

## Assignment 3 - Working with Arrays

**Problem 1.** What does the following code method do?

```
private static void mystery(int[] arr) {  
    if (arr.length < 5) {  
        throw new IllegalArgumentException("arr must have more than five elements");  
    }  
  
    int a = arr[1];  
    arr[1] = arr[4];  
    arr[4] = a;  
}
```

**Problem 2.** Write a private static method `concatReverse()` that given a `String` array, concatenates the elements into a single string in reverse order. For example, `concatReverse("ab", "12", "cd")` should evaluate to `"cd12ab"`.

**Hint:** Define an `String` output variable and initialize it to `""`. This is known as the *empty string*, the string with 0 characters. You can concatenate onto it.

**Problem 3.** A 2D array is an array of arrays. For example, consider the following 2D array:

```
int[][] example = {{1, 2, 3, 4}, {5, 6, 7, 8}};
```

This is an array that contains two arrays, each containing 4 integers.

What do the following evaluate to? Which of these throw exceptions/won't compile and why?

1. `example.length`
2. `example[0].length`
3. `example[0][3]`
4. `example[1][4]`
5. `example[3][2]`
6. `example[1][1]`
7. `2 < example[0]`
8. `9 < example[1][2]`

**Problem 4.** Write a private static method `sum2DRows()` that given a  $n \times m$  `int` array (i.e. `int[n][m]`) returns an array of length  $n$ , whose elements are the sums of the rows of the input. Using `example` defined in the problem above, `sum2DRows(example)` should return the array `{10, 26}` since  $1 + 2 + 3 + 4 = 10$  and  $5 + 6 + 7 + 8 = 26$ . You will need to use two nested for loops, one to iterate over the rows, and one to iterate over the columns. To make your code easier to read, use the temporary variables `row` and `column` rather than `i` and `j`.

**Hint:** Start with a simpler problem: how do you sum all the elements of a 1D integer array?

**Problem 5.** In one to two sentences, explain what you would change to your method above in order to write `sum2DDown()`, the method that sums the columns. For example, `sum2DRows(example)` should return the array `{6, 8, 10, 12}` since  $1 + 5 = 6$ ,  $2 + 6 = 8$ , etc.