Problem Solving Assignments
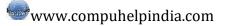
C Language

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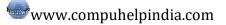## Introduction

1. What is C?
2. What is operating system?
3. What is the role of computer memory and its types?
4. Which memory used at run-time of program?
5. What is code editor?
6. What is compiler?
7. What is IDE? Explain.
8. Define the following terms:
   - Program
   - Source File
   - Executable File
   - Header File
   - Comments
   - Main() function
   - Statement Terminator
   - printf() Function
   - scanf() Function
   - Keyword/ Reserve words.

9. What is your first experience to join COMPUHELP?

Variables and Operators

1. What is variable?
2. Write the syntax to declare the variable?
3. What are the basic data types in C?
4. What is format Specifiers? Give examples of html Specifiers.
5. Name the function used to get input with example?
6. What are the rules to assign the variable?
7. What is operator?
8. Explain types of operator?
9. Differentiate between pre-increment and the post-increment operator with example?
10. What is expression with example?

Conditional statements

Q1: Enter the marks from the user and display the corresponding grades:

Marks	grade
100-80	A
80-60	B
60-40	C
Below 40	Fail

Q2: Accept a number and check if it is positive or negative or zero.

Q3: Accept a number and check if it is odd or even.

Q4: Accept a character and check whether it is vowel or not.

Q5: Accept a character and check if it is vowel, consonant or a special character.

Q6: Accept a number between 1 and 7 and print the corresponding week days. If the number is out of range, print message "wrong input".

Q7: Accept a number between 0 and 9 and print the words equivalent.

Q8: Accept a number between 1 and 12 and print the month it represents in words.

Q9: Accept a number between 1 and 5. If the user:

Enters 1: add two numbers

Enters 2: subtract two numbers

Enters 3: division of two numbers

Enters 4: multiplication of two numbers

Enters 5: exit the program

Q10: Enter three numbers and check the greatest out of the three.

Switch Statements

Q1: Accept a number between 0 and 9 and print the words equivalent.

Q2: Accept a number between 1 and 12 and print the months it represents in words.

Q3: Accept a number between 1 and 7 and print the days it represents in words.

Q4: Accept a character and check whether it is vowel or not.

Q5: Accept a number between 1 and 5. When the user
    Press 1: add two numbers
    Press 2: subtract two numbers
    Press 3: division of two numbers
    Press 4: multiplication
    Press 5: for exit.

Q6: Accept a number between 1 and 5. When the user
    Press 1 for Fibonacci series
    Press 2 for Factorial
    Press 3 for printing even series
    Press 4 for printing odd series
    Press 5 for exit

Q7: Accept a number between 1 and 5. When the user
    Press 1: print even numbers starting from 0 till the user wants
    Press 2: print odd numbers starting from 0 till the user wants
    Press 3: print the square of the number entered by the user
    Press 4: print the character entered by the user, that to, till the user wants
    Press 5 for exit

Q8: Accept a string by the user. Accept a number between 1 and 3. When the user
    Press 1: display the reverse of the string
    Press 2: display the entered string in upper case
    Press 3: display the entered string in lower case
    Do you want to continue? Press y for yes or n for no

LOOPS α

1. Print the following output : **********
2. Print the following output :

```
                    *
                    *
                    *
                    *
                    *
                    *
                    *
```

3. Print the following output :

```
                    *
        COMPUHELP
                    *
        COMPUHELP
                    *
        COMPUHELP
                    *
        COMPUHELP
                    *
        COMPUHELP
                    *
        COMPUHELP
                    *
```

4. Print the series 0 to 9 using loops.
5. Print the series 9 to 0 using loops.
6. Print the series 5 to 20 using loops.
7. Print the series 45 to 7 using loops.
8. Print the series of odd numbers till 20 using loops.
9. Print the series of even numbers till 20 using loops.
10. Print the series of odd numbers till the user enters using loops.
11. Print the series of even numbers till the user enters using loops.
12. Print the series : 0 3 6 9 12 15 18……… 50
13. Print the Fibonacci series : 0 1 1 2 3 5 8 13……… n
14. Print the series : 1 2 4 8 16 32……… n
15. Print the series : 0 3 6 9 12 15 18……… n
16. Print the factorial of the number entered by the user. Output should be: 1*2*3*4*5 = 120.
17. Print the sum of the number entered by the user. Output should be: 1+2+3+4+5 = 15.
18. Print the result of m^n where m and n are entered by the user.

LOOPS β

1. Print the following pattern :

   ```
   ***
   ***
   ***
   ```

2. Print the following pattern :

   ```
   111
   111
   111
   ```

3. Print the following pattern :

   ```
   123
   123
   123
   ```

4. Print the following pattern :

   ```
   111
   222
   333
   ```

5. Print the following pattern :

   ```
   123
   456
   789
   ```

6. Print the following pattern :

   ```
   333
   222
   111
   ```

7. Print the following pattern :

   ```
   321
   321
   321
   ```

8. Print the following pattern :

   ```
   987
   654
   321
   ```

9. Print the following pattern :

   ```
   *
   **
   ***
   ```

10. Print the following pattern :

   ```
   ***
   **
   *
   ```

11. Print the following pattern :

```
1
12
123
```

12. Print the following pattern :

```
1
22
333
```

13. Print the following pattern :

```
3
22
111
```

14. Print the following pattern :

```
111
22
3
```

15. Print the following pattern :

```
3
23
123
```

16. Print the following pattern :

```
3
32
321
```

17. Print the following pattern:

```
* * *
 * *
   *
```

18. Print the following pattern :

```
123
 12
  1
```

19. Print the following pattern :

```
111
 22
  3
```

20. Print the following pattern :

```
*
* *
* *  *
```

21.Print the following pattern:

```
      *
     * *
    * * *
   * * * *
```

22.Print the following pattern:

```
A
A B
A B C
```

23.Print the following pattern:

```
C B A
C   B
C
```

24.Print the following pattern:

```
  A
 A B
A B C
```

While/Do-while

Q1: Write a program to print the series starting from 0 till the user wants.

Q2: Write a program to print the series starting from the number entered by the user till 0.

Q3: Write a program to print the Fibonacci series till the user wants.

Q4: Write a program to generate a table of the entered number.

Q5: Write a program to input marks of 5 students in 3 subjects and print their marks average marks.

Q6: Accept a number and reverse it i.e. 1234-->4321

Q7: Write a program to print factorial of a number entered i.e. 5*4*3*2*1=120.

Q8: Write a program to print the series m^n where m and n are entered by the user.

Q9: Enter a number and check if the number is Palindrome or not.

Q10: Enter a number and check if the number is Armstrong or not.

Q11 :Enter a number and check Whether it is prime number or not.

Variations

```c
Q1: for (i=1; i<=3; i++)
    {
        printf ("%d",i);
        printf ("thanks\n");
    }
    printf   ("\n");
    printf ("welcome");
    printf ("%d", i);


Q2:    int i=1;
      for (    ;i<=3;i++)
      {
         printf ("hello");
         printf ("%d", i);
         printf ("\n");
      }
      printf ("%d", i);


Q3:  int j=3;
      for (       ; j>=1;      )
      {
             printf ("%d", j);
             printf ("\n");
      }
     printf ("welcome");
     printf ("%d", j);


Q4:   for (i=1; i<=3; i++)
      printf ("\n hello");
      printf ("%d", i);
      printf ("welcome");


Q5:   for (      ; i>=1; i--)
     {
        printf  ("hello");
        printf ("\n thanks");
        printf ("%d", i);
     }
     printf ("\n welcome");
     printf ("%d",i);


Q6: int i=0;
```

```
 For( ; ; )
{
    If(i<5)
        {printf("\nHello");
                i++;
        }
}
```

Q7:
```
for(i=0;i<10;i++);
    {
        printf("\n%d",i);
    }
```

Q8:
```
for(i=0;i>=5;i--)
    {
        printf("\n%d",i);
    }
```

Q9:
```
int i=5;
 for(i=0;i>=5;i--)
{
        printf("\n%d",i);
}
```

Q10:
```
int i=9,ctr=0;
for(;ctr<=i;i--)
{
 printf("%d",i);
  Ctr++;
}
```

Q11:
```
int i=-5,ctr=0;
  for(;;i++)
   if(i<ctr)
   {
   printf("%d",ctr);
   c++;
   }
```

Q12:
```
int i=91;
  for(;;i--)
  if(i>0)
  printf("%d",i); printf("bye");
```

Single Dimension Arrays

1. Write a program to accept an integer array of 5 elements from the user, and display the array. For e.g.: if the user enters the array 2 3 4 6 7, the output should be as follows:

    ENTER THE ARRAY ELEMENTS: 2 3 4 6 7

    ELEMENT IS: 2
    ELEMENT IS: 3
    ELEMENT IS: 4
    ELEMENT IS: 6
    ELEMENT IS: 7

2. Write a program to accept an integer array of 5 elements from the user and display the array elements in reverse order. For e.g.: if the array is 3 5 6 2 8 then the output should be:

    ENTER THE ARRAY ELEMENTS: 3 5 6 2 8

    ELEMENT IS: 8
    ELEMENT IS: 2
    ELEMENT IS: 6
    ELEMENT IS: 5
    ELEMENT IS: 3

3. Write a program to accept 2 integer arrays of the same size and copy the elements of the first array into the second array. The output should be as follows:

    ENTER THE ARRAY ELEMENTS OF THE FIRST ARRAY: 2 3 4 5 1

    THE COPY OF THE ARRAY IS: 2 3 4 5 1

4. Write a program to accept 2 arrays of the same size and copy the reverse of the elements of the first array into the second array. The output should be as follows:

    ENTER THE ARRAY ELEMENTS OF THE FIRST ARRAY: 2 3 4 5 1

    THE REVERSE COPY OF THE ARRAY IS: 1 5 4 3 2

5. Write a program to accept an integer array of 6 elements, display them, then add the elements of the array and display the sum. For e.g.: if the array is 2 4 1 5 6 3 then the output should be:

    ENTER THE ARRAY ELEMENTS: 2 4 1 5 6 3
    ELEMENT IS: 2
    ELEMENT IS: 4
    ELEMENT IS: 1

ELEMENT IS: 5
ELEMENT IS: 6
ELEMENT IS: 3

THE SUM OF THE ELEMENTS IS:
2 + 4 + 1 + 5 + 6 + 3 = 21

6. Write a program to accept 2 integer arrays of 5 elements from the user and display their elements. Then add the elements of the two arrays store their sum in another array and display the sum as a third array. The output should be:
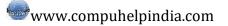
        ENTER THE FIRST ARRAY ELEMENTS: 2 3 1 5 6

        ENTER THE SECOND ARRAY ELEMENTS: 3 1 8 4 7

        THE ELEMENTS OF THE FIRST ARRAY ARE:
        ELEMENT IS: 2
        ELEMENT IS: 3
        ELEMENT IS: 1
        ELEMENT IS: 5
        ELEMENT IS: 6

        THE ELEMENTS OF THE SECOND ARRAY ARE:
        ELEMENT IS: 3
        ELEMENT IS: 1
        ELEMENT IS: 8
        ELEMENT IS: 4
        ELEMENT IS: 7

        THE SUM OF EACH ELEMENT OF THE TWO ARRAYS IS:
        ELEMENT IS: 5
        ELEMENT IS: 4
        ELEMENT IS: 9
        ELEMENT IS: 9
        ELEMENT IS: 13

7. Write a program to accept 2 integer arrays of 5 elements from the user and display their elements. Then subtract the elements of the two arrays, store their differences in another array and display the subtraction as a third array. The output should be:

        ENTER THE FIRST ARRAY ELEMENTS: 2 4 1 5 6

        ENTER THE SECOND ARRAY ELEMENTS: 3 1 8 4 7

        THE ELEMENTS OF THE FIRST ARRAY ARE:

ELEMENT IS: 2
ELEMENT IS: 4
ELEMENT IS: 1
ELEMENT IS: 5
ELEMENT IS: 6

THE ELEMENTS OF THE SECOND ARRAY ARE:
ELEMENT IS: 3
ELEMENT IS: 1
ELEMENT IS: 8
ELEMENT IS: 4
ELEMENT IS: 7

THE DIFFERENCE OF EACH ELEMENT OF THE TWO ARRAYS IS:
ELEMENT IS: -1
ELEMENT IS: 3
ELEMENT IS: -7
ELEMENT IS: 1
ELEMENT IS: -1

8. Write a program to accept an integer array of 5 elements from the user and find the greatest element in the array and display it along with its position/location. The output should be:

ENTER THE ARRAY ELEMENTS: 2 3 1 5 6

THE ELEMENTS OF THE FIRST ARRAY ARE:
ELEMENT 1: 2
ELEMENT 2: 3
ELEMENT 3: 1
ELEMENT 4: 5
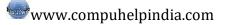**ELEMENT 5: 6**

THE GREATEST ELEMENT IS: 6

THE LOCATION IS: 5

9. Write a program to accept an integer array of 5 elements from the user and find the smallest element in the array and display it along with its position/location. The output should be:

ENTER THE ARRAY ELEMENTS: 2 4 1 5 6

THE ELEMENTS OF THE ARRAY ARE:
ELEMENT 1: 2
ELEMENT 2: 4
ELEMENT 3: 1

ELEMENT 4: 5
ELEMENT 5: 6

THE SMALLEST ELEMENT IS: 1

THE LOCATION IS: 3

10. Write a program to accept an integer array of 5 elements, display them. Then sort the array in ascending order and display the sorted array. The output should be:
   ENTER THE ARRAY ELEMENTS: 2 4 1 5 6

   THE ELEMENTS OF THE ARRAY ARE:
   ELEMENT 1: 2
   ELEMENT 2: 4
   ELEMENT 3: 1
   ELEMENT 4: 5
   ELEMENT 5: 6

   THE SORTED ARRAY IS:
   ELEMENT 1: 1
   ELEMENT 2: 2
    ELEMENT 3: 4
   ELEMENT 4: 5
   ELEMENT 5: 6

11. Write a program to accept an integer array of 5 elements, display them. Then sort the array in descending order and display the sorted array. The output should be:
   ENTER THE ARRAY ELEMENTS: 2 4 1 5 6

   THE ELEMENTS OF THE ARRAY ARE:
   ELEMENT 1: 2
   ELEMENT 2: 4
   ELEMENT 3: 1
   ELEMENT 4: 5
   ELEMENT 5: 6

   THE SORTED ARRAY IS:
   ELEMENT 1: 6
   ELEMENT 2: 5
    ELEMENT 3: 4
   ELEMENT 4: 1
   ELEMENT 5: 2

12. Write a program to accept an integer array of 5 elements from the user, display them. Then accept a number from the user and search that number in the array. If the number is found print "**NUMBER IS FOUND AT THE LOCATION------**" along with its location/position. If the number is not found print "**NUMBER IS NOT FOUND**".

Double Dimension Arrays

1. What is a double dimension array? How does it look like? Explain it with a pictorial representation. What other name is given to double dimension arrays?

2. Write a program to accept a 3 X 3 matrix from the user and display the matrix.
   For e.g: if the user enters the array 2 3 4 6 7 9 1 4 2, the output should be as follows:

   ENTER THE ELEMENTS:
   2 3 4
   6 7 9
   1 4 2
   THE ARRAY ELEMENTS ARE:
   2 3 4
   6 7 9
   1 4 2

3. Write a program to accept two matrices of the same size and copy the elements of the first matrix into second matrix. The output should be as follows:
   ENTER THE ELEMENTS OF THE FIRST MATRIX:
   2 3
   1 2
   THE COPY OF THE MATRIX IS:
   2 3
   1 2

4. Write a program to accept two matrices of the same size and store the reverse of the first matrix into second matrix. The output should be as follows:
   ENTER THE ELEMENTS OF THE FIRST MATRIX:
   2 3
   1 2
   THE REVERSE COPY OF MATRIX IS:
   2 1
   3 2

5. Write a program to accept a matrix and display its elements in the reverse order. The output should be as follows:

   ENTER THE ELEMENTS OF THE MATRIX:
   2 3 4 1
   THE REVERSE OF MATRIX IS:
   1 4 3 2

6. Write a program to accept a 2 x 2 matrix, display them and add the elements of the matrix and display the sum. For e.g. if the array is 2 4 1 5 then the output should be as follows:

> **ENTER THE ELEMENTS OF THE MATRIX:**
> **2 4**
> **1 5**
> **THE SUM OF THE ELEMENTS IS:**
> **2+4+1+5=12**

7. Write a program to accept two 3 x 3 matrices from the user, display their elements, then add the elements of the two matrices store their sum in another matrix and display the third matrix. The output should be as follows:

> **ENTER THE FIRST MATRIX:**
> **2 3 1 5 6 7 1 2 3**
> **ENTER THE SECOND MATRIX:**
> **3 1 8 4 7 6 5 4 3**
> **THE SUM OF TWO MATRICES IS:**
> **5 4 9**
> **9 13 13**
> **6 6 6**

8. Write a program to accept two 3 x 3 matrices from the user, display their elements, then subtract the elements of the two matrices store their subtraction in another matrix and display the third matrix. The output should be as follows:

> **ENTER THE FIRST MATRIX:**
> **2 3 1 5 6 7 1 2 3**
> **ENTER THE SECOND MATRIX:**
> **3 1 8 4 7 6 5 4 3**
> **THE SUBTRACTION OF TWO MATRICES IS:**
> **-1 2 -7**
> **1 -1 1**
> **-4 -2 0**

9. Write a program to multiply two matrices. For multiplication of two matrices one must keep in mind that number of columns in the first matrix should be equal to the number of rows in the second matrix. The output should be as follows:

> **ENTER THE FIRST MATRIX:**
> **2 3 4**
> **1 3 6**
> **ENTER THE SECOND MATRIX:**
> **3 2**
> **1 5**

 6 3
THE MULTIPLICATION IS:
33 31
18 35

10. Write a program to accept 2 x 2 matrix from the user and find the greatest element in the matrix and display it along with its row and column number. The output should be as follows:

>**ENTER THE MATRIX:**
>**2 4 1 5**
>**THE ELEMENTS OF THE MATRIX ARE:**
> **2 4**
> **1 5**
>**THE GREATEST ELEMENT IN THE MATRIX IS: 5 AND IS PRESENT IN ROW 2 AND COLUMN 2**

11. Write a program to accept 2 x 2 matrixes from the user and find the smallest element in the matrix and display it along with its row and column number. The output should be as follows:

>**ENTER THE MATRIX:**
> **2 4 1 5**
>**THE ELEMENTS OF THE MATRIX ARE:**
> **2 4**
> **1 5**
>**THE SMALLEST ELEMENT IN THE MATRIX IS: 1 AND IS PRESENT IN ROW 2 AND COLUMN 1**

12. Write a program to transpose a matrix. Transpose means changing the rows into columns and columns into rows. The output should be as follows:

>**ENTER THE MATRIX:**
> **2 4**
> **1 5**
> **THE TRANSPOSE IS:**
> **2 1**
> **4 5**

13. Write a program to accept two matrices from the user, display it. Then accept a number from the user and search that number in the matrix. If the number is found print "NUMBER IS FOUND AT LOCATION ...." along with its location/position. If the number is not found print "NUMBER IS NOT FOUND". For e.g.:

> **ENTER THE MATRIX: 2 3 1 6 4 6 7 9 8**
> **THE MATRIX IS:**
> **2 3 1**
> **6 4 6**
> **7 9 8**
> **ENTER THE NUMBER TO BE SEARCHED: 7**
> **NUMBER FOUND IN ROW 3 COLUMN 1**

14. Write a program to accept two matrices of the same size and check whether each element of the first matrix matches the each element of the second matrix or not. If both are equal, then display "MATRICES ARE EQUAL".

Character Array

1. What is a character array? What is the collection of character known as?
2. What are the various input output functions for character arrays apart from scanf () and printf ()?
3. Write a program to accept a string from the user and display it.

> **OUTPUT:**
> **ENTER A STRING: COMPUHELP**
> **THE STRING YOU ENTERED IS: COMPUHELP**

4. Write a program to accept a string from the user and display it in reverse.

> **OUTPUT:**
> **ENTER A STRING: COMPUHELP**
> **THE STRING YOU ENTERED IS: PLEHUPMOC**

5. Write a program to find the length of an entered string and display it as follows:

> **ENTER A STRING: COMPUHELP**
> **THE LENGTH OF THE STRING IS: 9**

6. Write a program to accept a string in upper case and convert it into lower case. The output should
   be:

> **ENTER A STRING IN UPPER CASE: COMPUHELP**
> **THE STRING IN LOWER CASE: compuhelp**

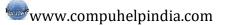7. Write a program to accept a string in lower case and convert it into upper case. The output should
   be:

> **ENTER A STRING IN LOWER CASE: compuhelp**
> **THE STRING IN UPPER CASE: COMPUHELP**

8 Write program to count and print the number of vowels in an entered string. The output should be as follows:

> **ENTER A STRING: COMPUHELP**
> **THE VOWELS ARE: O U E**
> **THE NUMBER OF VOWELS IS: 3**

9. Write a program to count and print the number of consonants in an entered string. The output should be as follows:

> **ENTER A STRING: COMPUHELP**
> **THE CONSONANTS ARE: CMPHLP**
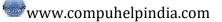> **THE NUMBER OF CONSONANTS ARE: 6**

10. Write a program to accept two character arrays and copy the first string into second one. The output should be as follows:

ENTER THE STRING: COMPUHELP
THE COPY OF STRING IS: COMPUHELP

11. Write a program to find out the number of words in a sentence. The output should be:

ENTER A SENTENCE: COMPUHELP COMPUTER EDUCATION
THE NUMBERS OF WORDS ARE: 3

Functions

1. What is function? Why do we need them? Explain with the help of pictorial diagrams.
2. What are the stages of the functions? What is the default return type of any function?
3. How is function declaration different from function definition?
4. How many types of functions are provided by the c language? Explain.
5. How many different types of user-defined functions we can make?
6. What is the use of main ( ) in a program? What will happen, if there is no main ( ) in our Program?
7. What is calling and called function?
8. Write a function sum ( ) to calculate the sum of four numbers and display the sum. Neither does
   the function return any value nor accepts any value. The output should be as follows:

> **ENTER FIRST NUMBER: 3**
> **ENTER SECOND NUMBER: 4**
> **ENTER THIRD NUMBER: 2**
> **ENTER THIRD NUMBER: 1**
> **THE SUM OF ALL NUMBERS IS: 10**

9. Write a program which contains the following functions performing all arithmetic operations:
   Add ( ) - function to add two numbers
   Sub ( ) - function to subtract the smaller number from the greater one.
   Div ( ) - function to divide the greater number from the smaller one
   Mull ( ) - function to multiply two numbers
   If mull ( ) function is called for instance, the output should be as following:

> **ENTER FIRST NUMBER: 3**
> **ENTER SECOND NUMBER: 4**
> **THE PRODUCT OF THE TWO NUMBERS IS: 12**

10. What do you mean by arguments? What other name can you give to arguments?

11. Write a function odd ( ) to display all the odd numbers from 1to n, where n is the ending number passed as arguments to the function. The output should be as follows:

> **ENTER THE NUMBER: 8**
> **THE ODD SERIES IS: 1 3 5 7**

12. Write a function even ( ) to display all the even numbers from 1 to n, where n is the ending number passed as an argument to the function. The output should be as follows:

> **ENTER THE NUMBER: 8**
> **THE EVEN SERIES IS: 2 4 6 8**

13. Write a program for following output:
    ENTER A CHARACTER: $
    $$

14. Write a function series ( ) which accept two values as arguments. One value is the starting
    value of the series and the second value is the ending value of the series. The function prints all
    the numbers from the starting value till the ending value. The output should be as follows:
    ENTER THE STARTING VALUE: 5
    ENTER THE ENDING VALUE: 15
    THE SERIES IS: 5 6 7 8 9 10 11 12 13 14 15

15. Write a function named is_pos_neg ( ) which accepts a number and calculates if the entered
    number is positive or negative.

16. Write a function Fibonacci ( ) to generate the Fibonacci series **till** „n" numbers, where n is an
    integer passed as argument to the function. The output should be:
    Enter the number: 9
    Fibonacci series: 0 1 1 2 3 5 8

17. Write a function to_upper ( ) which accepts a single alphabet in lower case and converts that
    alphabet into upper case. The output should be as follows:
    ENTER AN ALPHABET IN LOWER CASE: k
    THE ALPHABET IN UPPER CASE IS: K

18. Write a function to_lower ( ) which accepts a single alphabet in upper case and converts that
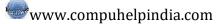   alphabet into lower case. The output should be as follows:
    ENTER AN ALPHABET IN UPPER CASE: K
    THE ALPHABET IN LOWER CASE IS: k

19. Write a function to generate the following series till „n", where n is an integer passed as
    an argument to the function. The output should be as follows:
    ENTER A NUMBER: 5
    SERIES: 1+4+9+16+25=55

20. What is the use of the return statement? Where is the return statement placed? Maximum how
    many values can be returned to a function?

21. Write a function factorial( ) which calculates the factorial of a number given as an argument to the function and returns the value of that factorial of that number to the calling function. The output should be should be as follows:

   ENTER A NUMBER: 5
   THE FACTORIAL IS: 5*4*3*2*1=120

22. Write a function swap ( ) which accepts two numbers as arguments and swaps the value of these two variables. The output should be as follows:

   ENTER FIRST NUMBER: 5
   ENTER SECOND NUMBER: 8
   THE VALUE OF THE NUMBERS BEFORE SWAPPIG IS:
   FIRST: 5
   SECOND: 8
   THE VALUES AFTER SWAPPING IS:
   FIRST: 8
   SECOND: 5.

23. What do you mean by recursion? Write a program for finding out the factorial of a number illustrating the concept of recursion in it.

24. Write a function fact(), that through recusrsion, prints the series of factorial. The output should

   be should be as follows:

   ENTER A NUMBER: 5
   THE FACTORIAL IS: 5*4*3*2*1=120

25. What are the most commonly used in-built functions for input and output? Name the files which contain their definition.
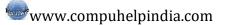
Pointers

1. What are pointers? Why do we need them?
2. What are the stages of pointers? What is the data type of pointers? How much memory do they occupy?
3. What does this mean?
    int *ptr;
4. Enter two numbers from the user, add them through pointers and display their sum through pointers.
5. Swap the values of two variables through pointers.
6. Write a program to enter an array of 5 elements. Through pointers reverse them and display them.
7. Write a program to enter an array of 5 elements. Through pointers add the elements, and display them.
8. Write a program to enter two arrays of 5 elements. Through pointers add the two arrays, copy the result in third array and display them.
9. Write a program to print the series till the user wants starting from 0 through pointers.
10. Write a program to add the elements of a 3x3 matrix through pointers.
11. Write the output for the following program:

```
void main( )
{
int *ptr;
cin>>*ptr;
cout<<*ptr;
getch( );
}
```

12. Write the output for the following program:

```
void main( )
{
int num1,*ptr;
cin>>num1;
cout<<*ptr;
cout<<ptr;
cout<<&ptr;
cout<<&num1;
getch( );
}
```

13. Write the output for the following program:

```
void main( )
{
int num1,*ptr,**ptr1,***ptr2;
ptr=&num1;
ptr1=&ptr;
ptr2=&ptr1;
cin>>num1;
cout<<*ptr;
cout<<ptr;
cout<<&ptr;
cout<<&num1;
cout<<*ptr1;
cout<<&ptr1;
cout<<**ptr1;
cout<<*ptr2;
cout<<&ptr2;
cout<<**ptr2;
cout<<***ptr2;
getch( );
}
```

Structures

Q1 Write a program to input rollno, name and fees of a student and display the output.

Q2 Write a program to input the rollno and marks of a student in five subjects and display the output.

Q3 Write a program to find the average marks of nine subjects through structures.

Q4 Write a program to input the details of 5 employees using array of structures and print them back.

Q5 Write a program to find percentage of five subjects of five students.

Q6 Write a program to find the percentage of five subjects through pointers.

Q7 Write a program to find the percentage of five subjects of five students through pointers.

Q8 Write a program to pass a structure to a function by reference.

File Handling

Q1 Write a program to create a file and write a string into it.

Q2 Write a program to create a file. Accept a number from the user and write that number into the file which you have created.

Q3 Write a program to create a file. Accept a number from the user and write that number into the file which you have created. Now read the number from the file and display it on the console screen

Q4 Write a program to create a file. Accept a number from the user and write that number into the file which you have created. Now read the number from the file and write it into another file.

Q5 Write a program to create a text file and read all the contents of the file character by character and display all the contents on the console screen.

Q6 Write a program to create a text file and count the number of characters in it.

Q7 Write a program to create a text file and count the number of vowels in it

Q8 Write a program to create a text file and count the number of upper case letters and lower case letters in it.

Q9 Write a program to create a file and count the number of spaces and words in the file.

Q10 Write a program to create a file and count the number of lines in the file.

Q11 Write a program to write 10 numbers into a file and display the even and odd numbers separately on the console screen.

Q12 Write a program to enter few characters from the user and store in a file. Enter another character and convert all occurrences of that character to upper case.

Q13 Write a program to enter the rollno, name, and fees of the student through structures and save the data into a file.