CS 2150 Exam 1, Spring 2019

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!

Other than bubbling in your userid at the bottom of this page, please do not write in the footer section of this page.

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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Page 2: C++

1. [3 points] What is the purpose of a *destructor*? List two scenarios in which the destructor is invoked in C++.

2. [3 points] List one advantage of each of the following parameter passing strategies: *Pass by Value*, *Pass by Reference*, *Pass by Constant Reference*.

3. [3 points] What does the default *operator*= method do? Why might you want to override this method when creating your own class?

4. [3 points] What is a *memory leak*? Write a short snippet of code that produces a memory leak.

Page 3: Lists

5. [3 points] Describe why *arrays* have constant time access to element i. In other words, why does myArray[i] always run in constant time? Be as precise as you can.

6. [3 points] List one advantage of implementing a *Queue* using a *Linked-List* and one advantage of implementing it using an *Array*.

7. [6 points] Suppose you are writing a custom *Vector* class that stores integers only (for simplicity). Implement the resize() method below, which doubles the capacity of the vector.

```
/**
  * Fields of your vector class for your reference:
  *   int*  theArray;
  *   int   size;
  *   int   capacity;
  */
void Vector::resize(){









}
```

Page 4: Numbers

8. [3 points] Convert each of the following decimal numbers into an 8-bit twos-complement binary number.

Decimal Value	8-bit Twos-Complement Binary
78	
-108	
-128	

9. [9 points] Consider an IEEE Floating-Point format that works exactly like the one described in class, but instead contains 1 sign bit, 4 exponent bits, and 3 mantissa bits. Answer the following questions regarding this format:

- Convert -3.5_{10} into this floating point format.

- Convert 01101100_2 from this floating point format into decimal

- What is the EXACT largest value this format can represent in decimal?

Page 5: Miscellaneous

10. [3 points] Why do we like big-Theta instead of big-Oh?

11. [3 points] List five unix commands and briefly describe what each one does.

12. [3 points] List three GDB (or LLDB) commands and briefly describe what each one does.

13. [3 points] What is the difference in space (number of bytes) to store a *char pointer* versus an *int pointer*? Briefly describe why?

Page 6: No questions here

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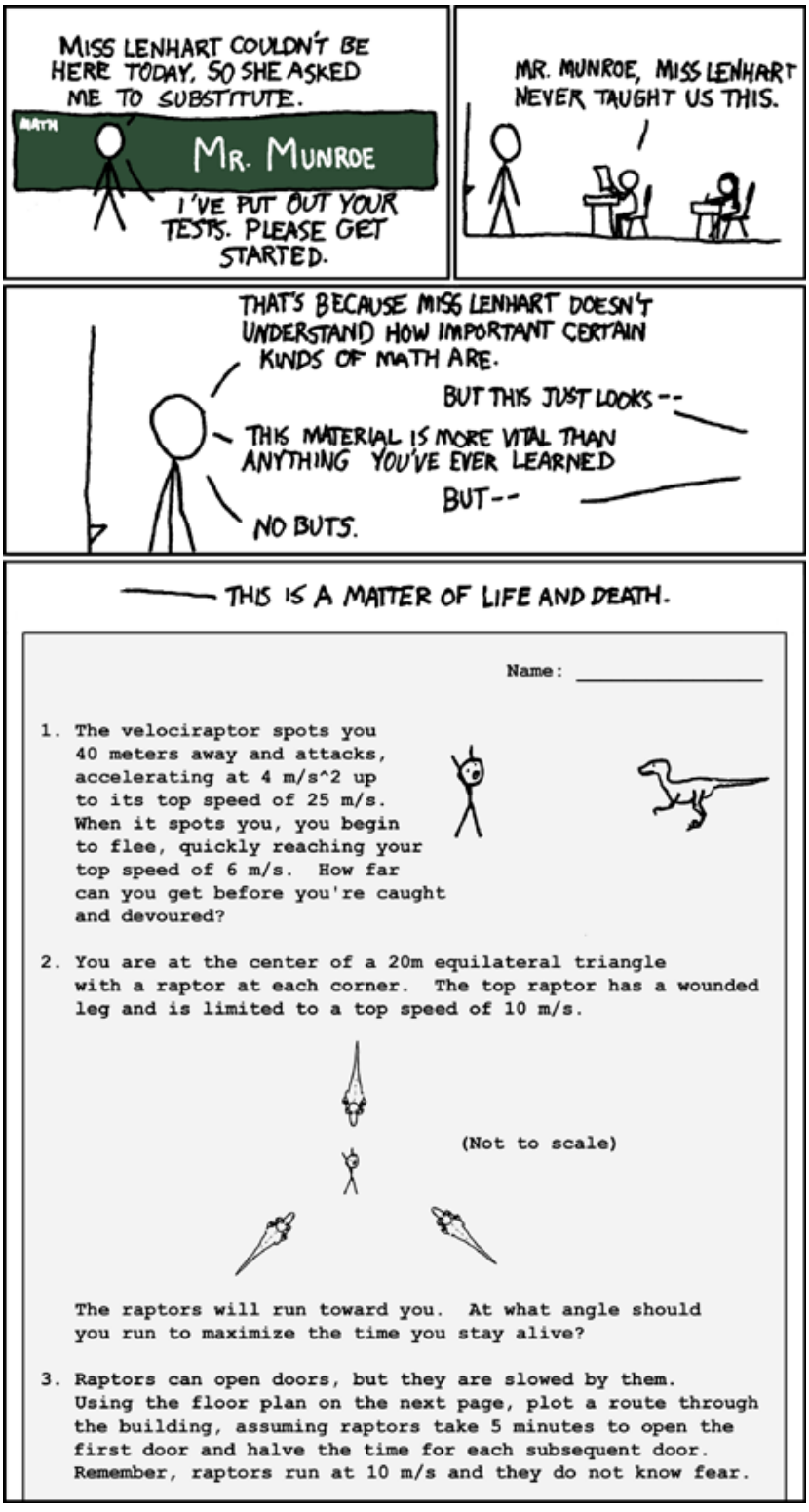

xkcd #135