C++ ASSIGNMENT 4 (ARRAYS)

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.**

```cpp
#include<iostream>
using namespace std;

int main()
{
    int count=0;
    int arr[10];
    for(int i=0;i<10;i++)
    {
        cout<<"Enter the Value :";
        cin>>arr[i];
    }
    for(int i=0;i<10;i++)
    {
        if(arr[i]>=10)
        {
            count++;
        }
    }
    cout<<"The number greater than or equal to 10:"<<count<<endl;
    return 0;
}
```

```
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PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q1.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Enter the Value :1
Enter the Value :2
Enter the Value :3
Enter the Value :4
Enter the Value :5
Enter the Value :6
Enter the Value :7
Enter the Value :8
Enter the Value :11
Enter the Value :10
The number greater than or equal to 10:2
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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.**

```
#include<iostream>
using namespace std;

int main()
{
int i,temp=0;
int arr[5];
for(i=0;i<5;i++)
{
cout<<"Please enter numbers: ";
cin>>arr[i];
}
for(i=1;i<5;i++)
{
if(arr[temp]<arr[i])
{
temp=i;
}
}
cout<<"The Largest element="<<arr[temp]<<" Index="<<temp<<endl;
return 0;
}
```

```
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PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q2.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 1
Please enter numbers: 2
Please enter numbers: 3
Please enter numbers: 4
Please enter numbers: 5
The Largest element=5 Index=4
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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.**

```
#include<iostream>
using namespace std;
```

```cpp
int main()
{
int i,temp;
int a[5];
for(i=0;i<5;i++)
{
cout<<"Please enter numbers: ";
cin>>a[i];
}
for(int i=0;i<5;i++)
{
for(int j=0;j<5;j++)
{
    if(a[i]>a[j])
{
temp=a[i];
a[i]=a[j];
a[j]=temp;
}
}
}
for(i=0;i<5;i++)
{
cout<<"Elements in Dencending order: "<<a[i]<<endl;
}
return 0;
}
```

```
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PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q3.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 10
Please enter numbers: 40
Please enter numbers: 2
Please enter numbers: 50
Please enter numbers: 3
Elements in Dencending order : 50
Elements in Dencending order : 40
Elements in Dencending order : 10
Elements in Dencending order : 3
Elements in Dencending order : 2
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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."**

```
#include<iostream>
using namespace std;

int main()
{
int n;
cout<<"Please enter numbers: ";
cin>>n;
int arr[n];
for(int i=0;i<n;i++)
{
cin>>arr[i];
}
bool grow=true;
for(int i=1;i<n;i++)
{
if(arr[i]<=arr[i-1])
{
grow=false;
}
}
bool desc=true;
for(int i=1;i<n;i++)
{
if(arr[i]>=arr[i-1])
{
desc=false;
}
}
bool cons=true;
for(int i=1;i<n;i++)
{
if (arr[i]!=arr[i-1])
{
cons=false;
}
}
if(grow==true)
{
cout<<"array is growing"<<endl;
}
```

```
else if(desc==true)
{
cout<<"array is decreasing"<<endl;
}
else if(cons==true)
{
cout<<"array is constant"<<endl;
}
else
{
cout<<"array is growing and decresing";
}
return 0;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SQL CONSOLE

PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q4.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 3
1
1
array is constant
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 3
3
2
1
array is decreasing
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 3
10
20
30
array is growing
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Please enter numbers: 3
10
5
15
array is growing and decresing
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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.**

```cpp
#include <iostream>
using namespace std;

int main()
{
int a[10]={10,20,30,40,50,60,70,80,90,100};
int b[10] = {11,12,13,14,15,16,17,18,19,20};
int c[20];
for(int i=0;i<10;i++)
{
c[i]=a[i];
}
for(int i=0;i<10;i++)
{
c[i+10]=b[i];
}
for(int i=0;i<20;i++)
{
cout<<c[i]<<" ";
}
return 0;
}
```

```
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PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q5.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
10 20 30 40 50 60 70 80 90 100 11 12 13 14 15 16 17 18 19 20
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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.**

```cpp
#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 is..."<<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;
}
```

```
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PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q6.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Enter the 1 value: 10
Enter the 2 value: 20
Enter the 3 value: 39
Enter the 4 value: 40
Enter the 5 value: 50
Enter the 6 value: 20
Enter the 7 value: 60
Enter the 8 value: 100
Enter the 9 value: 22
Enter the 10 value: 56
Enter an interger value V: 90
Enter an index value i between 0 and 9: 4
Updated array is...
10 20 39 40 90 50 20 60 100 22
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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

```cpp
#include<iostream>
using namespace std;

int main(int argc,char* argv[])
{
for(int i=0;i<=argc;i++)
cout<<argv[i]<<endl;
return 0;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SQL CONSOLE

PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q7.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
C:\Users\DELL\Desktop\C++ Assignment\Assignment4\a.exe
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

8. **Write a program to add 2 matrices.**

```cpp
#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 the elements of mat1 matrix..."<<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 the elements of mat2 matrix..."<<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 sum matrix are..."<<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;
}
```

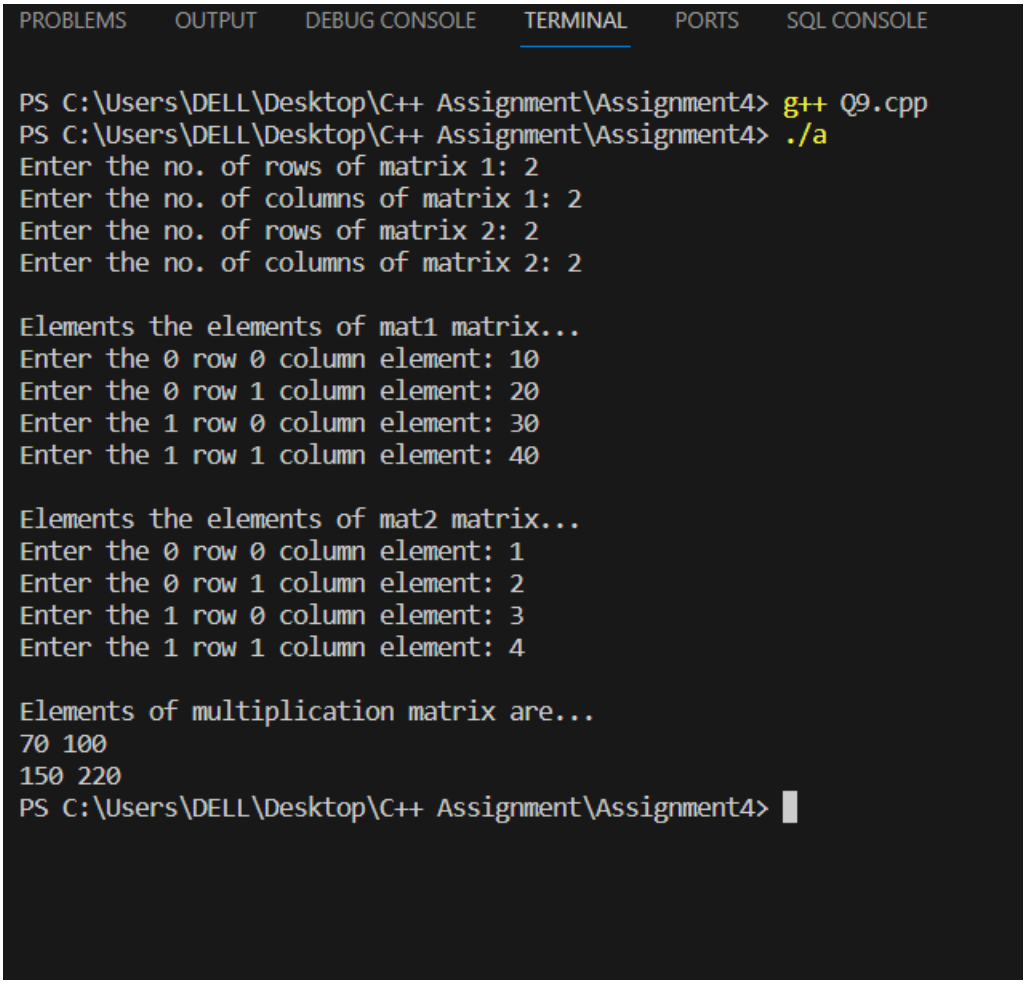
```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   SQL CONSOLE

PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q8.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Enter the no. of rows of matrix: 4
Enter the no. of columns of matrix: 3

Elements the elements of mat1 matrix...
Enter the 0 row 0 column element: 1
Enter the 0 row 1 column element: 2
Enter the 0 row 2 column element: 3
Enter the 1 row 0 column element: 4
Enter the 1 row 1 column element: 5
Enter the 1 row 2 column element: 6
Enter the 2 row 0 column element: 7
Enter the 2 row 1 column element: 8
Enter the 2 row 2 column element: 9
Enter the 3 row 0 column element: 10
Enter the 3 row 1 column element: 11
Enter the 3 row 2 column element: 12

Elements the elements of mat2 matrix...
Enter the 0 row 0 column element: 10
Enter the 0 row 1 column element: 20
Enter the 0 row 2 column element: 30
Enter the 1 row 0 column element: 40
Enter the 1 row 1 column element: 50
Enter the 1 row 2 column element: 60
Enter the 2 row 0 column element: 70
Enter the 2 row 1 column element: 80
Enter the 2 row 2 column element: 90
Enter the 3 row 0 column element: 100
Enter the 3 row 1 column element: 110
Enter the 3 row 2 column element: 120

Elements of sum matrix are...
11 22 33
44 55 66
77 88 99
110 121 132
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

9. **Write a program to multiply 2 matrices.**

```cpp
#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 mat1 matrix..."<<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 mat2 matrix..."<<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;
}
```



10. Write a program to implement sorting an array.

```
#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;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SQL CONSOLE

PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q10.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Enter the 1 value: 11
Enter the 2 value: 12
Enter the 3 value: 19
Enter the 4 value: 40
Enter the 5 value: 20
Enter the 6 value: 5
Enter the 7 value:
70
Enter the 8 value: 50
Enter the 9 value: 33
Enter the 10 value: 45
Sorted Array...
5 11 12 19 20 33 40 45 50 70
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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

```
#include<iostream>
using namespace std;

#define SQUARE(x) (x)*(x);
```

```cpp
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;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SQL CONSOLE

PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> g++ Q11.cpp
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4> ./a
Enter a number: 2
Square of a number using macros: 4
Square of a number using inline function: 4
PS C:\Users\DELL\Desktop\C++ Assignment\Assignment4>
```

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

```cpp
#include<iostream>
using namespace std;

int area(int side)
{
return side*side;
}
int area(int length,int breadth)
{
return length*breadth;
}
double area(double base,double height)
{
return(1.0/2.0)*base*height;
}
```

```cpp
int main()
{
int side,length,breadth;
double base,height;
cout<<"Enter the side of sqaure: ";
cin>>side;
cout<<"Enter the length of rectangle: ";
cin>>length;
cout<<"Enter the breadth of rectangle: ";
cin>>breadth;
cout<<"Enter the base of triangle: ";
cin>>base;
cout<<"Enter the height of triangle: ";
cin>>height;
cout<<"Area of square: "<<area(side)<<endl;
cout<<"Area of rectangle: "<<area(length, breadth)<<endl;
cout<<"Area of triangle: "<<area(base, height)<<endl;
}
```