

## Assignment 2

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You have done very well in "Self-ordering System", and you have been upgraded from a junior developer to an intermediate developer. Now you're assigned the following development tasks:

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### Question 1.

#### Description

Write a program to count the total consumption of each customer.

Take input using Scanner.

### Warning:

Please do not write `new Scanner` command in the loop when using Scanner in any question, or you will get zero for the corresponding question.

Sample: Get n integers and print them. Wrong Answer:

```
while(n-->0){
    Scanner scan = new Scanner(System.in);
    System.out.println(scan.nextInt());
}
```

Correct Answer:

```
Scanner scan = new Scanner(System.in);
while(n-->0){
    System.out.println(scan.nextInt());
}
```

#### Input:

The first line of input is an integer **n** representing the number of consumers ( $0 < n < 10^5$ ), followed by **n** lines which are customer's consumption records.

For each line, the first input is an integer called **id** ( $11510000 < id < 11919999$ ), representing the student id, while the second input is also an integer called **m** ( $0 < m < 1000$ ), representing the consumption number. And the following **m** inputs are all integers called  $a_1, a_2, \dots, a_m$  ( $0 < a_i < 10^5$ ), which represent the consumption amounts.

#### Output:

The output contains **n** lines, with two integers **id** and the sum of the student's consumption amount for each line. Note that **id** and the sum should be separated by **only one space**.

Sample:

```
[zhaoyao:src zhaoyao$ java A2Q1
```

```
2
```

```
11610001 5 100 200 300 400 500
```

```
11610002 1 101
```

input

```
11610001 1500
```

```
11610002 101
```

output

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## Question 2.

### Description

On the Customer Management Homepage, the restaurant manager wants to see the top five consumers. Please rank the top five consumers according to their total consumption amount, then output the other users with the original order. If some consumers share the same consumption amount, priority is given to the number that appears first in the original sequence.

### Take input using Scanner.

#### Input:

The first line of input is an integer **n** representing the number of consumers ( $0 < n < 10^5$ ), followed by **n** lines. For each line, the first input is the integer **id** ( $11510000 < id < 11919999$ ) representing the student id, the second input is the integer **m** ( $0 < m < 1000$ ) representing the total consumption amount.

#### Output:

Output **n** lines in the required order with **id** and **m** - separated by **only one space** - in each line.

#### Sample:

Pay attention to the value 33.

```
[zhaoyao:src zhaoyao$ java A2Q2
```

8

11511111 55

11512222 44

11516666 33

11514444 11

11515555 11

11513333 33

11517777 77

11518888 88

input

11518888 88

11517777 77

11511111 55

11512222 44

11516666 33

11514444 11

11515555 11

11513333 33

output

appears earlier in the  
original sequence

### Question 3.

#### Description

The restaurant introduces a robotic waiter whose route needs to be calculated. Given an  $n \times m$  matrix map, whose elements are either 1 or 2, with 1 representing a wall, 2 representing a road, the Robot needs to find out the path (only one unit width and no branch) from his starting position to the destination position without walking backwards. The robot can only move up, right, down or left. Please output the trajectory of the robot according to the given map. The trajectory should be represented as a coordinate sequence.

Take input using Scanner.

#### Input:

The first line of the input contains two integers  $n$  ( $0 < n < 100$ ) and  $m$  ( $0 < m < 100$ ), followed by  $n$  lines with  $m$  integers which represents the elements(1 or 2) of the map matrix.

The last line is the coordinate of the start point, including two integers: the **startX** (the index of the row) and the **startY** (the index of column).

### Output:

Output the coordinate sequence that the Robot goes through, each line representing the coordinate of current point. The coordinate contains two integers: **x** (the index of row) and **y** (the index of column), separated by **only one space**.

### Sample:

```
[zhaoyao:src zhaoyao$ java A2Q3
```

5	5			
1	1	1	1	2
1	1	2	2	2
1	1	2	1	1
1	2	2	1	1
1	1	1	1	1
3	1			

input

(3,1) is start point

3	1
3	2
2	2
1	2
1	3
1	4
0	4

output

## Question 4.

### Description

The robot likes to play games with customers. His favorite game is a number game. Given an  $N * N$  ( $N$  is an odd integer) square, you should verify whether this given square meets the requirements that each of the integers between 1 and  $N * N$  occurs only once, and all row sums, column sums, and diagonal sums are equal.

Take input using Scanner.

### Input:

The first line of the input is an integer **n** ( $0 < n < 100$ , **n** is an odd integer), followed by **n** lines with **n** integers representing the elements of the square in each line.

### Output:

Output **true** if the given square meets the requirement of this game, or **false** instead.

### Sample:

```
zhaoyao:src zhaoyao$ java A2Q4
3
4 9 2
3 5 7
8 6 1
false
```

input

output

## Question 5.

### Description

The most annoying game for the robot is called "Migration". This game uses a square map, on which the weather is represented by characters, and each weather corresponds to a score. The player has an initial position and can move one step up, down, left or right each time. The player should choose the most valuable position from four positions. The estimation of a position is to calculate the average weather value of the current position and its surrounding positions in eight directions: upper left, upper middle, upper right, left, lower left, lower middle, lower right and right. Please write a program to calculate the next 5 positions the player moves. In your program, you are required to :

(1) Write a static method `strMapToIntMap()` that takes a string array as an argument and return a two-dimensional integer array. This method can convert the string array to a two-dimensional integer array according the map between weather and score.

```
public static int[][] strMapToIntMap(String[] strMap)
```

(2) Write a static method `getAverage()` that takes a two-dimensional integer array and two integers (representing a position) as arguments and return a double value. This method can calculate the estimation value of the position from the input arguments.

```
public static double getAverage(int[][] intMap, int x, int y)
```

In your `main()` method, you should call methods above.

Character To Score Table:

Character	Weather	Score
S	Snowy	1
R	Rainy	2
W	Windy	3
F	Fog	4
H	Hot	5
C	Cloudy	6
G	Good	7

Take input using Scanner.

Input:

The first line of input is an integers **n** ( $2 < n < 100$ ), followed by **n** lines with a string whose length is **n** in each line.

The last line is the coordinate of the start point, including two integers: the **startX** (the index of row) and the **startY** (the index of column).

Output:

Output **5** lines, with each line containing two integers: **x** (the index of row) and **y** (the index of column), separated by **only one space**.

Sample:

```
[zhaoyao:src zhaoyao$ java A2Q5
```

```
3
```

```
SRW
```

```
FHC
```

```
GGG
```

```
1 1
```

input

```
2 1
```

```
2 2
```

```
2 1
```

```
2 2
```

```
2 1
```

output

### Question 6. (Bonus)

Write a program which reads an odd integer  $N$  from the command line and prints out an  $N * N$  square which can meet the requirement of question 4 (Each integer occurs only once and the sums share the same values).

#### Input:

An integers  $n$  ( $0 < n < 1000$ ).

#### Output:

Output "**Invalid**" if the given integer is even, otherwise a matrix that meets the requirements.

#### Sample:

```
[zhaoyao:src zhaoyao$ java A2Q6 3
```

```
4 9 2
```

```
3 5 7
```

```
8 1 6
```

output

Read in from  
command line

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### Submission of Assignment:

- (1) You should submit all the source code files (with an extension **“.java”**).
- (2) The class name of each **“.java”** file should be **A2Q1, A2Q2, ... , A2Q5, A2Q6** respectively to represent these six questions.
- (3) You should submit all source code **directly** into the sakai system below, **do not compress** them into one folder. <https://sakai.sustech.edu.cn/portal/site/c406ef0d-67ef-4172-b81c-b6e0474c1974/tool/0658d0c0-ec96-4bec-b06f-dde96d2155fc>
- (4) **No Chinese characters** are allowed to appear in your code.
- (5) No **package** included.
- (6) The arguments and the output must **strictly** follow the description of each question.
- (7) The assignment should be submitted before the deadline (**Oct.20th 19:00pm**). **Late submissions within 24 hours after the deadline (even a few minutes) will incur a 50% penalty**, meaning that you can only get 50% of the score, which you could get if the assignment was submitted before the latest deadline. **Assignments submitted after the latest deadline will not be graded** (meaning your will get a zero for the assignment).

**Wish you to enjoy coding!**