

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++){
```

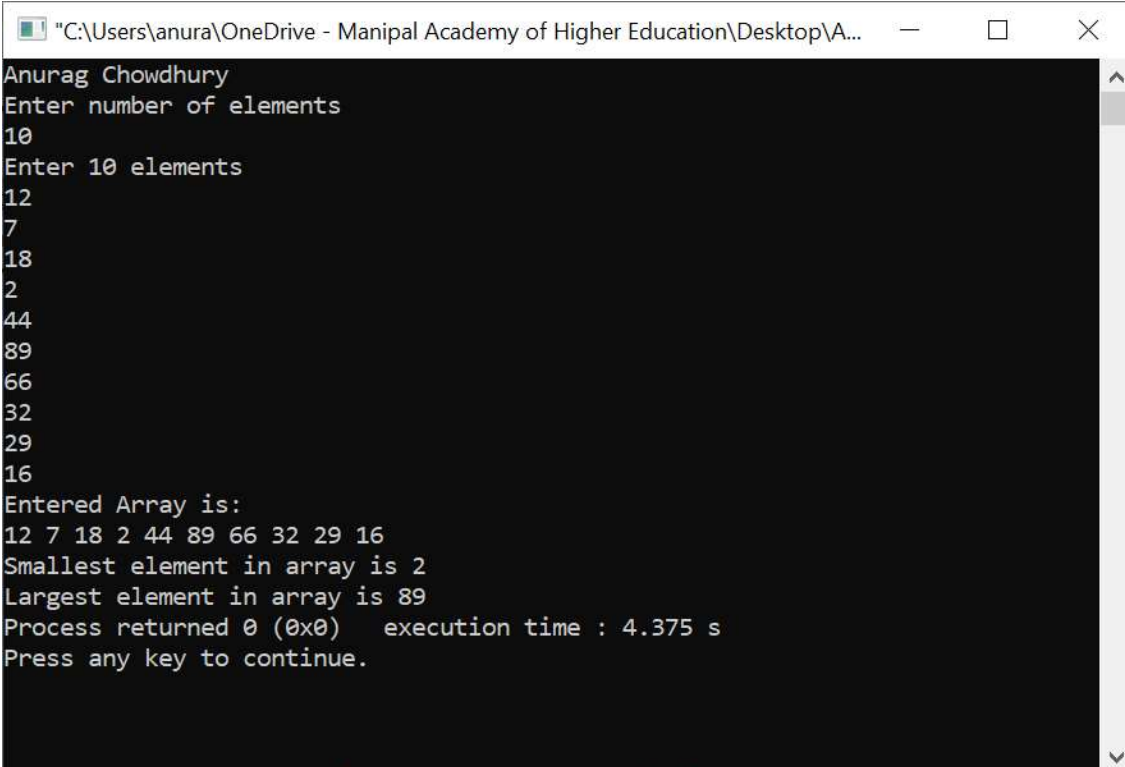
```

        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;
}

```



```

"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\A...
Anurag Chowdhury
Enter number of elements
10
Enter 10 elements
12
7
18
2
44
89
66
32
29
16
Entered Array is:
12 7 18 2 44 89 66 32 29 16
Smallest element in array is 2
Largest element in array is 89
Process returned 0 (0x0)   execution time : 4.375 s
Press any key to continue.

```

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;

        }

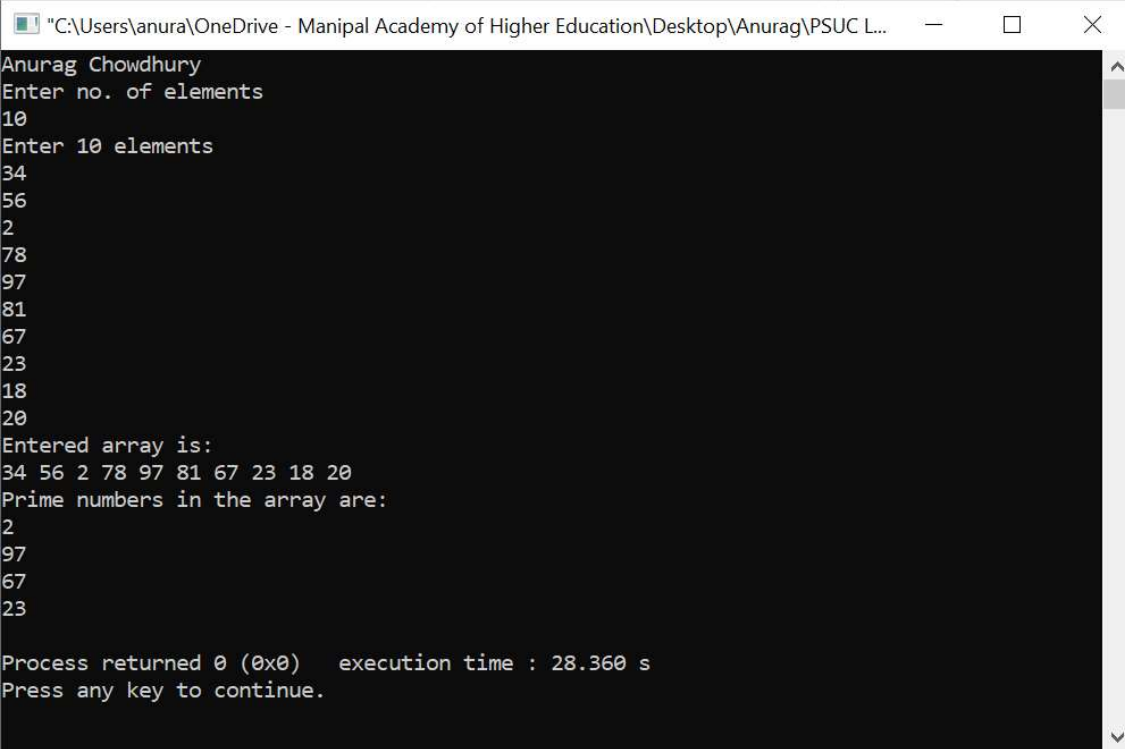
        if(fl==1)

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

    }

    return 0;
```

}



A screenshot of a Windows command prompt window titled "C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC L...". The window shows the execution of a C program. The output is as follows:

```
Anurag Chowdhury
Enter no. of elements
10
Enter 10 elements
34
56
2
78
97
81
67
23
18
20
Entered array is:
34 56 2 78 97 81 67 23 18 20
Prime numbers in the array are:
2
97
67
23

Process returned 0 (0x0)   execution time : 28.360 s
Press any key to continue.
```

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 original array

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

printf("\n Choose the order of sorting by entering respective
character\n a.Ascending order\n d.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;

}

```

```

"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab- CSE 1061\Lab 5\bubblesort.exe"
Anurag Chowdhury
Enter no. of elements
10
Enter 10 elements
27
23
43
98
61
87
32
2
18
9
Entered array is
27 23 43 98 61 87 32 2 18 9
Choose the order of sorting by entering respective character
a.Ascending order
d.Descending order
d

Array after sorting according to d option
98 87 61 43 32 27 23 18 9 2
Process returned 0 (0x0)   execution time : 27.787 s
Press any key to continue.

```

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 original 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;
```

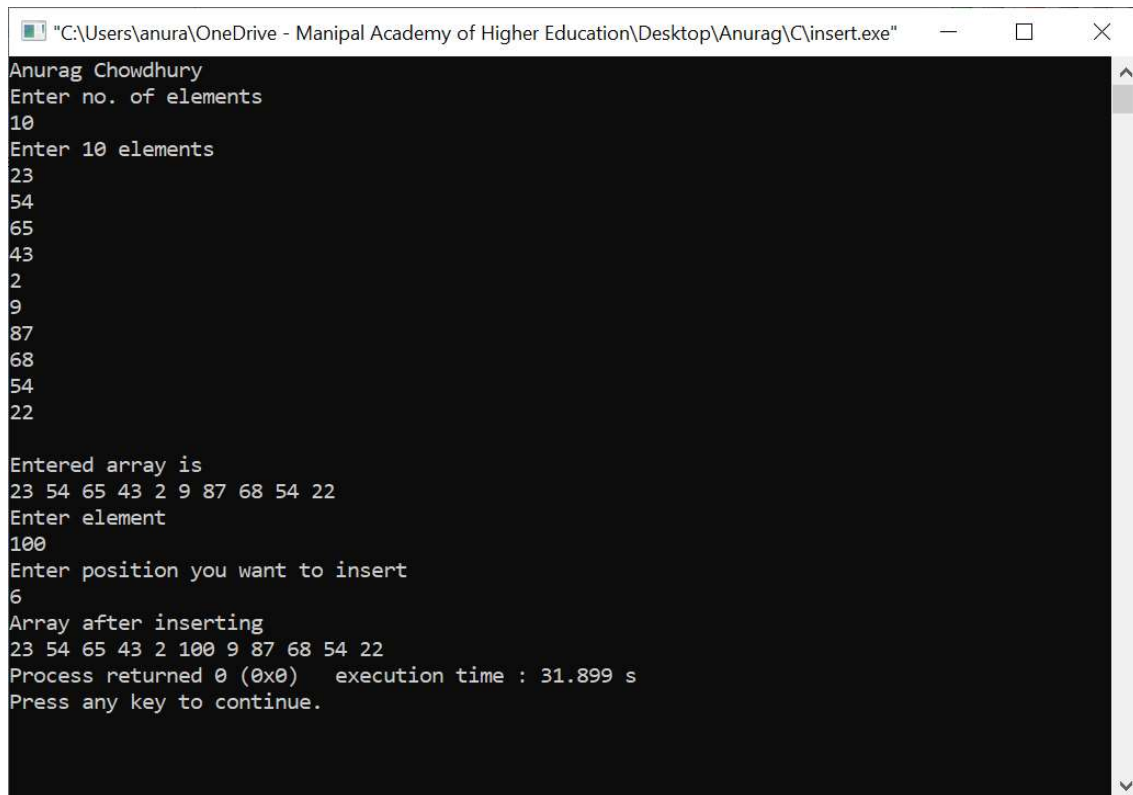
```
    printf("Array after inserting\n");
```

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

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

```
    return 0;
```

}



```
"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\C\insert.exe"
Anurag Chowdhury
Enter no. of elements
10
Enter 10 elements
23
54
65
43
2
9
87
68
54
22

Entered array is
23 54 65 43 2 9 87 68 54 22
Enter element
100
Enter position you want to insert
6
Array after inserting
23 54 65 43 2 100 9 87 68 54 22
Process returned 0 (0x0)   execution time : 31.899 s
Press any key to continue.
```

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");

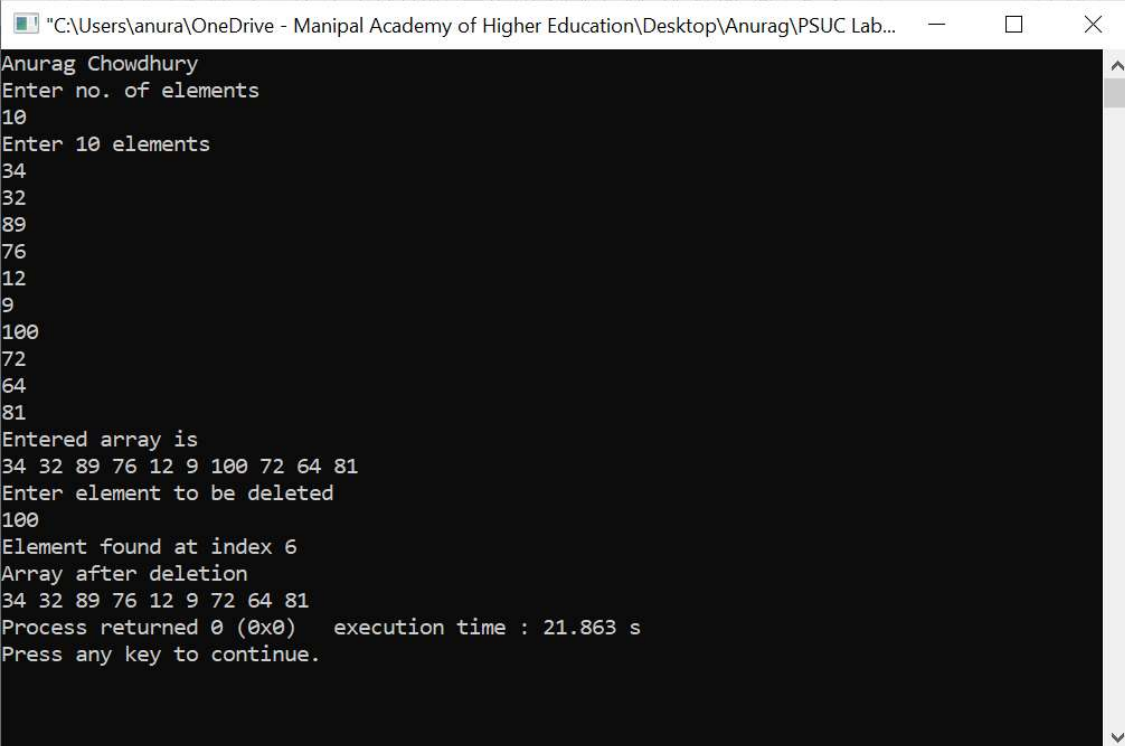
    int n,a[100];

    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;  
}
```

```
"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PS..."
Anurag Chowdhury
Enter no. of rows
3
Enter no. of columns
3
Enter Matrix
1
2
3
2
4
5
3
5
6
Entered matrix is:
1 2 3
2 4 5
3 5 6
Matrix is Symmetric
Process returned 0 (0x0)   execution time : 14.309 s
Press any key to continue.
```

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;
}

```

```
"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\P...
Anurag Chowdhury
Enter no. of rows
3
Enter no. of columns
3
Enter Matrix
1
2
3
4
5
6
7
8
9
Entered matrix is:
1 2 3
4 5 6
7 8 9
Trace of the Matrix is 15
Norm of the matrix is 16.881943

Process returned 0 (0x0)   execution time : 6.312 s
Press any key to continue.
```

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;
}

```

```
Select "C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab- CSE 1061\Lab 6\matrixmulti.exe"
Anurag Chowdhury
Enter no. of rows for 1st matrix
3
Enter no. of columns for 1st matrix
3
Enter 1st Matrix
1 2 3
4 5 6
7 8 9
Entered matrix is:
1 2 3
4 5 6
7 8 9
Enter no. of rows for 2nd matrix
3
Enter no. of columns for 2nd matrix
3
Enter 2nd Matrix
3 5 6
1 2 3
4 5 4
Entered matrix is:
3 5 6
1 2 3
4 5 4
Matrix after multiplication:
17 24 24
41 60 63
65 96 102
```

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");
    }

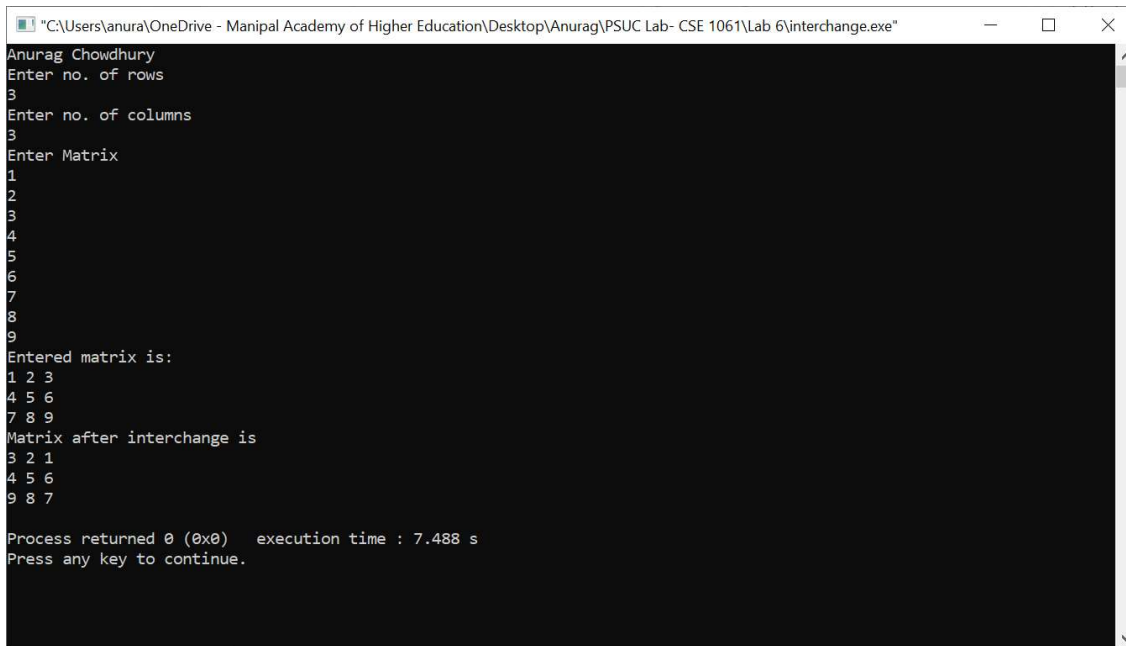
    for (int i=0;i<n;i++){
        if (i!=n / 2){
            int temp=a[i][i];
            a[i][i]=a[i][n-i-1];
            a[i][n-i-1]=temp;
        }
    }

    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;

```

}



```
"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab- CSE 1061\Lab 6\interchange.exe"
Anurag Chowdhury
Enter no. of rows
3
Enter no. of columns
3
Enter Matrix
1
2
3
4
5
6
7
8
9
Entered matrix is:
1 2 3
4 5 6
7 8 9
Matrix after interchange is
3 2 1
4 5 6
9 8 7
Process returned 0 (0x0)   execution time : 7.488 s
Press any key to continue.
```

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;
}

```

The screenshot shows a Windows command prompt window titled "C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab- CSE 1061\Lab 6\rowscols.exe". The program prompts the user for the number of rows (3) and columns (3), then enters a 3x3 matrix: 1 6 8, 9 4 3, 0 1 7. It displays the original matrix and then asks for the row to interchange (2) and the row to interchange with (3). It then asks for the column to interchange (1) and the column to interchange (2). Finally, it displays the new matrix: 6 1 8, 1 0 7, 4 9 3. The process returned 0 (0x0) and the execution time was 28.601 s. The prompt asks to press any key to continue.

```

Anurag Chowdhury
Enter no. of rows
3
Enter no. of columns
3
Enter Matrix
1 6 8
9 4 3
0 1 7
Original matrix is:
1 6 8
9 4 3
0 1 7
Enter row you want to interchange.:
2
Enter row to be interchanged with
3
Enter column you want to interchange:
1
Enter column to interchange :
2
New matrix is:
6 1 8
1 0 7
4 9 3

Process returned 0 (0x0)   execution time : 28.601 s
Press any key to continue.

```

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 occurrences 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;

}

```

```

"C:\Users\anura\OneDrive - Manipal Academy of Higher Education\Desktop\Anurag\PSUC Lab- CSE 1061\Lab 6\frequncy.exe"
Anurag Chowdhury
Enter no. of rows
4
Enter no. of columns
4
Enter Matrix
3
7
8
9
7
2
1
0
9
6
4
3
0
7
8
7
Entered matrix is:
3 7 8 9
7 2 1 0
9 6 4 3
0 7 8 7
Enter an element to find the no. of its occurrences in the matrix
7
7 occurs 4 times

```