20/11/25

1) What is "C" language?

C language is a high-level programming language used to develop software like operating systems, compilers, databases, and embedded systems.

* Simple definition:-

"C" is a general-purpose, structured programming language that allows you to write programs that directly interact with computer hardware.

* Key points:-

- Developed by: "Dennis Ritchie" in 1972.
- Type: High level, but close to machine language.
- Fast & Efficient: used in system programming.
- Portable: Same C program can run on different computers
- Foundation language:- many languages like C++, Java, Python borrow concepts from C.

* Where C is used:-

- operating systems (like early versions of unix, parts of linux)
- Embedded systems (micro controllers)
- Game development
- Compilers and interpreters
- Device drivers

--> Example Programm:-

```
#Include <stdio.h>
int main (){
    Print-f ("Hello, world!");
    Return 0;
    }
```

* Applications of 'C' Programming.

-Here are the main application of C programming

Explained simply:-

* Operating Systems:-

"C" is used to build System Software

- UNIX, LiNux, kernel, windows, parts are written inc,

* Embedded Systems:-

C is widely used in microcontrollers and hardware programming.

- washing machines
- Cars (ECUs)
- medical devices
- Smart home devices

* Game development:-

"C" is used to build game engines and graphics libraries

- Example: Early game engines were written in C.

* Compilers & Interpreters:-

many language compliers are build using C.

- C++, Java, Python intepreters use C/C++ internally.

* Data base Systems:-

Popular data Base use C for speed

- MySQL
- PostgreSQL

* Device Drivers:-

C is used to write drivers for:

- Printers
- keyboards
- Graphic

* Networking:-

Used in

- Socket Programming
- Network tools (like wire shark /nmap)

* System Applications:-

C is the back bone of many system tools

- Text Editors
- File systems
- Antivirus Software.

* Scientific & Engineering Applications.

C is used where speed matters

- Simulations
- modeling
- High-Performance computing.

* What is Variable?

A variable is a name give to a memory location in a program where we store data.

Simple definition:-

A varible is something that holds a value which can change during the execution of a programm.

Example:-

```
int age = 20;
```

Here:-

- int → data type
- age → varible name
- 20 → value stored in the variable

Important Points:-

- A variable stores data in memory
- Its value can be changed
- It must be declared before use
- Data type decides what kind of value it stores (int, float, char etc).

* What are different data type in C Programming.

Here are the different data types in C programming

* Primary (Basic) Data Types.

These are the fundamental built-in types.

Data type	Description	Example
"int"	Stores integer number	10, -5
"float"	Stores decimal Numbers	3.14
"double"	Stores larger decimal numbers	12.345678
"char"	Stores a single character	'A', 's'

* Derived Data types

These are created from basic types.

- Array
- Pointer
- Structure (struct)
- Union
- Function

* User-defined Data type:

Created by a Programmer

- Struct
- Union
- Enum (Enumeration)
- typedef

* Void data type:-

used when a function returns nothing or when a pointer can point to any type.

Example:-

```
void show ();
```

✡ Simple Exam - Ready Answer:-

'C' has four categories of data types

* Basic -> int, float, double, char
* Derived -> array, pointer, structure, union.
* User-defined -> struct, union, enum, typedef
* Void -> No value / No return.

5) What is format Specifier:-

A format specifier is a symbol used in C programming to tell the compiler what type of data you want to print or using printf () or scanf ().

* Simple definition:

A format specifier the type of data (int, float, char, etc) that will be displayed or taken as input.

* common format specifiers in c.

Data type	Format specifier	Example
int	%d	printf("%d", age);
float	%f	Printf ("%f", price);
double	%.1f	Printf ("%.1f", amount);
char	%c	Printf ("%c", letter);
String	%s	printf ("%s", name);
unsigned int	%u	Printf ("%u", num);
long int	%ld	printf ("%ld", big);
long long int	%lld	Print-f("%lld", very big);
Hexa decimal	%x / %X	Printf ("%x", value);
octal	%o	printf ("%o", value);

Example Program:-

```
#include <stdio.h>
int main () {
    int age = 20;
    float marks = 95.5;
    char grade = 'A';
    printf ("age = %d\n", age);
    printf ("%marks = %f\n", marks);
    printf ("Grade = %c\n", grade);
```

Return 0;