3.what is the difference between multitasking and multiprogramming os

Multiprogram	Multitask
in MP multiple processes run at same time on a single processor	MT is when more than one task is executed at single time utilizing multiple CPU.
based on concept of context switching	based on concept of time sharing
utilizes single CPU	multiple CPU
takes more time to execute processes	takes less time to execute processes
idea is to reduce CPU idle time	idea is to allow multiple processes to run at same time via time sharing

2.who Invented c and Linux

C – Denni's Ritchie Linux – Linus Torvalds

1.size of long long int, size of long double, size of 3.14

1. short int – 2
   unsigned short int – 2
   unsigned int – 4
   int – 4
   float – 4
   double – 8 (double floating)
   long double – 16
   long int – 4
   char – 1

4.what is binary coded decimal

A system for coding a number in which each digit of a decimal number is represented individually by its binary equivalent

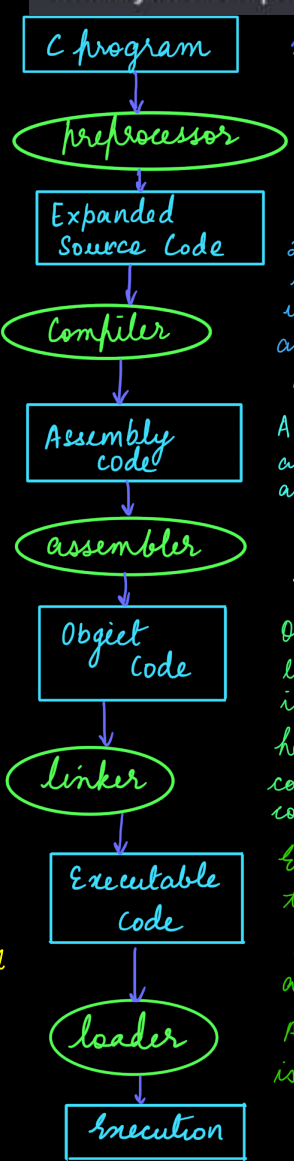
5.what is the drawback of one's complement

In ones complements method there are two zeroes → +0, −0 which is problematic
0(0000 and 1111)

6.what do you mean by algorithms,advantages of algo

A set of instructions for solving a problem or accomplishing a task.
Advantages → acts as blueprint of a program and helps during program procedure

7.lifecycle of c program



1. C program is sent to preprocessor first
   preprocessor converts preprocessor directives into respective values and generates expanded source code.
2. Expanded source code is sent to compiler which compiles the code and converts it to Assembly code
   Assembly code is sent to assembler which assembles the code and converts it to object code.
   Object code is sent to linker. linker links it to library such as header files. Then it is converted into executable code.
   Executable code is sent to loader which loads it into memory and then executed.
   After execution, output is sent to console.

8.storage class specifiers - scope and life

Storage classes are used to describe the features of a variable / function like SCOPE, VISIBILITY & LIFE-TIME

C uses 4 storage classes

Storage Specifier	Storage	Initial Value	Scope	Life
auto	Stack	Garbage	within block	End of block
extern	Data segment	0	Global multiple files	Till end of program
Static	Data segment	0	within block	Till end of program
Register	CPU register	Garbage	within block	End of block

Scope determines the life of a variable

9.Header file of malloc, calloc

<Stdlib.h>

10.use of #define

The #define preprocessor directive is used to define constant or micro substitution

A macro is a fragment of code that is given a name. You can define a macro in C using #define preprocessor directive

eg #define C 299792458

here when we use C in the program it is replaced with 299...

11.return type of size of operator

It returns an unsigned integer type of at least 16 bit

13.what is XOR operator

^ (bitwise XOR) in C takes two numbers The result of XOR is 1 if the numbers are different. and returns 0 if the numbers are same

14. Define typedef and enum

typedef is a keyword used to assign alternative names to existing datatype. Eg when names of datatype becomes too complicated to use in programs.

SYNTAX

typedef <existing_name> <alias_name>

eg typedef unsigned long ulong;

It can also be used to give a name to a user defined data type as well.

eg typedef struct Eleenta

15.range of long int

TYPE	STORAGE SIZE	RANGE
char	1 byte	-128 to 127 / 0 - 255 signed / unsigned
int	2 or 4 bytes	-32,768 to 32767 or -2,147,483,648 to 2147,483,647 signed ↑ 0 - 65,535 or 0 - 4,294, 967,295 unsigned int ↑
short or short int	2 bytes	-32,768 to 32,767 signed ↑ 0 - 65,535 ↖ unsigned
long or long int	8 bytes or (4 for 32 bit)	-9×10^{18} to 9×10^{18} signed ↑ 0 to 18×10^{18} ← unsigned

TYPE	STORAGE SIZE	RANGE	PRECISION
float	4 byte	1.2×10^{-38} to 3.4×10^{38}	6 decimal places
double	8 byte	2.3×10^{-308} to 1.7×10^{308}	15 decimal places
long double	10 byte	3.4×10^{-4932} to 1.1×10^{4932}	19 decimal places

16.define bios, Post

The BIOS is firmware which contains information for hardware, operating systems and drivers to interface with the motherboard components. It stores information concerning what hardware is available.

The POST is the Power On Self Test which the BIOS runs when you power on the computer. It tests the various components to ensure correct function before passing program control to the boot system on the device selected as the boot device in the BIOS settings.

17.advantage of functions

- Enhances Readability
- Control flow can be easily managed
- Reduces complexity
- For reusability

18.explain pointer arithmetic

A pointer in c is an address, which is a numeric value. Therefore, you can perform arithmetic operations on a pointer just as you can on a numeric value. There are four arithmetic operators that can be used on pointers: ++, --, +, and -

1. Increment & Decrement

```
eg  ptr1 = &N;
    printf("%p", ptr1);
    ptr1++;
    printf("%p", ptr1);
```

OUTPUT : 0x950 0x954 (4 is size of int)

```
eg  ptr1 = &N;
    printf("%p", ptr1),
    ptr1--;
    printf("%p", ptr1);
```

OUTPUT 0x956 0x952 (4 is size of int)

ADDITION

when a pointer is added with a value then

pointer = pointer + (value * sizeof data)

```
ptr2 = 0x770
eg  ptr2 = ptr2 + 3
    print(ptr2)
```

output = 0x776

SUBTRACTION

```
ptr2 = 0x770
eg  ptr2 = ptr2 - 3
    print(ptr2)
```

output = 0x764

SUBTRACTION OF 2 POINTERS

possible only when pointers are of same type

```
eg  ptr1 = &N ; ptr2 = &N;
    ptr2 += 3;
    int x = ptr2 - ptr1;
    print(x)
```

OUTPUT = 3

19. Use of 2 D arrays

It is convenient to store data in the form of a grid or table with rows and coloumns.

20.explain bubble sort

Bubble sort, sometimes referred to as sinking sort, is a simple sorting algorithm that repeatedly steps through the list, compares adjacent elements and swaps them if they are in the wrong order. The pass through the list is repeated until the list is sorted.

21.define dynamic memory allocation

Since C is a structured language, it has some fixed rules for programming. One of them includes changing the size of an array. If e we want to change the size of the array we have to use dynamics memory allocation

22.define memory leak

a memory leak is a type of resource leak that occurs when a computer program incorrectly manages memory allocations in a way that memory which is no longer needed is not released. A memory leak may also happen when an object is stored in memory but cannot be accessed by the running code.

memory allocated must always be freed

23.what are the 3 levels of cache memory.

Cache memory, also called CPU memory, is high-speed static random access memory (SRAM) that a computer microprocessor can access more quickly than it can access regular random access memory (RAM).

Cache memory is fast and expensive. Traditionally, it is categorized as "levels" that describe its closeness and accessibility to the microprocessor. There are three general cache levels:

L1 cache, or primary cache, is extremely fast but relatively small, and is usually embedded in the processor chip as CPU cache.

L2 cache, or secondary cache, is often more capacious than L1. L2 cache may be embedded on the CPU, or it can be on a separate chip or coprocessor and have a high-speed alternative system bus connecting the cache and CPU. That way it doesn't get slowed by traffic on the main system bus.

Level 3 (L3) cache is specialized memory developed to improve the performance of L1 and L2. L1 or L2 can be significantly faster than L3, though L3 is usually double the speed of DRAM. With multicore processors, each core can have dedicated L1 and L2 cache, but they can share an L3 cache. If an L3 cache references an instruction, it is usually elevated to a higher level of cache.

24.How do you run a program in the Linux terminal

```
gcc a.c -o a -Wall
./a
```

25.explain construction of hard disk drive

Hard disks are rigid platters, composed of a substrate and a magnetic medium. The substrate – the platter's base material – must be non-magnetic and capable of being machined to a smooth finish. It is made either of aluminum alloy or a mixture of glass and ceramic.

26.role of os

An operating system has three main functions: (1) manage the computer's resources, such as the central processing unit, memory, disk drives, and printers, (2) establish a user interface, and (3) execute and provide services for applications software.

27.name the three different modes in vi editor

COMMAND MODE → When vi starts up, it is in command mode. This mode allows us to move, delete, copy & paste files.

INSERT MODE → This mode enables you to insert text into the file. To come to insert mode, press [i]

LAST LINE MODE (ESCAPE MODE) → This mode lets you perform tasks like saving files, executing commands etc To come to insert mode, press [:]

28.what are different types of registers

Registers are very fast computer memory which are used to execute programs and operations efficiently

The sole purpose of having register is fast retrieval of data for processing by CPU. Though accessing instructions from RAM is comparatively faster with hard drive, it still isn't enough for CPU. For even better processing, there are memories in CPU which can get data from RAM which are about to be executed beforehand. After registers we have cache memory, which are faster but less faster than registers.

ACCUMULATOR →	• Most frequently used to store data
Memory Adress Registers (MAR) →	holds address of the location to be accessed from memory
Memory Data Registers (MDR) →	contains data to be written or read out from adressed locatn
General Purpose Registers →	used to store temporary data during ongoing operations
Program Counter (PC) →	tracks execution of program
Instruction Register →	holds the instruction which has to be executed.
Condition Code Register →	It contains diff flags that indicate status of any operation.