1. **Write a program to find maximum element in the diagonal of 2 dimensional array**

```
public  static  void  findMax()
{
        int  ar[][]={{17,38,20,22},{31,32,45,17},
                        {18,66,27,14},{12,34,45,32}};
        display(ar);
        int  lrbig=ar[0][0];
        int  rlbig=ar[0][ar[0].length-1];
        for(int  i=0;i<ar.length;i++)
        {
                for(int  j=0;j<ar[i].length;j++)
                {
                        if(i==j)
                                if(ar[i][j]>lrbig)  lrbig=ar[i][j];
                        if(i+j==ar.length-1)
                                if(ar[i][j]>rlbig)  rlbig=ar[i][j];
                }
        }
        System.out.println("Diagonal  1  large:"+lrbig);
        System.out.println("Diagonal  2  large:"+rlbig);
}
```

2. **Write a program to find maximum element in the row and column**

```
public  static  void  rowColBig()
{
        int  ar[][]={{17,38,20,22},{31,32,45,17},
                        {18,66,27,14},{12,34,45,32}};
        display(ar);
        for(int  i=0;i<ar.length;i++)
        {
                int  rbig=ar[i][0];
                int  cbig=ar[0][i];
                for(int  j=0;j<ar[i].length;j++)
                {
                        if(rbig<ar[i][j])
                                rbig=ar[i][j];
                        if(cbig<ar[j][i])
                                cbig=ar[j][i];
                }
                System.out.println(i+1+"row  biggest  element:"+rbig);
                System.out.println(i+1+"column  biggest  element:"+cbig);
        }
}
```

3. Write a program to do the transpose of a 2d array

```
public  static  findTranspose(int  ar[][])
{
        for(int  i=0;i<ar.length;i++)
        {
                for(int  j=i+1;j<ar[i].length;j++)
                {
                        int  temp=ar[i][j];
                        ar[i][j]=ar[j][i];
                        ar[j][i]=temp;
                }
        }
}
```

4. Write a program to do 90 degree shift right of a 2d array

```
class  Shift90Right{
        static  void  display(int  mat[][]){
                for(int  i=0;i<mat.length;i++){
                        for(int  j=0;j<mat[i].length;j++){
                                System.out.print(mat[i][j]+"     ");
                        }
                        System.out.println();
        }       }
        static  int[][]  transpose(int[][]  ar){
                for(int  i=0;i<ar.length;i++){
                        for(int  j=i+1;j<ar[i].length;j++){
                                int  temp=ar[i][j];
                                ar[i][j]=ar[j][i];
                                ar[j][i]=temp;
                        }
                }
                return  ar;
        }
        static  int[][]  rowReverse(int  ar[][]){
                for(int  i=0;i<ar.length;i++){
                        for(int  j=0;j<ar[i].length/2;j++){
                                if(ar[i][j]  !=  ar[i][ar[i].length-1-j]){
                                        int  temp=ar[i][j];
                                        ar[i][j]=ar[i][ar[i].length-1-j];
                                        ar[i][ar[i].length-1-j]=temp;
                                }
                        }
                }
                return  ar;
```

```
    }
    public static void main(String[] args){
        int ar[][]={{1,2,3},{5,6,7},{8,9,0}};
        display(ar);
        ar=transpose(ar);
        display(ar);
        ar=rowReverse(ar);
        display(ar);
    }
}
```

5. Write a program to do 90 degree shift left of a 2d array

```
class Shift90Left{
    static int[][] transpose(int[][] ar){
        for(int i=0;i<ar.length;i++){
            for(int j=i+1;j<ar[i].length;j++){
                int temp=ar[i][j];
                ar[i][j]=ar[j][i];
                ar[j][i]=temp;
            }
        }
        return ar;
    }
    static int[][] rowSwap(int ar[][]) {
        for(int i=0;i<ar.length/2;i++) {
            for(int j=0;j<ar[i].length;j++) {
                int temp=ar[i][j];
                ar[i][j]=ar[ar.length-1-i][j];
                ar[ar.length-1-i][j]=temp;
            }
        }
        return ar;
    }
    public static void main(String[] args) {
        int ar[][]={{1,2,3},{5,6,7},{8,9,0}};
        ar=transpose(ar);
        ar=rowSwap(ar);
    }
}
```

6. Write a program to find spiral of a 2d array

```
public static void spiral( )
{
        int mat[][]={{2,3,4,5},{6,7,8,9},{8,3,4,7},{9,8,7,5}};
        display(mat);
        int n = mat.length;
        for(int i=0,j=n-1;j>i;i++,j--)
        {
                for(int k=i;k<j;k++) System.out.print(mat[i][k]+" ");
                for(int k=i;k<j;k++) System.out.print(mat[k][j]+" ");
                for(int k=j;k>i;k--) System.out.print(mat[j][k]+" ");
                for(int k=j;k>i;k--) System.out.print(mat[k][i]+" ");
        }
        if(n%2 == 1)
                System.out.print(mat[n/2][n/2]);
}
```