CS 100 – Discovering Computer Science
Midterm Exam #1 - Prof. Reed
Spring 2014

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..........................60 points; (30 questions, 2 points each)
II. Multiple Choice..................40 points; (10 questions, 4 points each)

This test is worth 5% of your final grade. You must put your answers on the bubble form. This test is open book and open notes, however you may not use any electronic resources or confer with anyone else. 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.

1. A Google doc allows the entire class to edit it at once. T
2. Computer memory holds information once the computer is turned off F
3. ASCII is a code used to represent numbers, letters and other symbols. T
4. The relationship between the Twizzler-cutting activity and binary numbers is that both of them have to do with powers of two. T
5. An algorithm is a set of precise steps to be used in solving a problem. T
6. There can be multiple correct algorithms for solving a problem. F
7. In the class activity where we analyzed a picture of a room and all the objects in the room we had enough evidence to make an ordering of which representation (picture, list, wordle) came first. T
8. Think back to the picture drawing activity, where we all drew pictures of a house, the sun, a stick-figure family and a mustang next to the house. The point of this activity was to show that English is an ambiguous language. T
9. The main point of the Mustard-Jelly sandwich activity in class was to show that there are many different ways to do the same thing. T
10. The paper-and-pencil computer (0/1 guessing) was developed in class by groups of ~4 students, and the "computer" managed to beat every group of students every time. T
11. In the “magic” age-guessing game done in class using the 6 tables of numbers, the number in the upper-left hand corner of each box represents the group size for different place values of binary numbers. T
12. If we are using odd parity, then we need to add a 1 to the bits 011001. T
13. Given a grid of numbers where all the columns have an extra parity bit that represents even parity, a single bit change can not only be detected, but can be corrected.  
14. Black and White newspaper pictures can be represented as a grid of 0’s and 1’s.  
15. Compression can be used with large grids of 0’s and 1’s to represent pictures without having to store each individual bit separately.  
16. The .jpg image compression format is\textit{lossy}. 

The following questions refer to Chapter 1 of the book "Blown to Bits": 
17. Tanya Rider was located by cell phone triangulation (using angles) rather than trilateralization (using distance).  
18. One of the Koans described is: "Technology causes an acceleration of living and requires choices to deliberate slow the pace of change."  
19. Moore's Law dictates that technology cannot measure itself. 

The following questions refer to Chapter 2 of the book "Blown to Bits." As we did in class, for each of these choose A (for True) if the statement/example/topic was covered in the chapter, B (for False) if the statement/example/topic was not covered in the chapter. 
20. The Korean subway "Puppy-poo-girl" was publicly shamed because of another passenger capturing the event on a cell phone.  
21. Ron Lee rented a car from PayLess in California, and because of GPS was charged money for leaving the state.  
22. Many color printers secretly embed an id code in print-outs.  
23. Gender, zip code and date of birth are all that is needed in the US to identify 87\% of the population. 

The following questions refer to Chapter 3 of the book "Blown to Bits." As we did in class, for each of these choose A (for True) if the statement/example/topic was covered in the chapter, B (for False) if the statement/example/topic was not covered in the chapter.  
24. The Caesar Cipher was used in ancient times to encode secret messages.  
25. The Vigenere Cipher is a totally different kind of cipher from the Caesar Cipher.  
26. In theory one-time pads are unbreakable
The following questions refer to the short story "Light of Other Days".

**T F 27.** The interaction with Hagan escalates the level of conflict between Mr. Garland and Selina once they leave.

**T F 28.** In class we discussed how this sort of technology already exists, but in a slightly different form.

The following questions refer to the short story "And Mimsey were the Borogoves".

**T F 29.** The “cube” described in the story gave scenarios that kept changing.

**T F 30.** At the end of the story the children disappear and can no longer be reached by their parents.

Multiple Choice (4 points each)

31. Consider the Martin Luther King Jr. web site we looked at as a class. The point of us looking at that web site was:
   a) To show how technology can help publicize social messages
   b) To encourage us to not accept what we see online as always reliable
   c) To explore HTML web page formatting
   d) To compare user interface features for how user-friendly they are.
   e) None of the above

32. Think about the handshakes activity done in class. What problem-solving representations proved helpful in explaining the solution to others?
   a) Diagrams on paper of the process.
   b) The formula showing how to get the answer, given \( n \) people
   c) Acting out the solution using real people
   d) Modelling the solution using objects to stand for people
   e) All of the above

33. The Turing Test is:
   a) A computer skills competency test named after Alan Turing
   b) A conversational test to determine if a computer is indistinguishable from a human
   c) An IQ test for computer programs
   d) A set of minimum performance standards a computer must meet if it is to perform intelligently
   e) None of the above

34. Consider an exercise in class where we count how many students were in the class. Everyone starts out as a number 1, then compares with another person standing. One person became the sum of the two numbers, and the other person sits 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

2, 4, 8, 16, 32, 64, 128, 256, 512, 1024
35. What is the biggest number that can be represented in binary on one hand, where each finger represents a single binary digit?
   a) 8
   b) 16
   c) 32
   d) 64
   e) None of the above

36. Binary Number \[101001\] in decimal is:
   a) 21
   b) 31
   c) 41
   d) 53
   e) None of the above

37. Consider the ASCII table, where the decimal value for ‘A’ is 65, the value for ‘a’ is 97, and the value for ‘0’ is 48. What is the equivalent of the following binary message, where each 7 bits represent a single ASCII character?

   \[1001000 \quad 1000101 \quad 1001100 \quad 1010000\]

   a) OHMY
   b) GOCS
   c) HELP
   d) OLYM
   e) None of the above

38. Adding a zero to the right of a binary number (e.g. changing 110 to 1100) has the following effect:
   a) It doubles the original number
   b) It halves the original number
   c) It doesn't change the original number
   d) None of the above

39. Adding a zero to the left of a binary number (e.g. changing 110 to 0110) has the following effect:
   a) It doubles the original number
   b) It halves the original number
   c) It doesn't change the original number
   d) None of the above

40. Adding a one to the left of a binary number of all ones (e.g. changing 111 to 1111) has the following effect:
   a) It equals double the original number, minus 1
   b) It halves the original number
   c) It doesn't change the original number
   d) None of the above