Problem 01: Write a Java program to print all elements of a given 2D array

Code:

```
3    package javaproject;
4
5    import java.util.Scanner;
6
7
8
9    public class Test {
10
11     public static void main(String[] args){
12     int a[][] =new int[2][3];
13     Scanner input =new Scanner(System.in);
14     System.out.println("enter array elemants ");
15
16
17     for (int i=0; i<2; i++){
18
19     for (int j=0; j<3; j++){
20         a[i][j]=input.nextInt();}
21                 }
22
23      System.out.println("Matrix");
24      for (int i=0; i<2; i++){
25
26     for (int j=0; j<3; j++){
27    System.out.print(a[i][j]+ " ");   }
28      System.out.println();
29                  }
30    }
31      }
```

Output:

```
enter array elemants
4 9 6 7 5 3
Matrix
4 9 6
7 5 3
------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------
```

Problem 02: Sum of each row and each column in a 2D array

Code:

```
public class Test {

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


  for (int i=0; i<3; i++){
  int sum=0;
  for (int j=0; j<4; j++){
  sum += integars [i][j];       //sum=sum+ integars [i][j];
  }
  System.out.println("the sum of row "+(i+1)+ "="+sum); }

   for (int i=0; i<4; i++){
  int sum=0;
  for (int j=0; j<3; j++){
  sum += integars [j][i];
  }
  System.out.println("the sum of column " +(i+1)+ "="+sum); }

  }
    }
```

Output:

```
the sum of row 1=21
the sum of row 2=28
the sum of row 3=10
the sum of column 1=19
the sum of column 2=14
the sum of column 3=11
the sum of column 4=15
------------------------------------------------
BUILD SUCCESS
------------------------------------------------
```

Problem 03: Find the largest and smallest elements

Code:

```
11    public static void main(String[] args){
12    int max,min;
13    int a[][] =new int[2][3];
14    Scanner input =new Scanner(System.in);
15    System.out.println("enter array elemants ");
16
17
18    for (int i=0; i<2; i++){
19
20    for (int j=0; j<3; j++){
21        a[i][j]=input.nextInt();}
22                              }
23
24     for (int i=0; i<2; i++){
25
26    for (int j=0; j<3; j++){
27  System.out.print(a[i][j]+ "\t");  }
28      System.out.println();
29                                  }
30      max=a[0][0];
31      min=a[0][0];
32      for (int i=0; i<2; i++)    {
33
34    for (int j=0; j<3; j++){
35        if(a[i][j]>max){max=a[i][j];}
36        if(a[i][j]<min){min=a[i][j];}       }
37                                  }
38      System.out.println("Maximum element : "+max);
39      System.out.println("Minimum element : "+min);
40
41    }
42      }
```

Output:

```
enter array elemants
5 9 7 6 3 1
5         9         7
6         3         1
Maximum element : 9
Minimum element : 1
------------------------------------------------
BUILD SUCCESS
------------------------------------------------
```

Problem 04: Sum of all elements in a 2D array

Code:

```
9   public class Test {
10
11    public static void main(String[] args){
12    int a[][] =new int[2][3];
13    Scanner input =new Scanner(System.in);
14    System.out.println("enter array elemants ");
15
16
17    for (int i=0; i<2; i++){
18
19    for (int j=0; j<3; j++){
20        a[i][j]=input.nextInt();}
21                              }
22
23     for (int i=0; i<2; i++){
24
25    for (int j=0; j<3; j++){
26  System.out.print(a[i][j]+ "\t");  }
27     System.out.println();
28                              }
29     int sum=0;
30     for (int i=0; i<2; i++)    {
31
32    for (int j=0; j<3; j++){
33        sum=sum+ a[i][j]; }
34                                 }
35     System.out.println("sum of all elements : "+sum);
36
37    }
38      }
```

Output:

```
enter array elemants
1 2 3 4 5 6
1         2         3
4         5         6
sum of all elements : 21
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 05: Find the transpose of a Matrix

Code:

```
9    public class Test {
10
11     public static void main(String[] args){
12     int a[][] =new int[2][3];
13     Scanner input =new Scanner(System.in);
14     System.out.println("enter array elemants ");
15
16
17     for (int i=0; i<2; i++){
18
19     for (int j=0; j<3; j++){
20         a[i][j]=input.nextInt();}
21                                }
22
23      for (int i=0; i<2; i++){
24
25     for (int j=0; j<3; j++){
26    System.out.print(a[i][j]+ "\t");   }
27      System.out.println();
28                                  }
29     System.out.println("Transpose Matrix");
30      for (int i=0; i<3; i++){
31
32     for (int j=0; j<2; j++){
33    System.out.print(a[j][i]+ "\t");   }
34      System.out.println();
35                                     }
36       }
37   }
```

Output:

```
enter array elemants
1 2 3 4 5 6
1       2       3
4       5       6
Transpose Matrix
1       4
2       5
3       6
------------------------------------------
BUILD SUCCESS
```

Problem 06: Add two matrixes and store the result in another 2D array

Code:

```
11   public static void main(String[] args){
12   int a[][] =new int[2][3];
13   int b[][] =new int[2][3];
14   int c[][] =new int[2][3];
15   Scanner input =new Scanner(System.in);
16   System.out.println("enter first array elemants ");
17   for (int i=0; i<2; i++){
18   for (int j=0; j<3; j++){
19       a[i][j]=input.nextInt();} }
20
21    for (int i=0; i<2; i++){
22   for (int j=0; j<3; j++){
23  System.out.print(a[i][j]+ "\t");  }
24    System.out.println();  }
25    System.out.println("enter second array elemants ");
26   for (int i=0; i<2; i++){
27   for (int j=0; j<3; j++){
28       b[i][j]=input.nextInt();}   }
29    for (int i=0; i<2; i++){
30   for (int j=0; j<3; j++){
31  System.out.print(b[i][j]+ "\t");  }
32    System.out.println();
33                          }
34    System.out.println("sum of two matrix :");
35    for (int i=0; i<2; i++){
36  for (int j=0; j<3; j++){
37       c[i][j]=a[i][j]+b[i][j];
38  System.out.print(c[i][j]+ "\t");  }
39    System.out.println();
40                          } } }
```

Output:

```
enter first array elemants
1 2 3 4 5 6
1       2       3
4       5       6
enter second array elemants
4 5 6 7 8 9
4       5       6
7       8       9
sum of two matrix :
5       7       9
11      13      15
------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------
```

Problem 07: Multiply two matrixes and store the result in another 2D array

Code:

```
11   public static void main(String[] args){
12   int a[][] =new int[2][3];
13   int b[][] =new int[2][3];
14   int c[][] =new int[2][3];
15   Scanner input =new Scanner(System.in);
16   System.out.println("enter first array elemants ");
17   for (int i=0; i<2; i++){
18   for (int j=0; j<3; j++){
19       a[i][j]=input.nextInt();} }
20
21    for (int i=0; i<2; i++){
22   for (int j=0; j<3; j++){
23  System.out.print(a[i][j]+ "\t");  }
24    System.out.println();  }
25    System.out.println("enter second array elemants ");
26   for (int i=0; i<2; i++){
27   for (int j=0; j<3; j++){
28       b[i][j]=input.nextInt();}   }
29    for (int i=0; i<2; i++){
30   for (int j=0; j<3; j++){
31  System.out.print(b[i][j]+ "\t");  }
32    System.out.println();
33                          }
34    System.out.println("Multiplication of two matrix :");
35    for (int i=0; i<2; i++){
36  for (int j=0; j<3; j++){
37       c[i][j]=a[i][j]*b[i][j];
38  System.out.print(c[i][j]+ "\t");  }
39    System.out.println();
40                          } } }
```

Output:

```
enter first array elemants
1 2 3 4 5 6
1       2       3
4       5       6
enter second array elemants
4 5 6 7 8 9
4       5       6
7       8       9
Multiplication of two matrix :
4       10      18
28      40      54
------------------------------------------------------
BUILD SUCCESS
```

Problem 08: Search for a given number In a 2D array and print it's position

Code:

```
8    public static void main(String[] args){
9    int a[][] =new int[2][3];
10
11   Scanner input =new Scanner(System.in);
12   System.out.println("enter array elemants ");
13     for (int i=0; i<2; i++){
14   for (int j=0; j<3; j++){
15       a[i][j]=input.nextInt();} }
16
17    for (int i=0; i<2; i++){
18  for (int j=0; j<3; j++){
19  System.out.print(a[i][j]+ "\t");  }
20  System.out.println();  }
21
22  int n,count=0;
23  System.out.println("enter search element :");
24  Scanner target =new Scanner(System.in);
25  n=target.nextInt();
26
27   for (int i=0; i<2; i++){
28   for (int j=0; j<3; j++){
29       if (a[i][j]==n){count++; /*i,j value input korar jonno
30       nasted if else use korechi.nahoy break diye only if else use kortam*/
31     if (count>0){
32  System.out.print("item found at"+i +","+j);}
33  else
34  System.out.print("item is not found"); }
35                                  }
36                                  }
37    }
38  }
```

Output:

```
enter array elemants
1 2 3 4 5 6
1        2        3
4        5        6
enter search element :
1
item found at0,0
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 09: Write a Java program to check if a matrix is symmetric (i.e., matrix is equal to its transpose).

Code:

```
 8    public static void main(String[] args){
 9    int a[][] =new int[3][3];
10
11    Scanner input =new Scanner(System.in);
12    System.out.println("enter matrix elemants ");
13      for (int i=0; i<3; i++){
14    for (int j=0; j<3; j++){
15        a[i][j]=input.nextInt();} }
16
17     for (int i=0; i<3; i++){
18   for (int j=0; j<3; j++){
19  System.out.print(a[i][j]+ "\t");   }
20  System.out.println();   }
21
22  int count=0;
23   for (int i=0; i<3; i++){
24   for (int j=0; j<3; j++){
25       if (a[i][j]!=a[j][i]){count++;
26       break;}
27                           }
28                           }
29   if (count==0){
30   System.out.println("Matrix is symmetric ");}
31   else
32       System.out.println("Matrix is nonsymmetric");
33    }
34  }
```

Output:

```
enter matrix elemants
1 2 3 2 4 5 3 5 8
1       2       3
2       4       5
3       5       8
Matrix is symmetric
------------------------------------------------
BUILD SUCCESS
------------------------------------------------
```

Problem 10: Write a Java program to calculate the sum of the main diagonal and secondary diagonal of a square matrix.

Code:

```
package javaproject;

import java.util.Scanner;
public class Test {

  public static void main(String[] args){
Scanner input = new Scanner(System.in);
System.out.print("Enter matrix size: ");
int n = input.nextInt();
int a [][] = new int [n][n];
 System.out.println("Enter matrix elements:");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                a[i][j] = input.nextInt();}}
        System.out.println("Square Matrix:- ");
        for (int i=0;i<n;i++){
         for (int j=0;j<n;j++){
        System.out.print(a[i][j]+ " ");}
         System.out.println();}

         int sum = 0;      // Calculate sums of diagonals
        for (int i = 0; i < n; i++) {
            sum =sum + a[i][i] + a[i][n - 1 - i]; }

        if (n % 2 == 1) { // If n is odd, subtract the middle element counted twice
            sum =sum - a[n / 2][n / 2]; }
        System.out.println("Sum of both diagonals: " + sum);

        }
  }
```

Output:

```
Enter matrix size: 3
Enter matrix elements:
1 2 3 4 5 6 7 8 9
Square Matrix:-
1 2 3
4 5 6
7 8 9
Sum of both diagonals: 25
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Explanation:-