

CS 2150 Exam 2

Name _____

You **MUST** write your e-mail ID on **EACH** page and bubble in your userid at the bottom of this first page. And put your name on the top of this page, too.

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There are 6 pages to this exam. Once the exam starts, please make sure you have all the pages. Questions are worth different amounts of points.

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This exam is CLOSED text book, closed-notes, closed-calculator, closed-cell phone, closed-computer, closed-neighbor, etc. Questions are worth different amounts, so be sure to look over all the questions and plan your time accordingly. Please sign the honor pledge below.

*You step in the stream,
But the water has moved on.
This page is not here.*

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Page 4: x86

6. [6 points] Explain how a buffer overflow attack works with the C calling convention. While we are looking for a brief answer, it should be detailed enough to explain the vulnerability (where the weakness is) and how it is exploited (how to use this for an attack).
7. [3 points] Why must parameters be pushed on in reverse order? In your explanation, also describe what would happen if they were pushed on in forward order.
8. [3 points] What are all the parts of an activation record?

Page 5: Proofs

9. [6 points] Prove that the maximum number of nodes in a binary tree of height h is $2^{h+1} - 1$.
10. [6 points] Given that $f(n) = 3n^2 + 7x - 3$, prove that $f(n) \in \Theta(n^2)$. Note that this is big-Theta, not big-Oh.

