CS 2150 Exam 1, fall 2014

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.

If you are still writing when "pens down" is called, your exam will be ripped up and not graded – even if you are still writing to fill in the bubble form. So please do that first. Sorry to have to be strict on this!

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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.

If you do not bubble in this first page properly, you will not receive credit for the exam!

Answers for the short-answer questions should not exceed about 20 words; if your answer is too long (say, more than 30 words), you will get a zero for that question!

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.

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You step in the stream,
But the water has moved on.
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Page 2: C++

1. [3 points] Other than syntax, what are the three differences between references and pointers?

2. [6 points] There are many ways to cause a segmentation fault while using pointers in C++, and some of these ways are prevented by using references. List three such ways (of causing a segfault with a pointer) that are not possible with references, and *briefly* explain why each is not possible with references.

3. [3 points] Assume that `Rational *r = new Rational()` has been declared. Explain *exactly* what happens when `delete r` is called.

Page 3: Lists

4. [3 points] Why do people use iterators? Specifically, why iterators versus just going through the data structure directly?

5. [3 points] Why does the C++ compiler have such a hard time determining errors with template code?

6. [3 points] Why do we use Abstract Data Types?

7. [3 points] Consider a list implemented two ways: with vectors, and as a linked list. Give two operations that have different running times between the two implementations, and *briefly* describe why their running times are different.

Page 4: Numbers, page 1

8. [6 points] Consider the *little-Endian* hexadecimal value 0x00009c41, which is an IEEE 754 encoded floating point number. Convert this to base 10.

9. [3 points] Convert 125_6 to base 9

10. [3 points] Convert -3 to two's complement big-Endian hexidecimal notation. Your answer should be 32-bit hex value.

Page 5: Miscellaneous

11. [3 points] Write a C++ function that returns the 13th bit of a passed `int` parameter.

12. [3 points] What does the `backtrace` command do in gdb?

13. [3 points] What is the *shell* in Linux?

14. [3 points] What would go wrong if array base names were allowed to be reassigned?

Page 6: No questions here

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