Arnav Agrawal Lab 5 and 6

Lab 5

Question 1

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

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 1
// Find the largest and smallest element in a 1D array.
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int a[50], i, n, large, small;
    printf("\nEnter the number of elements: ");
    scanf("%d", &n);
    printf("\nInput the array elements: ");
    for (i = 0; i < n; ++i)
    {
        scanf("%d", &a[i]);
    }

    large = small = a[0];

    for (i = 1; i < n; ++i)
    {
        if (a[i] > large)
            large = a[i];

        if (a[i] < small)
            small = a[i];
    }

    printf("\nThe smallest element is %d\n", small);
    printf("\nThe largest element is %d\n", large);

    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int a[50], i, n, large, small;
    printf("\nEnter the number of elements: ");
    scanf("%d", &n);
    printf("\nInput the array elements: ");
    for (i = 0; i < n; ++i)
    {
        scanf("%d", &a[i]);
    }

    large = small = a[0];

    for (i = 1; i < n; ++i)
    {
        if (a[i] > large)
            large = a[i];

        if (a[i] < small)
            small = a[i];
    }

    printf("\nThe smallest element is %d\n", small);
    printf("\nThe largest element is %d\n", large);

    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20

Enter the number of elements: 10

Input the array elements: 12 5 64 24 2 13 4 21 31 3

The smallest element is 2

The largest element is 64

Process returned 0 (0x0)   execution time : 15.441 s
Press any key to continue.
```

Lab 5

Question 2

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

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 2
// Print all the prime numbers in a given 1D array.
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");

    int arr[10], i, s, j, p;

    printf("Enter size of an array:");
    scanf("%d", &s);

    printf("Enter array elements:");
    for (i = 0; i < s; i++)
    {
        scanf("%d", &arr[i]);
    }

    printf("The following primes are there\t");
```

```c
    for (i = 0; i < s; i++)
    {
        j = 2;
        p = 1;
        while (j < arr[i])
        {
            if (arr[i] % j == 0)
            {
                p = 0;
                break;
            }
            j++;
        }
        if (p == 1)
        {
            printf("%d ", arr[i]);
        }
    }

    return 0;
}
```

```c
// Lab 5
// Question 2
// Print all the prime numbers in a given 1D array
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");

    int arr[10], i, s, j, p;

    printf("Enter size of an array:");
    scanf("%d", &s);

    printf("Enter array elements:");
    for (i = 0; i < s; i++)
    {
        scanf("%d", &arr[i]);
    }

    printf("The following primes are there\t");
    for (i = 0; i < s; i++)
    {
        j = 2;
        p = 1;
        while (j < arr[i])
        {
            if (arr[i] % j == 0)
            {
                p = 0;
                break;
            }
            j++;
        }
        if (p == 1)
        {
            printf("%d ", arr[i]);
        }
    }

    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter size of an array: 5
Enter array elements:2 3 4 5 6
The following primes are there  2 3 5
Process returned 0 (0x0)   execution time : 10.464 s
Press any key to continue.
```

Lab 5

Question 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].

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 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("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int i, j, a, n, ch;
    printf("Enter the size \n");
    scanf("%d", &n);
    int number[n];
    printf("Enter the Numbers \n");
    for (i = 0; i < n; i++)
    {
        scanf("%d", &number[i]);
    }
    while (1)
```

```c
    {
        printf("Press 1. For ASCENDING\n");
        printf("Press 2. For DESCENDING\n");
        printf("Enter Your Choice:\n");
        scanf("%d", &ch);
        switch (ch)
        {
        case 1:
            for (i = 0; i < n; i++)
            {
                for (j = i + 1; j < n; j++)
                {
                    if (number[i] > number[j])
                    {
                        a = number[i];
                        number[i] = number[j];
                        number[j] = a;
                    }
                }
            }
            printf("\nThe numbers arranged in ascending order are given below\n");
            for (i = 0; i < n; i++)
            {
                printf("%d\n", number[i]);
            }
            break;
        case 2:
            for (i = 0; i < n; i++)
            {
                for (j = i + 1; j < n; j++)
                {
                    if (number[i] < number[j])
                    {
                        a = number[i];
                        number[i] = number[j];
                        number[j] = a;
                    }
                }
            }
            printf("\nThe numbers arranged in descending order are given below\n");
            for (i = 0; i < n; i++)
            {
                printf("%d\n", number[i]);
            }
            break;
        default:
            printf("\n INVALID CHOICE \n");
            break;
        }
    }
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int i, j, a, n, ch;
    printf("Enter the size \n");
    scanf("%d", &n);
    int number[n];
    printf("Enter the Numbers \n");
    for (i = 0; i < n; i++)
    {
        scanf("%d", &number[i]);
    }
    while (1)
    {
        printf("Press 1. For ASCENDING\n");
        printf("Press 2. For DESCENDING\n");
        printf("Enter Your Choice:\n");
        scanf("%d", &ch);
        switch (ch)
        {
        case 1:
            for (i = 0; i < n; i++)
            {
                for (j = i + 1; j < n; j++)
                {
                    if (number[i] > number[j])
                    {
                        a = number[i];
                        number[i] = number[j];
                        number[j] = a;
                    }
                }
            }
            printf("\nThe numbers arranged in ascending order are given below\n");
            for (i = 0; i < n; i++)
            {
                printf("%d\n", number[i]);
            }
            break;
        case 2:
            for (i = 0; i < n; i++)
            {
                for (j = i + 1; j < n; j++)
                {
                    if (number[i] < number[j])
                    {
                        a = number[i];
                        number[i] = number[j];
                        number[j] = a;
                    }
                }
            }
            printf("\nThe numbers arranged in descending order are given below\n");
            for (i = 0; i < n; i++)
            {
                printf("%d\n", number[i]);
            }
            break;
        default:
            printf("\n INVALID CHOICE \n");
            break;
        }
    }
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"
Arnav Agrawal
200905200
Section M - 20
Enter the size
6
Enter the Numbers
2 34 5 6 435 4
Press 1. For ASCENDING
Press 2. For DESCENDING
Enter Your Choice:
2

The numbers arranged in descending order are given below
435
34
6
5
4
2
Press 1. For ASCENDING
Press 2. For DESCENDING
Enter Your Choice:
1

The numbers arranged in ascending order are given below
2
4
5
6
34
435
Press 1. For ASCENDING
Press 2. For DESCENDING
Enter Your Choice:
```

Lab 5

Question 4

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

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 4
// Insert an element into a 1D array by getting an element and the position from the
// user.
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int array[100], position, c, n, value;
    printf("Enter number of elements in array\n");
    scanf("%d", &n);

    printf("Enter %d elements\n", n);
    for (c = 0; c < n; c++)
    {
        scanf("%d", &array[c]);
    }

    printf("Enter the location where you wish to insert \n");
    scanf("%d", &position);

    printf("Enter the value to insert\n");
    scanf("%d", &value);

    for (c = n - 1; c >= position - 1; c--)
        array[c + 1] = array[c];

    array[position - 1] = value;

    printf("Resultant array is\n");

    for (c = 0; c <= n; c++)
        printf("%d\t", array[c]);

    return 0;
}
```

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 4
// Insert an element into a 1D array by getting an element and the position from the
// user.
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int array[100], position, c, n, value;
    printf("Enter number of elements in array\n");
    scanf("%d", &n);

    printf("Enter %d elements\n", n);
    for (c = 0; c < n; c++)
    {
        scanf("%d", &array[c]);
    }

    printf("Enter the location where you wish to insert \n");
    scanf("%d", &position);

    printf("Enter the value to insert\n");
    scanf("%d", &value);

    for (c = n - 1; c >= position - 1; c--)
        array[c + 1] = array[c];

    array[position - 1] = value;

    printf("Resultant array is\n");

    for (c = 0; c <= n; c++)
        printf("%d\t", array[c]);

    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter number of elements in array
5
Enter 5 elements
1 2 3 4 5
Enter the location where you wish to insert
2
Enter the value to insert
0
Resultant array is
1       0       2       3       4       5
Process returned 0 (0x0)   execution time : 15.276 s
Press any key to continue.
```

Lab 5

Question 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**

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 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
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int a[10], n, pos = 0, x, temp;
    printf("Enter the no of elements:\n");
    scanf("%d", &n);
    printf("Enter the elements:\n");
    for (int i = 0; i < n; i++)
    {
        scanf("%d", &a[i]);
    }
    printf("Enter the no to be deleted:");
    scanf("%d", &x);
    for (int i = 0; i < n; i++)
    {
        if (a[i] == x)
        {
            pos = i;
        }
    }
    for (int i = pos; i < n - 1; i++)
    {
        a[i] = a[i + 1];
    }
    printf("The new array is :\n");
    for (int i = 0; i < n - 1; i++)
    {
        printf("%d\t", a[i]);
    }
    return 0;
}
```

```c
// Arnav Agrawal
// 200905200
// Lab 5
// Question 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
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int a[10], n, pos = 0, x, temp;
    printf("Enter the no of elements:\n");
    scanf("%d", &n);
    printf("Enter the elements:\n");
    for (int i = 0; i < n; i++)
    {
        scanf("%d", &a[i]);
    }
    printf("Enter the no to be deleted:");
    scanf("%d", &x);
    for (int i = 0; i < n; i++)
    {
        if (a[i] == x)
        {
            pos = i;
        }
    }
    for (int i = pos; i < n - 1; i++)
    {
        a[i] = a[i + 1];
    }
    printf("The new array is :\n");
    for (int i = 0; i < n - 1; i++)
    {
        printf("%d\t", a[i]);
    }
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the no of elements:
5
Enter the elements:
1 2 3 4 5
Enter the no to be deleted: 4
The new array is :
1       2       3       5
Process returned 0 (0x0)   execution time : 7.892 s
Press any key to continue.
```

Lab 6

Question 1

Find whether a given matrix is symmetric or not. [Hint: A = A]

```
// Arnav Agrawal
// 200905200
// Lab 6
// Question 1
// Find whether a given matrix is symmetric or not. [Hint: A = AT

#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, a[10][10];
    int i, j;
    printf("Enter the rows and columns\n");
    scanf("%d %d", &m, &n);
    if (m != n)
        printf("Its not a square matrix");
    else
    {
        printf("Enter the elements\n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        }
        printf("The given matrix is: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
            {
                if (a[i][j] != a[j][i])
                {
                    printf("Matrix is Not Symmetric\n");
                    exit(0);
                }
            }
        }
        printf("Matrix is Symmetric\n");
    }
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, a[10][10];
    int i, j;
    printf("Enter the rows and columns\n");
    scanf("%d %d", &m, &n);
    if (m != n)
        printf("Its not a square matrix");
    else
    {
        printf("Enter the elements\n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        }
        printf("The given matrix is: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
            {
                if (a[i][j] != a[j][i])
                {
                    printf("Matrix is Not Symmetric\n");
                    exit(0);
                }
            }
        }
        printf("Matrix is Symmetric\n");
    }
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the rows and columns
3
3
Enter the elements
1 2 3
4
5
5
5
6
7
The given matrix is:
1        2        3
4        5        5
5        6        7
Matrix is Not Symmetric

Process returned 0 (0x0)    execution time : 24.622 s
Press any key to continue.
```

Lab 6

Question 2

Find the trace and norm of a given square matrix

```
// Arnav Agrawal
// 200905200
// Lab 6
// Question 2
// Find the trace and norm of a given square matrix
#include<stdio.h>
#include<math.h>

int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    #include<stdio.h>
    int m,n,a[10][10],trace=0,sum=0;
    float norm;
    int i,j;
    printf("Enter the number of rows and columns\n");
    scanf("%d %d",&m,&n);
    if(m!=n)
```

```c
        printf("Not a square matrix , trace and norm cant be found\n");
    else
    {
        printf("Enter the elements\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                scanf("%d",&a[i][j]);

        }
        printf("The Matrix is:\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        for(i=0;i<m;i++)
            trace=trace+a[i][i];
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                sum=sum+a[i][j]*a[i][j];
        }
        norm = sqrt(sum);
        printf("The trace of the matrix is: %d\n",trace);
        printf("The norm of the matrix is: %f\n",norm);
    }
    return 0;
}
```

```c
#include<stdio.h>
#include<math.h>

int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    #include<stdio.h>
    int m,n,a[10][10],trace,sum;
    float norm;
    int i,j;
    printf("Enter the number of rows and columns\n");
    scanf("%d %d",&m,&n);
    if(m!=n)
        printf("Not a square matrix , trace and norm cant be found\n");
    else
    {
        printf("Enter the elements\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                scanf("%d",&a[i][j]);

        }
        printf("The Matrix is:\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        for(i=0;i<m;i++)
            trace=trace+a[i][i];
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
                sum=sum+a[i][j]*a[i][j];
        }
        norm = sqrt(sum);
        printf("The trace of the matrix is: %d\n",trace);
        printf("The norm of the matrix is: %f\n",norm);
    }
    return 0;

}
```

```
■ "C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the number of rows and columns
3 3
Enter the elements
1 2 3 4 5 6 7 8 9
The Matrix is:
1       2       3
4       5       6
7       8       9
The trace of the matrix is: 15
The norm of the matrix is: 16.881943

Process returned 0 (0x0)   execution time : 9.923 s
Press any key to continue.
```

Lab 6

Question 3

Perform matrix multiplication.

```c
// Arnav Agrawal
// 200905200
// Lab 6
// Question 3
// ### Perform matrix multiplication.
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int i, j, k, m, n, p, q;
    int a[10][10], b[10][10], c[10][10];
    printf("Enter dimension for a\n");
    scanf("%d %d", &m, &n);
    printf("\n enter dimension  for b\n");
    scanf("%d %d", &p, &q);
    if (n != p)
    {
        printf("Cannot multiply");
    }
```

```c
        else
        {
            printf("Enter elements for a\n");
            for (i = 0; i < m; i++)
            {
                for (j = 0; j < n; j++)
                    scanf("%d", &a[i][j]);
            }
            printf("Enter elements for b\n");
            for (i = 0; i < p; i++)
            {
                for (j = 0; j < q; j++)
                    scanf("%d", &b[i][j]);
            }
            for (i = 0; i < m; i++)
            {
                for (j = 0; j < q; j++)
                {
                    c[i][j] = 0;
                    for (k = 0; k < n; k++)
                        c[i][j] = c[i][j] + a[i][k] * b[k][j];
                }
            }
            printf("The multiplied matrix is: \n");
            for (i = 0; i < m; i++)
            {
                for (j = 0; j < n; j++)
                    printf("%d\t", c[i][j]);
                printf("\n");
            }
        }
        return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int i, j, k, m, n, p, q;
    int a[10][10], b[10][10], c[10][10];
    printf("Enter dimension for a\n");
    scanf("%d %d", &m, &n);
    printf("\n enter dimension  for b\n");
    scanf("%d %d", &p, &q);
    if (n != p)
    {
        printf("Cannot multiply");
    }
    else
    {
        printf("Enter elements for a\n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        }
        printf("Enter elements for b\n");
        for (i = 0; i < p; i++)
        {
            for (j = 0; j < q; j++)
                scanf("%d", &b[i][j]);
        }
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < q; j++)
            {
                c[i][j] = 0;
                for (k = 0; k < n; k++)
                    c[i][j] = c[i][j] + a[i][k] * b[k][j];
            }
        }
        printf("The multiplied matrix is: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", c[i][j]);
            printf("\n");
        }
    }
    return 0;
}
```

Lab 6

Question 4

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

```
// Arnav Agrawal
// 200905200
// Lab 6
// Question 4
// To interchange the primary and secondary diagonal elements in the given Matrix
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, temp, a[10][10];
    int i, j;
    printf("Enter the dimensions of matrix\n");
```

```
    scanf("%d %d", &m, &n);
    if (m != n)
    {
        printf("Matrix is not symmetric\n");
    }
    else
    {
        printf("Enter the elements of the matrix: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        }
        printf("The original Matrix is:\n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
            {
                if (i == j)
                {
                    temp = a[i][j];
                    a[i][j] = a[i][n - i - 1];
                    a[i][n - i - 1] = temp;
                }
            }
        }
        printf("The Updated Matrix is: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
    }
    return 0;
}
```

```c
// To interchange the primary and secondary diagonal elements in
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, temp, a[10][10];
    int i, j;
    printf("Enter the dimensions of matrix\n");
    scanf("%d %d", &m, &n);
    if (m != n)
    {
        printf("Matrix is not symmetric\n");
    }
    else
    {
        printf("Enter the elements of the matrix: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        }
        printf("The original Matrix is:\n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
            {
                if (i == j)
                {
                    temp = a[i][j];
                    a[i][j] = a[i][n - i - 1];
                    a[i][n - i - 1] = temp;
                }
            }
        }
        printf("The Updated Matrix is: \n");
        for (i = 0; i < m; i++)
        {
            for (j = 0; j < n; j++)
                printf("%d\t", a[i][j]);
            printf("\n");
        }
    }
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the dimensions of matrix
3 3
Enter the elements of the matrix:
1 2 3
4
5
6
7 8 9
The original Matrix is:
1       2       3
4       5       6
7       8       9
The Updated Matrix is:
3       2       1
4       5       6
9       8       7

Process returned 0 (0x0)    execution time : 11.090 s
Press any key to continue.
```

Lab 6

Question 5

Interchange any two Rows & Columns in the given Matrix.

```
// Arnav Agrawal
// 200905200
// Lab 6
// Question 5
// Interchange any two Rows & Columns in the given Matrix.
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, a[10][10], temp, r1, r2, c1, c2;
    int i, j;
    printf("Enter the dimensions of the matrix: \n");
    scanf("%d %d", &m, &n);
```

```c
    printf("Enter the elements of the matrix\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            scanf("%d", &a[i][j]);
    }
    printf("The original matrix is \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    printf("\nEnter the rows to exchange:\n");
    scanf("%d %d", &r1, &r2);
    for (j = 0; j < n; j++)
    {
        temp = a[r1 - 1][j];
        a[r1 - 1][j] = a[r2 - 1][j];
        a[r2 - 1][j] = temp;
    }
    printf("The updated matrix is: \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    printf("\nEnter the columns to exchange:\n");
    scanf("%d %d", &c1, &c2);
    for (i = 0; i < m; i++)
    {
        temp = a[i][c1 - 1];
        a[i][c1 - 1] = a[i][c2 - 1];
        a[i][c2 - 1] = temp;
    }
    printf("The updated matrix is: \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    return 0;
}
```

```c
// Interchange any two Rows & Columns in the given Matrix.
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, a[10][10], temp, r1, r2, c1, c2;
    int i, j;
    printf("Enter the dimensions of the matrix: \n");
    scanf("%d %d", &m, &n);
    printf("Enter the elements of the matrix\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            scanf("%d", &a[i][j]);
    }
    printf("The original matrix is \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    printf("\nEnter the rows to exchange:\n");
    scanf("%d %d", &r1, &r2);
    for (j = 0; j < n; j++)
    {
        temp = a[r1 - 1][j];
        a[r1 - 1][j] = a[r2 - 1][j];
        a[r2 - 1][j] = temp;
    }
    printf("The updated matrix is: \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    printf("\nEnter the columns to exchange:\n");
    scanf("%d %d", &c1, &c2);
    for (i = 0; i < m; i++)
    {
        temp = a[i][c1 - 1];
        a[i][c1 - 1] = a[i][c2 - 1];
        a[i][c2 - 1] = temp;
    }
    printf("The updated matrix is: \n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the dimensions of the matrix:
3 3
Enter the elements of the matrix
1 2 3 4 5 6 7 8 9
The original matrix is
1        2        3
4        5        6
7        8        9

Enter the rows to exchange:
1 2
The updated matrix is:
4        5        6
1        2        3
7        8        9

Enter the columns to exchange:
3 1
The updated matrix is:
6        5        4
3        2        1
9        8        7

Process returned 0 (0x0)    execution time : 19.151 s
Press any key to continue.
```

Lab 6

Question 6

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

```
// Arnav Agrawal
// 200905200
// Lab 6
// Question 6
// Search for an element in a given matrix and count the number of its occurrences.
```

```c
#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, count, a[10][10], num;
    int i, j;
    count = 0;
    printf("Enter the dimensions: \n");
    scanf("%d %d", &m, &n);
    printf("Enter the element to be searched\n");
    scanf("%d", &num);
    printf("Enter the elements of the matrix\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            scanf("%d", &a[i][j]);
    }
    printf("The given matrix is:\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
        {
            if (num == a[i][j])
                count++;
        }
    }
    if (count > 0)
        printf("The total number of times the element has occurred is :%d\n ", count);
    else
        printf("Element not found\n");
    return 0;
}
```

```c
// Arnav Agrawal
// 200905200
// Lab 6
// Question 6
// Search for an element in a given matrix and count the number of its occurrences.

#include <stdio.h>
int main()
{
    printf("Arnav Agrawal\n");
    printf("200905200\n");
    printf("Section M - 20\n");
    int m, n, count, a[10][10], num;
    int i, j;
    count = 0;
    printf("Enter the dimensions: \n");
    scanf("%d %d", &m, &n);
    printf("Enter the element to be searched\n");
    scanf("%d", &num);
    printf("Enter the elements of the matrix\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            scanf("%d", &a[i][j]);
    }
    printf("The given matrix is:\n");
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
            printf("%d\t", a[i][j]);
        printf("\n");
    }
    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
        {
            if (num == a[i][j])
                count++;
        }
    }
    if (count > 0)
        printf("The total number of times the element has occurred is :%d\n ", count);
    else
        printf("Element not found\n");
    return 0;
}
```

```
"C:\Users\Arnav Agrawal\Desktop\code.exe"

Arnav Agrawal
200905200
Section M - 20
Enter the dimensions:
3 3
Enter the element to be searched
1
Enter the elements of the matrix
1 1 1 2 3 4 6 7 8
The given matrix is:
1        1        1
2        3        4
6        7        8
The total number of times the element has occurred is :3

Process returned 0 (0x0)   execution time : 9.022 s
Press any key to continue.
```