Problem Set 3 Exercise #25: Maximum Pair Frequency

Reference: Lecture 8 notes

Learning objectives: Two-dimensional array; Algorithm design

Estimated completion time: 60 minutes

Problem statement:

[CS1010 AY2010/11 Semester 1 Exam, Q6]

Consider a two-dimensional integer array **`mtx`** in which each element is a non-negative integer between 0 and 9 inclusive. We say that **`mtx`** contains a pair with value *v* if there exist two consecutive elements within the same row or column in **`mtx`** that have the value *v*.

For example, consider the following array:

	0	**1**	**2**	**3**
0	8	1	1	2
1	5	5	1	0
2	4	2	1	6
3	1	8	8	2

It contains a total of five pairs:

- Pair 1: **`mtx[0][1]`** and **`mtx[0][2]`** with a value of 1
- Pair 2: **`mtx[0][2]`** and **`mtx[1][2]`** with a value of 1
- Pair 3: **`mtx[1][0]`** and **`mtx[1][1]`** with a value of 5
- Pair 4: **`mtx[1][2]`** and **`mtx[2][2]`** with a value of 1
- Pair 5: **`mtx[3][1]`** and **`mtx[3][2]`** with a value of 8

Your program should contain a static method

```
int getMaxPairFrequency(int[][] mtx)
```

that returns the maximum number of pairs of the same value contained in the given array **`mtx`**.

In the above example, **`getMaxPairFrequency(mtx)`** returns 3 corresponding to the number of pairs with a value of 1.

Complete the skeleton program **PS3_Ex25_MaxPairFrequency.java** for the above task.

A tip is given at the end of next page.

Sample run #1:

```
Enter the size of the matrix: 4 4
Enter elements row by row:
8 1 1 2
5 5 1 0
4 2 1 6
1 8 8 2
Maximum number of pairs = 3
```

Sample run #2:

```
Enter the size of the matrix: 4 5
Enter elements row by row:
8 1 1 1 2
5 5 5 1 5
4 4 4 6 5
1 1 8 8 8
Maximum number of pairs = 4
```

Useful tip:

Each array element is a non-negative integer value between 0 and 9 inclusive.