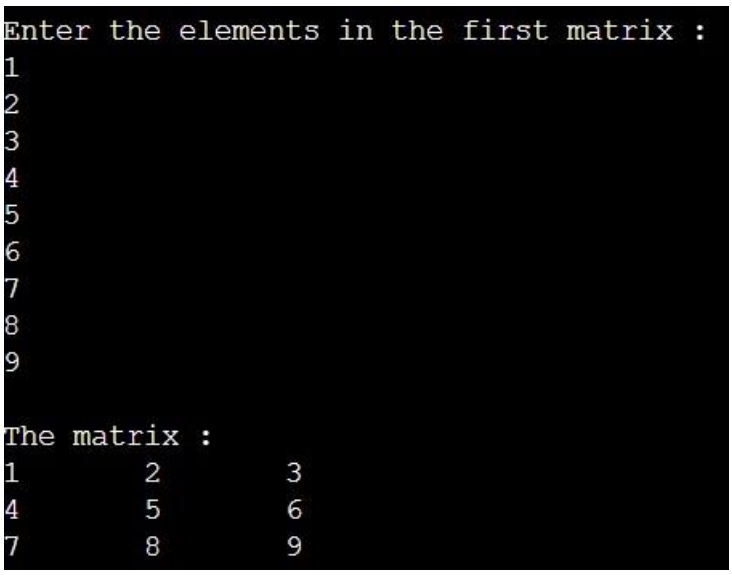
Computer Programming Lab
Lab Evaluation 2

Questions:

1. Write a C program to create 2 3x3 matrices whose value will be passed by user. [1 Marks]

```
#include <stdio.h>

int main()
{
   int i, j, m[3][3];

   printf("\nEnter the elements in the first matrix :\n");
   for(i=0; i<3; i++){
      for(j=0; j<3; j++)
         scanf("%d", &m[i][j]);
   }

   printf("\nThe matrix :\n");
   for(i=0; i<3; i++){
      for(j=0; j<3; j++)
         printf("%d\t", m[i][j]);
         printf("\n");
   }

   return 0;
}
```



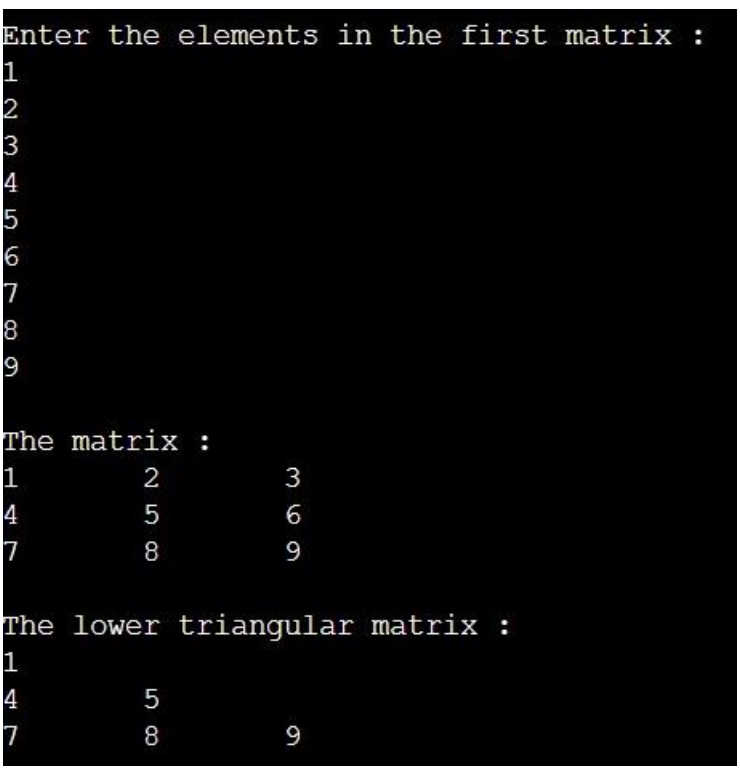
2. Write function for the following (for first matrix): [3 * 3 Marks = 9 Marks]

a. To print lower triangular matrix as shown.

If matrix = 1 2 3
4 5 6
7 8 9
Output = 1
4 5
7 8 9

```
#include <stdio.h>

int main()
{
   int i, j, m[3][3];

   printf("\nEnter the elements in the first matrix :\n");
   for(i=0; i<3; i++){
      for(j=0; j<3; j++)
         scanf("%d", &m[i][j]);
   }
```

```
    printf("\nThe matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            printf("%d\t", m[i][j]);
            printf("\n");
    }

    printf("\nThe lower triangular matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<=i; j++)
            printf("%d\t", m[i][j]);
            printf("\n");
    }

    return 0;
}
```



b. Interchange the row as per below exchanges:

Row 1 -> Row 3
Row 2 -> Row 1
Row 3 -> Row 2

```
#include <stdio.h>

int main()
{
   int i, j, m[3][3];

   printf("\nEnter the elements in the first matrix :\n");
   for(i=0; i<3; i++){
      for(j=0; j<3; j++)
         scanf("%d", &m[i][j]);
   }

   printf("\nThe matrix :\n");
   for(i=0; i<3; i++){
      for(j=0; j<3; j++)
         printf("%d\t", m[i][j]);
         printf("\n");
   }

   int temp, intermediate;

   for (i=0; i<3; i++) {
   temp =  m[0][i] ;
   m[0][i] = m[2][i];
   intermediate = m[1][i];
   m[1][i] = temp;
   m[2][i] = intermediate;
  }


   printf("\nThe matrix after the rows are interchanged :\n");
   for(i=0; i<3; i++){
```

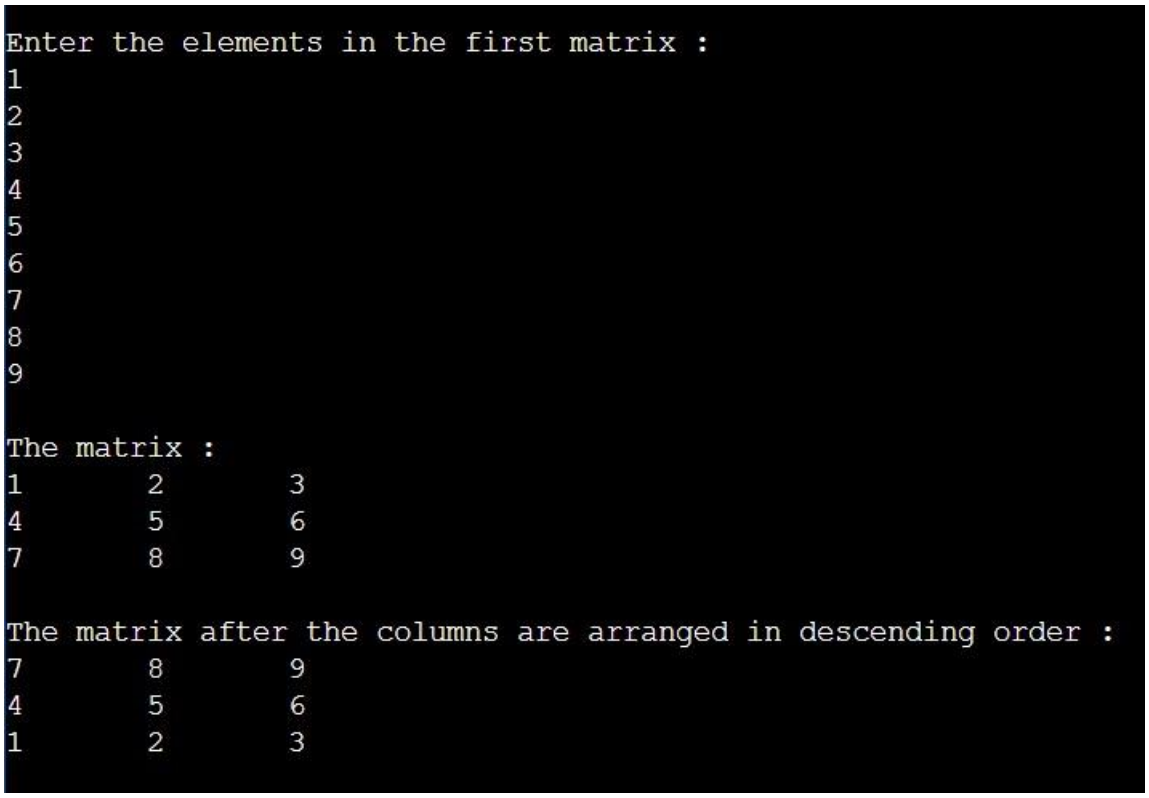
```
        for(j=0; j<3; j++)
            printf("%d\t", m[i][j]);
            printf("\n");
    }
    return 0;
}
```

```
Enter the elements in the first matrix :
1
2
3
4
5
6
7
8
9

The matrix :
1       2       3
4       5       6
7       8       9

The matrix after the rows are interchanged :
7       8       9
1       2       3
4       5       6
```

c. Arrange each column elements in descending order.

```
#include <stdio.h>

int main()
{
    int i, j, k, m[3][3];

    printf("\nEnter the elements in the first matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            scanf("%d", &m[i][j]);
```

```
    }

    printf("\nThe matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            printf("%d\t", m[i][j]);
            printf("\n");
    }

    for (int k = 0; k < 3; k++) {
        for (int i = 0; i < 2; i++) {
            for (int j = i + 1; j < 3; j++) {
                if (m[j][k] > m[i][k]) {
                int temp = m[j][k];
                m[j][k] = m[i][k];
                m[i][k] = temp;
                }
            }
        }
    }

    printf("\nThe matrix after the columns are arranged in descending
order :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            printf("%d\t", m[i][j]);
            printf("\n");
    }

    return 0;
}
```



3. Write the following function: [2 * 5 Marks = 10 Marks]

a. Addition/Subtraction of matrices where operation is selected by user.

```
#include <stdio.h>

void sum(int r1, int c1, int r2, int c2, int arr1[r1][c1], int arr2[r2][c2]){
    int i,j;
    printf("\nThe sum of the matrices :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", arr1[i][j]+arr2[i][j]);
            printf("\n");
    }

}

void sub(int r1, int c1, int r2, int c2, int arr1[r1][c1], int arr2[r2][c2]){
    int i,j;
```

```
    printf("\nThe subraction of the matrices :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", arr1[i][j]-arr2[i][j]);
            printf("\n");
    }

}

int main()
{
    int r1, c1, r2, c2, i, j;
    char op, buffer;

    printf("Enter the number of rows in the first matrix: ");
    scanf("%d", &r1);
    printf("Enter the number of columns in the first matrix: ");
    scanf("%d", &c1);

    int m1[r1][c1];
    printf("\nEnter the elements in the first matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            scanf("%d", &m1[i][j]);
    }

    printf("\nEnter the number of rows in the second matrix: ");
    scanf("%d", &r2);
    printf("Enter the number of columns in the second matrix: ");
    scanf("%d", &c2);

    scanf("%c", &buffer);
    printf("\nEnter the operator (+,-): ");
    scanf("%c", &op);
```

```
if ( (r1 == r2) && (c1 == c2) ){

int m2[r2][c2];
printf("\nEnter the elements in the second matrix :\n");
for(i=0; i<r2; i++){
    for(j=0; j<c2; j++)
        scanf("%d", &m2[i][j]);
}

printf("\nThe first matrix :\n");
for(i=0; i<r1; i++){
    for(j=0; j<c1; j++)
        printf("%d\t", m1[i][j]);
        printf("\n");
}

printf("\nThe second matrix :\n");
for(i=0; i<r2; i++){
    for(j=0; j<c2; j++)
        printf("%d\t", m2[i][j]);
        printf("\n");
}

if(op == '+')
    sum(r1,c1,r2,c2,m1,m2);

else
    sub(r1,c1,r2,c2,m1,m2);

}

else
```

```
    printf ("Matrices with entered orders can't be added with each other.");

    return 0;
}
```

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
1
1
1

Enter the number of rows in the second matrix: 2
Enter the number of columns in the second matrix: 2

Enter the operator (+,-): +

Enter the elements in the second matrix :
3
3
3
3

The first matrix :
1       1
1       1

The second matrix :
3       3
3       3

The sum of the matrices :
4       4
4       4
```

b. Multiplication of matrices.

```
#include<stdio.h>


int main()

{
```

```
int r1, c1, r2, c2, i, j, k, sum=0;

printf("Enter the number of rows in the first matrix: ");
scanf("%d", &r1);
printf("Enter the number of columns in the first matrix: ");
scanf("%d", &c1);

int m1[r1][c1];
printf("\nEnter the elements in the first matrix :\n");
for(i=0; i<r1; i++){
   for(j=0; j<c1; j++)
      scanf("%d", &m1[i][j]);
}

printf("\nEnter the number of rows in the second matrix: ");
scanf("%d", &r2);
printf("Enter the number of columns in the second matrix: ");
scanf("%d", &c2);

int m2[r2][c2];
int multiplication[r1][c2];
(c1 != r2)?
   (printf("Matrices with entered orders can't be multiplied with each other.\n")):

(
{
printf("\nEnter the elements in the second matrix :\n");
for(i=0; i<r2; i++){
   for(j=0; j<c2; j++)
      scanf("%d", &m2[i][j]);
}
```

```
printf("\nThe first matrix :\n");
for(i=0; i<r1; i++){
   for(j=0; j<c1; j++)
      printf("%d\t", m1[i][j]);
      printf("\n");
}
printf("\nThe second matrix :\n");
for(i=0; i<r2; i++){
   for(j=0; j<c2; j++)
      printf("%d\t", m2[i][j]);
      printf("\n");
}

for(i=0; i<r2; i++){
   for(j=0; j<c1; j++){
      for(k=0; k<c2; k++){
         sum = sum + m1[i][k]*m2[k][j];
      }
   multiplication[i][j] = sum;
   sum = 0;
   }
}
printf("\nThe multiplication of the two matrices :\n");
 for ( i = 0 ; i < r1 ; i++ ){
  for ( j = 0 ; j < c2 ; j++ )
   printf("%d\t", multiplication[i][j]);
   printf("\n");
}
}
);
return 0;
```

}

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
1
1
1

Enter the number of rows in the second matrix: 2
Enter the number of columns in the second matrix: 2

Enter the elements in the second matrix :
1
1
1
1

The first matrix :
1       1
1       1

The second matrix :
1       1
1       1

The multiplication of the two matrices :
2       2
2       2
```