CS 2150 Exam 1, Fall 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!

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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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Page 2: C++

1. [3 points] Which of the following will occur if you place an expression in an if-statement in C++ (e.g., if(5+2*-2)): Compiler Error, Runtime Error (i.e., crash), Runs with no errors. Explain your answer.

2. [3 points] How do you determine whether a C++ class requires a destructor?

3. [3 points] Whats the purpose of the preprocessing commands in a header file? List 3 preprocessing directives.

4. [3 points] Suppose you declare an array as shown below. what is the value (in hex) of $\&(intArray)$? You should assume that integers are 8 bytes.

```
int intArray2D[4][6];      //Suppose also that
                                &(IntArray2D[3][3]) == 0xffde6c
```

Page 3: Lists

5. [3 points] Given the class ListNode on the left, describe what the mystery function on the right will do. We are looking for a high-level description of what is printed.

```
ListNode:
  string value;
  ListNode* next;
```

```
void mysteryFunction(ListNode* node){
  if(node != NULL){
    mysteryFunction(node -> next);
    cout << node -> value << " ";
  }
}
```

6. [3 points] How many pointers (at minimum) need to be updated when removing the last node from a linked list? You should assume the list is built as the one in lab (i.e., doubly-linked, dummy nodes, etc.).

7. [6 points] Suppose you are writing a vector-based queue with *front* and *back* indices into the array. Write out the enqueue method. *Hint: You may call resize() and assumes it works as intended.*

Page 4: Numbers

8. [3 points] Convert $2ag_{19}$ into decimal.

9. [3 points] When adding the 4-bit (twos-complement) binary numbers 1011 and 0010, what is the resulting value? Give your answer both in 4-bit binary and in decimal.

10. [6 points] Convert -29.5 to IEEE-754 floating point notation. Leave your answer in hexadecimal.

Page 5: Miscellaneous

11. [3 points] Name one operation that will have a different runtime on a Vector versus a doubly-linked list (head and tail pointer). Explain your answer.

12. [3 points] Name one operation that will have a different runtime on a singly-linked list (head pointer) versus a doubly-linked list (head and tail pointer). Explain your answer.

13. [3 points] Write two lines of code, one that initalizes a statically allocated linked-list node (called node) and one that creates a pointer to that node (called ptr).

14. [3 points] List three unix commands and what they do.

Page 6: No questions here

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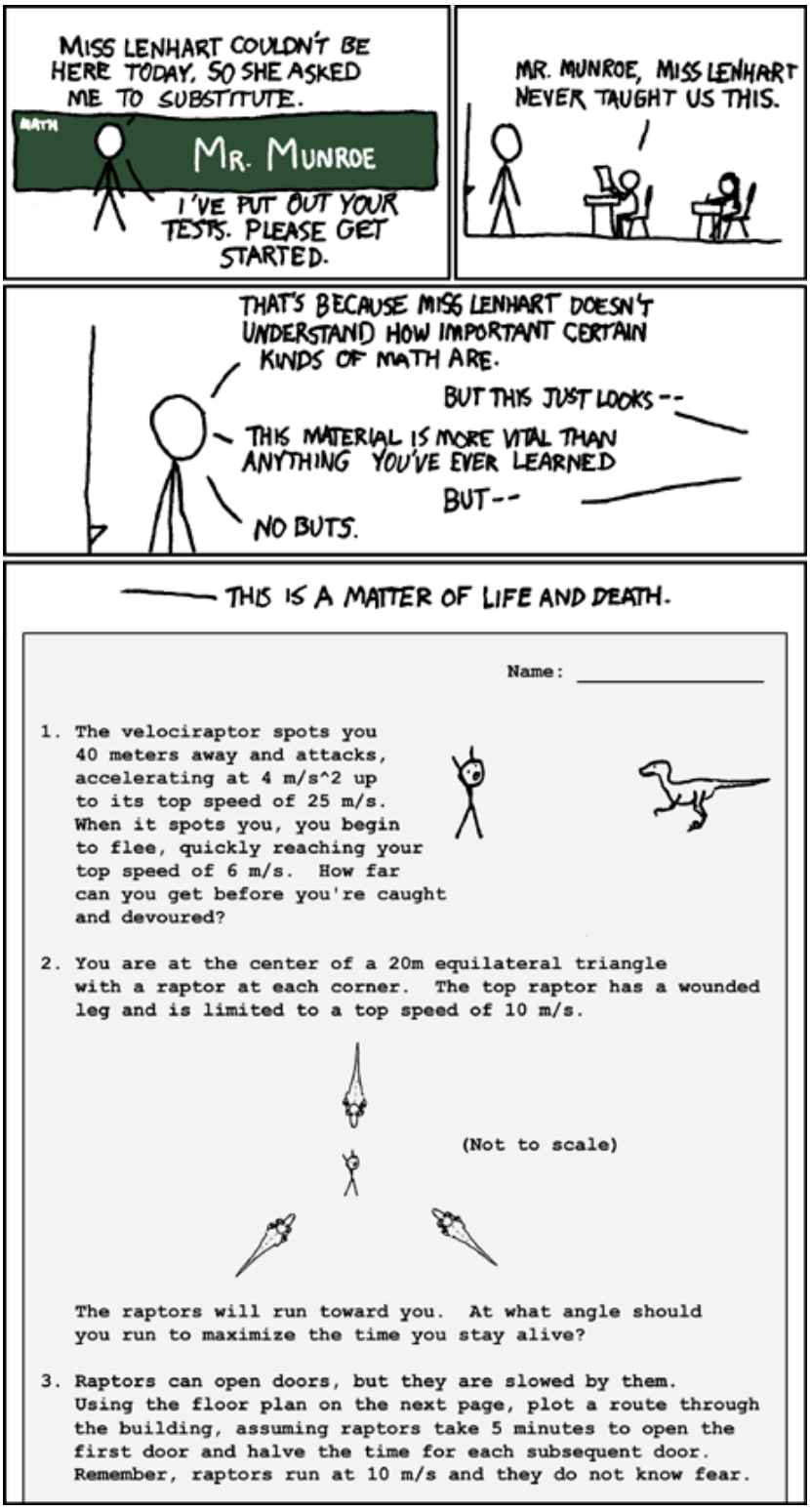

xkcd #135