C Programming

1. Give brief description of C language.

C is a structured programming language. It is machine independent language. It was developed by Dennis Ritchie at Bell Telephone Laboratories in 1972 A.D. Compilers are used to translate the programming code into machine (binary) code.

2. When, where and who developed C programming language?

C programming language was developed in 1972 A.D. by system programmer Dennis Ritchie at Bell laboratories.

3. Why C is called middle level language?

C is called middle level language because it combines elements of a high level language with some features of assembler.

4. List some advantages or features of structured programming.

a. Effective programs can be developed.
b. Easy to understand and modify the program block.
c. Each module can be tested separately, so debugging is easy.
d. A module written in one program can be used in another program.
e. Programs can be divided into simpler blocks.
f. Simultaneous coding of program by multiple users is possible.

5. List some characteristic features of C language.

a. It is simple and easy to use
b. It occupies less memory space.
c. Programs written in C language are efficient and fast
d. Multiple programmers can work simultaneously on a program.

6. List some disadvantages of C language

a. There is no runtime checking.
b. It does not support concept of Object Oriented Programming(OOP)
c. It does not provide concept of namespace.

7. Why C is called structured programming language?

C is called structured programming language because a program in C language can be divided into small logical functional modules or structures with the help of function procedure.

8. List any two data types used in C language.

The basic data type used in C language are a. int b. float c. char d. double

9. Write the memory consumption of string integer, float and double data type in C language

a. Character Data Type (char) : It is used for storing character (string) enclosed within single quotes **(1 byte)**
b. Integer Data Type (int) : It is used with such variables which stores integer values. **(2 bytes)**
c. Float Data Type (float) : It is used to store floating point numeric value. **(4 Bytes)**
d. Double Data Type (double) : It is used to store large floating point numeric value. **(8 Bytes)**

10. Data Type and its size and range

Data Type	Keyword	Size	Range
Character or string	char	1 byte	-128 to 127
Integer	int	2 bytes	-32768 to 32767
Floating number	float	4 bytes	3.4×10^{-38} to $3.4 \times 10^{+38}$
Double precision number	double	8 bytes	1.7E-308 to 1.7E308

11. Differentiate between int and float data type in C language.

float	int
1. It is used to store floating point numeric value	1. It is used to store integer values
2. Memory consumption of float is 4 bytes	2. Memory consumption of int is 2 bytes

12. Define keywords and list any three keywords of C language

Keywords are special words which have meaning and reserved by the compiler in C language. Keywords are also known as reserved words. Some keywords of C language are : auto, long, return, switch, char, register, for , do, static, const, void etc.

13. List any four library functions used in C language.

a. printf ( ) : It is used to display the formatted output on the screen
b. clrscr ( ) : It is used to clear the screen
c. scanf ( ) : It is used to accept input from the standard input device such as keyboard.
d. getch ( ) : It is used to accept a single character from the keyboard but doesn't display on the screen.

14. What is Identifier in C language.

Identifiers are used to identify or name various program-elements such as variables, symbolic constants, functions etc.

15. What is language processor?

Language processors are the programs that translate the program written in other languages into machine language. Eg: Compiler, Assembler

16. What is compiler, assembler and interpreter?

Compiler : It is a program that translate the high level language code into machine language.
Assembler : It is a program that translate the low level language code (assembly language) code into machine language.
Interpreter : It doesn't convert the whole program but directs CPU to convert each high level program statement into machine code.

17. What is header file?

Header file is a standard file that contains definitions of variables, symbols, operations and functions necessary for the functioning of the program. (stdio.h, string.h, math.h, ctype.h)

18. What are operators? What are the different types of C operators

Operators are the symbols which are used to compute values and perform different types of operation with operands. The different types of operators in C languages are :
Arithmetic operator (+, -), Unary operator (++, --), Relational operator (<, >, ==), Logical operator ((&&, !) , Assignment operator (=).

19. What is unary operator? What are the two unary operators supported by C language.

The operator which perform increment or decrement value by 1 and that operates on one operand is known as unary operator. The operators are ++ (increment), -- (decrement)

20. Write any two application of C language

Two application of C language are simple program development and system program development.

21. Write any two rules for writing variable name in C language

a. The name can contain letters, digits and the underscore (-) sign.
b. The variable name can be up to 31 characters.
c. Variable name is case sensitive
d. C keywords are not allowed as variables

22. Differentiate between C and QBasic programming language.

QBasic	C language
1. It is high level language	1. It is middle level language
2. It supports both sub procedure and function procedure	2. It supports only function procedure.
3. It is basically used for developing application software.	3. It can be used to develop system software and application software.
4. It supports limited data types and 159 keywords	4. It supports wide range of data types and 32 keywords

23. Write any two similarities between C and QBasic programming language.

a. Both language can be used to develop structured programs
b. Both languages support local and global variables
c. Both languages support procedures.

C Programs

1. Write a Program to input length and breadth and calculate the area and perimeter of rectangle

```
#include <stdio.h>
int main()
{
        int l,b,a,p;
        printf("Enter the length:");
        scanf("%d",&l);
        printf("Enter the breadth:");
        scanf("%d",&b);
        a=l*b;
        p=2*(l+b);
        printf("The area of rectangle is %d\n",a);
        printf("The perimeter of rectangle is %d\n",p);

}
```

2. WAP to calculate the volume of cuboid object.

```
#include <stdio.h>
int main()
{
        int l,b,h,v;
        printf("Enter the length:");
        scanf("%d",&l);
        printf("Enter the breadth:");
        scanf("%d",&b);
        printf("Enter the height:");
        scanf("%d",&h);
        v=l*b*h;
        printf("The volume of cuboid is %d\n",v);
}
```

3. WAP to calculate the volume of cylinder

```
#include <stdio.h>
int main()
{
        float r,h,v;
        printf("Enter the radius:");
        scanf("%f",&r);
        printf("Enter the height:");
        scanf("%f",&h);
        v=3.14*r*r*h;
        printf("The volume of cylinder is %.2f\n",v);
}
```

4. WAP to calculate the volume of sphere.

```
#include <stdio.h>
```

```
int main()
{
        float r,v;
        printf("Enter the radius:");
        scanf("%f",&r);
        v=4/3.0*3.14*r*r*r;
        printf("The volume of sphere is %.2f\n",v);
}
```

5. WAP to calculate simple interest.

```
#include <stdio.h>
int main()
{
        float p,t,r,si;
        printf("Enter the Principal:");
        scanf("%f",&p);
        printf("Enter time:");
        scanf("%f",&t);
        printf("Enter rate:");
        scanf("%f",&r);
        si=p*t*r/100;
        printf("The simple interest is %.2f\n",si);
}
```

6. WAP to calculate distance.

```
#include <stdio.h>
int main()
{
        float u,t,a,s;
        printf("Initial Velocity:");
        scanf("%f",&u);
        printf("Enter time:");
        scanf("%f",&t);
        printf("Enter acceleration:");
        scanf("%f",&a);
        s=u*t+1/2.0*a*t*t;
        printf("The distance is %.2f\n",s);
}
```

7. WAP to convert centigrade into Fahrenheit

```
#include <stdio.h>
int main()
{
        float c,f;
        printf("Enter the temperature in centigrade:");
        scanf("%f",&c);
```

```
        f=9/5.0*c+32;
        printf("The temperature in Fahrenheit %.2f\n",f);
    }
```

8. WAP to convert Fahrenheit into Centigrade.

```
#include <stdio.h>
int main()
{
        float f,c;
        printf("Enter the temperature in Fahrenheit:");
        scanf("%f",&f);
        c=5/9.0*(f-32);
        printf("The temperature in Centigrade %.2f\n",c);
}
```

9. WAP to input three numbers and find average.

```
#include <stdio.h>
int main()
{
        int a,b,c;
        float avg;
        printf("Enter first number:");
        scanf("%d",&a);
        printf("Enter second number:");
        scanf("%d",&b);
        printf("Enter third number:");
        scanf("%d",&c);
        avg=(a+b+c)/3.0;
        printf("The average of three number is %.2f\n",avg);
}
```

10. WAP to calculate area of four walls of a room

```
#include <stdio.h>
int main()
{
        int l,b,h,area;
        printf("Enter the length:");
        scanf("%d",&l);
        printf("Enter the breadth:");
        scanf("%d",&b);
        printf("Enter the height:");
        scanf("%d",&h);
        area=2*h*(l+b);
        printf("The area of four walls of a room is %d\n",area);
}
```

11. WAP to check whether input number is odd or even

```
#include <stdio.h>
int main()
{
        int num;
        printf("Enter any number:");
        scanf("%d",&num);
        if (num % 2 == 0)
                {
                        printf("It is an Even number\n");
                }
                        else
                {
                        printf("It is an Odd number\n");
                }
}
```

12. WAP to check whether input number is perfectly divisible by 3 or not

```
#include <stdio.h>
int main()
{
        int num;
        printf("Enter any number:");
        scanf("%d",&num);
        if (num % 3 == 0)
                {
                        printf("It is Perfectly divisible by 3\n");
                }
                        else
                {
                        printf("It is not perfectly divisible by 3\n");
                }
}
```

13. WAP to check whether input number is perfectly divisible by 3 and 5 or not.

```
#include <stdio.h>
int main()
{
        int num;
        printf("Enter any number:");
        scanf("%d",&num);
        if (num % 3 == 0 && num%5==0)
                {
                        printf("It is Perfectly divisible by 3 and 5 \n");
                }
```

```
                else
        {
                printf("It is not perfectly divisible by 3 and 5 \n");
        }
}
```

14. WAP to input any number and check whether it is negative or positive number.

```
#include <stdio.h>
int main()
        {
                int num;
                printf("Enter any number:");
                scanf("%d",&num);
                if (num >0)     printf("It is Positive Number\n");
                if (num<0)      printf("It is Negative Number\n");
                if (num ==0)    printf("It is Neutral Number\n");

        }
```

15. WAP to input three different numbers and find the greatest number.

```
#include <stdio.h>
int main()
{
        int a,b,c,gre;
        printf("Enter first number:");
        scanf("%d",&a);
        printf("Enter second number:");
        scanf("%d",&b);
        printf("Enter third number:");
        scanf("%d",&c);
        if(a>b && a>c)  gre=a;
        if(b>c && b>a)  gre=b;
        if(c>b && c>a)  gre=c;
        printf("The greatest number is %d\n",gre);
}
```

16. WAP to input three different numbers and find the smallest number.

```
#include <stdio.h>
int main()
{
        int a,b,c,sma;
        printf("Enter first number:");
        scanf("%d",&a);
        printf("Enter second number:");
        scanf("%d",&b);
        printf("Enter third number:");
        scanf("%d",&c);
```

```
        if(a<b && a<c)   sma=a;
        if(b<c && b<a)   sma=b;
        if(c<b && c<a)   sma=c;
        printf("The smallest number is %d\n",sma);
    }
```

17. WAP to input any number and check whether it is prime or composite number.

```
#include <stdio.h>
int main()
    {
        int i,n,r,c=0;
        printf("Enter any number:");
        scanf("%d",&n);
        for (i=1;i<=n;i++)
        {
            r= n %i;
            if (r==0) c=c+1;
        }
            if(c==2)
                    {
                printf("It is a prime number\n");
            }
            else
            {
                printf("It is a composite number\n");
            }
            printf("%d",c);
    }
```

18. Write a program that asks any two numbers and find their sum, difference and product.

```
#include <stdio.h>
int main()
{
    int a,b,sum,dif,pro;
    printf("Enter first number:");
    scanf("%d",&a);
    printf("Enter second number:");
    scanf("%d",&b);
    sum=a+b;
    dif=a-b;
    pro=a*b;
    printf("The sum of two numbers %d\n",sum);
    printf("The difference of two numbers %d\n",dif);
    printf("The product of two numbers %d\n",pro);
```

```
}
```

19. Write a program that asks any two numbers and display the greater and smaller number.

```
#include <stdio.h>
int main()
{
        int a,b,sma,gre;
        printf("Enter first number:");
        scanf("%d",&a);
        printf("Enter second number:");
        scanf("%d",&b);
        if(a>b)  gre=a;
        if(b>a)  gre=b;
        if(b<a)  sma=b;
        if(a<b)  sma=a;
        printf("The greatest number is %d\n",gre);
        printf("The smallest number is %d\n",sma);
}
```

20. Write a program that asks your marks in Computer Science and checks whether you are pass or fail if the pass mark is 40.

```
#include <stdio.h>
int main()
{
        int comp;
        printf("Enter the marks in Computer Science:");
        scanf("%d",&comp);
        if(comp>40)
        {
                printf("Congratulation!!!!\n");
                printf("You have secured %d marks in Computer
Science\n",comp);
                        printf("You are Pass\n");
        }
        else
        {
                printf("Sorry!!You are Fail\n");
        }
}
```

21. WAP to reverse an integer number.

```
#include <stdio.h>
int main()
{
        int n,r=0,p=0;
                printf("Enter an integer number:");
```

```
        scanf("%d",&n);
        while(n!=0)
        {
                r=n%10;
                p=p*10+r;
                n=n/10;
        }
                printf("The reverse number is: %d\n",p);
}
```

22. Count the total number of digits.

```
#include <stdio.h>
int main()
{
        int n,r=0,t=0;
                printf("Enter an integer number:");
        scanf("%d",&n);
        while(n!=0)
        {
                t=t+1;
                n=n/10;
        }
                printf("The total number of digits: %d\n",t);
}
```

23. Sum of all the digits

```
#include <stdio.h>
int main()
{
        int n,r=0,s=0;
                printf("Enter an integer number:");
        scanf("%d",&n);
        while(n!=0)
        {
                r=n%10;
                s=s+r;
                n=n/10;
        }
                printf("The sum of all the digits: %d\n",s);
}
```

24. Greater number of two numbers

```
        #include <stdio.h>
        int main()
        {
```

```
        int a,b,gre;
        printf("Enter first number:");
        scanf("%d",&a);
        printf("Enter second number:");
        scanf("%d",&b);
        if(a>b)   gre=a;
        if(b>a)   gre=b;
        printf("The greatest number is %d\n",gre);
    }
```

25. Enter marks in 5 different subjects and calculate the total and average marks.

```
#include <stdio.h>
int main()
{
    int eng,nep,mat,sci,comp,tot;
    float avg;
    printf("Enter the marks in English:",eng);
    scanf("%d",&eng);
    printf("Enter the marks in English:",nep);
    scanf("%d",&nep);
    printf("Enter the marks in English:",mat);
    scanf("%d",&mat);
    printf("Enter the marks in English:",sci);
    scanf("%d",&sci);
    printf("Enter the marks in English:",comp);
    scanf("%d",&comp);
    tot=eng+nep+mat+sci+comp;
    avg=tot/5;
    printf("The total mark is %d\n",tot);
    printf("The average mark is %.2f\n",avg);
}
```

26. Calculate the area and volume of a room.
27. WAP to print the numbers from 1 to 100

```
#include <stdio.h>
int main()
    {
        int i=1;
        for(i=1;i<=100;i++)
        {
            printf("%d\t",i);
        }
    }
```

28. WAP to print the factorial of input number.

29. g) Write down C program to generate the below series:

i) 1,2,3,4,5….

ii) 5, 10, 15, ….. 50

```
#include <stdio.h>
int main()
    {
        int i=1;
        for(i=5;i<=50;i=i+5)
        {
            printf("%d\t",i);
        }
    }
```

iii) 1,2,4,8 up to 10^{th} Term

```
#include <stdio.h>
int main()
    {
        int i=1,p=1;
        for(i=1;i<=10;i=i+1)
        {
            printf("%d\t",p);
            p=p*2;

        }
    }
```

iv) Fibonacci Series 1,2,3,5…… 89.

```
#include <stdio.h>
int main()
    {
        int a=1,b=2,c;
        while(a<=89)
        {
        printf("%d\t",a);
        c=a+b;
        a=b;
        b=c;
        }
    }
```

v) iv) 999, 728, 511, …. up to 10th terms

```
#include <stdio.h>
int main()
    {
        int i,p;
```

```
                    for(i=10;i>=1;i=i-1)
                    {
                        p=(i*i*i)-1;
                        printf("%d\t",p);
                    }
                }
```

vi) v) 1,2,3,5,8,13,21, …. up to 10th terms

```
                #include <stdio.h>
                int main()
                    {
                        int i=1,p=1;
                        for(i=1;i<=10;i=i+1)
                        {
                            printf("%d\t",p);
                            p=p+2;
                        }
                    }
```

vii) 100,95,90,85 ….5

```
            #include <stdio.h>
            int main()
                {
                    int i;
                    for(i=100;i>=5;i=i-5)
                    {
                        printf("%d\t",i);
                    }
                }
```

viii) 1
22
333
4444
55555

```
            #include <stdio.h>
            int main()
                {
                    int i,a=0,b;
                    for(i=1;i<=5;i=i+1)
                    {
                        a=a*10+1;
                        b=a*i;
                        printf("%d\n",b);
                    }
                }
```