

Homework 01

1 General Instructions

Homework should be submitted to Desire2Learn, as either a plain-text file or a PDF file. For parts of homework that are writing code you may wish to type your answers into an Eclipse projects so that you can test them, then copy and paste them into the document you are submitting.

Homework will be graded for completion – whether or not it looks like you have tried to answer all of the questions to the best of your ability – rather than correctness. In fact, you won't get much feedback about your homework submissions at all. Instead, I will be posting a solution after the due date. You are strongly encouraged to compare that solution to your own work, and ask questions on Piazza or in person if you do not understand any parts of the solution.

The purpose of homework is to help you figure out how well you understand the concepts that you can expect to see on the exams.

2 Assignment

1. Declare and allocate a two-dimensional array of integers named `table`. Make it 6 rows by 3 columns. Then write a pair of nested loops to set each element to the sum of its row and column indexes. (See table below.)

0	1	2
1	2	3
2	3	4
3	4	5
4	5	6
5	6	7

2. What is a data structure? How does it relate to an algorithm?
3. Analyze the time complexity of the following code. Use only multiplications as basic operations. (Nothing else needs to be counted.) Treat `n` as the size of the input. Answer in a form like $3n^3 + 2n^2 + 7n + 4$.

```
1 public static void weirdMultiplication(int [][] M, int [][] A, int [][] B, int n)
2     {
3     for(int i = 0; i < n; i++) {
4         for(int j = 0; j < n; j++) {
5             M[i][j] = A[i][j] * B[i][j];
6         }
7     }
```

4. List the five stages of software development (as defined in our slideshow) and briefly define what each stage does.
5. Implement a method that could go in the `Location` class (which has fields `name`, `xCoordinate`, and `yCoordinate`) that returns a `String` containing which quadrant the location is in ("`I`", "`II`", "`III`", "`IV`"). See [https://en.wikipedia.org/wiki/Quadrant_\(plane_geometry\)](https://en.wikipedia.org/wiki/Quadrant_(plane_geometry)) if you do not remember what a quadrant is. Also, think of a special case in which it is not clear what the method should do. Explain what that special case is, and handle it however you would like in the method.

3 Submitting Your Work

If your document is not already plain-text or PDF, convert it to one of those formats. Then upload it to D2L under this assignment.