CCA-101: Fundamentals of IT& Programming

ASSIGNMENT

Q1.What are the fore fundamental parts of computer? Explain it with the help of diagram.

4 Main Parts of a Computer System:

Although computers have evolved significantly over the past several decades, the core functionality – and the hardware that enables these functions – has undergone no fundamental redefinition. Because of this, it's not overly difficult to gain competency in the basic operation of a computer system and the primary components of a modern desktop or laptop computer. The 4 main parts of a computer which ensure that users can access a wide variety of tools and services include the central processing unit, or CPU, the motherboard, the hard drive and random access memory, or RAM. Understanding the role of these computer parts will help you better understand how your computer gets the job done.

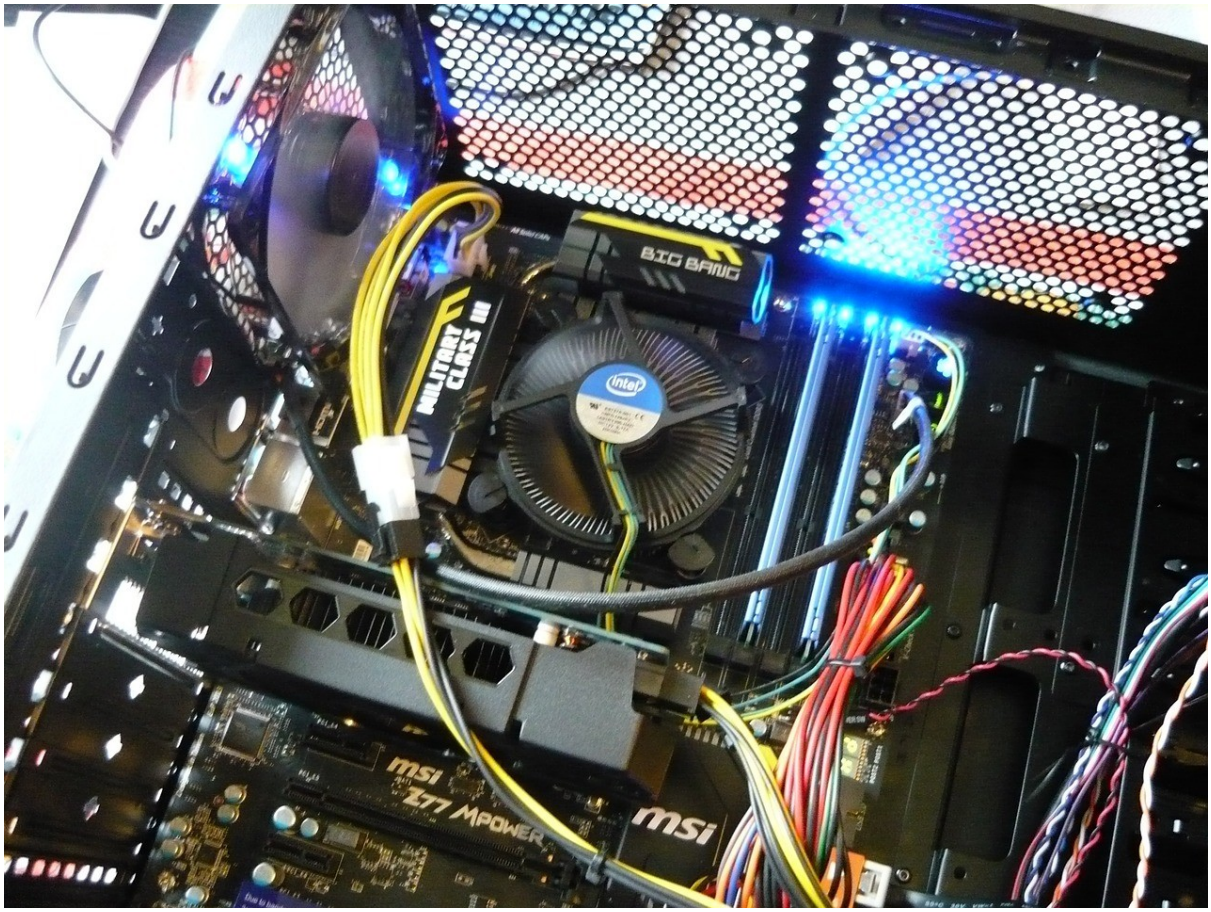
The 4 Main Parts of a Computer:

The Central Processing Unit [CPU]

The central processing unit, or CPU, can be thought of as the "brain" of a computer. Using a combination of arithmetic functions, logic processes and input/output commands, the CPU receives instructions from various computer programs in use and executes them as needed. The modern CPU exists in the form of a microprocessor, which features a single integrated circuit design. This

is a dramatic departure from the earliest CPU units, which featured a transistor-based construction. Compared to the CPUs used in the second half of the 20th century, modern hardware is highly efficient, portable and relatively inexpensive to manufacture.

CPU

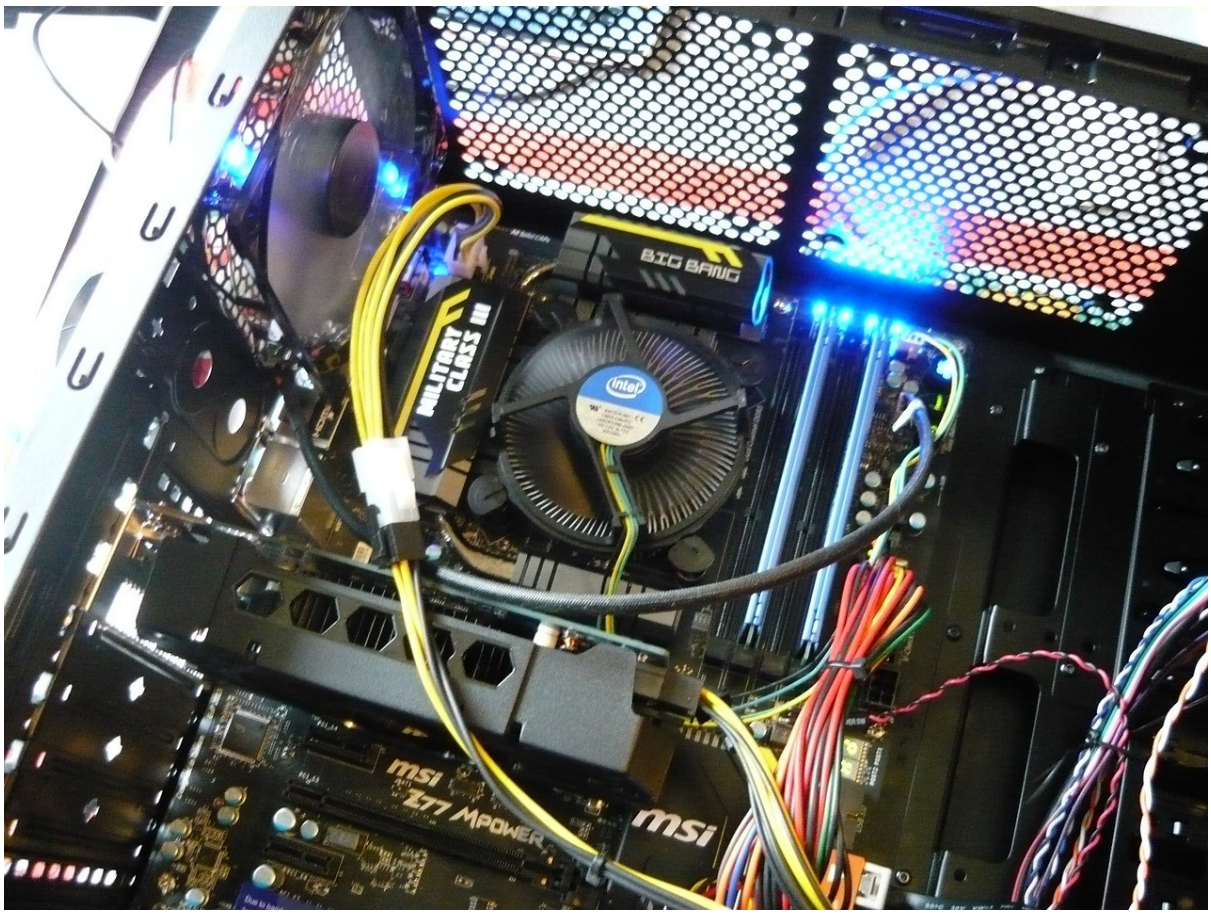


The Motherboard

A CPU can't achieve its intended purpose without the assistance of the motherboard. The motherboard is a printed circuit board, or PCB, found inside a computer which not only hosts the CPU but also acts as a connected gateway to various other computer peripherals, including sound cards, hard drives, video cards and so on. The motherboard hosts a number of sockets into which microprocessors, such as the CPU, can be plugged. The motherboard is also connected to the computer's power

supply and distributes electrical voltage to the attached components. Simply put, a motherboard provides a critical platform on which the rest of a CPU's hardware can operate. Without the motherboard in place, a computer couldn't function.

MOTHER BOARD

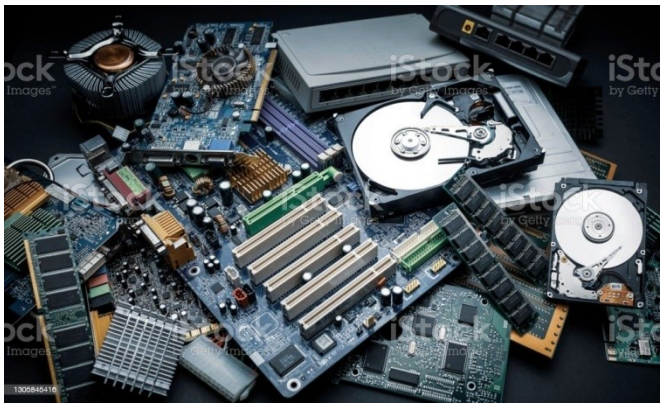


Hard Drives and RAM

The hard drive, often shortened to HD, stores data which can then be accessed by various other programs at any given time. Hard drives provide users with various levels of storage capacity, with more expensive units often providing greater space for data storage and faster rates of data transmission.

It's somewhat easy to confuse the function of the hard drive with that of random access memory, or RAM. Unlike a hard drive, RAM is composed of a series of chips which allow for temporary data storage only. Whereas a hard drive will continue to store data even after a computer has been powered off, RAM will be cleared. RAM is often used to act as a holding zone for open files or critical data that a program may need to access intermittently during use. RAM should not be thought of as storage, per say, but instead as a "place holder" for valuable information. Nevertheless, it remains one of the 4 main parts of a computer that is still in use today.

HARD DRIVS



RAM

Q2.Discuss about the classification of computer based on size and capacity.

Computer Classification

A computer is a device that transforms unusable data into information. According to the set of instructions the user gives it, it processes the input and generates the desired outcome. Modern digital computers are classified on the basis of their size and capacity. The size and data handling capabilities of the various types of computers may be used to categorize them into two groups.

1.Computers according to size:

- Supercomputer.
- Mainframe computer.
- Personal computer.
- Workstation.
- Minicomputer.

2. Computers according to their Capacity to manage data:

- Digital computer.
- Hybrid computer.
- Analog computer.

Classification of Computers

Different classifications of Computers are as follows.

Classification According to Size

There are four different sorts of computers based on their size and how they are configured to operate:

1.Super computers

The most efficient computers in terms of processing data and performance are supercomputers. These computers are used for research and exploratory purposes. Supercomputers are exceedingly large and highly expensive. It can only fit in large, air-conditioned spaces. Supercomputers are used for a range of tasks, such as space exploration, seismic research, and the testing of nuclear weapons.

Supercomputer Features:

- **They make use of AI (Artificial intelligence)**
- **They are the fastest and strongest;**
- **They are very costly.**
- **They are enormous in size.**
- **They are employed by companies that manufacture goods.**
- **They process information at a rapid rate.**

2. Mainframe Computers

Despite being less efficient than supercomputers, mainframe computers are nevertheless extremely expensive. Large corporations and governmental organizations frequently employ mainframe computers to run everyday operations. They have the ability to store and analyze a lot of data. To maintain information on their customers, students, and insurance policyholders, banks, colleges, and insurance companies utilize them. They may also act as a

server in a network environment. Hundreds of users may be managed simultaneously by them.

Mainframe Computer Features:

- ***They have enormous amounts of memory.***
- ***They are capable of running several different operating systems.***
- ***They have a significant number of CPUs with powerful processing speeds.***
- ***Tightly Coupled Clustering Technology is employed.***

3.Minicomputer

Minicomputers are used by small businesses and industries. They go by the term "Midrange Computers." These minicomputers frequently have several users, just as mainframe computers. They are a bit slower than mainframe computers. For example, the manufacturing department may employ minicomputers to keep an eye on specific production processes.

Features of Minicomputers :

- ***It is smaller than mainframes or supercomputers in terms of size.***
- ***In comparison to a mainframe or supercomputer, it is less costly.***
- ***It is able to perform many jobs at once.***
- ***It may be utilized by several users simultaneously.***
- ***It is utilized by small businesses.***

4. Microcomputers.

A microcomputer, sometimes referred to as a personal computer (PC), is a type of computer that runs on a smaller scale than traditional computers (Personal Computer). A component that is commonly referred to as a motherboard houses

the central processing unit (CPU), a microprocessor, memory in the form of ROM (Read Only Memory), RAM (Random Access Memory), I/O ports, and a bus system of connecting wires. They are the most affordable.

Features of Microcomputers:

- They are extensively employed for personal usage.
- They are smaller and comparably less expensive.
- Multi-user functionality is not supported.
- It has a limited computational capacity.
- They are quite simple to use.

Based on Capacity

According to fundamental operating principles, there are three different kinds of computers. They are as follows:

1.Analogous Computers

Analog computers process analog data. Temperature, pressure, weight, depth, and voltage are a few examples of this type of data. These have an infinite range of values and are continuous quantities. The first computers were analog, and they laid the groundwork for today's digital computers.

2.Digital Computers

In digital computers, letters, numbers, and other special symbols are represented by digits. On-off (ON-OFF) inputs are used by digital computers, and ON-OFF signals are also generated by them. An ON is often represented by a 1 and an OFF by a 0, respectively. A digital computer is capable of processing both numerical and non-numerical

data. In addition to doing fundamental arithmetic operations like addition, subtraction, multiplication, and division, it can also perform logical operations.

3. Hybrid Computers

Computers that combine digital and analog components are called hybrid computers. It combines the best features of both types, having the speed of an analog computer with the memory and precision of a digital computer. Hybrid computers are typically used in specific applications where both forms of data need to be processed. As an example, a gas pump contains a processor that converts measurements of fuel flow into information about quality and cost.

Q3.What is the meaning of computer generation? How many computer generation are defiend? What technologies were/are used?

The development of computer systems is normally discussed as the development over different generations.

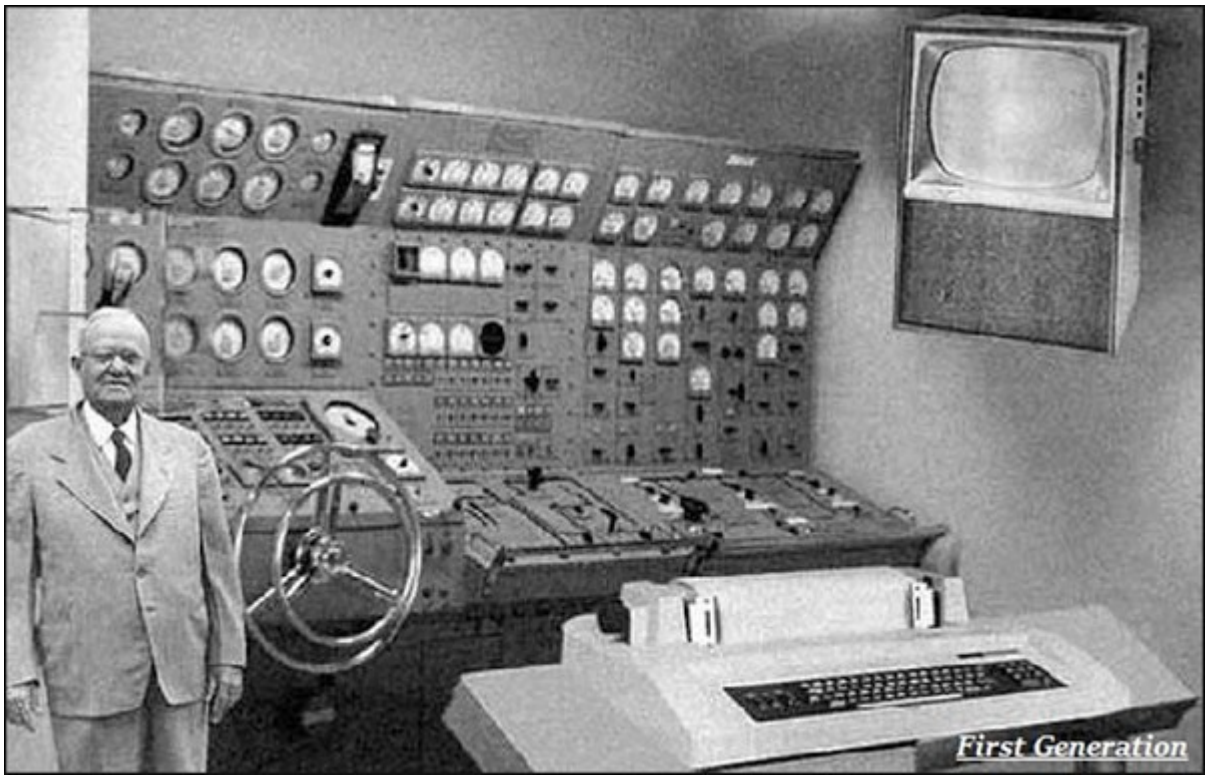
With the succession of different generations, came the advancement in computer technology.

Computer Generations

Let us now discuss the development in Computer Technology over the different generations.

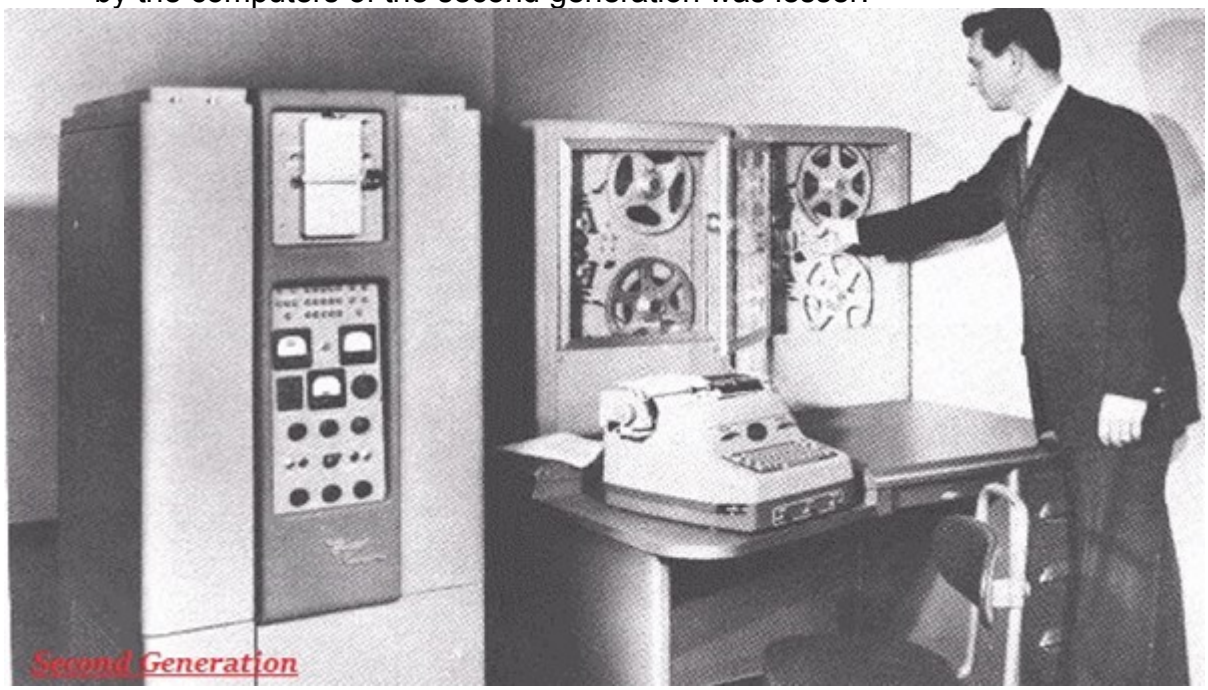
First Generation

- The period 1940 to 1956, roughly considered as the First Generation of Computer.
- The first generation computers were developed by using vacuum tube or thermionic valve machine.
- The input of this system was based on punched cards and paper tape; however, the output was displayed on printouts.
- The first generation computers worked on binary-coded concept (i.e., language of 0-1). **Examples:** ENIAC, EDVAC, etc.



Second Generation

- The period 1956 to 1963 is roughly considered as the period of Second Generation of Computers.
- The second generation computers were developed by using transistor technology.
- In comparison to the first generation, the size of second generation was smaller.
- In comparison to computers of the first generation, the computing time taken by the computers of the second generation was lesser.



Third Generation

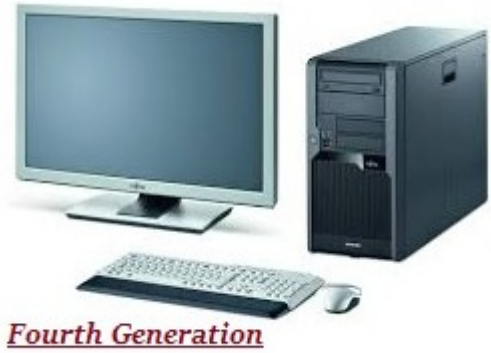
- The period 1963 to 1971 is roughly considered as the period of Third Generation of computers.
- The third generation computers were developed by using the Integrated Circuit (IC) technology.

Third Generation

- In comparison to the computers of the second generation, the size of the computers of the third generation was smaller.
- In comparison to the computers of the second generation, the computing time taken by the computers of the third generation was lesser.
- The third generation computer consumed less power and also generated less heat.
- The maintenance cost of the computers in the third generation was also low.
- The computer system of the computers of the third generation was easier for commercial use.

Fourth Generation

- The period 1972 to 2010 is roughly considered as the fourth generation of computers.
- The fourth generation computers were developed by using microprocessor technology.



- By coming to fourth generation, computer became very small in size, it became portable.
- The machine of fourth generation started generating very low amount of heat.
- It is much faster and accuracy became more reliable.
- The production cost reduced to very low in comparison to the previous generation.
- It became available for the common people as well.

Fifth Generation

- The period 2010 to till date and beyond, roughly considered as the period of fifth generation of computers.
- By the time, the computer generation was being categorized on the basis of hardware only, but the fifth generation technology also included software.
- The computers of the fifth generation had high capability and large memory capacity.
- Working with computers of this generation was fast and multiple tasks could be performed simultaneously.
- Some of the popular advanced technologies of the fifth generation include Artificial intelligence, Quantum computation, Nanotechnology, Parallel processing, etc.

Q4. Differentiate between Volatile & Non –Volatile memories.

Volatile and Non-Volatile Memory are both types of computer memory. Volatile Memory is used to store computer programs and data that CPU needs in real time and is erased once computer is switched off. RAM and Cache memory are volatile memory. Where as Non-volatile memory is static and remains in the computer even if computer is switched off. ROM and HDD are non-volatile memory.

Following are the important differences between Volatile and Non-Volatile Memory.

S. No.	Volatile Memory	Non-Volatile Memory
1.	Volatile memory is the type of memory in which data is lost as it is powered-off.	Non-volatile memory is the type of memory in which data remains stored even if it is powered-off.
2.	Contents of Volatile memory are stored temporarily.	Contents of Non-volatile memory are stored permanently.
3.	It is faster than non-volatile memory.	It is slower than volatile memory.
4.	**RAM(Random Access Memory)** is an example of volatile memory.	**ROM(Read Only Memory)** is an example of non-volatile memory.
5.	In volatile memory, data can be easily transferred in comparison to	In non-volatile memory, data can not be easily transferred in comparison to

S. No.	Volatile Memory	Non-Volatile Memory
	non-volatile memory.	volatile memory.
6.	In Volatile memory, process can read and write.	In Non-volatile memory, process can only read.
7.	Volatile memory generally has less storage capacity.	Non-volatile memory generally has more storage capacity than volatile memory.
8.	In volatile memory, the program's data are stored which are currently in process by the CPU.	In non-volatile memory, any kind of data which has to be saved permanently are stored.
9.	Volatile memory is more costly per unit size.	Non-volatile memory is less costly per unit size.
10.	Volatile memory has a huge impact on the system's performance.	Non-volatile memory has a huge impact on a system's storage capacity.
11.	In volatile memory, processor has direct access to data.	In non-volatile memory, processor has no direct access to data.
12.	Volatile memory chips are generally	Non-volatile memory chips are

S. No.	Volatile Memory	Non-Volatile Memory
	kept on the memory slot.	embedded on the motherboard.
13.	**Advantages-** • Fast speed • Low power consumption • Better system performance as it increases speed	**Advantages-** • More reliable • Stores data permanently • Inexpensive memory • Helps in booting of operating system
14.	**Disadvantages-** • Expensive • Limited storage space • Stores data temporarily	**Disadvantages-** • Slow speed • Can only read data

Q5. Distinguish among system software, application software and open source software on the basis of their features.

System software

System Software is a set of programs that control and manage the operations of computer hardware. It also helps application programs to execute correctly.

System Software are designed to control the operation and extend the processing functionalities of a computer system. System software makes the operation of a computer more fast, effective, and secure. Example: Operating system, programming language, Communication software, etc.

Features of System Software

An important feature of System Software are:

- ***System Software is closer to the system***
- ***Generally written in a low-level language***
- ***The system software is difficult to design and understand***
- ***Fast in speed***
- ***Less interactive***
- ***Smaller in size***
- ***Hard to manipulate***

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Application software

Application Software is a program that does real work for the user. It is mostly created to perform a specific task for a user.

Application Software acts as a mediator between the end-user and System Software. It is also known as an application package. This type of software is written using a high-level language like C, Java, VB. Net, etc. It is a user-specific and is designed to meet the requirements of the user.

You can also install multiple Application Software on a single System Software. You can store this kind of software on CDs, DVDs, flash derive, or keychain storage devices. Example: Word-processing, Spreadsheet, Database, etc.

Feature of application software

An important feature of Application Software:

- ***Perform more specialized tasks like word processing, spreadsheets, email, photo editing, etc.***
- ***It needs more storage space as it is bigger in size***
- ***Easy to design and more interactive for the user***
- ***Generally written in a high-level language***

Open source software

Open source software is software develped and maintained via open collaboration, and made available, typically at no cost, for anyone to use, examine, alter and redistribute however they like. This contrasts with proprietary or closed source software applications—e.g. Microsoft Word, Adobe Illustrator—which are sold to end users by the creator or copyright holder, and cannot be edited, enhanced or redistributed except as specified by the copyright holder.

The term open source also refers more generally to a community-based approach to creating any intellectual property (such as software) via open collaboration, inclusiveness, transparency, and frequent public updates.

The features of open source software

- *The results are of quite high quality.*
- *Users can easily change the software according to requirements.*
- *It is more secure.*
- *Long term use.*
- *Transparency.*
- *Affordable.*
- *Help in developing skills.*

Q6.

a) Create a file in MS-word to insert a paragraph about yourself and save it with file name “yourself” . Describe al steps involved in it.

b) Write steps regarding followings

To change the font style

To change the fond size

To change the fond color

To highlight (in yellow) the line that reads “need to get IMS’s address”.

To change the font style

On the Insert tab, the galleries include items that are designed to coordinate with the overall look of your document. You can use these galleries to insert tables, headers, footers, lists, cover pages, and other document building blocks. When you create pictures, charts, or diagrams, they also coordinate with your current document look.

To change the font size

You can easily change the formatting of selected text in the document text by choosing a look for the selected text from the Quick Styles gallery on the Home tab. You can also format text directly by using the other controls on the Home tab. Most controls offer a choice of using the look from the current theme or using a format that you specify directly.

To change the font color

To change the overall look of your document, choose new Theme elements on the Page Layout tab. To change the looks available in the Quick Style gallery, use the Change Current Quick Style Set command. Both the Themes gallery and the Quick Styles gallery provide reset commands so that you can always restore the look of your document to the original contained in your current template.

IMS's address

6th floor, NCL Building, 'E' Block,

bandra kurla Complex (BKC),

(next to city park- garden),

Bandra (east),

Mumbai – 400051.

Q7. Create a file in MS-Word for the following document and save it with file name 'ms _ word'. Describe all steps involved in it.

MS Word is a widely used commercial word processor developed by Microsoft.

Microsoft Word is a word processor developed by Microsoft. It was first released on October 25, 1983, under the name Multi-Tool Word for Xenix systems.

MS word is application software, which is capable of

MS Word is an example of application software developed by the company Microsoft. It allows users to type and save documents. It is helpful too for making documents.

- **Creating**
- **Editing**
- **Saving**
- **Printing any type of document**

Q8.Create a file in MS-word for the following document and save it with file name ‘equations’.

Equations

$X_2+Y_5=30$

$Z^3+Q^4=50$

$A_2+B^8=X_2+Y^8$

Q9. Create a file in MS-word that convert existing text to table as shown below and save it as file name ‘text _ to _ table’. Describe all steps involved in it.

To change the overall look of your document	choose new Theme elements on the Page Layout tab. To change the looks available in the Quick Style gallery

use the Change Current Quick Style Set command. Both the Themes gallery and the Quick Styles gallery provide reset commands so that you can always restore the look of your document to the original contained in your current template	

Q10. create a file in MS-word to insert a table in the document. Describe all steps involved in it.

Q11. Create a following worksheet in MS-excel and save it with name 'book1'.

ROLL NO	NAMES	MARK
1	N1	
2	N2	
3	N3	
4	N4	
5	N5	
6	N6	
7	N7	
8	N8	
9	N9	
10	N10	

Q12.Calculate the following things of a range (C2:C11) of data in the worksheet created in question no 10.

- **The sum of marks using AutoSum in a range of cells (C2:C11)**

MARKS
75
65
79
88
49
67
92
80

- **Average of the marks in a range of cells(C2:C11)**

78
75
94
88
67
83
51
99
64

- **Highest marks in a range of cells(C2:C11)**

84
96
83
71
82
49
87
99
99

- **Minimum marks in a range of cells(C2:C11)**

MARKS
71
84
95
73
62
56
49
80

Q13.

a).Describe various steps involved in the following

- **To modify column width of a worksheet**

- **To modify the row height of a worksheet**

- **To delete rows and columns of a worksheet**

Q13.

b) Describe following terms in the worksheet

- **Absolute reference and relative reference in formula**

marks
77
88
99
58
79
66
49
49

- **Cell address**

49
86
91
35

Q14.

a)What tools are available to customize our power point presentation?

PowerPoint is a very practical presentation tool. But no matter how many times you have worked with PowerPoint before, there are a few tips and tricks that can help customize your presentation. The first part of this article will explain how to customize presentation options and views and in the second part we will show you how to navigate by using presentation views. Please read on..

Changing page setup options

Presentations are created mainly to project either on a projector or more and more frequently to a plasma or TV screen. There are times when a presentation can be created for delivery in different formats.

- On-screen show (4:3)
- Letter Paper (8.5 x 11 in)
- Ledger Paper (11 x 17 in)
- A3 Paper (297 x 420 mm)
- A4 Paper (210 x 297 mm)
- B4 (ISO) Paper (250 x 353 mm)
- B5 (ISO) Paper (176 x 250 mm)
- 35mm Slides
- Overhead
- Banner
- On-screen Show (16:9)
- On-screen Show (16:10)
- Widescreen
- Custom

To select a slide size other than the standard one:

1. In Slide Master View
2. Click on Slide Size
3. Select from one of the two options
4. For more choices, click Custom

5. Select one of the options

There are several different views in PowerPoint as we saw earlier and you can navigate through the presentation in each in different ways.

In Normal View

- Click on the thumbnail of the slide you want to see
- Use the Vertical Scrollbar to move between slides
- Use the up and down arrow keys on the keyboard to move one slide backwards or forwards

In Slide Sorter View

- Click on the slide you want to select
- Use the arrow keys to move up, down, left and right

In Reading View

Use the next and back icons in the status bar to move back or forwards or use the menu which is accessed from the icon in the middle

Q14.

b)Write the steps for the following action for creation of power point presentation

Open a blank presentation

Open PowerPoint. In the left pane, select New. Select an option: To create a presentation from scratch, select Blank Presentation.

Introduction

By the end of this lesson, you should be able to:

- Choose and apply a slide layout
- Add text to a placeholder
- Save and close a presentation

- Exit PowerPoint

Creating a blank presentation

PowerPoint offers three ways to create a presentation: **Blank presentation**, **From Design Template**, and **From AutoContent Wizard**.

The blank presentation option is one of the more commonly used methods. It offers several blank slides with layouts for text and graphics.

To create a blank presentation:

- Open PowerPoint.
- A slide featuring a place for a title and subtitle appears by default. You can begin your presentation with this slide or choose a different slide layout.

- The **New Presentation Pane** appears on the right side of the screen.
- Under **New**, click **Blank Presentation**.
- A list appears.

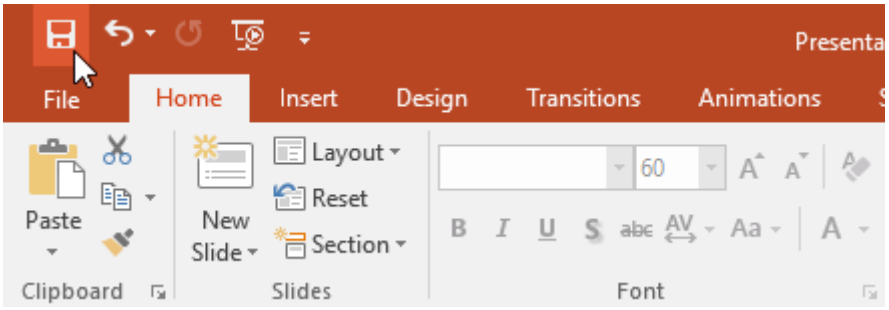
Save the presentation as Lab1.pptx

In PowerPoint, you can save your desktop presentation to your local drive (such as your laptop), a network location, a CD, a DVD, or a flash drive. You can also save it as a different file format.

To save a presentation:

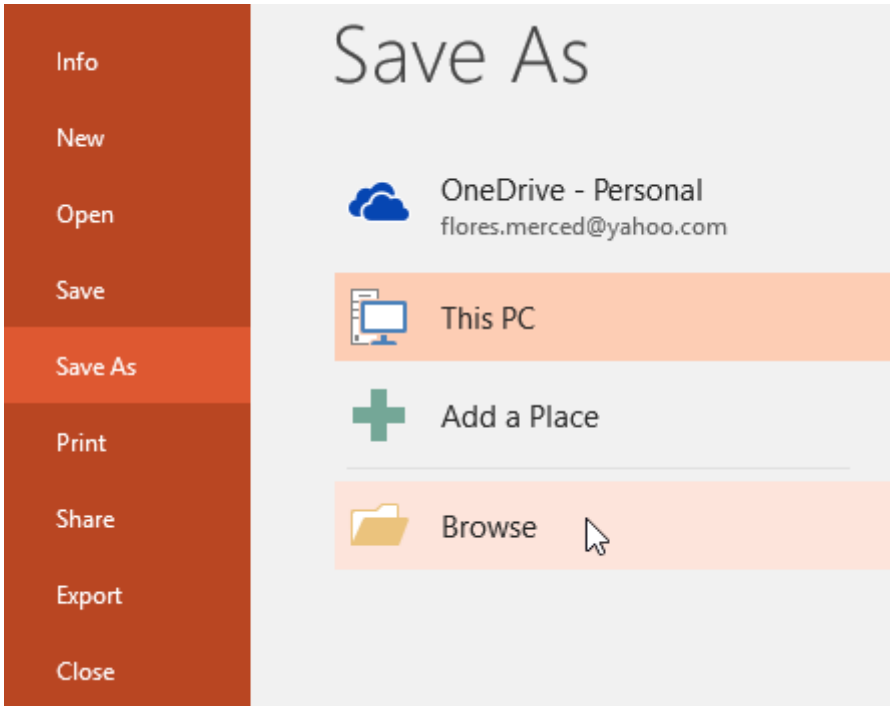
It's important to **save your presentation** whenever you start a new project or make changes to an existing one. Saving early and often can prevent your work from being lost. You'll also need to pay close attention to **where you save** the presentation so it will be easy to find later.

1. Locate and select the **Save** command on the **Quick Access Toolbar**.



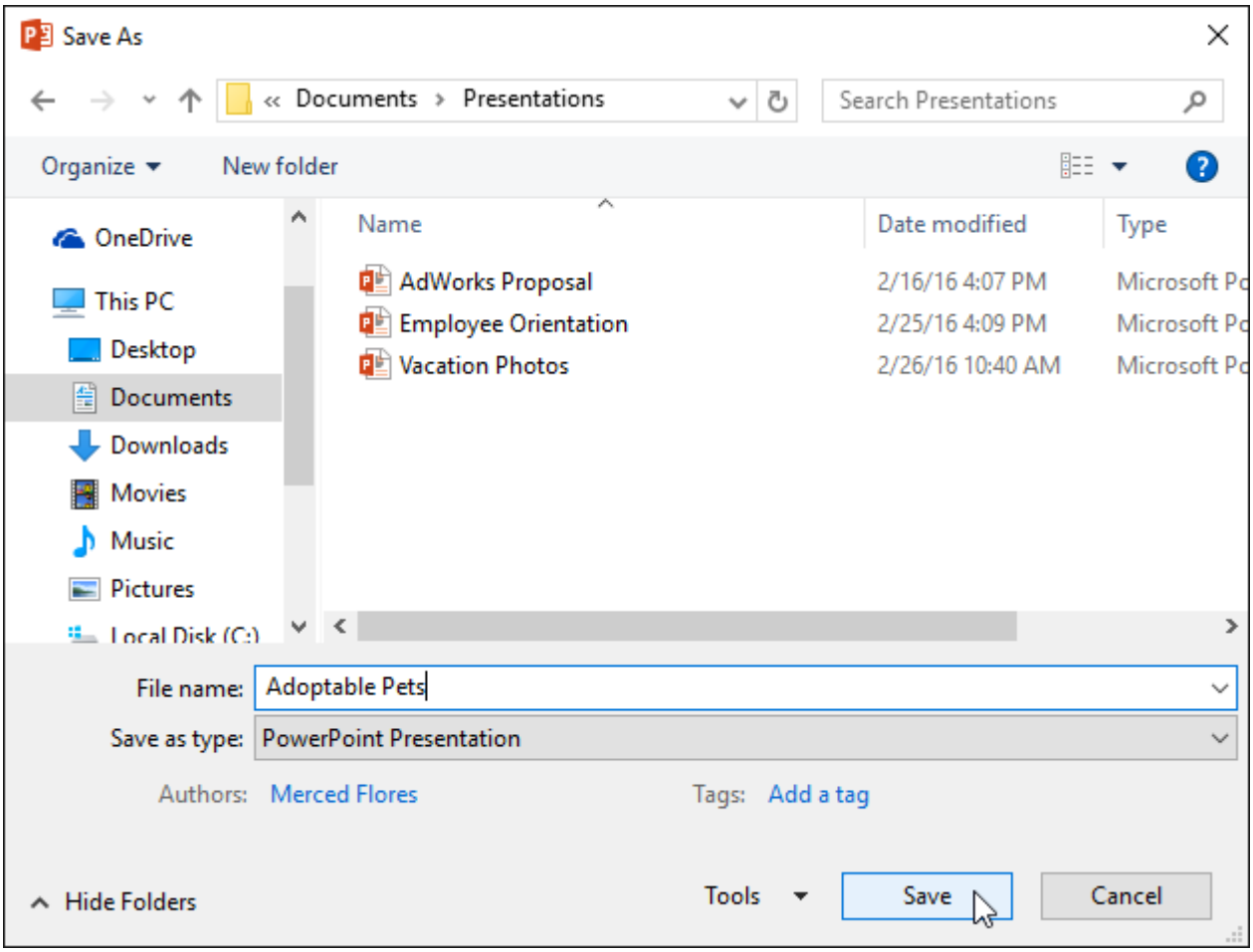
2. If you're saving the file for the first time, the **Save As** pane will appear in **Backstage view**.

3. You'll then need to choose **where to save** the file and give it a **file name**. Click **Browse** to select a location on your computer. You can also click **One Drive** to save the file to your One Drive.



4. The **Save As** dialog box will appear. Select the **location** where you want to save the presentation.

5. Enter a **file name** for the presentation, then click **Save**.



6. The presentation will be **saved**. You can click the **Save** command again to save your changes as you modify the presentation.

- **Add a title to the first slide: the name of the college**

CSC ACADEMY

- **Type your first name and last name in subtitle section**

Keerthiga

- **Add a new slide which has a title and content**

Q15.Write steps for creation of a set of power point slides that demonstrates your skill to use the tools of power point. It should include the following things

➢ Title slide & bullet list

Title slide

There are multiple ways to add titles to your slides in PowerPoint. Use the **Layout** option to create a standalone title slide or to add a title to a slide that contains other text. You can also use the Outline view or the **Accessibility** ribbon to create and update the titles of your slides.

Bullet list

The simple definition is that a bullet list is a series of items with a heading broken up by dotted points. These lists can be used for anything you need them to, whether it's as informal as an agenda or as formal as a business plan at your workplace.

➢ Inserting Excel Sheet

1. In PowerPoint, on the Insert tab, click or tap Object.
2. In the Insert Object dialog box, select Create from file.
3. Click or tap Browse, and in the Browse box, find the Excel workbook with the data you want to insert and link to.

➢ **Clip art and text**

Part-2

Q16. What is the difference Machine language and high level language?

High level language:

- One can easily interpret and combine these languages as compared to the low-level languages.
- They are very easy to understand.
- Such languages are programmer-friendly.
- Debugging is not very difficult.
- They come with easy maintenance and are thus simple and manageable.
- One can easily run them on different platforms.
- They require a compiler/interpreter for translation into a machine code.
- A user can port them from one location to another.
- Such languages have a low efficiency of memory. So it consumes more memory than the low-level languages.
- They are very widely used and popular in today's times.
- Java, C, C++, Python, etc., are a few examples of high-level languages.

machine language:

- They are also called machine-level languages.
- Machines can easily understand it.
- High-level languages are very machine-friendly.
- Debugging them is very difficult.
- They are not very easy to understand.
- All the languages come with complex maintenance.
- They are not portable.
- These languages depend on machines. Thus, one can run it on various platforms.
- They always require assemblers for translating instructions.
- Low-level languages do not have a very wide application in today's times.

Difference Between High-Level and Machine Languages

Parameter	High-Level Language	Machine Language
Basic	These are programmer-friendly languages that are manageable, easy to understand, debug, and widely used in today's times.	These are machine-friendly languages that are very difficult to understand by human beings but easy to interpret by machines.
Ease of Execution	These are very easy to execute.	These are very difficult to execute.
Process of	High-level languages require the use of a	Low-level language requires an

Translation	compiler or an interpreter for their translation into the machine code.	assembler for directly translating the instructions of the machine language.
Efficiency of Memory	These languages have a very low memory efficiency. It means that they consume more memory than any low-level language.	These languages have a very high memory efficiency. It means that they consume less energy as compared to any high-level language.
Portability	These are portable from any one device to another.	A user cannot port these from one device to another.
Comprehensibility	High-level languages are human-friendly. They are, thus, very easy to understand and learn by any programmer.	Low-level languages are machine-friendly. They are, thus, very difficult to understand and learn by any human.
Dependency on Machines	High-level languages do not depend on machines.	Low-level languages are machine-dependent and thus very difficult to understand by a normal user.
Debugging	It is very easy to debug these languages.	A programmer cannot easily debug these languages.
Maintenance	High-level languages have a simple and comprehensive maintenance technique.	It is quite complex to maintain any low-level language.
Usage	High-level languages are very common and widely used for programming in today's times.	Low-level languages are not very common nowadays for programming.
Speed of Execution	High-level languages take more time for execution as compared to low-level languages because these require a translation program.	The translation speed of low-level languages is very high.
Abstraction	High-level languages allow a higher abstraction.	Low-level languages allow very little abstraction or no abstraction at all.
Need of Hardware	One does not require a knowledge of hardware for writing programs.	Having knowledge of hardware is a prerequisite to writing programs.
Facilities Provided	High-level languages do not provide various	Low-level languages are very close to the hardware. They help in writing

	facilities at the hardware level.	various programs at the hardware level.
Ease of Modification	The process of modifying programs is very difficult with high-level programs. It is because every single statement in it may execute a bunch of instructions.	The process of modifying programs is very easy in low-level programs. Here, it can directly map the statements to the processor instructions.
Examples	Some examples of high-level languages include Perl, BASIC, COBOL, Pascal, Ruby, etc.	Some examples of low-level languages include the Machine language and Assembly language.

Q17.Discuss about different data types of C programming language.

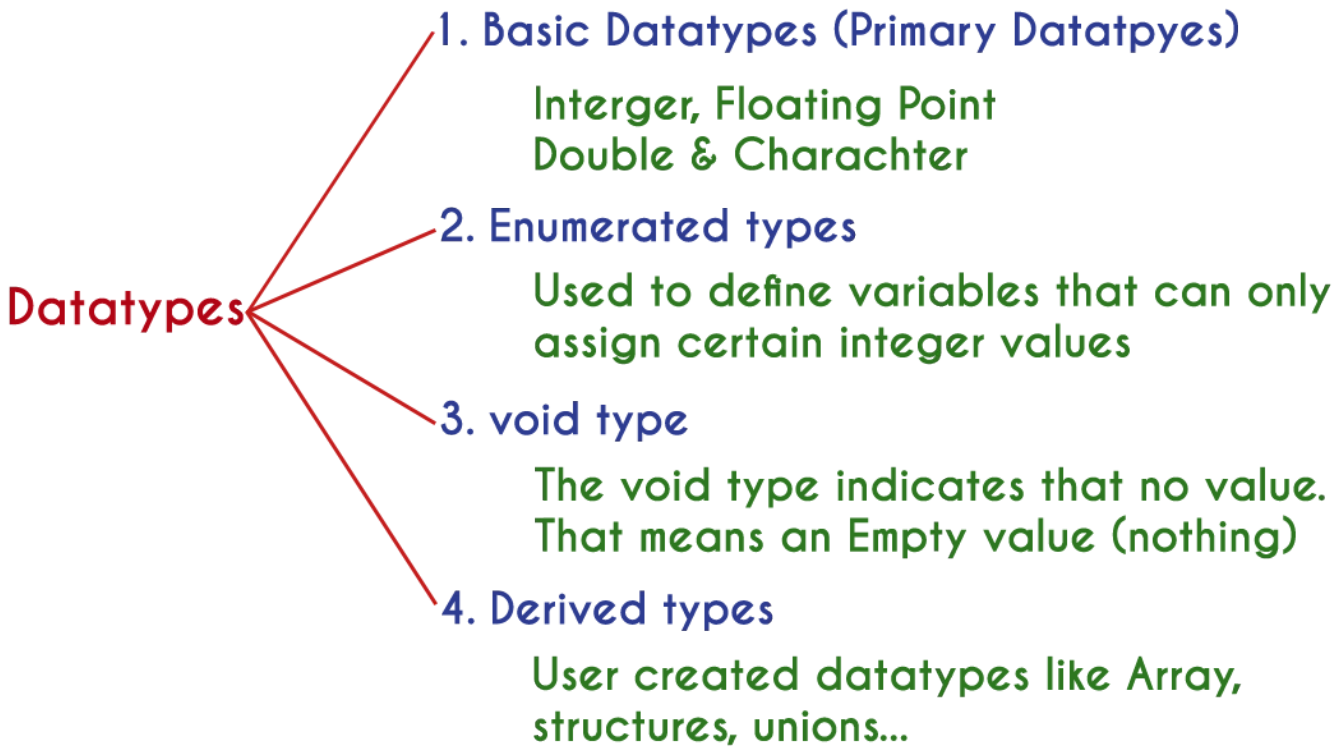
Data used in c program is classified into different types based on its properties. In the C programming language, a data type can be defined as a set of values with similar characteristics. All the values in a data type have the same properties.

Data types in the c programming language are used to specify what kind of value can be stored in a variable. The memory size and type of the value of a variable are determined by the variable data type. In a c program, each variable or constant or array must have a data type and this data type specifies how much memory is to be allocated and what type of values are to be stored in that variable or constant or array. The formal definition of a data type is as follows...

The Data type is a set of value with predefined characteristics. data types are used to declare variable, constants, arrays, pointers, and functions.

In the c programming language, data types are classified as follows...

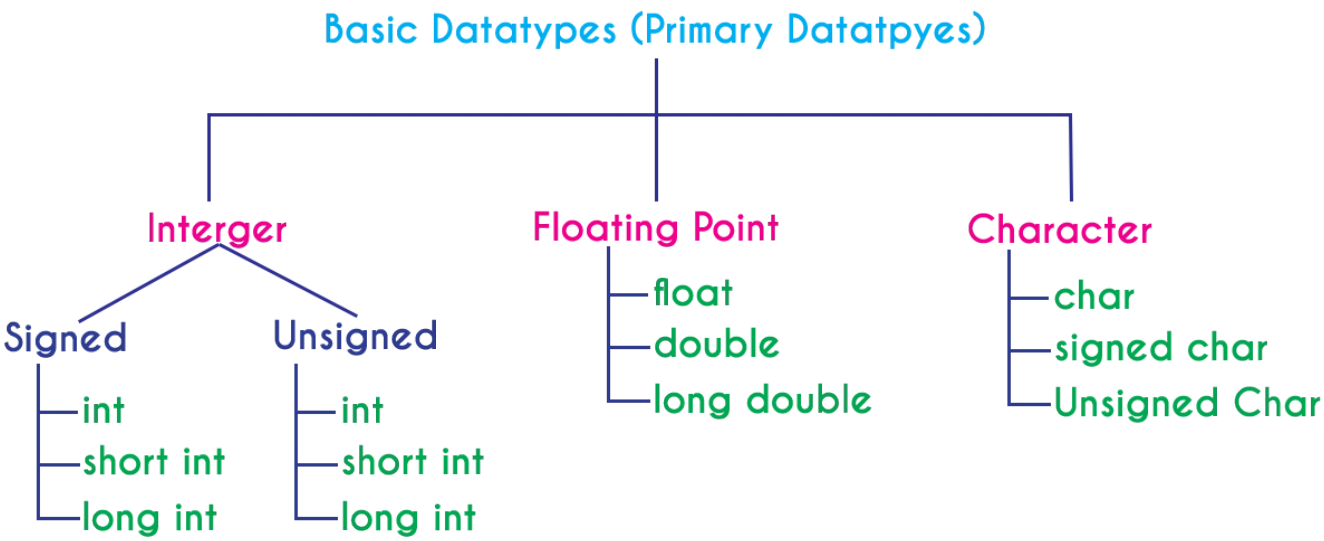
1. Primary data types (Basic data types OR Predefined data types)
2. Derived data types (Secondary data types OR User-defined data types)
3. Enumeration data types
4. Void data type



Primary data types

The primary data types in the C programming language are the basic data types. All the primary data types are already defined in the system. Primary data types are also called as Built-In data types. The following are the primary data types in c programming language...

1. Integer data type
2. Floating Point data type
3. Double data type
4. Character data type



Integer Data type

The integer data type is a set of whole numbers. Every integer value does not have the decimal value. We use the keyword "**int**" to represent integer data type in c. We use the keyword int to declare the variables and to specify the return type of a function. The integer data type is used with different type modifiers like short, long, signed and unsigned. The following table provides complete details about the integer data type.

Type	Size (Bytes)	Range	Specifier
int (signed short int)	2	-32768 to +32767	%d
short int (signed short int)	2	-32768 to +32767	%d
long int (signed long int)	4	-2,147,483,648 to +2,147,483,647	%d
unsigned int (unsigned short int)	2	0 to 65535	%u
unsigned long int	4	0 to 4,294,967,295	%u

Floating Point data types

Floating-point data types are a set of numbers with the decimal value. Every floating-point value must contain the decimal value. The floating-point data type has two variants...

- float
- double

We use the keyword "**float**" to represent floating-point data type and "**double**" to represent double data type in c. Both float and double are similar but they differ in the number of decimal places. The float value contains 6 decimal places whereas double value contains 15 or 19 decimal places. The following table provides complete details about floating-point data types.

Type	Size (Bytes)	Range	Specifier
float	4	1.2E - 38 to 3.4E + 38	%f
double	8	2.3E-308 to 1.7E+308	%ld
long double	10	3.4E-4932 to 1.1E+4932	%ld

Character data type

The character data type is a set of characters enclosed in single quotations. The following table provides complete details about the character data type.

Type	Size (Bytes)	Range	Specifier
char (signed char)	1	-128 to +127	%c
unsigned char	1	0 to 255	%c

The following table provides complete information about all the data types in c programming language...

	Integer	Floating Point	Double	Character
What is it?	Numbers without decimal value	Numbers with decimal value	Numbers with decimal value	Any symbol enclosed in single quotation
Keyword	int	float	double	char
Memory Size	2 or 4 Bytes	4 Bytes	8 or 10 Bytes	1 Byte
Range	-32768 to +32767 (or) 0 to 65535 (Incase of 2 bytes only)	1.2E - 38 to 3.4E + 38	2.3E-308 to 1.7E+308	-128 to + 127 (or) 0 to 255
Type Specifier	%d or %i or %u	%f	%ld	%c or %s
Type Modifier	short, long signed, unsigned	No modifiers	long	signed, unsigned
Type Qualifier	const, volatile	const, volatile	const, volatil	const, volatile

void data type

The void data type means nothing or no value. Generally, the void is used to specify a function which does not return any value. We also use the void data type to specify empty parameters of a function.

Enumerated data type

An enumerated data type is a user-defined data type that consists of integer constants and each integer constant is given a name. The keyword "**enum**" is used to define the enumerated data type.

Derived data types

Derived data types are user-defined data types. The derived data types are also called as user-defined data types or secondary data types. In the c programming language, the derived data types are created using the following concepts...

- Arrays
- Structures
- Unions
- Enumeration

Q18.Find the output of the following expressions

a) **X=20/5*2+30-5**

b) **Y=30-(40/10+6)+10**

c) **Z=40*2/10-2+10**

Q19. Describe the syntax of the following statements

A) If – else statement

The program asks the user to input a number, after getting the number, the program will check the first “if” condition i.e., number %2 == 0. If it is True, the program will check the next “if” condition: number <= 100. When the inner “if ” condition is False, its else part will execute.

An **if** statement can be followed by an optional **else** statement, which executes when the Boolean expression is false.

Syntax

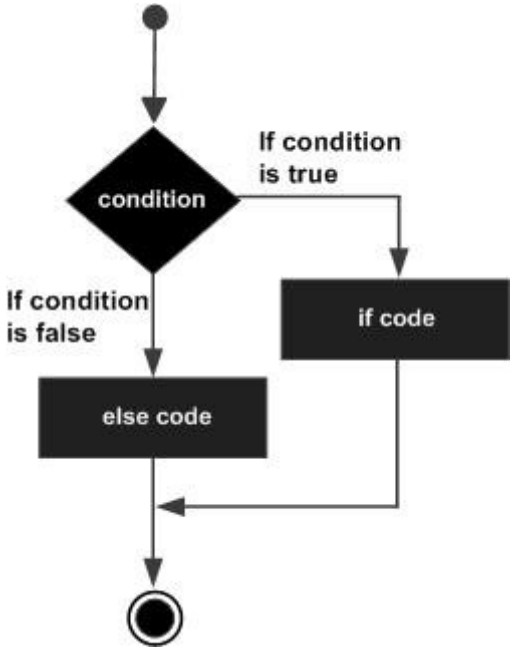
The syntax of an **if...else** statement in C programming language is −

```
if(boolean_expression) {
   /* statement(s) will execute if the boolean expression is true */
} else {
    /* statement(s) will execute if the boolean expression is false */
}
```

If the Boolean expression evaluates to **true**, then the **if block** will be executed, otherwise, the **else block** will be executed.

C programming language assumes any **non-zero** and **non-null** values as **true**, and if it is either **zero** or **null**, then it is assumed as **false** value.

Flow Diagram



B) For loop

In computer science a for-loop or for loop is a control flow statement for specifying iteration. Specifically, a for loop functions by running a section of code repeatedly until a certain condition has been satisfied.

For loop in C

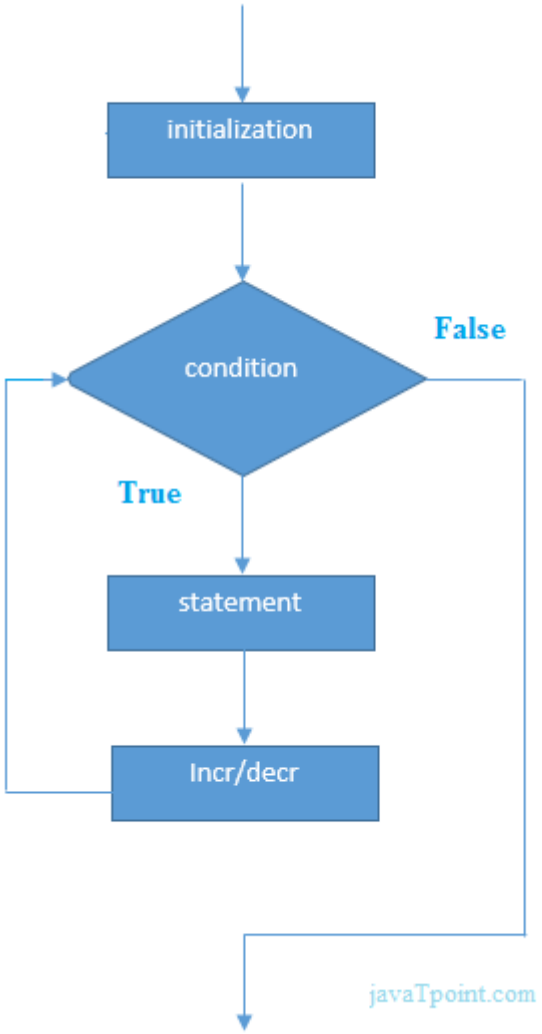
The **For loop in C language** is used to iterate the statements or a part of the program several times. It is frequently used to traverse the data structures like the array and linked list.

Syntax of for loop in C

The syntax of for loop in c language is given below:

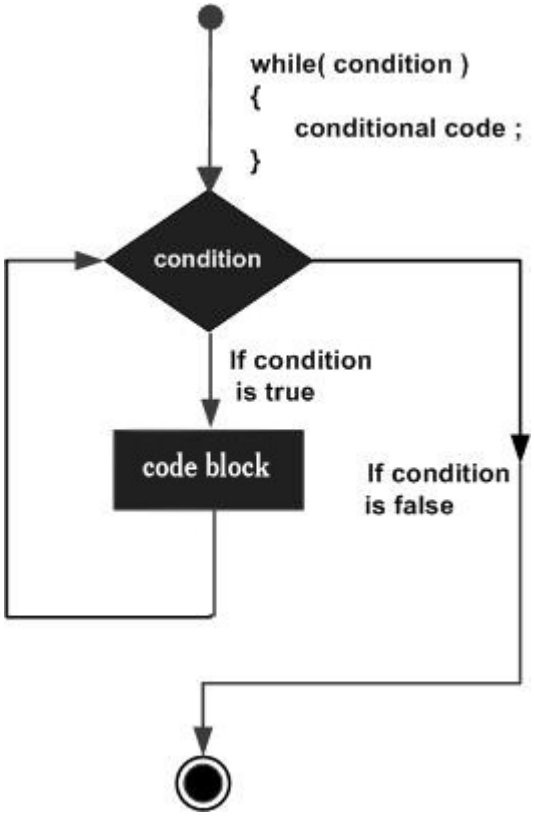
```
1. for(Expression 1; Expression 2; Expression 3){
2. //code to be executed
3. }
```

Flowchart of for loop in C



C) While loop

- A **while** loop in C programming repeatedly executes a target statement as long as a given condition is true.
- Syntax
- The syntax of a **while** loop in C programming language is −
- while(condition) {
- statement(s);
- }
- Here, **statement(s)** may be a single statement or a block of statements. The **condition** may be any expression, and true is any nonzero value. The loop iterates while the condition is true.

- When the condition becomes false, the program control passes to the line immediately following the loop.
- Flow Diagram
- 

- Here, the key point to note is that a while loop might not execute at all. When the condition is tested and the result is false, the loop body will be skipped and the first statement after the while loop will be executed.

D) Do-while loop

Unlike **for** and **while** loops, which test the loop condition at the top of the loop, the **do...while** loop in C programming checks its condition at the bottom of the loop.

A **do...while** loop is similar to a while loop, except the fact that it is guaranteed to execute at least one time.

Syntax

The syntax of a **do...while** loop in C programming language is −

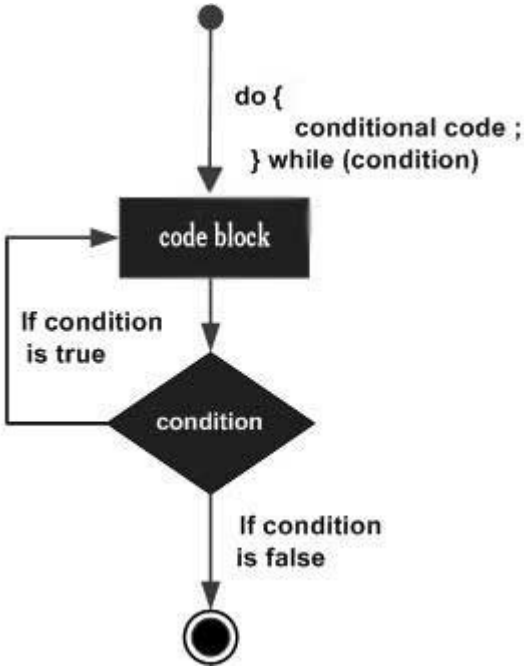
```
do {
   statement(s);
```

} while(condition);

Notice that the conditional expression appears at the end of the loop, so the statement(s) in the loop executes once before the condition is tested.

If the condition is true, the flow of control jumps back up to do, and the statement(s) in the loop executes again. This process repeats until the given condition becomes false.

Flow Diagram



Q20.Find the output of the following program segments

a)	b)	c)

#include<stdio.h>
int main()
{
int i;
for (i=1;i=2;i++)
{
Printf("IMS Ghaziabad\n");
}
}
	#include <stdio.h.>
	int main()
	{
	int i = 1;
	while (i <= 2)
	{
	printf("IMS Ghaziabad\n");
	i = i + 1;
	}
	}
		#include <stdio.h>
		Void main()
		{
		int a = 10, b=100;
		if(a > b)
		printf("Largest number is %d\n", a);else
		printf("Largest number is %d\n", b);
		}