1. If you complete a survey that does not ask for your name, address, phone number, or other obvious forms of identification, can you safely assume that your answers are truly anonymous?
   A. Yes
   B. No

2. Assuming a high speed home Internet connection of 8Mbits/sec, about how long would it take to download 2 minutes of uncompressed HDTV video (~100Gbits)?
   A. 35 seconds
   B. 3.5 minutes
   C. 35 minutes
   D. 3.5 hours
   E. 35 hours

3. If you had to throw away some bits from each pixel of a message, which should you throw away so that the remaining image was as different to the original as possible?
   A. The rightmost (low order bits).
   B. The leftmost (high order bits).
   C. Doesn’t matter, just how many you throw is all that matters.

4. According to the text, digital technology has now made it possible to create copies of pre-digital artworks that are indistinguishable from the original?
   A. True
   B. False

5. A particular lake has water lilies growing on it. On the first day, there is one water lily. Each day, the number of water lilies doubles. After 30 days, the water lilies cover half the lake. How long before they also cover the other half of the lake, so the whole lake is full?
   A. 1 day
   B. 15 days
   C. 30 days

6. What is decimal 44 in binary?
   A. 110100
   B. 101100
   C. 110101
   D. 101101
   E. 011010

7. How many bits do we need to represent 21?
   A. 3
   B. 4
   C. 5
   D. 6
   E. 8

8. What is the largest decimal number that can be represented with 4 bits?
   A. 15
   B. 16
   C. 31
   D. 32
   E. 63

9. Binary number arithmetic: compute the following summation. abcd are the carry bits (1 or 0) and efghij is the resulting sum. (The little subscript 2 is the way we indicate these are binary, base-2 numbers.)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
</tr>
</tbody>
</table>

   A. abcd = 0011, efghij=101010
   B. abcd = 0011, efghij=100110
   C. abcd = 0101, efghij=100100
   D. abcd = 1101, efghij=101010
   E. abcd = 1011, efghij=100100

10. Deleting a file on a computer (using normal delete) is like
    A. Using whiteout to cover up some words in a printed document.
    B. Erasing writing on a chalk/white board.
    C. Shredding a document in a document shredder.
    D. Removing an entry from the table of contents or index of a magazine without removing the actual article from the pages.
    E. Tearing a page out of a book or magazine.
11. What is the value of \( p \ OR (p \ AND \ q) \) if \( p \) is 1 and \( q \) is 0?  
   A. 1  B. 0

12. What is the value of \( p \ OR (p \ AND \ q) \) if \( p \) is 0 and \( q \) is 1?  
   A. 1  B. 0

13. What is the value of \((p \ OR \ q) \ AND (NOT \ r)\) if \( p \) is 1, \( q \) is 0, and \( r \) is 1?  
   A. 1  B. 0

14. What is the value of \((p \ OR \ q) \ AND (NOT \ r)\) if \( p \) is 0, \( q \) is 1, and \( r \) is 0?  
   A. 1  B. 0

15. Decode the following ASCII values using the ASCII code table provided below. For example, the ASCII value for the letter “A” is “01000001”.

| ASCII | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|       | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | ;    | <    | =    | >    | ?    |
| 0100  | @    | A    | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    | N    |
| 0101  | P    | Q    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    | [    | \    | ]    | ^    |
| 0110  | `    | a    | b    | c    | d    | e    | f    | g    | h    | i    | j    | k    | l    | m    | n    |
| 0111  | p    | q    | r    | s    | t    | u    | v    | w    | x    | y    | z    | {    | |    | }    | ~    |

- 15. 01110100  
  A. g  B. N  C. t  D. v

- 16. 01110110  
  A. g  B. N  C. t  D. v

- 17. 01010110  
  A. ^  B. V  C. =  D. e

18. Which best describes Claude Shannon’s contribution to the field of computer science?  
   A. He described a system in which all information can be represented using 0s and 1s  
   B. He invented the personal computer  
   C. He described a system in which documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the Internet.

19. Which of these is NOT part of a person’s digital footprint?  
   A. What you buy at Safeway using a credit card.  
   B. A cash purchase at a pizza parlor.  
   C. What web sites you visit.  
   D. What ATMs you use and when.  
   E. Where you go when carrying a “smart” phone.

20. In Blown to Bits chapter 2 the authors write “In Orwell’s imagined London, only O’Brien and other members of the Inner Party could escape the gaze of the telescreen. For the rest, the constant gaze was a source of angst and anxiety.” Orwell’s vision does not match reality today because  
   A. today many if not most people willingly accept “the gaze” and the benefits that they get from doing so.  
   B. the technology Orwell imagined would be considered “amateurish” today.  
   C. Both A and B  
   D. None of the above. Orwell’s vision was surprisingly accurate.

21. How many times does this script say “Hip”?  
   A. 2  B. 3  C. 5  D. 6  E. 8
22. What does clicking on the “mystery 8” block (below) report?
   A. 0
   B. 1
   C. 2
   D. 3

23. What would appear on the screen? While this question may look similar to the practice midterm, it is not the same question.
   A. 
   B. 
   C. 

24. Which of the following CORRECTLY computes the sum of the numbers from x to y, inclusive? Select ALL that apply.
   A. 
   B. 
   C. 

25. What best describes what this block (below) computes?
   A. sum of two smallest
   B. sum of two biggest
   C. sum of the smallest and the biggest
   D. something else
26. Under what conditions would the block in the previous question say “ERROR”?
   A. if all 3 numbers are the same
   B. if two of the numbers are the same
   C. always
   D. never

27. 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.)

![Diagram of logic gates]

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

28. Convert the following logic gate diagram to a boolean expression. Recall “!” means Not, “&&” means And, “||” means Or.

   ![Logic gate diagram]

   a. !(A || B) || (C && D)
   b. !(A && B) || (C || D)
   c. !((A || B) && (C && D))
   d. !((A && B) && (C || D))

29. Evaluate the previous boolean expression given values A=1, B=0, C=1, D=0.
   a. 1
   b. 0

30. As discussed in class, which operation is the following logic gate diagram used for? For reference, the logic gate that outputs S is XOR.

   ![XOR logic gate]

   a. Multiplication
   b. Addition
   c. Read
   d. Write