

# *Design & Analysis of Algorithms*

- This exam will be given via-Blackboard.
- You will be given 24 hours (the specified day) to take the exam. When you start the exam, you have exactly 120 minutes to finish it.
- Don't forget to charge your battery!!
- Make sure you have 120 min uninterrupted time before you start.
- The exam sheet will be an ms-word document that you can download it on your machine and write your answer. After you finish, you must submit it back as a pdf or ms-word to the exam entry on Blackboard.
- If you need to draw something, there are good tools as paint that can help!!
- Hand written solutions are accepted, you can draw figures on paper and then upload them as pictures to you ms-word file.
- Your answers hand written or types must be as one pdf of ms-word document that have all the answers to the questions clearly. Your answers need to be readable, clear, and understanding. If the submission is not readable, you will not get credit for it.
- The exam consists of 5 problems worth 50 points each, plus a bonus problem 6 for an extra 30 points credit. Make sure you have tried to answered the first 5 problems before moving on to the bonus problem.
- You need to collect 200 points out of 280 to have an A.

## **Instruction**

Work as many problems as possible. All problems have the same value, but subparts of a problem may have different values (depending on their difficulties, importance, etc). Provide a short preliminary explanation of how an algorithm works before running an algorithm or presenting a formal algorithm description, and use examples or diagrams if they are needed to make your presentation clear. Please be concise and give well-organized explanations. Long, rambling, or poorly written/organized explanations, which are difficult to follow, will receive less credit.

## **Grading**

Expect questions of the following form (note that a problem may consist of a few questions):

- A series of short-answer questions. For example, I may ask you to provide a definition, explanation, or run time analysis. Although the answers are short, some of the questions may require some thought. Don't worry about skipping a question, or guessing an answer, if you don't see the answer right away.
- Work through some algorithm on a given input, showing intermediate results. I'll pick the algorithm at random because I want you to learn them all. For some more complex algorithms (e.g. Red-Black tree insertion), I may ask you to do only one operation.
- Design and analyze simple algorithms. These are much more unpredictable. I try to ask at least a couple of questions that involve a very simple modification to a homework problem, so be sure you understand the solutions to all the homework problems. Other questions usually involve a slight modification to a problem that we have worked on in class.
- One challenging bonus problem. Don't be upset if you cannot solve this problem. (But at least be sure to read it, since sometimes the problem is not as challenging as I think it is, and there may be a very simple solution.) If you cannot see how to solve the problem, feel free to write down your wild ideas or observations. You might get some partial credit if your idea is good. When it comes to grading, I tend to give more credit for insight than for

memorization. For example, if a problem involves inorder traversal of a binary tree, you will get little credit for just writing down the algorithm. (You could just copy that out of your cheat sheet.) However, if you can say something intelligent about the mathematical structure of the particular problem, or about why some approach is not useful, you may get some partial credit (depending on how much your observation indicates about your understanding of the problem).