CS 100 - Introduction to Programming  
Midterm Exam #2 - Prof. Reed  
Fall 2012

You may take this test with you afterwards, but you must turn in your bubble form answer sheet.

This test has the following sections:
I. True/False ....................... 40 points; (20 questions, 2 points each)
II. Multiple Choice.................. 60 points; (10 questions, 6 points each)

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100 points total

This test is worth 7.5\% of your final grade. You must put your answers on the bubble form. This test is closed book and closed notes. For the multiple choice problems, select the best answer for each one and select the appropriate letter on your answer sheet. Be careful - more than one answer may seem to be correct. Some questions are tricky.

**True/False: (2 points each)** On your bubble form fill out A for true and B for false.

T F 1. When we think of a computer as being something that takes input, does some processing and provides output, then a tree qualifies as a computer.

T F 2. An algorithm is an estimate or approximation of the strategy to be used in solving a problem.

T F 3. Adding two small binary numbers can be done inside a computer by using only AND and XOR

The following 4 problems refer to our textbook from chapter 4 “Needles in the Haystack. Select True if each of them is a point made in that chapter, otherwise select False.

T F 4. Kinderstart sued Google because Google demoted the kinderstart web pages due to child pornography links.

T F 5. The "Jen" search engine was an early precursor to the Google search engine.

T F 6. The market capitalization of Google is more than 50\% larger than the combined capitalization of the New York Times, Pearson Publishing, eBay, and Macy's.

T F 7. The "Page" in the PageRank algorithm refers Larry Page, not to web pages.

T F 8. A parity bit is an extra bit added to a digital transmission used to detect an error.

T F 9. A selection sort is generally faster than a bubble sort.

T F 10. Binary search is generally slower than linear search.

T F 11. Think back to the handshakes activity. The main point of this activity was to find the formula for the number of handshakes required.
12. Consider the circuit shown below with a single XOR gate where one of its inputs is $x$ and the other input is always a 1. This circuit is the same as a NOT gate.

13. Think back to the *Muddy City* problem represented using a graph. The solution set of paths can always be found by using a strategy of first selecting the paths that are shortest.

14. Think back to the *Ice Cream Town* problem represented using a graph, which is an example of a dominating set. The solution (smallest set of points covering the graph) can always be found by using a strategy of first selecting the nodes with the smallest number of connections.

15. CSS stands for *Computing System Standard* and is used for two machines from different manufacturers to communicate with each other over the Internet.

16. The `<h1>` and `<h2>` tags in HTML allow you to create different length horizontal lines.

17. The `<hr>` HTML tag creates a hard return.

18. The Google nGrams page allows you to send a virtual telegram to many people at the same time.

19. In Scratch it is possible to make a sprite glide to a different position, but the only way to do this is to write a loop that moves it in small increments with a very small pause in between movements.

20. In Scratch from what we have studied so far in class it is possible when writing a script for a sprite to give the instruction for a different sprite to say something.
Multiple Choice (6 points each)

21. Think back to the exercise in class where we counted how many students were in the class. Everyone started out as a number 1, then compared with another person standing. One person became the sum of the two numbers, and the other person sat down. If a set of such comparisons were all done one stage at a time, how many stages would be needed to count 1,000 people?
   a) 8
   b) 10
   c) 50
   d) 500
   e) None of the above

22. Binary Number 1011 in decimal is:
   a) 6
   b) 11
   c) 13
   d) 21
   e) None of the above

23. Binary Number 1101 in decimal is:
   a) 6
   b) 11
   c) 13
   d) 21
   e) None of the above

24. Binary Number 111011 in decimal is:
   a) 28
   b) 30
   c) 55
   d) 59
   e) None of the above

25. Binary Number 110111 in decimal is:
   a) 28
   b) 30
   c) 55
   d) 59
   e) None of the above

26. Decimal Number 35 in binary is:
   a) 10011
   b) 11011
   c) 011101
   d) 100011
   e) None of the above
27. Decimal Number 62 in binary is:
   a) 11110
   b) 111010
   c) 110110
   d) 111110
   e) None of the above

28. If a transposition cipher is being used, what is the translation for the text:
   QTL JLOB
   a) THE BEST
   b) TWO MORE
   c) FOR REAL
   d) ONE TIME
   e) None of the above

29. Consider the following circuit. The outputs c and z can best be described as:

   ![Circuit Diagram]

   a) The opposite of the inputs (x,y)
   b) c is the result of adding x and y, and z is the carry
   c) z is the result of adding x and y, and c is the carry
   d) The result when subtracting y from x
   e) None of the above

30. Consider the following circuit. The output f can best be described as:

   ![Circuit Diagram]

   a) A 1 if all 3 inputs (x, y, z) were 1
   b) The difference between the first 2 inputs (x,y) and the third input (z)
   c) The sum of the first two (x, y) plus the sum of the second two (y,z)
   d) A 1 if any two of the three inputs(x,y,z) were 1
   e) None of the above