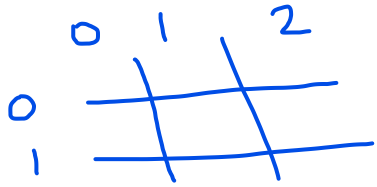
TWO DIM. ARRAY (MATRIX)

```
int a [2] [3];
      row  col
```



a[0][0] a[0][1] a[0][2]

a[1][0] a[1][1] a[1][2]

// INPUT AND PRINT MATRIX

```
#include<stdio.h>
    int   main()
    {     int  a[10][10] , i , j , m , n ;
```

```
        printf(" ENTER ROW AND COL \n " );
scanf("%d%d" , &m , &n);

        printf(" ENTER MATRIX  ELEMENTS \n ");
for(  i  = 0 ; i  <  m ; i++ )     // ROWS
        {
            for(  j = 0 ;  j <  n  ;  j++ )   // COLS
            {       scanf("%d", &a[i][j]);
            }
        } // INPUT MATRIX

        printf(" MATRIX  A \n");
        for(  i =  0  ;  i  <  m  ; i++)
        {
            for( j = 0 ; j < n ; j++)
```

```
            {       printf("%4d",a[i][j]);
            }
            printf("\n");
        } // PRINT MATRIX
    }
/*
```

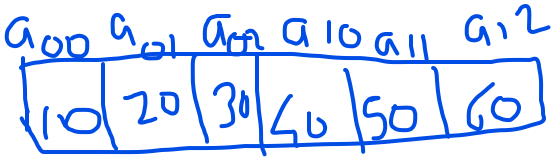
---

row = m = 2 ; col = n = 3;

m = 2
n = 3

for i = 0 to 1

i = 0 j = 0 to 2



j = 0 a[0][0] = 10

j = 1 a[0][1] = 20

j = 2 a[0][2] = 30 10 20 30

I = 1 j = 0 to 2 40 50 60

J = 0 a[1][0] = 40

J = 1 a[1][1] = 50

J = 2 a[1][2] = 60

```
/* PRINT   TRASPOSE OF MATRIX  */
#include<stdio.h>
  int      main()
  {          int  a[10][10] , i , j , m , n;
             printf(" ENTER ROW AND COL\n ");
scanf("%d%d",&m,&n);
```

```
        printf(" ENTER MATRIX \n");
for(  i = 0 ; i < m ; i++)
        {
             for( j = 0 ; j < n ; j++)
              {              scanf("%d" , &a[i][j]);
              }
        }  // INPUT MATRIX
```

```
      printf(" TRANSPOSE OF MATRIX A \n ");
       for(  i = 0 ; i < n ; i++)  // COLS
```

```
        {
            for(  j = 0 ; j < m ; j++)  // ROWS
            {     printf("%4d", a[j][i]);
            }
            printf("\n");
        }
    }
/*
```

---

row = m = 2 ; col = n = 3; for i = 0 to 2

i = 0 j = 0 to 1 j =

0 a[0][0] = 10 j = 1 a[1][0] =

40 10 40

---

i = 1 j = 0 to 1 20

50 j = 0 a[0][1] = 20 j

= 1 a[1][1] = 50

---------- i =

2 j = 0 to 1 30 60

j = 0 a[0][2] = 30 j = 1

a[1][2] = 60

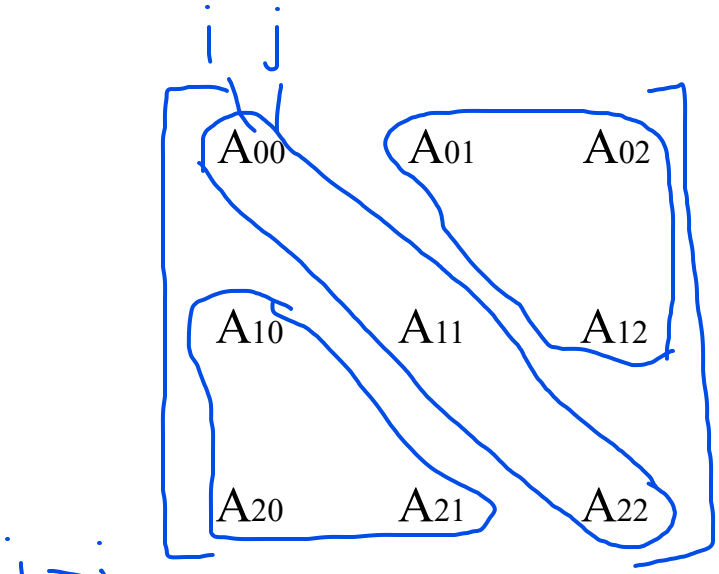
SUM OF MATRIX ELEMENTS

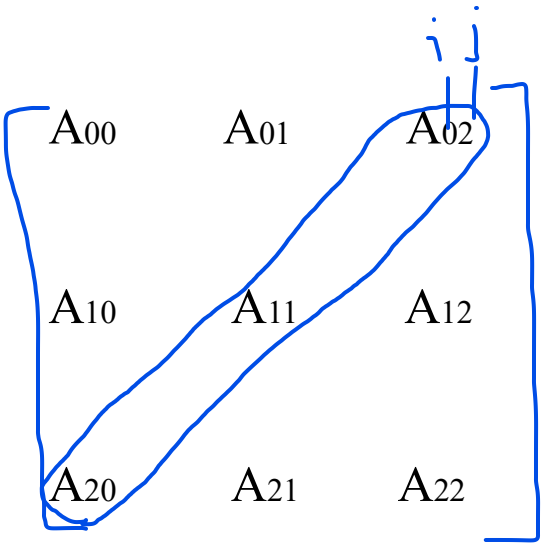
```
#include<stdio.h>
int main()
{
```

```
        int    a[2][3] = { {10, 20, 30}, {40 ,50,60} } ;
    int    m = 2 , n = 3 , s = 0 , i , j ;
        for(  i = 0 ; i < m ; i++)
         {    for(  j = 0 ; j < n ; j++)
              {        s  =  s  +  a[i][j]  ;
              }
        }
printf(" SUM  OF  MATRIX  ELEMENTS = %d\n " , s );  // 210
}
```

```
        // SUM   OF  DAIGONAL  ELEMENTS
#include<stdio.h>
    int    main()
    {      int    m = 2 , n = 3 , s = 0 , i , j ;
```

```
        int    a[2][3] = { {10, 20, 30}, {40 ,50,60} } ;
    for( i = 0 ; i < m ; i++)
        {
            for( j = 0 ; j < n ; j++)
            {
    if( i == j )
                    {     s = s + a[i][j];
                    }
            }
        }
    printf(" SUM OF DIAGONAL ELEMENTS = %d\n " , s);
}
```


i j
A00 A01 A02
A10 A11 A12
A20 A21 A22
i<j
i>j


i j
A00 A01 A02
A10 A11 A12
A20 A21 A22
Reverse Daigonal
i+j = n-1

1 2 3

4 5 6

7 8 9

PRINT LOWER TRIAGULAR MATRIX

1 2 3 1

4 5 6 --- > 4 5

7 8 9 7 8 9

```
#include<stdio.h> int
main()
{    int   i ,  j  ,  n = 3;
     int   a[3][3] = { {1 , 2 ,3} ,{ 4 , 5, 6}, {7, 8 , 9} };

       printf(" PRINT LOWER TRIAGULAR MATRIX\n");
      for ( i = 0 ; i <n ; i++)   // ROWS
```

```
{
    for(  j = 0 ; j < n ; j++)  // COLS
    {
            if(  i  >=  j )
                {          printf("%4d",a[i][j]);
                }
            }
        printf("\n");
    }
}
```

PRINT UPPER TRIAGULAR MATRIX

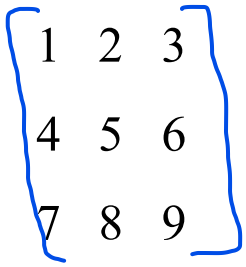
1	2	3		1	2	3
4	5	6	--- >		5	6

i<=j

7 8 9 9

```
#include<stdio.h>
    int   main()
    {     int  i , j  ,n = 3;
          int  a[3][3] = { {1 , 2 ,3} , {4 , 5, 6},{ 7, 8 , 9} };
printf(" PRINT UPPER TRIAGULAR MATRIX\n");
      for ( i = 0 ; i < n ; i++)   // ROWS
          {
              for( j = 0 ; j < n ; j++)  // COLS
                  {
                      if( i <= j )
                      {         printf("%4d",a[i][j]);
                      }
                      else
```

```
                    {     printf("    ");
                    }
                } // j
                printf("\n");
            } // i
        }
```



3)

1

5

9

4)

3

5

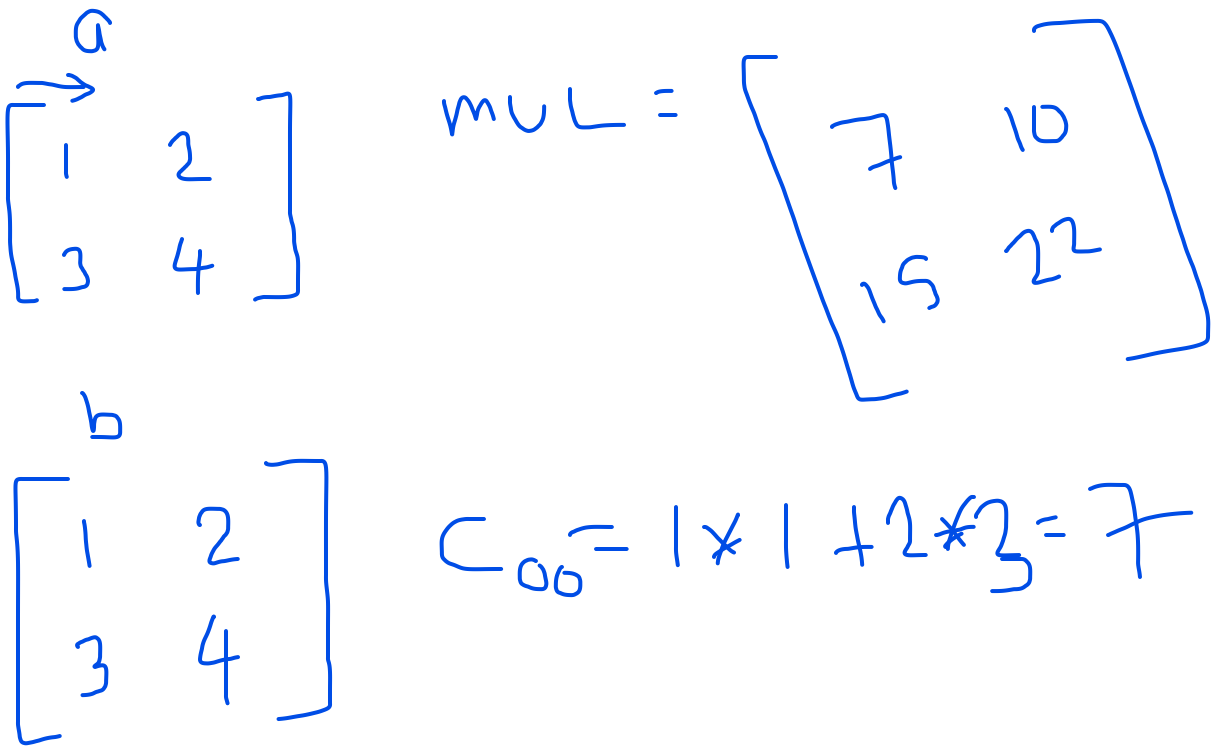
7

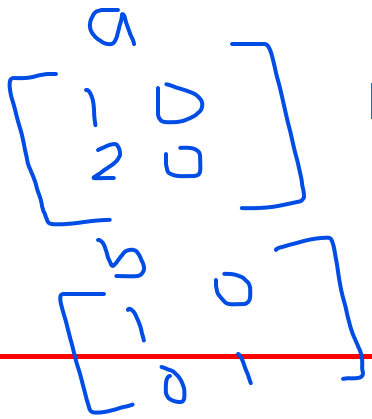
```
/* ADDITION OF TWO MATRIXS */
#include<stdio.h>
int    main()
{
        int  a[10][10] , b[10][10] , c[10][10] , i , j , m , n;

        printf(" ENTER ROW AND COL \n ");
        scanf("%d%d", &m , &n) ;
printf(" ENTER MATRIX  a \n ");
for(  i  = 0  ; i < m ; i++)
        {
                for(  j = 0 ; j < n ; j++)
                {       scanf("%d" , &a[i][j]);
                }
```

```
}
printf(" ENTER MATRIX b \n " );
for( i = 0 ; i < m ; i++ )
{
      for( j = 0 ; j < n ; j++ )
       {   scanf("%d" , &b[i][j]);
       }
}
for( i = 0 ; i < m ; i++)
{     for( j = 0 ; j < n ; j++)
      {
            c[i][j] = a[i][j] + b[i][j];
      }
}
```

```
        printf( " ADDITION OF MATRIX \n" );
        for(  i  = 0  ;  i <  m  ; i++ )
        {
              for(  j = 0  ;  j  <  n  ;  j++ )
              {     printf("%4d" , c[i][j]);
               }
              printf("\n");
         }
}
```





Identity Checking