ASSIGNMENT NO:6 **DATE:06/03/2015**

PROGRAM TITLE:Club an Upper Triangular and a Lower Triangular Matrix together.

THEORY: An upper triangular matrix consists of elements above the left diagonal. A lower triangular matrix consists of elements below the left diagonal. All other elements are zero. While clubbing these two matrices, the number of columns increases by one.

PROGRAM ALGORITHM:

```
Algo_club(a[][],b[][],r,c)
{
      for(i=0 to r-1)
      {
            for(j=0 to c-1)
            {
                  if(i>j)
                  {
                        d[i][j]=a[i][j];
                  }
                  else if(i<j)
                  {
                        d[i][j+1]=b[i][j];
                  }
                  else
                  {
                        d[i][j]=a[i][j];
                        d[i][j+1]=b[i][j];
                  }
            }
      }
}
```

PROGRAM CODE:

```
/*C Program to Club an Upper Triangular and a Lower Triangular Matrix
together*/
#include <stdio.h>
int main()
{
      int i,j,r=3,c=3;
      int a[r][c],b[r][c],d[r][c+1];

      /*Read user input*/
      printf("\tEnter elements of the lower Triangular matrix::");
      for(i=0;i<r;i++)
      {
            for(j=0;j<c;j++)
            {
                  scanf("%d",&a[i][j]);
            }
      }
      printf("\tEnter elements of the Upper Triangular matrix::");
```

```
for(i=0;i<r;i++)
{
      for(j=0;j<c;j++)
      {
            scanf("%d",&b[i][j]);
      }
}

/*Club the two matrices together*/
for(i=0;i<r;i++)
{
      for(j=0;j<c;j++)
      {
            if(i>j)
            {
                  d[i][j]=a[i][j];
            }
            else if(i<j)
            {
                  d[i][j+1]=b[i][j];
            }
            else
            {
                  d[i][j]=a[i][j];
                  d[i][j+1]=b[i][j];
            }
      }
}

/*Print the input*/
printf("\n\tUpper Triangular Matrix\t\tLower Triangular Matrix\n");
for(i=0;i<r;i++)
{
      for(j=0;j<c;j++)
      {
            printf("\t%d",a[i][j]);
      }
      printf("\t");
      for(j=0;j<c;j++)
      {
            printf("\t%d",b[i][j]);
      }
      printf("\n");
}

/*Print the result*/
printf("\tThe Clubbed Matrix is:\n");
for(i=0;i<r;i++)
{
      for(j=0;j<c+1;j++)
      {
            printf("\t%d",d[i][j]);
      }
      printf("\n");
}
```

```
    return 0;
}
```

OUTPUT:

```
    Enter elements of the lower Triangular matrix::1 0 0 2 3 0 4 5 6
    Enter elements of the Upper Triangular matrix::7 8 9 0 -5 1 0 0 2

    Upper Triangular Matrix          Lower Triangular Matrix
    1    0    0          7    8    9
    2    3    0          0    -5   1
    4    5    6          0    0    2
    The Clubbed Matrix is:
    1    7    8    9
    2    3    -5   1
    4    5    6    2
```

DISCUSSION:

The complexity of the Program is $O(n^2)$. The program can be easily modified to work with square matrices of different sizes too.