level of a human expert

APPLICATION OF EXPERT SYSTEM

1. Hearsay: it was used for solving voice recognition problems
2. Mistral: it is used for monitoring dam safety
3. Dendral: it identifies the molecular structure of unknown compounds
4. Prospector: It is used to locate mineral deposit
5. Altrex: it was designed to diagnose engine troubles of certain models of cars (automobile)

CHARACTERISTICS OF EXPERT SYSTEM

- High performance
- Adequate response
- Good reliability
- Understandable
- Flexibility

ADVANTAGES OF EXPERT SYSTEM

1. Increase availability
2. reduced risk
3. reduced cost
4. permanence
5. Increased Reliability

LIMITATIONS OF EXPERT SYSTEM

1. 1 Difficulty in engineering
2. 2 mistrust by users
3. 3 limited area of specialization

COMPONENTS OF EXPERT SYSTEM

- The user interface
- The working memory: represent the set of facts known about the domain
- The knowledge: rule base i.e when *if then* rules are used
- The inference engine: programmable part of an Expert system
- The explanation system: why & how things came about.

Fuzzy expert system: this uses the degree of membership to determine a given request such as how far is a given journey.

Knowledge Engineering: is the process of extracting knowledge about the domain in which the expert system is being created.

Remark:

Information is a simple organized power that conveys meaning to its user, *knowledge* is the info. that has been put into a specific context.