Lab 5

Anurag Chowdhury

(Reg No. 200905238)

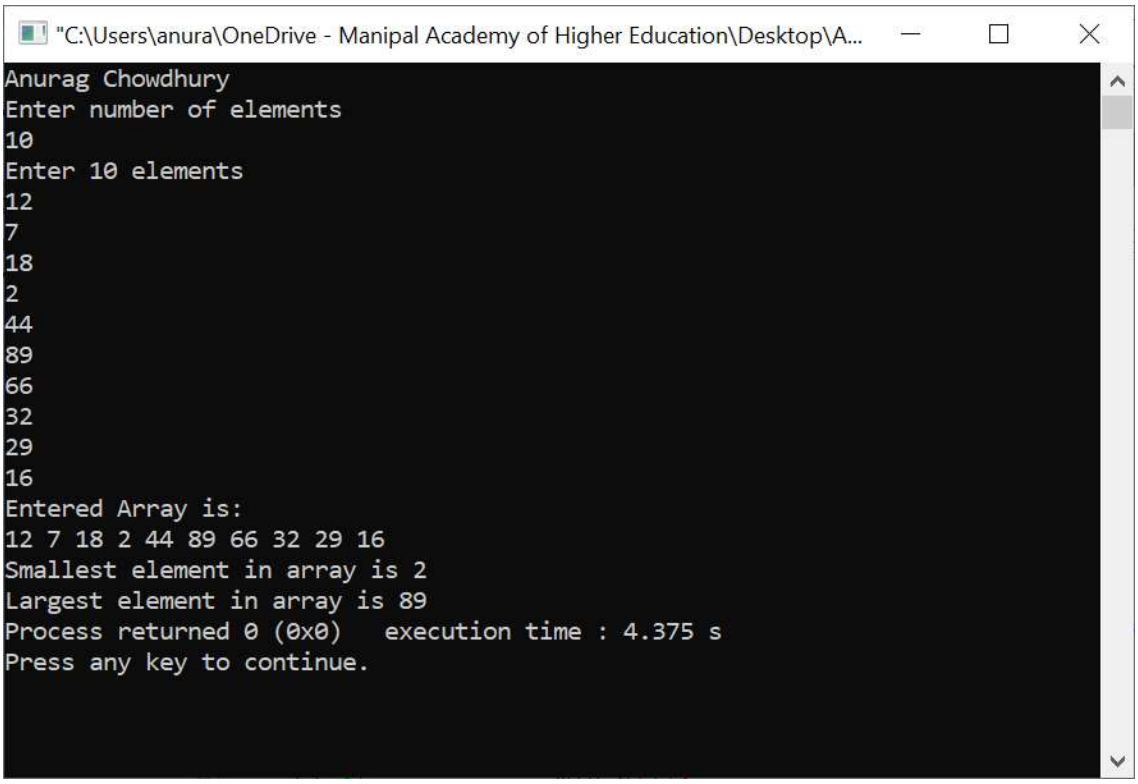
Section: M, Roll No.: 22

Date: 10/09/2021

1. Find the largest and smallest element in a 1D array

```
//Find the largest and smallest element in a 1D array
#include<stdio.h>
int main(){
   printf("Anurag Chowdhury\n");
   printf("Enter number of elements\n");
   int n;
   scanf("%d",&n);
   int a[100];
   printf("Enter %d elements\n",n);
   for(int i=0;i<n;i++){
      scanf("%d",&a[i]);
   }
   printf("Entered Array is:\n");
   for(int i=0;i<n;i++)//Displaying array
   printf("%d ",a[i]);
   int max=a[0],min=a[0];
   for(int i=1;i<n;i++){
```

```
        if(a[i]<min)
            min=a[i];
        if(a[i]>max)
            max=a[i];
    }
    printf("\nSmallest element in array is %d\nLargest element in array is %d",min,max);
    return 0;
}
```

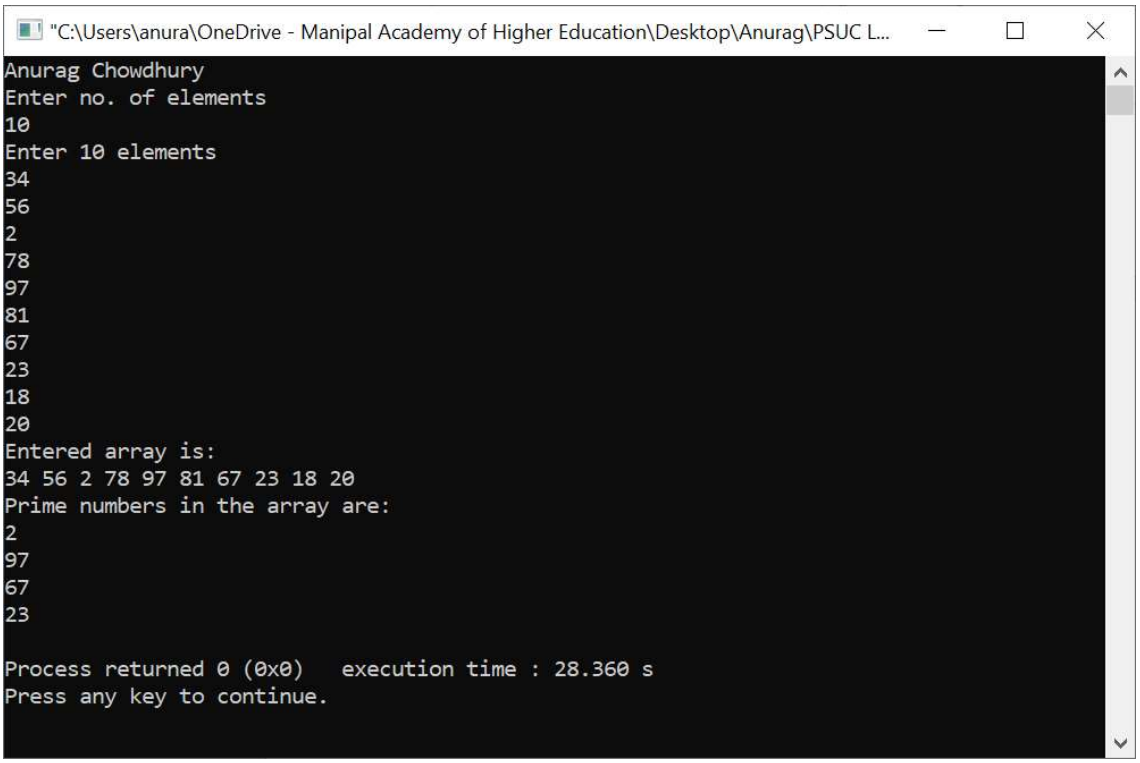


2. Print all the prime numbers in a given 1D array.

```
//Print all the prime numbers in a given 1D array.
```

```
#include<stdio.h>
#include<math.h>
int main(){
   printf("Anurag Chowdhury\n");
   int n,fl;
   printf("Enter no. of elements\n");
   scanf("%d",&n);
   int a[100];
   printf("Enter %d elements\n",n);
   for(int i=0;i<n;i++){
      scanf("%d",&a[i]);
   }
   printf("Entered array is:\n");
   for(int i=0;i<n;i++)//Displaying array
      printf("%d ",a[i]);
   printf("\nPrime numbers in the array are:\n");
   for(int i=0;i<n;i++){
         fl=1;
      for(int j=2;j<=sqrt(a[i]);j++){
         if(a[i]%j==0)
            fl=0;
      }
      if(fl==1)
         printf("%d\n",a[i]);
   }
   return 0;
```

```
}
```

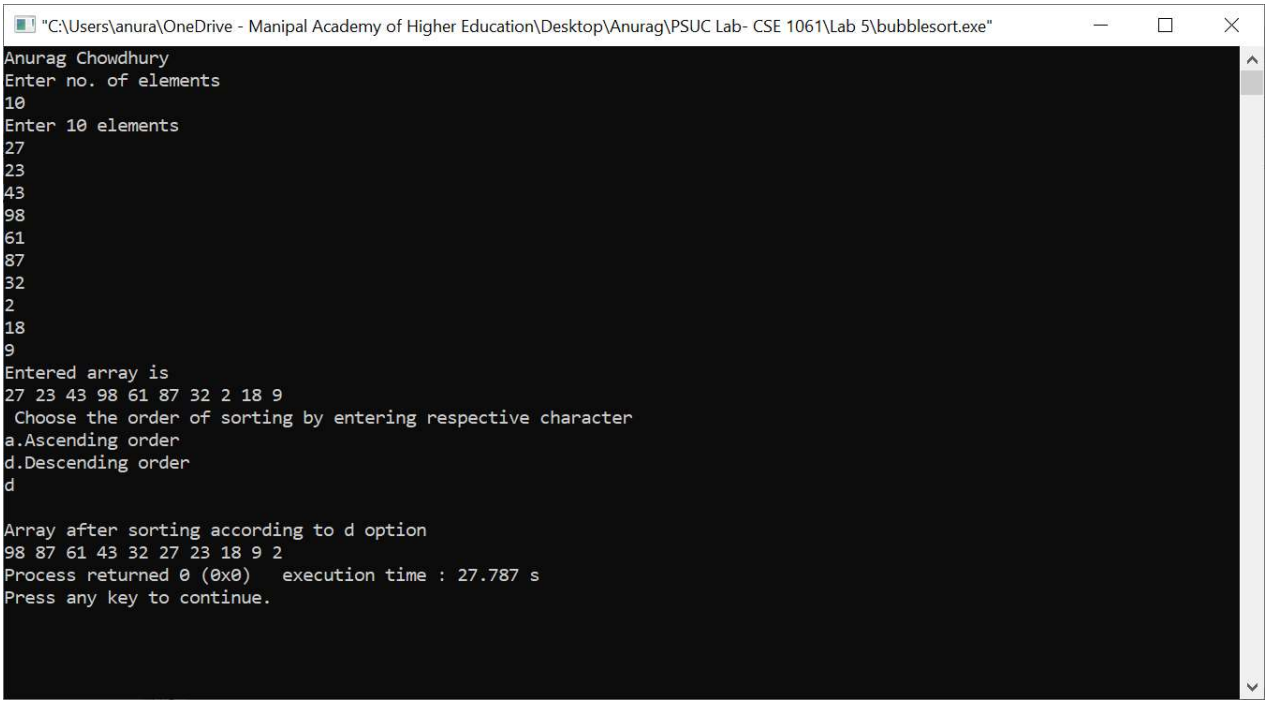


3. Arrange the given elements in a 1D array in ascending and descending order using bubble sort method. [Hint: use switch case (as case ‘a’ and case‘d’) to specify the order].

```
#include<stdio.h>
int main(){
   printf("Anurag Chowdhury\n");
   int a[100],n,temp;
   printf("Enter no. of elements\n");
   scanf("%d",&n);
   printf("Enter %d elements\n",n);
   for(int i=0;i<n;i++)
   scanf("%d",&a[i]);
   printf("Entered array is\n");
```

```
    for(int i=0;i<n;i++)//Displaying orignal array
    printf("%d ",a[i]);
    printf("\n Choose the order of sorting by entering respective character\na.Ascending order\nd.Descending order\n");
    char choice;
    scanf(" %c",&choice);
    switch(choice){
      case 'a':
        for(int i=0;i<n-1;i++){//Sorting
          for(int j=0;j<n-i-1;j++){
            if(a[j]>a[j+1]){
              temp=a[j];
              a[j]=a[j+1];
              a[j+1]=temp;
            }
          }
        }
        break;
      case 'd':
        for(int i=0;i<n-1;i++){//Sorting
          for(int j=0;j<n-i-1;j++){
            if(a[j]<a[j+1]){
              temp=a[j];
              a[j]=a[j+1];
              a[j+1]=temp;
            }
          }
```

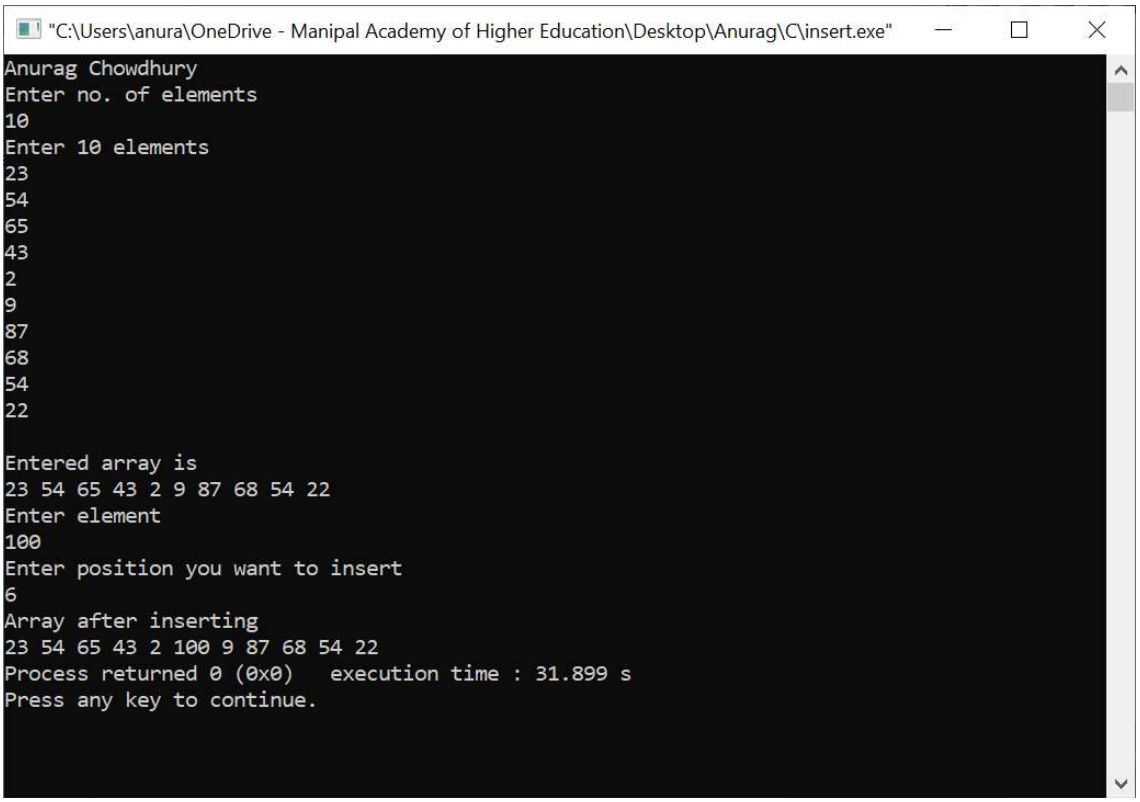
```
            }
            break;
        default:
            printf("Invalid choice");
    }
    printf("\nArray after sorting according to %c option\n",choice);
    //Display
    for(int i=0;i<n;i++)
    printf("%d ",a[i]);
    return 0;
}
```



4. Insert an element into a 1D array by getting an element and the position from the user.

```
/* Insert an element into a 1D array by getting an element and the
position    from the user.*/

#include<stdio.h>

int main(){

   printf("Anurag Chowdhury\n");

   int a[100],n,pos,ele,t;

   printf("Enter no. of elements\n");

   scanf("%d",&n);

   printf("Enter %d elements\n",n);

   for(int i=0;i<n;i++)

   scanf("%d",&a[i]);

   printf("\nEntered array is\n");

   for(int i=0;i<n;i++)//Displaying orignal array

   printf("%d ",a[i]);

   printf("\nEnter element\n");

   scanf("%d",&ele);

   printf("Enter position you want to insert\n");

   scanf("%d",&pos);

   int ind=pos-1;

   for(int i=n;i>ind;i--){

      a[i]=a[i-1];

   }

   a[ind]=ele;

   printf("Array after inserting\n");

   for(int i=0;i<=n;i++)

   printf("%d ",a[i]);

    return 0;
```

}

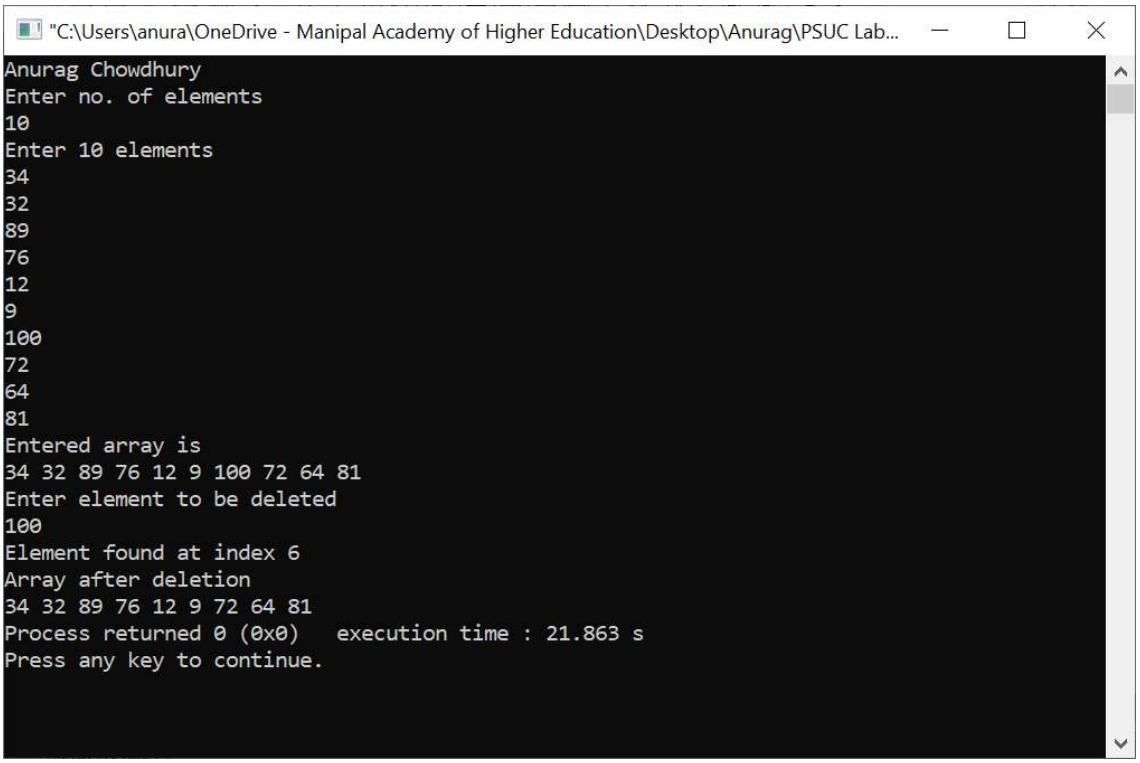


5. Search the position of the number that is entered by the user and delete that number from the array and display the resultant array elements.

```
/*Search the position of the number that is
entered by the user and delete that number from the
array and display the resultant array elements.*/
#include<stdio.h>
int main(){
   printf("Anurag Chowdhury\n");
   printf("Enter no. of elements\n");
   int n,a[100];
   scanf("%d",&n);
```

```
printf("Enter %d elements",n);
for(int i=0;i<n;i++){
   scanf("%d",&a[i]);
}
printf("Entered array is\n");
for(int i=0;i<n;i++){
   printf("%d ",a[i]);
}
printf("\nEnter element to be deleted\n");
int ele,pos=-1;
scanf("%d",&ele);
for(int i=0;i<n;i++){
   if(a[i]==ele){
      pos=i;
      break;
   }
}
if(pos==-1)
   printf("Element not found in entered array\n");
else{
   for(int i=pos;i<n-1;i++){
      a[i]=a[i+1];
   }
   printf("Array after deletion\n");
   for(int i=0;i<n-1;i++){
      printf("%d ",a[i]);
```

```
    }
  }
  return 0;
}
```


"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab...
Anurag Chowdhury
Enter no. of elements
10
Enter 10 elements
34
32
89
76
12
9
100
72
64
81
Entered array is
34 32 89 76 12 9 100 72 64 81
Enter element to be deleted
100
Element found at index 6
Array after deletion
34 32 89 76 12 9 72 64 81
Process returned 0 (0x0)   execution time : 21.863 s
Press any key to continue.

Lab 6

Anurag Chowdhury

(Reg No. 200905238)

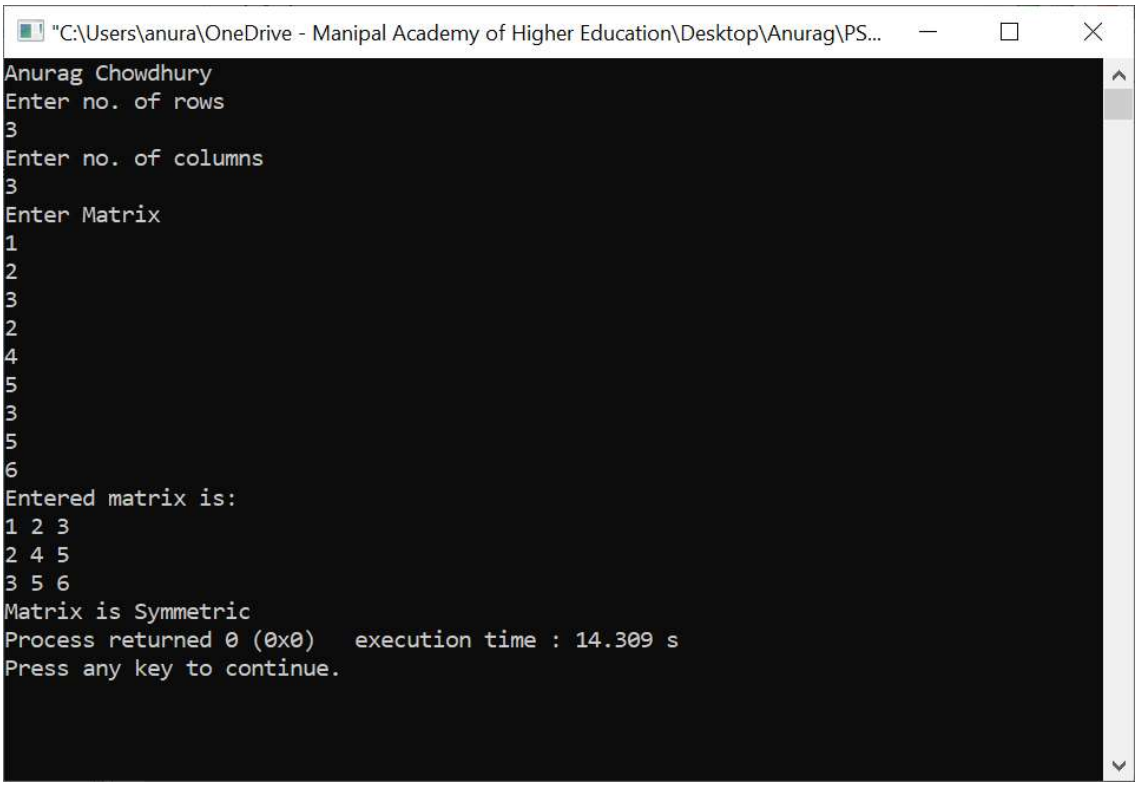
Section: M, Roll No.: 22

Date: 10/09/2021

1. Find whether a given matrix is symmetric or not.

```
//Find whether a given matrix is symmetric or not.
#include<stdio.h>
int main(){
   int n,m;
   printf("Anurag Chowdhury\n");
   printf("Enter no. of rows\n");
   int a[10][10];
   scanf("%d",&n);
   printf("Enter no. of columns\n");
   scanf("%d",&m);
   printf("Enter Matrix\n");
   for(int i=0;i<n;i++){
      for(int j=0;j<m;j++){
         scanf("%d",&a[i][j]);
      }
   }
   printf("Entered array is:\n");
```

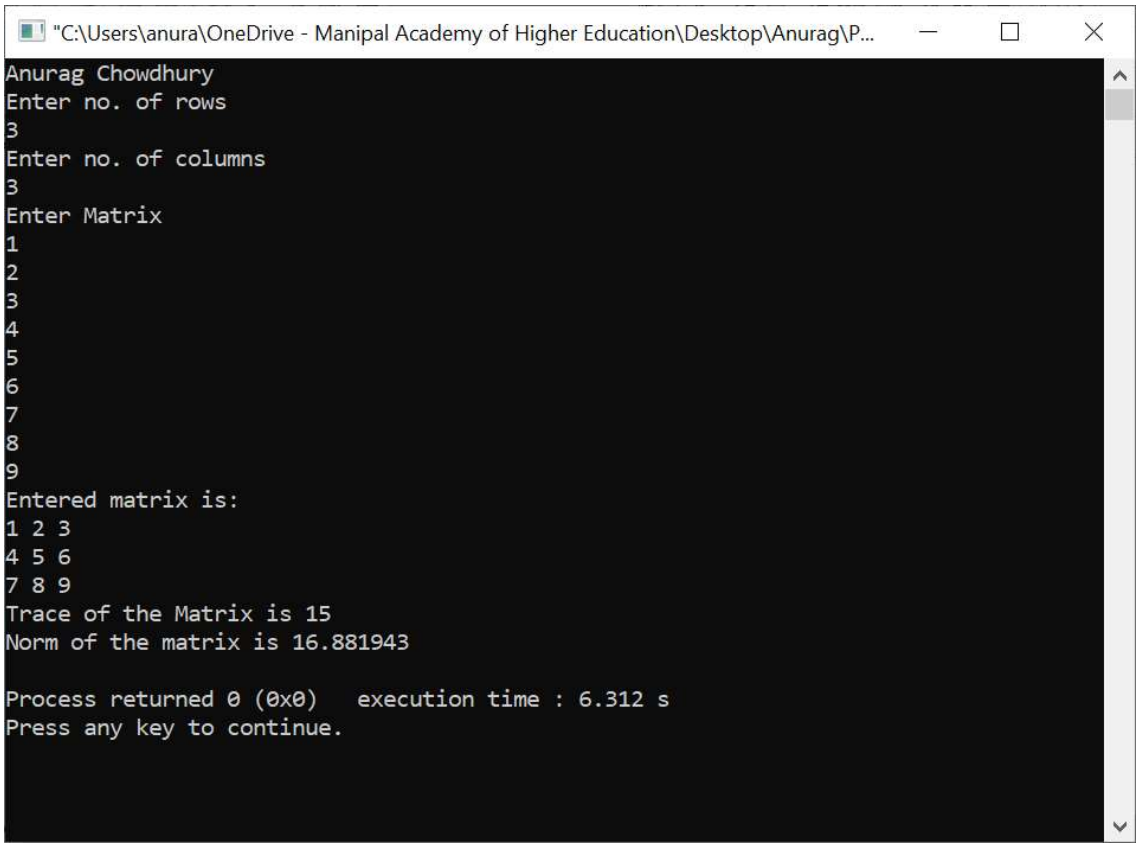
```
    for(int i=0;i<n;i++){
        for(int j=0;j<m;j++){
            printf("%d ",a[i][j]);
        }
        printf("\n");
    }
    int fl=1;
    for(int i=0;i<n;i++){
        for(int j=0;j<m;j++){
            if(a[i][j]!=a[j][i]){
                fl=0;
                break;
            }
        }
    }
    if(fl==1)
        printf("Matrix is Symmetric");
    else
        printf("Matrix is not Symmetric");
    return 0;
}
```



2. Find the trace and norm of a given square matrix.

```
//Find the trace and norm of a given square matrix.
#include<stdio.h>
#include<math.h>
int main(){
   printf("Anurag Chowdhury\n");
   int n,m,trace=0;
   float norm=0;
   int a[10][10];
   printf("Enter no. of rows\n");
   scanf("%d",&n);
   printf("Enter no. of columns\n");
```

```
    scanf("%d",&m);
    printf("Enter Matrix\n");
    for(int i=0;i<n;i++){
        for(int j=0;j<m;j++){
            scanf("%d",&a[i][j]);
        }
    }
    printf("Entered matrix is:\n");
    for(int i=0;i<n;i++){
        for(int j=0;j<m;j++){
            printf("%d ",a[i][j]);
            norm+=(a[i][j]*a[i][j]);
        }
        printf("\n");
    }
    norm=sqrt(norm);
    for(int i=0;i<n;i++)
        trace+=a[i][i];
    printf("Trace of the Matrix is %d\n",trace);
    printf("Norm of the matrix is %f\n",norm);
    return 0;
}
```

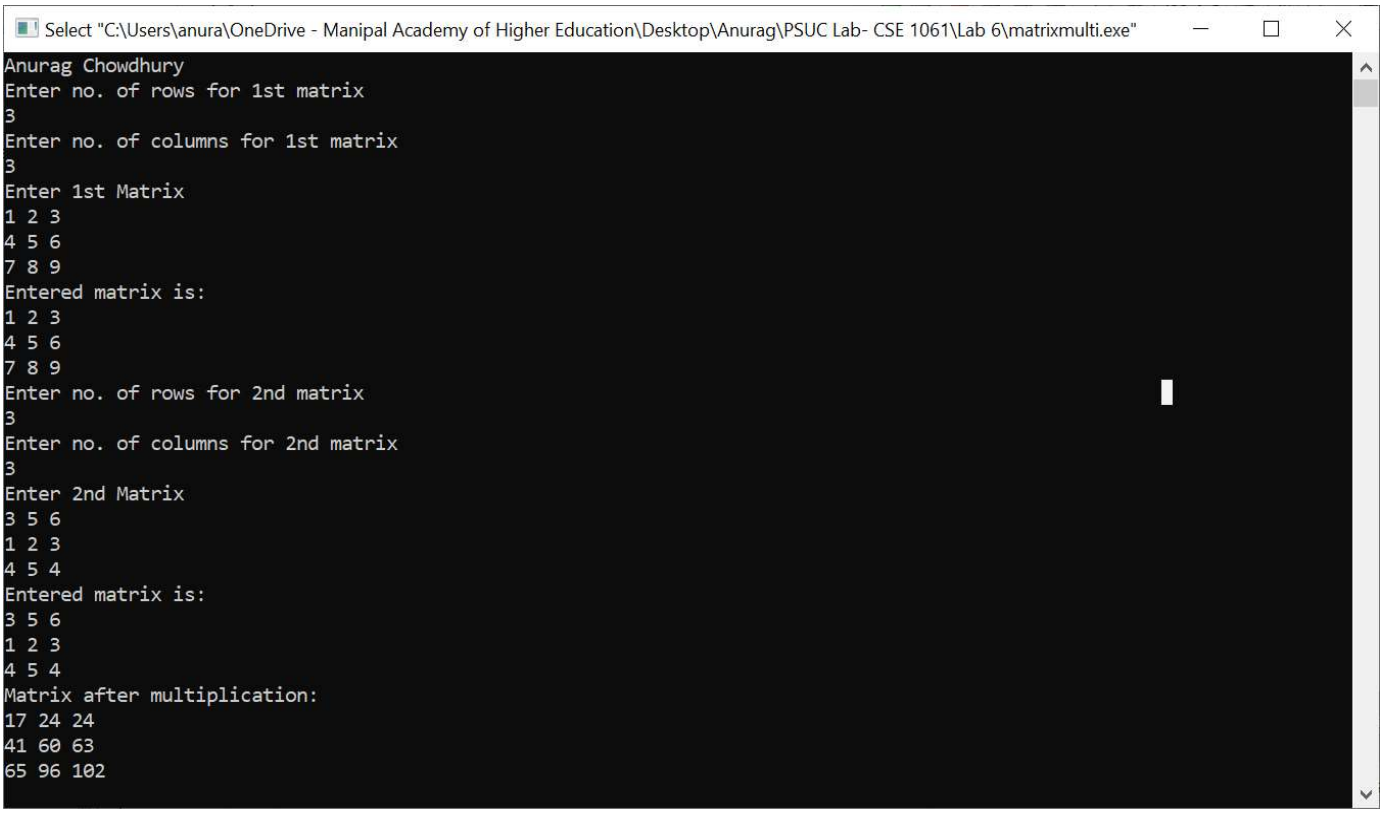


3. Perform matrix multiplication

```
//Perform matrix multiplication
#include<stdio.h>
int main(){
   int n,m,r,p;
   printf("Anurag Chowdhury\n");
   printf("Enter no. of rows for 1st matrix\n");
   int a[10][10],b[10][10],ans[10][10];
   scanf("%d",&n);
   printf("Enter no. of columns for 1st matrix\n");
   scanf("%d",&m);
   printf("Enter 1st Matrix\n");
```

```
for(int i=0;i<n;i++){
   for(int j=0;j<m;j++){
      scanf("%d",&a[i][j]);
   }
}
printf("Entered matrix is:\n");
for(int i=0;i<n;i++){
   for(int j=0;j<m;j++){
      printf("%d ",a[i][j]);
   }
   printf("\n");
}
printf("Enter no. of rows for 2nd matrix\n");
scanf("%d",&r);
printf("Enter no. of columns for 2nd matrix\n");
scanf("%d",&p);
printf("Enter 2nd Matrix\n");
for(int i=0;i<r;i++){
   for(int j=0;j<p;j++){
      scanf("%d",&b[i][j]);
   }
}
printf("Entered matrix is:\n");
for(int i=0;i<r;i++){
   for(int j=0;j<p;j++){
      printf("%d ",b[i][j]);
```

```
        }
        printf("\n");
    }
    if(m!=r)
        printf("Matrix Multiplication is not possible\n");
    else{
        printf("Matrix after multiplication:\n");
        for(int i=0;i<n;i++){
            for(int j=0;j<p;j++){
                ans[i][j]=0;
                for(int k=0;k<r;k++){
                    ans[i][j]+=a[i][k]*b[k][j];
                }
                printf("%d ",ans[i][j]);
            }
            printf("\n");
        }
    }
    return 0;
}
```

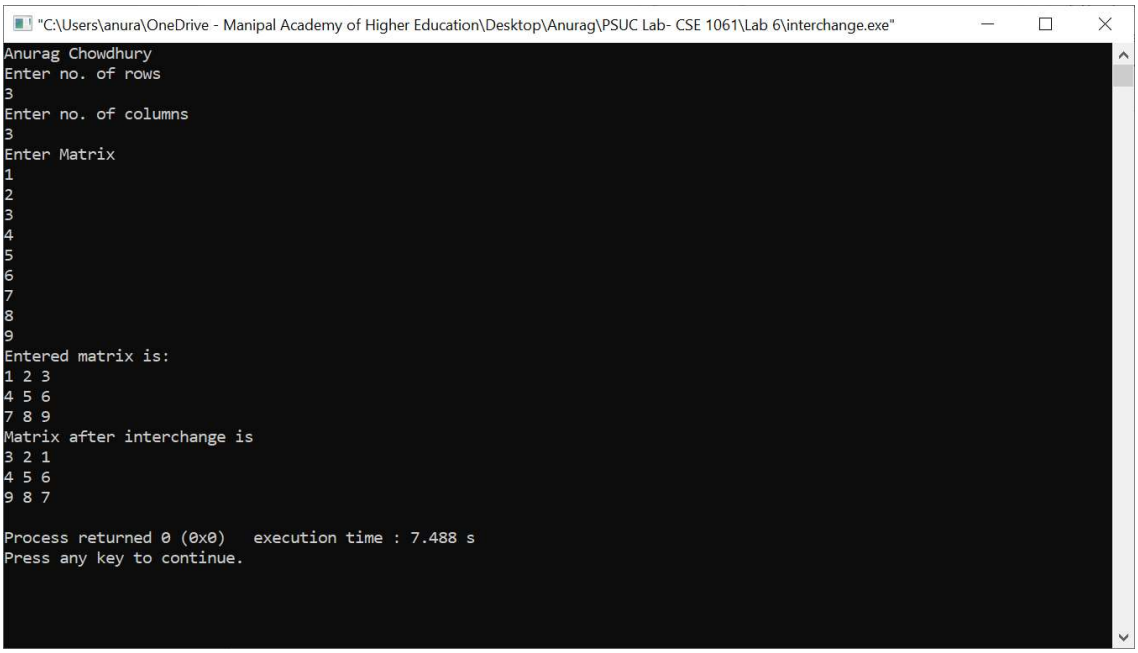


4. To interchange the primary and secondary diagonal elements in the given Matrix

```
#include<stdio.h>
int main(){
   int n,m;
   printf("Anurag Chowdhury\n");
   printf("Enter no. of rows\n");
   int a[10][10];
   scanf("%d",&n);
   printf("Enter no. of columns\n");
   scanf("%d",&m);
   printf("Enter Matrix\n");
   for(int i=0;i<n;i++){
```

```
    for(int j=0;j<m;j++){
        scanf("%d",&a[i][j]);
    }
}
printf("Entered matrix is:\n");
for(int i=0;i<n;i++){
    for(int j=0;j<m;j++){
        printf("%d ",a[i][j]);
    }
    printf("\n");
}
for (int i=0;i<n;i++){
    if (i!=n / 2){
        int temp=a[i][i];
        a[i][i]=a[i][n-i-1];
        a[i][n-i-1]=temp;
    }
}
printf("Matrix after interchange is\n");
for(int i=0;i<n;i++){
    for(int j=0;j<n;j++){
        printf("%d ",a[i][j]);
    }
    printf("\n");
}
return 0;
```

```
}
```

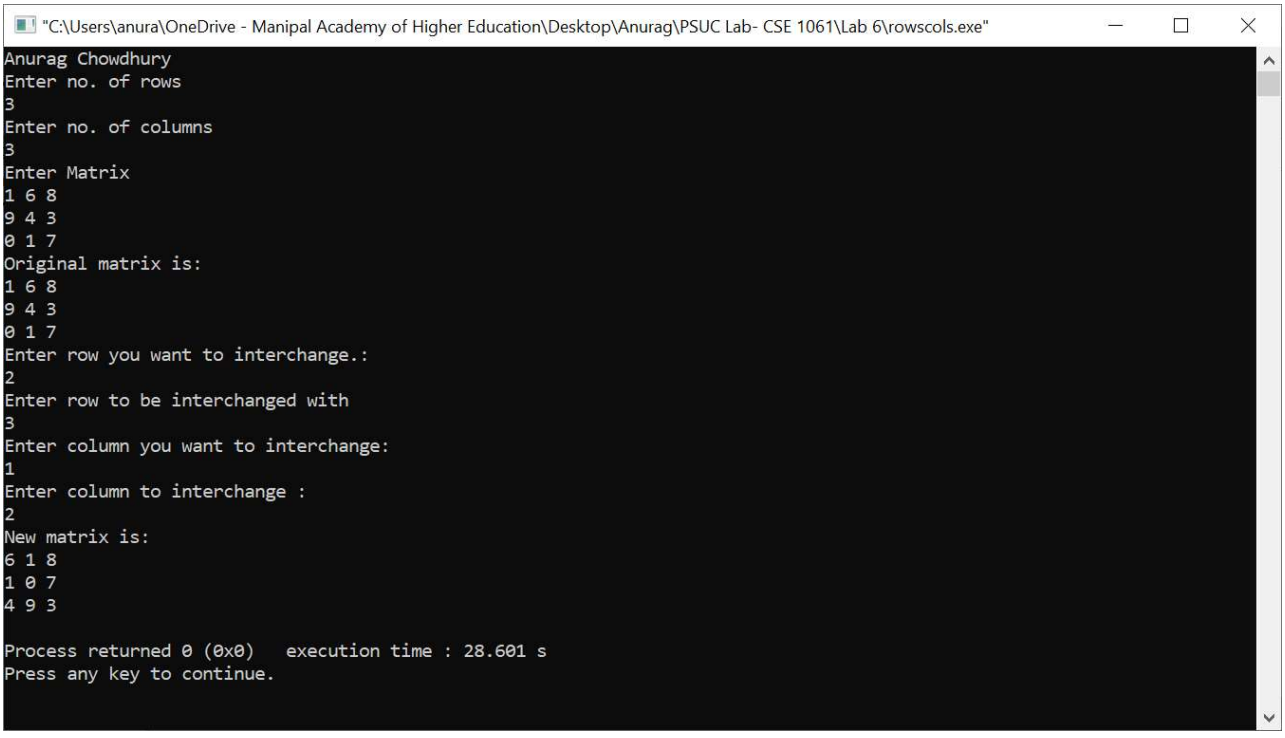


5. Interchange rows and columns in a matrix

```
// Interchange rows and columns in a matrix
#include <stdio.h>
int main()
{
   printf("Anurag Chowdhury");
   int n,m,r1,r2,c1,c2;
   printf("Enter no. of rows");
   scanf("%d",&n);
   printf("Enter no. of columns");
   scanf("%d",&m);
   int a[10][10];
```

```
printf("Enter Matrix\n");
for(int i=0;i<n;i++){
   for(int j=0;j<m;j++){
      scanf("%d",&a[i][j]);
   }
}
printf("Original matrix is: \n");
for(int i=0;i<n;i++){
   for (int j=0;j<m;j++){
      printf("%d ",a[i][j]);
   }
   printf("\n");
}
printf("Enter row you want to interchange.: \n");
scanf("%d",&r1);
printf("Enter row to be interchanged with\n");
scanf("%d",&r2);
for(int i=0;i<n;i++){
   int c=a[r1-1][i];
   a[r1-1][i]=a[r2-1][i];
   a[r2-1][i]=c;
}
printf("Enter column you want to interchange:\n");
scanf("%d",&c1);
printf("Enter column to interchange :\n");
scanf("%d",&c2);
```

```
    for (int i=0;i<m;i++){
        int r=a[i][c1-1];
        a[i][c1-1]=a[i][c2-1];
        a[i][c2-1]=r;
    }
    printf("New matrix is:\n");
    for (int i=0;i<m;i++){
        for (int j=0;j<n;j++){
            printf("%d ",a[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```



6. Search for an element in a given matrix and count the number of its occurrences.

```
//Search for an element in a given matrix and count the number of its occurrences.
#include<stdio.h>
int main(){
   int n,m;
   printf("Anurag Chowdhury\n");
   printf("Enter no. of rows\n");
   int a[10][10];
   scanf("%d",&n);
   printf("Enter no. of columns\n");
   scanf("%d",&m);
   printf("Enter Matrix\n");
   for(int i=0;i<n;i++){
      for(int j=0;j<m;j++){
         scanf("%d",&a[i][j]);
      }
   }
   printf("Entered matrix is:\n");
   for(int i=0;i<n;i++){
      for(int j=0;j<m;j++){
         printf("%d ",a[i][j]);
      }
      printf("\n");
```

```
    }
    printf("Enter an element to find the no. of its occurences in the
matrix\n");
    int ele,freq=0;
    scanf("%d",&ele);
    for(int i=0;i<n;i++){
        for(int j=0;j<n;j++){
            if(a[i][j]==ele)
                freq++;
        }
    }
    printf("%d occurs %d times",ele,freq);
    return 0;
}
```