**ASSIGNMENT 5 – Analysis Framework**

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| Topics |
| * Order of growth * Recursions |
| Readings |
| * CLRS, Chapter 4.3 – 4.5 * Lectures 5a-5c (Blackboard) |
| Instructions | |
| 1. Select a **partner** and inform instructor who you will work with  2. Do the problems and answer the questions listed in the next section   * Keep in mind Guidelines on plagiarism.   3. Follow instructions for submitting your work.  PROBLEMS AND QUESTIONS | |
| Problems and Questions |
| Part A Order of growth (2\*10 = 20 pts) |

Find the order of growth of the following sums. Use notation with the simplest possible.

A close up of a door

Description automatically generatedShow you work.

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| Part B Algorithm Analysis (40 pts) |
| Algorithm for fake coin problem (see the file ProblemsForWeek 5) |

fakeCoin(C, n)

// C => coin

// n => 1 if coin is fake, 2 compare, n > 2 divide into 3 piles

If n == 1 // The coin is fake

return the fake coin

If n == 2

Find the lightest coin

Call fakeCoin(C, n) on the lightest coin

else

divide the array into 3 sub arrays

discard any two arrays that have the same weight

call fakeCoin(C, n) on the last array

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| Part C Implementation (40 pts) |

Using Java, implement the iterative algorithm for computing the last 5 digits of the th Fibonacci number. Perform an experiment to find the largest value of for which your program runs under 1 minute on your computer.

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| Extra credit |
| Implement a recursive algorithm for the part C problem. Describe your observations when running this program for different inputs. |

2. **Summary questions:**

a. What concepts did you have trouble with? What still confuses you?

b. Suggestions for improving this assignment in the future?

Help instructor help you

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| Submitting your work |

1. Make sure that your name(s) are in all your files.
2. If you have more than one file for your solution, make a .zip file for your project
3. In Blackboard, attach your solution file to the submission for this assignment.

GUIDELINES ON

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| Guidelines on Plagiarism in Computer Science |

Outlined in the Syllabus