C LANGUAGE.

Q.1)-What is computer?

→ Computer is an electronic machine it's works "arithmetical" as well as "logical" function or computer is a programmable machine design to automatically process a sequence of various arithmetical and logical operation. It is made of English word (Latin word) "to compute".

Q.2)-What are the advantages of computer?

→ Some advantages of computer are-

1. Fast work. (speed)
2. Accuracy.
3. Storage.
4. Diligence.
5. Versatile. (Multiple works)
6. Automation. (Automatic work)
7. No feeling.
8. No intelligence or IQ.

Q.3)- What are the disadvantages of computer?

→ Some disadvantages or limitation of computer are-

1.Lack of Intelligence.

2.Depends on electricity.

3.Effect to virus.

➢ Application of computer-

Integration	Technology	Typical number of Device	Typical function
➢ SSI	BIPLOAR	10-20	GATES AND FLIP FLOP.
➢ MSI	BIPLOAR AND MOS	50-100	ADDRESS AND COUNTERS.
➢ LSI	CMOS	100-10000	ROM & RAM
➢ VLSI	CMOS (Mostly)	10000-500000	PROCESSOR
➢ WSI	CMOS	500000 & MORE	DSP & SPECIAL PURPOSE.

➢ NOTE-

SSI- Small scale integration.

MSI-Medium scale integration.

LSI-Large scale integration.

VLSI-Very large-scale integration.

WSI- Wafer scale integration.

ROM-Reads only memory

RAM-Random access memory

ROM-Rom is used to store the programs and data being used by the CPU in real-time. The data on the random-access memory can be read, written, and erased any number of times.

RAM-Ram is a type of memory where the data has been pre-recorded. Data stored in ROM is retained even after the computer is turned off.

➢ SOFTWARE ARE OF TWO TYPES.

1.System software.

→System software is software design to provide a platform for other software.

Ex- Include operating system like→ Mac OS, LINUX, Android and Microsoft windows, Computational science software, Game engine, Search engines, Industrial automation and Software as service application.

2.Application software.

→Application software is a software that allows user to do user-oriented task such as create text documents, play games, listen to music or browse the web.

➢ LANGUAGE TRANSLATOR.

Translator is a computer programme or set of instruction that converts instruction written in programming language or source code to machine language or object code.

There are “three” types of language Translator→

1.Assemblers.

→Translate the source programme in assembly language into machine code.

2.Compilers.

→Translate the user source programme written in high level language to an object code ready to Execution.

It reads the entire source collecting and organising the error. We have to correct the syntax or it won’t compile.

After correcting all the mistakes, it translates the entire source code into object mode.

3.Interpreter.

→Translate the user source programme written in high level language to an object code. A compiler translates an entire programme but an interpreter translates into visible line, an instruction executes the translated object code without shaving it.

So, when all programmes are executed at the end it gives result.

➢ ABOUT C

C is a general-purpose programming language that is extremely popular, simple and flexible to use. It is a structured programming language, that is machine independent and used to write various application, operating system like windows and many other complex programmes like oracle, database, python, interpreter, and many more.

“**It is said that C is a mother programming language and also C is god’s programming language**”.

One can say, C is base for the programming, if you know ‘C’ you can easily crap the knowledge of other programming language that use the concept of ‘C’.

It is essential to have a background in computer memory mechanism because it is an important aspect when dealing with the ‘C’ programming language.

TOP TEN LANGUAGE RANK.

1. PYTHON
2. C++
3. JAVA
4. C
5. C#
6. PHP
7. JAVA SPRIT
8. GO
9. ASSEMBLY
10. MANY MORE.

➢ HISTORY OF C.

C programming language is producible language that supports structured programming and provides low level access to a system memory.

Dennis Ritchie invented C language in 1972 at AT&T (in USA). (Then called Bell laboratory), where it was implemented in the UNIX system on DEC-PDP2. It was also the successor of the B programming language, invented by Ken Thomson.

C was design to overcome the problems encountered by BASIC, B and BECL programming language. BY 1980, C become the most popular language for main frames, micro-computers and mini-computers.

➢ FEATURES OF C PROGRAMMING.

Loved by programmers for doing low level coding and embedded program. C has found its way, gradually in the semi-conductor, hardware and storage industries the most important features provided by the C programming language includes-

1. It has inbuild functions and operators that can solve virtually any complex problems.
2. C is the combination of both low level (assembly language and high-level programming language).
   also, it can be used to write an application and interact with low level system memory and hardware.
3. Programs written in C are speedily due to the support provided by its data-type and operators.
4. It can be written on parodically, any operation system and even works in most hand-held device.
5. It is easily extendable as C++ was derived from C with addition likes OOPS (object-oriented programming system) and other features.
6. The function and operators are supported by the library provided by the programming language itself.

➢ FEATURES OF C LANGUAGE.

- Procedure language.
- Fast and efficient.
- Easy to extend.
- Portability.
- Middle level language.
- Library with rich function.
- General purpose language.
- Statically type.
- Rich set of build in operators.
- Case sensitive.
- Small and simple.
- Powerful.
- Syntax based.
- Structured oriented.
- Compiler based.
- Usage of pointer.
- Platform dependent.
- Very simple and powerful

Q. Why C language is so important?

→C language cases: -

I. Oracle is written in C.
II. Core library of android are written in C.
III. MY SQL is written in C.
IV. Almost every device drive is written in C.
V. Major part of web browser is written in C.

VI. UNIX operating system is developed in C.
VII. C is world most popular programming language.

Q. For student why C language is important?

I. C is important to build programming skills.
II. C covers basic features of all programming language.
III. C is most popular language for hardware dependent program and now campus recruitment process.

NOTE→ C has a (mid-level) programming language.

(Used with high level and low level).

Q. How to write C programme, compile and run the first C program.

→Step1. How to install C.

There are many compilers available for C & C++. You need to download anyone.

i. We are going to use turbo C++ or web C. It will work for both C & C++. To install the turbo C++ software, you need to follow this step.
   a. Download turbo C++.
   b. Create turbo directory C drive and extract the tC3.zip in C:/ turbo drive.
   c. Click on the tc application file located inside (C:)→(C path) (C:/ t c) Bin to write the C programme.

→Step2.First open the C console for write C programme.

```
#include<stdio.h>
Int main()
{
Printf("Hellow C language");
Return 0;
}
```

- #include<stdio.h>→ Includes the standard input-output library function.
- Printf()→ Function is defined in <stdio.h>.
  The printf() function is used to print data on the console.
- Int main()→The main() the function is the entry point of every programming C language.
- Return 0→ The return 0 statement return execution status to the OS. The 0 value is used for successful execution and 1 for unsuccessful execution.

❖ How to compile and run the C programme.

→ There are two ways to compile and run the C programme by menu and by shortcut.

I. By menu: -
   a) Now click on the compile menu
   b) Then go to compile sub menu to compile the C programme.
   c) Then click on the run menu.
   d) Then run sub menu to run the C programme.

ii. By shortcut: -

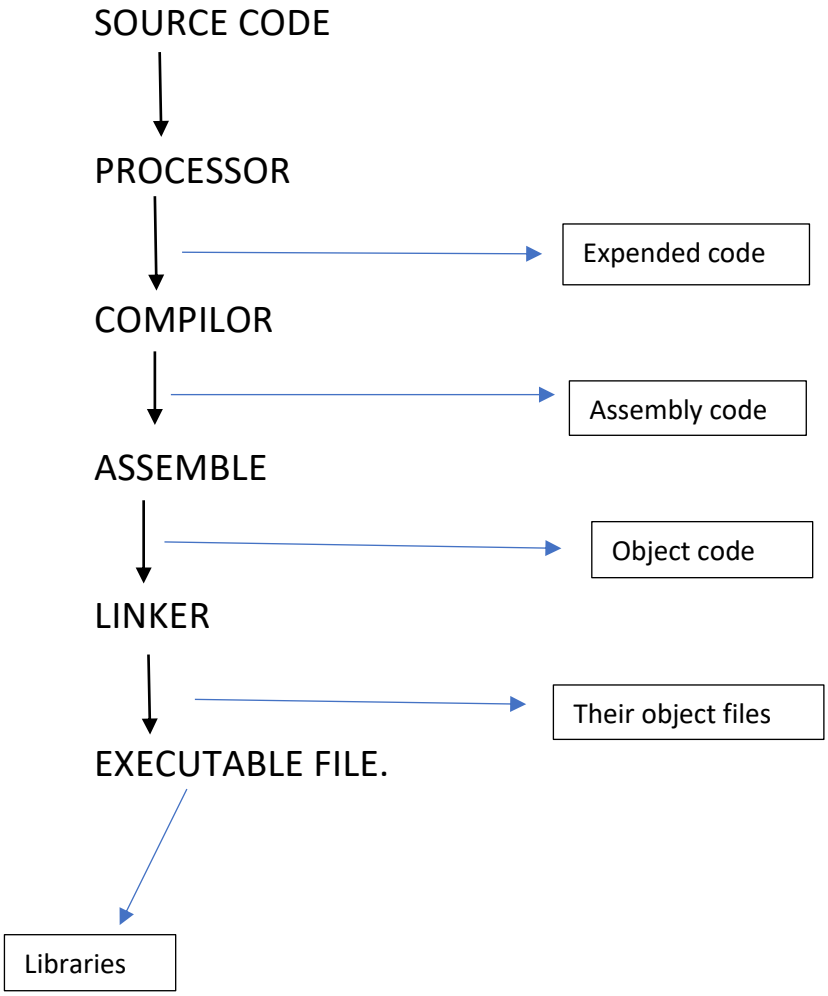
a) By shortcut command we can press ctrl+F9 keys to compile and run the programme directly.
b) After that you will see the following output on your computer screen.
c) You can view the user screen any time by pressing the Alt+F5 (alter+F5) keys.
d) Now Esc (Escape) to return to the turbo C++ console.

➢ What is a compilation?

→ The compilation is the process of converting the source code into the object code. It is done with the help of compiler. The compiler checks the source code for the systematically or structural errors and if the source code is errors free then it generates the object code.

The C compilation process converts the source code taken as an input, the object code or machine code. The C compilation process can be divided into four steps: -

1. The processing.
2. Compiling.
3. Assembling.
4. Linking.



1.The Processor→ The source code is the code which is written in a text editor and then the processor expands this code after expending the code, the expended code is passed to the compiler.

2.Compiler→ The code which is expended by the processor is pass to the compiler. The compiler converts this code into assembly code or we can say that the C compiler converts the pre-processed code into assembly code.

3.Assembler→ The assembly code is converted into object code by using assembler, the name of the object file generated by the assembler is same as the source file. The extension of the object file in DOS is ".obj" and in UNIX the extension is "O" if the name of the source file is "hellow.c" then the name of the object file would by "hellow.obj".

4.Linker→Many all the programs written in C use library function. These library functions are pre-compile and the object code of these library files which stored with ".lib" or ".a" extension. The main working of the linker is to combined the object code of library file with the object code of our programs.

Ex: - If we are using "printf" function in a program then the linker adds its associated codes in an output files.

❖Application of C programming: -

→C was initially use for system development work. Particularly this program makes the operating system. C was adapted as a system development language because it produces code that runs nearly as fast as the code written in assembly language. Some examples of use of C are: -

1. Operating system.
2. Language compiler.
3. Assembler.
4. Text editor.
5. Network drive.
6. Modern programs.
7. Database.
8. Language interpreter.
9. Utilities.

❖ Printf() and Scanf() in C:-

➔

➔ The printf() and Scanf() function are used for input and output in C language. Both function are inbuild library functions defined<stdio.h> → Header file.

❖ Printf() function

→The printf() function is used for output. It prints the given statements to the console. The syntax of printf() function is given below: -

Printf (“Format strain”, argument-list);

The format strain can be %d (Integer), %C (Character), %S (string), %F(float), etc.

❖ Scanf() function

❖ → The scanf() function is used for input. It reads the input data from the console.

Syntax→ Scanf(“Format string”, argument-list);

Q. Write a program to print a cube of given number?

```
#include<stdio.h>

Int main ()

{

Int number;

Printf (“enter number :”);

Scanf (“%d”, &number);

Printf (“Cube of number is %d”. number*number*number);
```

```
Return 0;
}
```

- After run open new window of C where enter a number ex:- Cube of number is 125 if we type 5.

- The Scanf (“%d”, &number): - Statement reads integer number from the console and stores the given value in a number variable.

- The printf (“Cube of number is %d”. number*number*number): - Statement prints the number on the console.

Q. Write a program to print Sum of two numbers?

```
#include<stdio.h>
Int main()
{
Int a=0,b=0,result=0;
Printf(“enter first number :”);
Scanf(“%d”,&a);
Printf(“enter second number :”);
Scanf(“%d”,&b);
Result=a+b;
Printf(“sum of 2 numbers : %d”,result);
Return 0;
```

}

Q. Write a program to print difference of two numbers?

```
#include<stdio.h>
Int main()
{
Int a=0,b=0,result=0;
Printf(“enter first number :”);
Scanf(“%d”,&a);
Printf(“enter second number :”);
Scanf(“%d”,&b);
Result=a-b;
Printf(“difference of 2 numbers : %d”,result);
Return 0;
}
```

- Data types in C→ A datatype specify the type of data that a variable can store such as integer, floating, and character, etc.

There are four types of datatypes in C: -

1.Basic.

2.Derived.

3.Enuneration.

4.Void.

1.Basic datatypes→ The basic datatypes are integers based and floating point based. C language supports both signed and unsigned letters.

The memory size of the basic datatypes may change according to 32 or 64 'bit' operating system.

Ex: - int, char, float, double.

2.Derived datatypes→ Array, pointer, structure, union.

3.Enuneration datatypes→ Enum.

4.Void datatypes→ Void.

- Note: - Use Scanf() function to take input from the user and printf() function to display output to the user.

- Output in C: - In C programming printf() is one of the main output function. The function sends formatted output to the screen.

EX: - #include<stdio.h>

```
Int main()
{
Printf("Hello world C programming");
Return 0;
}
```

Display the string inside quation

All valid C program must contain the main() function. The execution being from the start of the main function.

❖ Integer output: -

```
#include<stdio.h>
Int main()
{
Float number=2.5;
Double number=3.5;
Printf(“number 1=%f\n”,number 1);
Printf(“number 2=%lf”);
Return 0;
}
```

❖ Character: -

```
#include<stdio.h>
Int main()
{
Char=a;
Printf(“Character=%c”);
Return 0;
}
```

- Variable in C→ A variable is the name of memory location. It is used to store data. Its value can be changed and it can be reused

many times. It is away to represent memory location through symbol so, it can be easily identified.

Syntax: - type, variable-list;

Ex: - int a;

Float b;

Char c;

Here a, b, c is variable. The int, float, char are datatypes. We can also provide values while declaring the variables as given below.

- Int a=10, b=20; // declaring two variable of integer type.
- Float f=20.8;
- Char c= 'A';

❖ Rules for defining variables: -

i. A variable can have alphabets, digits and underscore (_).
ii. A variable name can start with alphabet and underscore only. It cannot start with digit.
iii. No, white space is allowed within the variable name.
iv. A variable name must not be any reserved word or key word.
Ex: - int, float, etc.

❖ Valid variable name: -

- Int a;
- Int _a
- Int a10;
- Int _10;

❖ Invalid variable name: -

- Int 10;
- Int a b;
- Int long;

➢ Types of variables in C→

→There are many types of variables in C: -

1. Local variable→ A variable that is declared inside the function or block is called a local variable. It must be declared at the start of the block.
   Ex: - void function1()
   {
   Int X=10;//Local variable
   }

   - You must have to initialise the local variable before it is used.

2. Global variable: - A variable that is declared outside the function or block is called global variable.
   Any function can changed the value of global variable.
   It is available to all the function. It must be declared at start of the block.
   int value=20;//global variable.
   Void function 1()
   {
   Int X=10;// Local variable;
   }

3. Static variable→ A variable that is declared with the static keyword is called static variable. It written its value between multiples function box.

   Void function1()
   {
   Int X=10;//Local variable;
   Static int y=10;//static number;

X=x+1;
Y=y+1;
Printf(“%d%d,x,y”);

If you call this function many times the local variable can print the same value, for each function called.
Ex: -11,11,11 and so on.
But the static variable will print the incremented value in each function called Ex: - 11,12,13 and so on

4. Automatic variable→ All variable in C that are declared inside the block are automatic variable by default. We can declare an automatic variable using auto keyword.

```
Void main()
{
Int x=0;//Local variable also automatic
Auto int y=20;//automatic variable
}
```

5. External variable→ We can share a variable in multiple source file by using an external variable. To declare an external variable you need to use extern keyword to use extern keyword.
Ex: - extern int=10;// external variable also global variable.

```
#include”my file.h”
#include<stdio.h>
Void print value()
{
Printf(“Global variable : %d”,global-variable);
}
```

❖How to print Hellow world

```
#include<stdio.h>
#include<conio.h>
Void main()
{
Clrscr();
Printf("Hellow world/n");
Getch();
}
```

- ❖ <Conio.h>→ <Conio.h> is a header file. It stands for console input output header file, which manage input\output on console-based application. <conio.h> is a header file used in old ms doc compilers to create text user interface. It is not part of the C programming language the C standard library. Some of the most commonly used function of <conio.h> are clrscr(), getch(), getch.che(), kbhit, etc. Function of <Conio.h> can be used to clear screen, change colour of text and background.

- ❖ Clrscr()→ This is used to clear the previous output in the output window. If we don't use it in our programme then the output window will become messi.

- Getch()→ This function is used to hold the output window otherwise when you run your code it will display the output window for a fraction of second. So, it is necessary to use it, if we want to hold our output screen.

Datatypes in C: -

Datatypes specify in what form we can represent and store information in our C programme. They let us know how that information will be used and what operation can be performed on it.

Datatypes also determine what type of data our variable can hold as each variable in C needs to declared what datatypes it represents: -

There are six datatypes been into the language but you can converts between different types which makes it not strongly typed.

I. Char datatypes in C→ The most basic datatypes in C are Char. You store it a single character such as letters of the ASCII (American standard code Integration).
Or (American standard code for information interchanged).
Chat like a 'a' 'z' or '!'.
Notice how I use "marks surrounded the single" (Char) you can't use double quation in this case.

(Char) also lets you store numbers raising from (-12 to 127) and in both cases, use one byte of memory.

And unsigned (Char) can take a range of numbers from (0-225).

❖ The float datatypes in C: -

→Floats are floating point value which is a number with decimals also called a (Real number). With single precision it allocates 4 bytes of memory.

❖Double datatypes in C: -

→Double is a floating-point value which has bigger value than that of a float. It can hold more memory 8 bytes compare to float and its double precision.

Along double is the largest size compare to floats and double holding at least 10 bytes of memory but can even hold up-to 12 or 16 bytes of memory and lastly the void type essentially means nothing or no value.

❖Format specifier: -

Datatypes	Memory	Range	Format specifier
Short int	2	-32768 to 32768	%hd
Unsigned short int	2	0 to 65535	%hu
Unsigned int	4	0 to 4294967295	%u
Int	4	-2147483648 to 2147483647	%d
Long int	4	-2147483648 to 2147483647	%ld
Unsigned long int	4	0 to 4294967295	%lu
Long long int	8	-(2^63) to (2^63)-1	%lld
Unsigned long long int	8	0 to 18446744073709551615	%llu
Signed char	1	-128 to 127	%c
Unsigned char	1	0 to 55	%c

Float	4	0	%f
Double	8		%lf
Long double	16		%lf

❖Add two number: -

```
#include<stdio.h>
#include<conio.h>
Int main()
{
Clrscr();
Int a,b;
Printf(“enter the first number :”);
Scanf(“%d”,&a);
Printf(“enter the second number :”);
Scanf(“%d”,&b);
Int c=a+b;
Printf(“Sum of two number : %d”);
Getch();
}
```

❖ Programs for add, subtract, multiply, and divide.

```
#include<stdio.h>
#include<conio.h>
Int main()
{
Clrscr();
Int a,b;
Printf(“enter the first number :”);
Scanf(“%d”,&a);
Printf(“enter the second number :”);
Scanf(“%d”,&b);
Int c=a+b;
Int d=a-b;
Int e=a*b;
Int f=a/b;
Printf(“addition of two number is %d”,c);
Printf(“subtract of two number is %d”,d);
Printf(“multiplication of two number is %d”,e);
Printf(“division of two number is %d”,f);
Getch();
Return 0;
}
```

❖Fibonacci series in C: -

In case of Fibonacci series next number is the sum of previous two number for Ex: - 0,1,1,2,3,5,8,13,21 etc.

The first two number of Fibonacci series are 0 and 1.

There are two types of Fibonacci series→

i. Fibonacci series without recursion.
ii. Fibonacci series using recursion.

I. Fibonacci series without recursion→

```
#include<stdio.h>
Int main()
{
Int n1=0,n2=1,n3,I,number :
Printf(“enter the number of elements :”);
Scanf(“%n%d”,n1,n2);
For (i=2,i< number; ++i);
{
N3=n1+n2;
Printf(“%d”,n3);
N1=n2;
N2=n3;
}
```

```
Return 0;
}
```

Output→ 0,1,1,2,3,5,8,13,21,34,55,89,144,233,377.

Enter the number of element.

II. Fibonacci series using recursion in C→

```
#include<stdio.h>
Void print Fibonacci (int n)
Static int n1=0,n2=1,n3;
If (n>0)
{
N3=n1+n2;
N1=n2;
N2=n3;
Printf("%d",n3);
Print Fibonacci (n-1);
}
}
Int main()
{
Int n;
Printf("enter the number of element :");
Scanf("%d",&n);
```

```
Printf(“Fibonacci series :”);
Printf(“%d%d,0,1”);
Print fibonacci (n-2);
Return 0;
}
```

(n-2)→ because two number are already printed.

Output→

enter the number of elements 15.

0,1,1,2,3,5,8,13,21,34,55,89,144,233,377.

❖ Reverse number in C programming: -

→We can reverse number in C using loop and arithmetic operation. We are getting a number from user and reverse that number output.

```
#include<stdio.h>
Int main()
{
Int n, reverse=0,rem;
Printf(“enter a number :”);
Scanf(“%d”&n);
While (n1=0);
{
Rem=n%10;
Reverse= reverse*10+rem;
```

```
n/=10;
}
Printf(“reversed number : %d”,reverse);
Return 0;
}
```

Output→ enter a number 3→3,2,1.