Name:_____

Final Exam: CMPS 10 Fall 2017 (A)

1. Which apply to HTML? Select ALL that apply.
   A. It is the language used for the web browser and the web server to communicate over the Internet.
   B. It is the language used to express how a document should be displayed.
   C. It is a language that allows for "documents" to be created that are not linear. (A book with chapters is linear – you normally read from start to end in order.)

2. According to the following html code, which expression is correct?

   `<br><a href="http://processing.org/">http://www.ucsc.edu/</a>`

   A. "http://www.ucsc.edu/" appears in the webpage. But when clicked, it links to http://processing.org/
   B. "http://processing.org/" appears in the webpage. But when clicked, it links to http://www.ucsc.edu/

3. True(A) or False(B). Google uses inbound links as part of its algorithm for ranking the relevant results.
4. True(A) or False(B). The step of "Building an index" is done each time you type a Web Search query.

5. The halting problem (determining if a program will halt given a specified input) is…
   A. an example of a polynomial time algorithm.
   B. an example of an exponential time algorithm.
   C. an example of a provably unsolvable problem.

6. What is the time complexity of guessing a number between 1 and n if each time all you know is the guess was right or wrong?
   A. constant   B. log(n)   C. linear (n)   D. polynomial but bigger than n   E. exponential

7. Suppose you want to visit 13 cities and you want to minimize how much you pay for airline tickets (the traveling salesman problem). Your algorithm consists of the following steps: (1) select an ordering of cities and compute the price; (2) pick another ordering and compute the price and then compare that price with the previous one; (3) At each step keep the cheapest itinerary (cheapest ordering). Which of the following statements are true?
   A. There are much better ways to solve this problem
   B. This is a polynomial time problem
   C. This is an NP-Complete Problem (requires exponential time)
   D. None of the above

8. What is the time complexity of guessing a number between 1 and n if each time you are told if the guess was too big, too small, or correct?
   A. constant   B. log(n)   C. linear (n)   D. polynomial but bigger than n   E. exponential

9. Which algorithm will run faster (complete more quickly) for large values of n?
   A. one that runs in time proportional to n, or
   B. one the runs in time proportional to log(n)?

10. Which of these analogies is the best match for sending a big message across the Internet?
    A. Sending a big message across the Internet is like a train with many cars (smaller packets) that are linked together to form a long train (the entire message).
    B. Sending a big message across the Internet is like sending a bunch of cars (smaller packets) that each take their own route to the destination and get reassembled after they all get there. Some might not even make it the first time.
    C. Sending a big message across the Internet is like pouring a lot of bits into a big box and then shipping it with USPS, not knowing exactly what route it will take to get there.
    D. Sending a big message across the Internet is like sending a bunch of cars (smaller packets) that each travel at their own pace but they all take the same route (follow the same map), although some might not make it the first time.
    E. Sending a big message across the Internet is like sending a message by putting it in a bottle, tossing it in the ocean, and hoping it makes it to its destination.

11. Which doesn't belong on this list?
    A. Ethernet   B. http   C.x.25   D. html   E. ftp

12. Are Internet names (e.g. www.soe.ucsc.edu) and addresses (e.g. 128.115.27.53) hierarchical?
    A. Yes they are both hierarchical.
    B. The names are hierarchical but not the addresses.
    C. The addresses are hierarchical but not the names.
    D. Neither is hierarchical.

13. What must fit in computer memory in order to give quick search results?
    A. The index (list) of terms (words etc.) and where on disk to find the pages that match each of those terms.
    B. The list of all URLs known to the search engine and their associated search terms.
    C. Neither A nor B fit entirely in the computers main memory.
    D. Both A and B need to fit to get good performance.

14. Which of the following is an example of information that is NOT hierarchical ?
    A. A university course catalogue.
    B. Classification of animals (family, genus, species, etc.)
    C. Telephone numbers.
    D. The location of books in a book store.
    E. Your network of friends.

15. What is the fastest known sorting algorithm?
    A. Bubble Sort
    B. Exchange Sort
    C. Quick Sort

16. Given the Vigenère cipher below, decode EOHS.
    ```
    ABCDEFGHIJKLMNOPQRSTUVWXYZ
    MNOPQRSTUVWXYZABCDEFGHIJKL
    DEFGHIJKLMNOPQRSTUVWXYZABC
    HIJKLMNOPQRSTUVWXYZABCDEFG
    ```
    A. SNAP   B. SNAG   C. SLAP   D. SLAG

17. If you are asked to guess a number between 1 and 300, what is the maximum number of guesses you will need using the optimal guessing strategy if after each guess you are told the guess was too big, too small, or you got it?

    A. 2   B. 4   C. 9   D. 16   E. 256

18. What is the decimal equivalent of the binary number 101101?

    A. 12   B. 42   C. 45   D. 52   E. 103

19. What is the binary equivalent of the decimal number 50?

    A. 111010
    B. 110010
    C. 110000
    D. 100101
    E. 100111

20. For how many seconds does this script say "Hip"?   A. 3   B. 6   C. 12   D. 18   E. 24

21. What appears on the screen when this script is run? Assume the sprite is pointing in the default direction (90 degrees / to the right).

22. What is displayed when the block on the left is clicked? (Caution: This block may be buggy in that it may not do what your intuition might expect given the names of the variables.)

A. true   B. false   C. windy   D. rainy   E. cold

23. Which of the following CORRECTLY computes the sum of the numbers from x to y, inclusive? Select ALL that apply. Caution some or all have been changed from the midterm. If they are all wrong select D.

24. What does clicking on the "mystery 4" block below display?

    A. 12
    B. 16
    C. 24

25. The block on the previous question is best described by which of the following?
    A. Exponential block
    B. Recursive block
    C. Iterative block

26. What does the following program "say" when the "hello" block on the left is run?

A. "hello 3" then "hello 2" then "hello 1" then "hello 0"
B. "hello 3" then "hello 2" then "hello 1"
C. "hello 3" then "hello 3" then "hello 3"
D. "hello 0" then "hello 0" then "hello 0"
E. "hello 1" then "hello 2" then "hello 3"

27. What does the following program "say"?

A. True   B. False   C. InCalifornia

28. What does clicking on the "one trial" block display?

A. Always 3
B. Sometimes 1, sometimes 2, sometimes 3
C. Any combination of 1, 2, or 3 on each click

29. Which of the answers below correctly specifies the values for the column Out? Each answer is a series of values for Out starting at the top of the column and going down.

A	B	C	D	Out
0	0	0	0	
0	0	1	1	
0	1	0	0	
0	1	1	0	
1	0	0	1	
1	0	1	0	
1	1	0	0	
1	1	1	1	
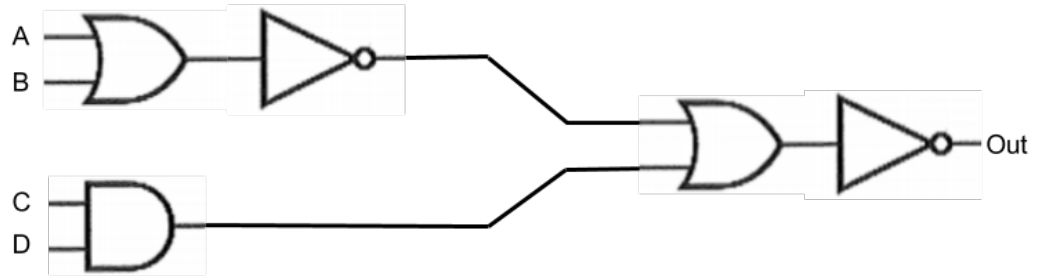
A. 0 0 1 1 0 0 1 0
B. 0 0 1 1 1 1 1 0
C. 0 0 0 0 1 1 1 0
D. 0 0 1 1 0 0 1 1

30. Which of the following trees could be a Huffman tree for symbols with the frequencies shown in the top row of circles? Check ALL that apply or mark C if neither are valid Huffman trees (If it is important, assume each left edge is labeled with a 1 and each right edge labeled with a 0.)

A

B
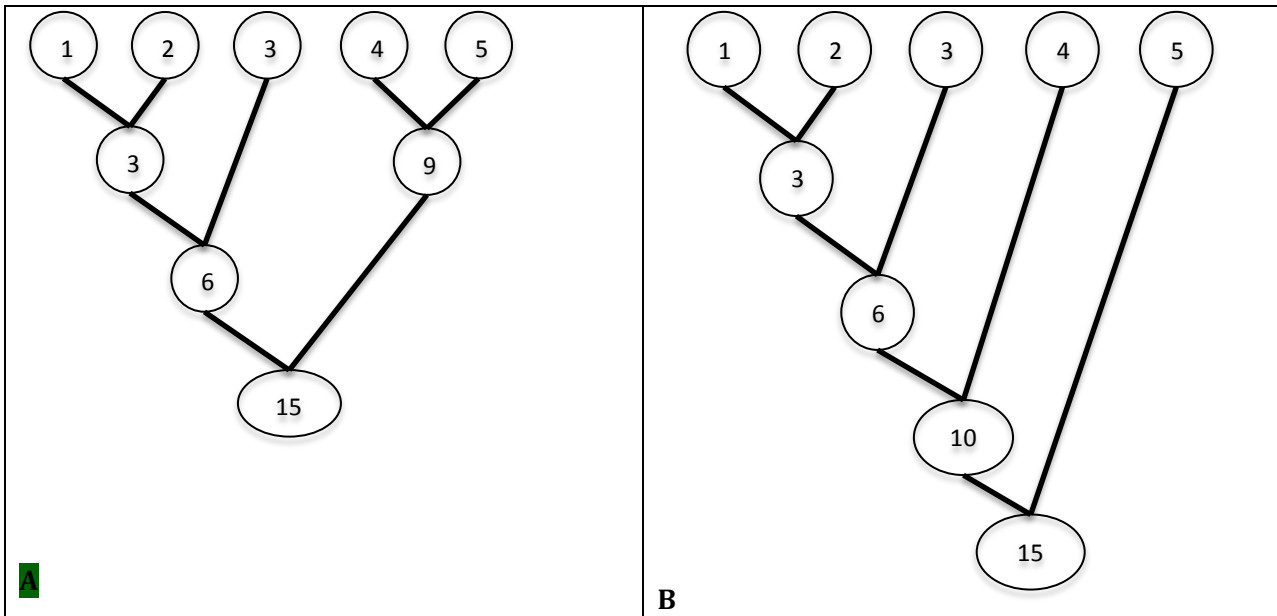
CONGRATULATIONS! YOU'RE DONE WITH CMPS 10!