CS109 Assignment 3

The ppt only provides one possible problem-solving idea, which does not mean that this is the only idea or the best problem-solving idea.

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Q1 - EASY

1. To solve this quesition, you need to create **6 arrays** and **6 indexes** of each array, which represents:
   Room theory, Room lab, Room art, Course theory, Course lab, Course art
2. Input value of the 6 arrays, for example:

```
7
R,theory,100
R,lab,50
C,theory,100
R,lab,60
C,lab,60
R,art,70
C,art,60
```

To splite each line, you can use:

```
Scanner in = new Scanner(System.in);
String line = in.next();
String[] elements = line.split( regex: ",");
```

Room theory	100	0	0	0	0	0	0	Index = 1
Room lab	50	60	0	0	0	0	0	Index = 2
Room art	70	0	0	0	0	0	0	Index = 1
Course theory	100	0	0	0	0	0	0	Index = 1
Course lab	60	0	0	0	0	0	0	Index = 1
Course art	60	0	0	0	0	0	0	Index = 1

Q1-EASY

3. Sort those 6 arrays on desending order in therange of index

Room theory	100	0	0	0	0	0	0	Index = 1
Room lab	60	50	0	0	0	0	0	Index = 2
Room art	70	0	0	0	0	0	0	Index = 1
Course theory	100	0	0	0	0	0	0	Index = 1
Course lab	60	0	0	0	0	0	0	Index = 1
Course art	60	0	0	0	0	0	0	Index = 1

4 Compare those three couple:

(1) Room theory and Couse theory
(2) Room lab and course lab
(3) Room art and course art

If each value of the room array is larger then or equal to the course array with the same index, it will ture.

Q2 - EASY

1. You can use substring() to split original string. For example:

```
public static void main(String[] args) {
    String str = "1234567890";
    int k = 3;
    System.out.println(str.substring(0, k));
    System.out.println(str.substring(k, 2 * k));
    System.out.println(str.substring(2* k, 3 * k));
    System.out.println(str.substring( beginIndex: 3 * k));
}
```

Q2 - EASY

2. Try to reverse each subString.

- In this case, you can use charAt() method.

```
String subString = "123";
for (int i = 0; i < subString.length(); i++) {
    System.out.println(subString.charAt(i));
}
```

- You can also use the reverse() method in StringBuilder

```
String subString = "123";
StringBuilder sb = new StringBuilder();
sb.setLength(0);// clear the StringBuilder
String reverse = sb.reverse().toString();
```

3. Convert String type to Long type.

```
Long num = Long.parseLong( s: "12345");
```

Q3-Hard

1. Create a structure representing the direction. The structure can be:

   (The order of direction: Right, Down, Left, Up

   - (1) Array `int[][] DIRECTION = {{0, 1}, {1, 0}, {0, -1}, {1, 0}};`
   - (2) Class

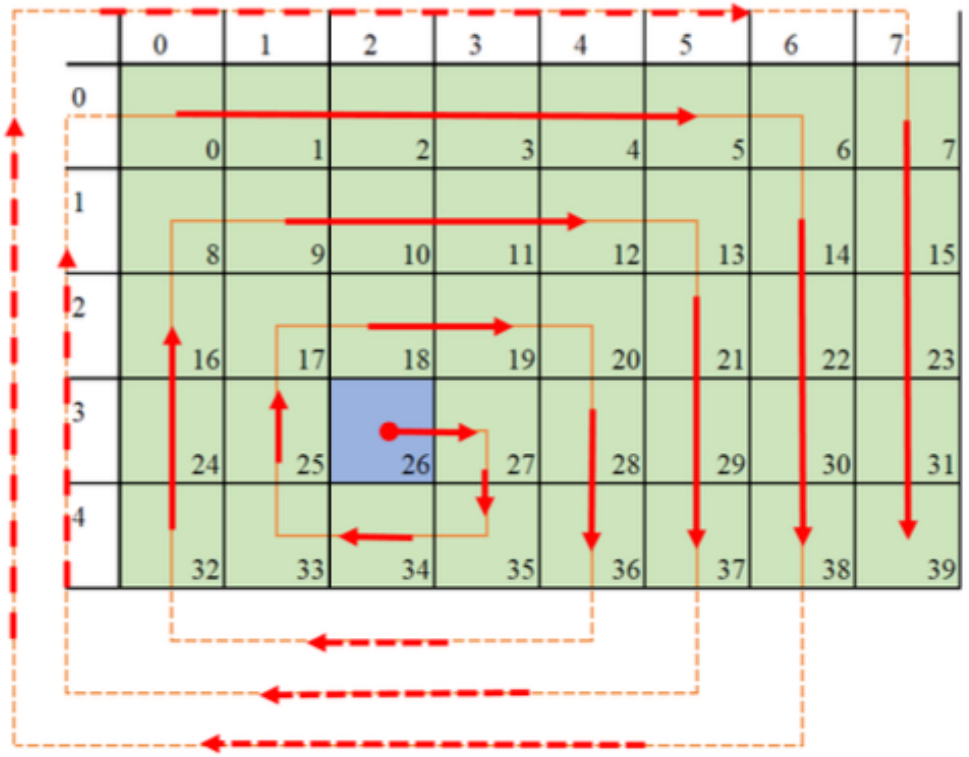
```
class Direction{
    int row;
    int col;
    public Direction(int row, int col) {
        this.row = row;
        this.col = col;
    }
}
public static void main(String[] args) {
    Direction[] directions = new Direction[4];
    directions[0]= new Direction(0,1);
                ……
```

Q3 - Hard

- (3) Enum

```
enum Direction{
    RIGHT(0,1), DOWN(1,0), LEFT(0,-1),UP(-1,0);
    int row;
    int col;
    Direction(int row, int col) {
        this.row = row;
        this.col = col;
    }
}
```

Q3-Hard



1. Find the row and col of the start value 26. row = 3, col = 2
2. How to go? For example go right

   dr = direction[index]. row;

   dc = direction[index].col;

   The next position will be:

   row += dr;

   col += dc;

3. Check whether the new row and col is in the matrix.
4. How to change direction?
   - Firstly, it goes Right and Down with only 1 step.
   - Then, it goes Left and Up with 2 steps.
   - Then, it gose Right and Down again with 3 steps.
   - ……