PRACTICAL : 6

Write C programs that use both recursive and non-recursive functions.

1. **To find the factorial of a given integer.**

```
#include <iostream>
using namespace std;
unsigned int factorial(unsigned int n)
{
   if (n == 0 || n == 1)
      return 1;
   return n * factorial(n - 1);
}
int main()
{
   int num = 5;
   cout << "Factorial of "
        << num << " is " << factorial(num) << endl;
   return 0;
}
```

OUTPUT:

Factorial of 5 is 120

2. **To find the GCD (greatest common divisor) of two given integers.**

```
#include <math.h>
#include <stdio.h>
int gcd(int a, int b)
{
   int result = ((a < b) ? a : b);
   while (result > 0) {
      if (a % result == 0 && b % result == 0) {
         break;
      }
      result--;
   }
   return result;
}
int main()
{
   int a = 98, b = 56;
   printf("GCD of %d and %d is %d ", a, b, gcd(a, b));
   return 0; }
```

	OUTPUT: GCD of 98 and 56 is 14

PRACTICAL:7	**1. Write a C program to find the largest integer in a list of integers**
	
	#include <stdio.h>
	#include <conio.h>
	void main()
	{
	int a[25], i, large, small, n;
	clrscr();
	printf("Enter the size of array(max 25)\n");
	scanf("%d", &n);
	printf("Enter any %d integer array elements\n",n);
	for(i = 0; i < n; i++)
	{
	scanf("%d", &a[i]);
	}
	large = a[0];
	small = a[0];
	for(i = 1; i < n ; i++)
	{
	if(a[i] > large)
	{
	large = a[i];
	}
	if(a[i] < small)
	{
	small = a[i];
	}
	}
	printf("The largest element from the given array is %d \nThe smallest element from the given array is %d", large, small);
	getch();
	}
	
	OUTPUT:
	Enter the size of array(max 25)
	5
	Enter any 5 integers array elements
	10 2 3 1 5
	The largest element from the given array is 10
	The smallest element from the given array is 1

2. Write a C program that uses functions to perform the following:

1. Addition of Two Matrices

```
#include <stdio.h>
#include <conio.h>
void main()
{
  int a[3][3], b[3][3], c[3][3], i, j;
  clrscr();
  printf("Enter the elements of 3*3 matrix a \n");
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   scanf("%d", &a[i][j]);
    }
  }
  printf("Enter the elements of 3*3 matrix b \n");
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   scanf("%d", &b[i][j]);
    }
  }
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   c[i][j] = a[i][j] + b[i][j];
    }
  }
  printf("The resultant 3*3 matrix c is \n");
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   printf("%d\t", c[i][j]);
    }
    printf("\n");
  }
  getch();
}
```

OUTPUT:

```
Enter the elements of 3*3 matrix  a
1 2 3 4 5 6 7 8 9
Enter the elements of 3*3 matrix  b
1 2 3 4 5 6 7 8 9
The resultant 3*3 matrix  c is
2      4      6
8     10     12
14    16     18
```

2. Multiplication of Two Matrices

```
#include<stdio.h>
#include<conio.h>
void main()
{
  int a[3][3], b[3][3], c[3][3], i, j, k;
  clrscr();
  printf("Enter the elements of 3*3 matrix a \n");
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   scanf("%d", &a[i][j]);
    }
  }
  printf("Enter the elements of 3*3 matrix b \n");
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   scanf("%d", &b[i][j]);
    }
  }
  for(i = 0; i < 3; i++)
  {
    for(j = 0; j < 3; j++)
    {
   c[i][j] = 0
   for(k = 0; k < 3; k++)
   {
     c[i][j] = c[i][j] + (a[i][k] * b[k][j])
   }
    }
  }
```

```
   printf("The resultant 3*3 matrix c is \n");
   for(i = 0; i < 3; i++)
   {
      for(j = 0; j < 3; j++)
      {
     printf("%d\t", c[i][j]);
      }
      printf("\n");
   }
   getch();
}
```

OUTPUT:

```
Enter the elements of 3*3 matrix  a
1 2 3 4 5 6 7 8 9
Enter the elements of 3*3 matrix  b
1 2 3 4 5 6 7 8 9
The resultant 3*3 matrix  c is
30    36      42
55    81      96
102   126     150
```