C++ ASSIGNMENT 4 (ARRAYS)

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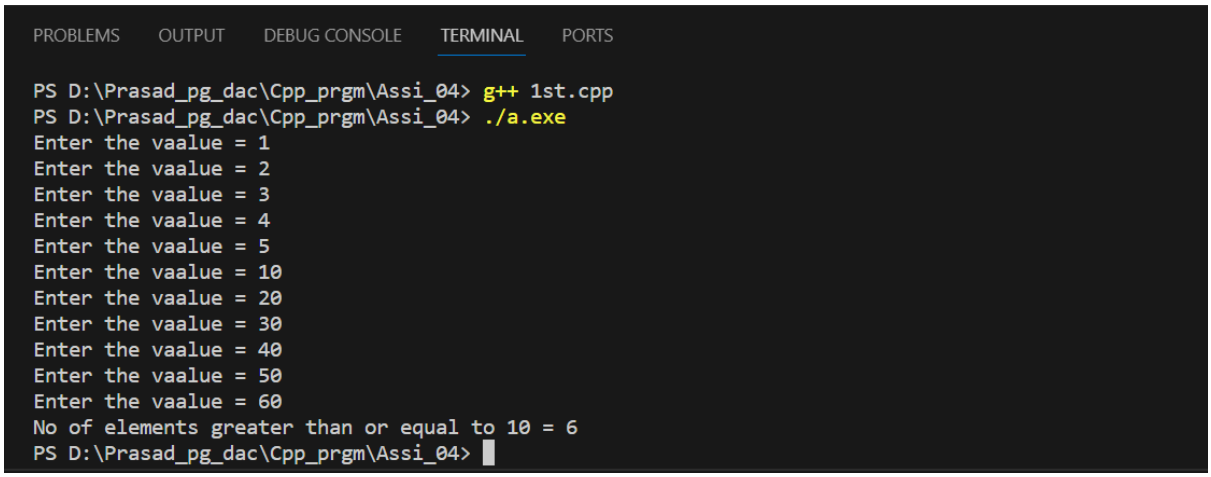
1.Write a program that asks the user to take array of 10 integers. The program must compute and write how many integers are greater than or equal to 10.

Code:--

```
#include <iostream>
using namespace std;
int main()
{
int n = 10;
int arr[n];
for (int i = 0; i <= n; i++)
{
cout<<"Enter the vaalue = ";
cin >> arr[i];
}
int x = 10;
int count = 0;
for (int i = 0; i < n; i++)
{
if (arr[i] <= x)
{
count++;
}
}
cout <<"No of elements greater than or equal to 10 = "<< count;
return 0;
}
```

Output:--



2. Write a program that asks the user to take array of 10 integers. The program must output the largest element in the array, and the index at which that element was found.

Code:--

```
#include <iostream>
using namespace std;
int main()
{
int n = 10;
int arr[n];
for (int i = 0; i < n; i++)
{
cout<<"Enter The Value = ";
cin >> arr[i];
}
int greater = INT_MIN;
int index = 0;
for (int i = 0; i < n; i++)
{
if (arr[i] > greater)
{
greater = arr[i];
index = i;
}
}
cout << "Largest element = " << greater << " on the index number = " << index;
return 0;
}
```

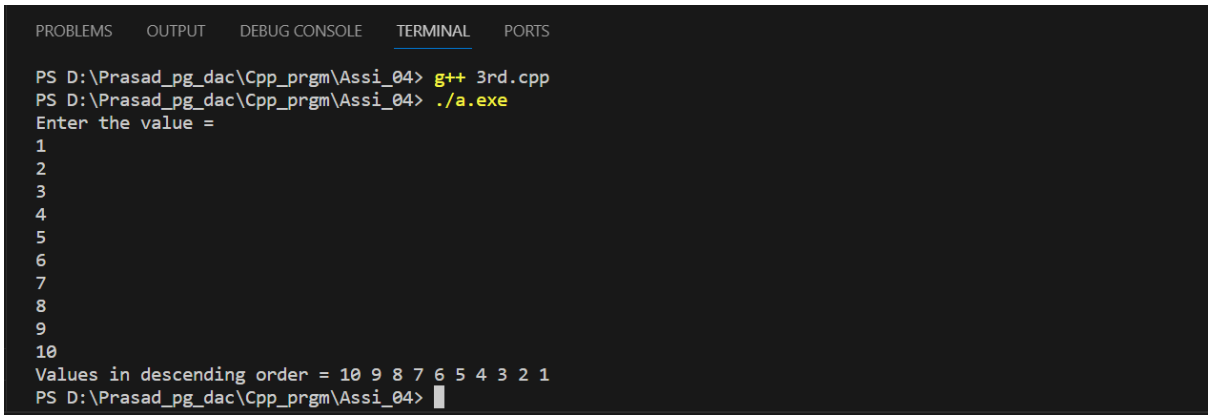
Output:--

3. Write a program that asks the user to take array of 10 integers. The program will then sort the array in descending order and display it.

Code:--

```
#include <iostream>
using namespace std;
int main()
{
int n = 10;
int arr[n];
cout<<"Enter the value = ","endl";
for (int i = 0; i < n; i++)
{
cin >> arr[i];
}
for (int i = 0; i < n - 1; i++)
{
for (int j = 0; j < n - 1; j++)
{
if (arr[j + 1] > arr[j])
{
swap(arr[j], arr[j + 1]);
}
}
}
cout << "Values in descending order = ";
for (int i = 0; i < n; i++)
{
cout << arr[i] << " ";
}
return 0;
}
```

Output:--



4. Write a program that asks the user to take array of 10 integers. The program will then display either "the array is growing", "the array is decreasing", "the array is constant", or "the array is growing and decreasing."

Code:--

```
#include<iostream>
using namespace std;
void descsort(int arr[],int n)
{
 bool isdecreasing=false,isincreasing=false;
 for(int i=1;i<n;i++)
 {
 if(arr[i]>arr[i-1])
 {
 isincreasing=true;
 }
 if(arr[i]<arr[i-1])
 {
 isdecreasing=true;
 }
 }
 if(isdecreasing && isincreasing)
 {
 cout<<"the array is growing and decreasing."<<endl;
 }
 else if(isincreasing)
 {
 cout<<"the array is growing."<<endl;
 }
 else if(isdecreasing )
 {
 cout<<"the array is decreasing."<<endl;
 }else {
 cout<<"array is constant"<<endl;
 }
}
void input(int arr[],int n)
{
 cout<<"Enter array elements = "<<endl;
 for(int i=0;i<n;i++){
 cout<<"Arr ["<<i<<"]: ";
 cin>>arr[i];
 }
 descsort(arr,n);
}
int main()
{
 int arr[10],n=10;
 input(arr,n);
 return 0;
}
```

Output:--

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 4th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter array elements =
Arr [0]: 2
Arr [1]: 2
Arr [2]: 2
Arr [3]: 2
Arr [4]: 2
Arr [5]: 2
Arr [6]: 2
Arr [7]: 2
Arr [8]: 2
Arr [9]: 2
array is constant
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 4th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter array elements =
Arr [0]: 10
Arr [1]: 9
Arr [2]: 8
Arr [3]: 7
Arr [4]: 6
Arr [5]: 5
Arr [6]: 4
Arr [7]: 3
Arr [8]: 2
Arr [9]: 1
the array is decreasing.
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 4th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter array elements =
Arr [0]: 1
Arr [1]: 2
Arr [2]: 3
Arr [3]: 4
Arr [4]: 5
Arr [5]: 6
Arr [6]: 7
Arr [7]: 8
Arr [8]: 9
Arr [9]: 10
the array is growing.
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

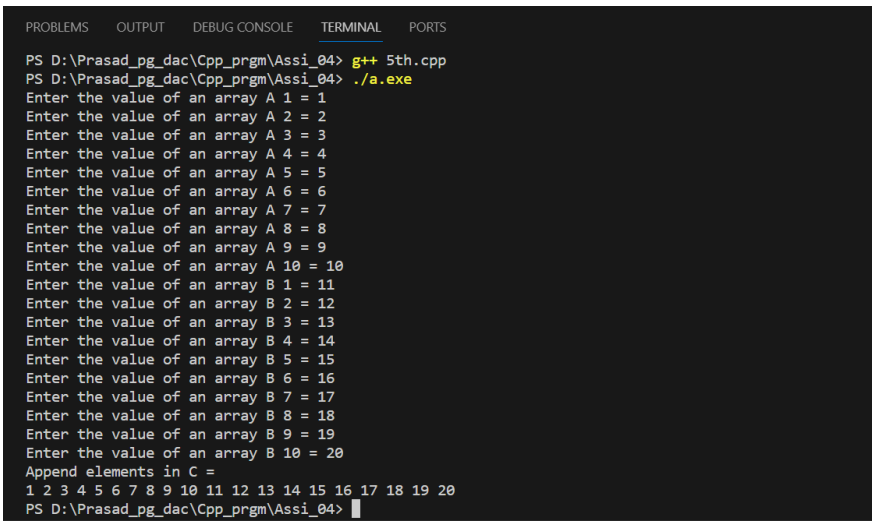
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 4th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter array elements =
Arr [0]: 1
Arr [1]: 2
Arr [2]: 3
Arr [3]: 4
Arr [4]: 5
Arr [5]: 5
Arr [6]: 4
Arr [7]: 3
Arr [8]: 2
Arr [9]: 1
the array is growing and decreasing.
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

5. Write a program which takes 2 arrays of 10 integers each, a and b. c is an array with 20 integers. The program should put into c the appending of b to a, the first 10 integers of c from array a, the latter 10 from b. Then the program should display c.

Code:--

```
#include<iostream>
using namespace std;
void appendArray(int a[], int b[])
{
int c[20], j=0, k=0;
for(int i=0; i<10; i++)
{
c[i] = a[j];
j++;
}
for(int i=10; i<20; i++)
{
c[i] = b[k];
k++;
}
cout<<"Append elements in C = "<<endl;
for(int i=0; i<20; i++)
{
cout<<c[i]<<" ";
}
}
int main()
{
int a[10], b[10];
for(int i=0; i<10; i++)
{
cout<<"Enter the value of an array A "<<i+1<<" = ";
cin>>a[i];
}
for(int i=0; i<10; i++)
{
cout<<"Enter the value of an array B "<<i+1<<" = ";
cin>>b[i];
}
appendArray(a, b);
return 0;
}
```

Output:--



6. Write a program that asks the user to take an array of 10 integer and an integer value V and an index value i between 0 and 9. The program must put the value V at the place i in the array, shifting each element right and dropping off the last element. The program must then write the final array.

Code:--

```
#include<iostream>
using namespace std;
void newArray(int arr[], int len, int V, int j)
{
for(int i=len-1; i>j; i--)
{
arr[i] = arr[i-1];
}
arr[j]=V;
cout<<"Updated array = "<<endl;
for(int i=0; i<len; i++)
{
cout<<arr[i]<<" ";
}
}
int main()
{
int arr[10], V, j;
for(int i=0; i<10; i++)
{
cout<<"Enter the "<<i+1<<" value = ";
cin>>arr[i];
}
cout<<"Enter an interger value V = ";
cin>>V;
cout<<"Enter an index value i between 0 and 9 = ";
cin>>j;
newArray(arr, 10, V, j);
return 0;
}
```

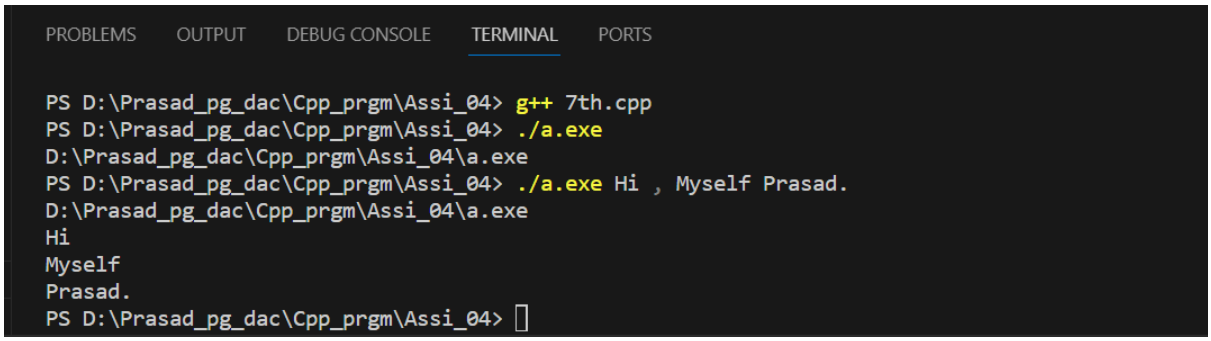
Output:--

7. Write a program to handle the command line arguments entered by the user.

Code:--

```
#include<iostream>
using namespace std;
int main(int argc, char* argv[])
{
for(int i=0; i<=argc; i++)
cout<<argv[i]<<endl;
return 0;
}
```

Output:--



8. Write a program to add 2 matrices.

Code:--

```
#include<iostream>
using namespace std;
int main()
{
int n, m;
cout<<"Enter the no. of rows of matrix = ";
cin>>n;
cout<<"Enter the no. of columns of matrix = ";
cin>>m;
int mat1[n][m], mat2[n][m], sum[n][m];
cout<<endl;
cout<<"Elements of the Matrix 1 = "<<endl;
for(int i=0; i<n; i++)
{
for(int j=0; j<m; j++)
{
cout<<"Enter the "<<i<<" row "<<j<<" column element = ";
cin>>mat1[i][j];
}
}
cout<<endl;
cout<<"Elements of the Matrix 2 = "<<endl;;
for(int i=0; i<n; i++)
```

```
{
for(int j=0; j<m; j++)
{
cout<<"Enter the "<<i<<" row "<<j<<" column element = ";
cin>>mat2[i][j];
}
}
cout<<endl;
cout<<"Elements of the sum matrices = "<<endl;
for(int i=0; i<n; i++)
{
for(int j=0; j<m; j++)
{
sum[i][j]=mat1[i][j]+mat2[i][j];
cout<<sum[i][j]<<" ";
}
cout<<endl;
}
return 0;
}
```

Output:--

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 8th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter the no. of rows of matrix = 2
Enter the no. of columns of matrix = 2

Elements of the Matrix 1 =
Enter the 0 row 0 column element = 2
Enter the 0 row 1 column element = 4
Enter the 1 row 0 column element = 6
Enter the 1 row 1 column element = 8

Elements of the Matrix 2 =
Enter the 0 row 0 column element = 3
Enter the 0 row 1 column element = 5
Enter the 1 row 0 column element = 7
Enter the 1 row 1 column element = 9

Elements of the sum matrices =
5 9
13 17
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

9. Write a program to multiply 2 matrices.

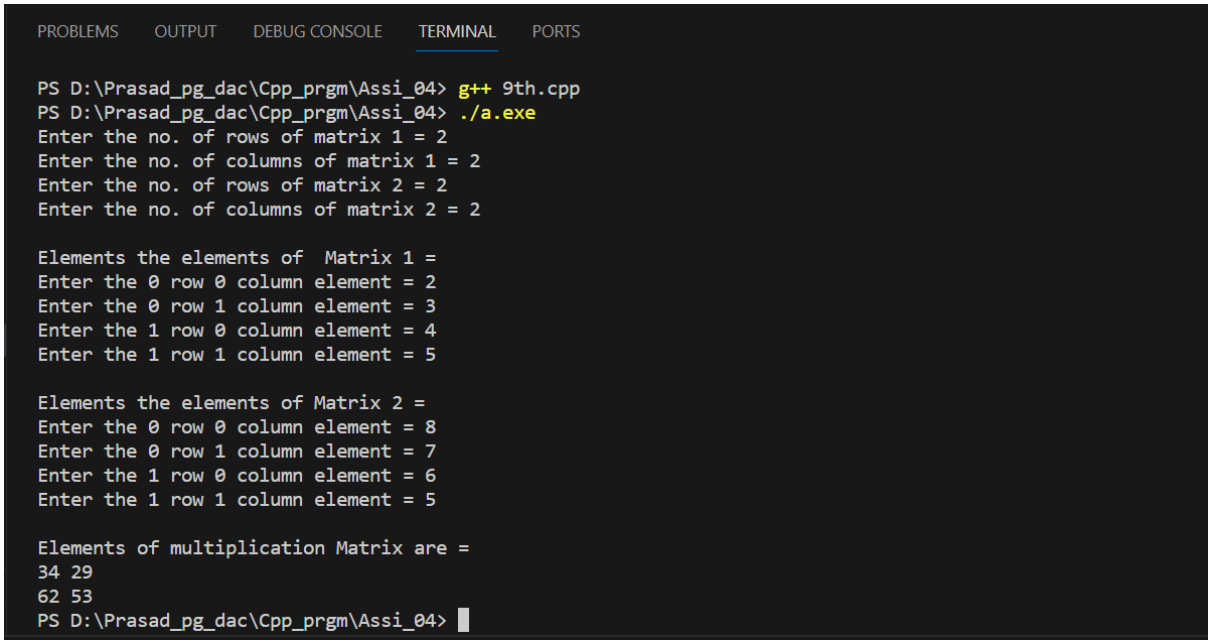
Code:--

```
#include<iostream>
using namespace std;
int main()
{
int n1, m1, n2, m2;
cout<<"Enter the no. of rows of matrix 1 = ";
cin>>n1;
```

```
cout<<"Enter the no. of columns of matrix 1 = ";
cin>>m1;
cout<<"Enter the no. of rows of matrix 2 = ";
cin>>n2;
cout<<"Enter the no. of columns of matrix 2 = ";
cin>>m2;
int mat1[n1][m1],mat2[n2][m2], mul[n1][m2];
cout<<endl;
if(m1==n2)
{
cout<<"Elements the elements of  Matrix 1 = "<<endl;
for(int i=0; i<n1; i++)
{
for(int j=0; j<m1; j++)
{
cout<<"Enter the "<<i<<" row "<<j<<" column element = ";
cin>>mat1[i][j];
}
}
cout<<endl;
cout<<"Elements the elements of Matrix 2 = "<<endl;
for(int i=0; i<n2; i++)
{
for(int j=0; j<m2; j++)
{
cout<<"Enter the "<<i<<" row "<<j<<" column element = ";
cin>>mat2[i][j];
}
}
cout<<endl;
for(int i=0; i<n1; i++)
{
for(int j=0; j<m2; j++)
{
mul[i][j]=0;
}
}
for(int i=0; i<n1; i++)
{
for(int j=0; j<m2; j++)
{
for(int k=0; k<m1; k++)
mul[i][j] += mat1[i][k] * mat2[k][j];
}
}
cout<<"Elements of multiplication Matrix are = "<<endl;
for(int i=0; i<n1; i++)
{
for(int j=0; j<m2; j++)
{
cout<<mul[i][j]<<" ";
```

```
}
cout<<endl;
}
}else
cout<<"Matrix multiplication is not possible";
return 0;
}
```

Output:--



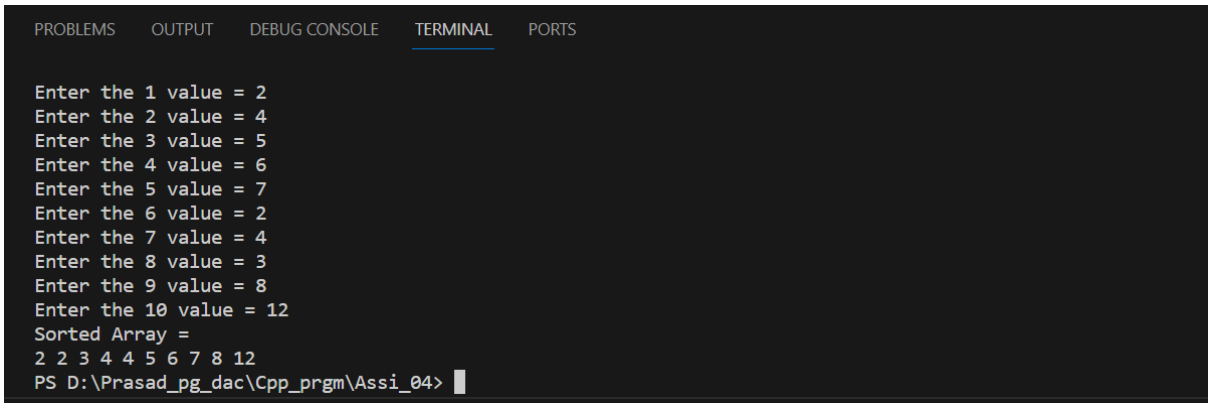
10. Write a program to implement sorting an array.

Code:--

```
#include<iostream>
using namespace std;
void sortAnArray(int arr[], int len)
{
int temp;
for(int i=0; i<len; i++)
{
for(int j=i+1; j<len; j++)
if(arr[i]>arr[j]){
temp = arr[i];
arr[i]=arr[j];
arr[j]=temp;
}
}
cout<<"Sorted Array = "<<endl;
for(int i=0; i<len; i++)
{
cout<<arr[i]<<" ";
}
```

```
}
int main()
{
int arr[10];
for(int i=0; i<10; i++)
{
cout<<"Enter the "<<i+1<<" value = ";
cin>>arr[i];
}
sortAnArray(arr, 10);
return 0;
}
```

Output:--



11. Write a program in C to calculate the square of the number using inline functions and macros both.

Code:--

```
#include<iostream>
using namespace std;
#define SQUARE(x) (x)*(x);
inline int square(int x)
{
return x*x;
}
int main()
{
int x;
cout<<"Enter a number: ";
cin>>x;
cout<<"Square of a number using macros: "<<SQUARE(x);
cout<<endl;
cout<<"Square of a number using inline function: "<<square(x);
return 0;
}
```

Output:--

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Enter a number: 5
Square of a number using macros: 25
Square of a number using inline function: 25
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```

12. Write a program in C to calculate area of all figures using the concept of function overloading.

Code:--

```
#include<iostream>
using namespace std;
double area(double side)
{
 return side*side;
}
int area(int length,int breath)
{
 return length*breath;
}
double area(double base,double height)
{
 return (1.0/2.0)*base*height;
}
int main()
{
 double side,base,height;
 int length,breath;
 cout<<"Enter side to calculate square area = ";
 cin>>side;
 cout<<"Area of square:"<<area(side)<<endl;
 cout<<"Enter length to calculate rectangle area = ";
 cin>>length;
 cout<<"Enter breath to calculate rectangle area = ";
 cin>>breath;
 cout<<"Area of rectangle:"<<area(length,breath)<<endl;
 cout<<"Enter base to calculate triangle area = ";
 cin>>base;
 cout<<"Enter height to calculate triangle area = ";
 cin>>height;
 cout<<"Area of rectangle:"<<area(base,height)<<endl;

}
```

Output:--

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> g++ 12th.cpp
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04> ./a.exe
Enter side to calculate square area = 4
Area of square:16
Enter length to calculate rectangle area = 6
Enter breath to calculate rectangle area = 4
Area of rectangle:24
Enter base to calculate triangle area = 8
Enter height to calculate triangle area = 4
Area of rectangle:16
PS D:\Prasad_pg_dac\Cpp_prgm\Assi_04>
```