CS 16 – Test #1 – February 13, 2009 – Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The 6-bit unsigned representation of –8 is \_\_\_\_\_\_\_.
   1. 111000
   2. 110111
   3. 001000
   4. 001001
   5. 000111
   6. none of the above
2. The 6-bit signed representation of –8 is \_\_\_\_\_\_\_.
   1. 111000
   2. 110111
   3. 001000
   4. 000111
   5. 111001
   6. none of the above
3. One early computer, Colossus, was developed in the UK during the decade of the \_\_\_\_\_\_\_.
   1. 1920s
   2. 1930s
   3. 1940s
   4. 1950s
   5. 1960s
   6. 1970s
4. For several decades, there has been a rule of thumb that the newest computer hardware technology is about 50% faster than that of the previous year. This “law” is named after which computer scientist?
   1. John Backus
   2. Gordon Moore
   3. Claude Shannon
   4. William Shockley
   5. Alan Turing
   6. John von Neumann
5. Which octal value is equivalent to 0xff ?
   1. 077
   2. 0177
   3. 0255
   4. 0377
   5. 0777
   6. 01515
6. What does the number 216 + 218 look like in hexadecimal?
   1. 0x24000
   2. 0x28000
   3. 0x48000
   4. 0x50000
   5. 0x90000
   6. 0xa0000
7. The 5-bit signed representation of –7 is the same as the 5-bit sign-magnitude representation of what number?
   1. –3
   2. –7
   3. –9
   4. –11
   5. –13
   6. –23
8. Suppose that in Excel, you have typed into cell D8 the formula =$C4 + C5. What will this formula look like if you copy it to cell E9?
   1. =$C4 + C5
   2. =$D5 + D6
   3. =$C5 + C6
   4. =$C5 + D6
   5. =$D4 + D5
   6. =$C4 + D6
9. In image representation, pixelation occurs when:
   1. The dynamic range is too high.
   2. The dynamic range is too low.
   3. The resolution is too high.
   4. The resolution is too low.
   5. The image is in portrait mode.
   6. The image is in landscape mode.
10. What value does the formula =IF(C5<D5,0,IF(C5<2\*D5,2\*C5,D5)) return if C5 contains 10 and D5 contains 8?
    1. 0
    2. 8
    3. 10
    4. 16
    5. 20
    6. none of the above
11. Convert the number 11/64 into binary.
    1. 0.011001
    2. 0.010011
    3. 0.001101
    4. 0.001011
    5. 0.011010
    6. 0.010110
12. In Excel, which type of chart is best to depict proportions or market share?
    1. line chart
    2. bar chart
    3. pie chart
    4. column chart
13. If your PC operates at 500 MHz and its average CPI is 3 cycles per instruction, how long will it take to run a program that executes 1 million instructions?
    1. 1.5 milliseconds
    2. 3 milliseconds
    3. 4.5 milliseconds
    4. 6 milliseconds
    5. 15 milliseconds
    6. none of the above
14. Suppose cell E4 contains the formula =sum(E1:E3). Which of the following actions will cause this formula to change automatically?
    1. deleting row 2
    2. deleting row 5
    3. deleting column D
    4. deleting column F
    5. both a and c
    6. both b and d
15. What happens if you double click the border between column headings C and D?
    1. column C becomes hidden
    2. column D becomes hidden
    3. the width of column C is changed to fit the largest entry in that column
    4. the width of column D is changed to fit the largest entry in that column
    5. a page break is inserted after column C
    6. the cells in columns C and D become highlighted in yellow
16. Suppose you are modifying a worksheet and you have highlighted the range A11:E11. How would you also select A13:E13 without deselecting A11:E11 in order to choose a non-contiguous range?
    1. select cells A13:E13, click right mouse button and choose “add range”
    2. click right mouse button, choose “add range”, and select cells A13:E13
    3. hold down on the control key while selecting cells A13:E13
    4. hold down on the shift key while selecting cells A13:E13
    5. it is not possible to select a non-contiguous range
17. Which of the following types of memory has sequential access?
    1. floppy disk
    2. RAM
    3. magnetic tape
    4. two of the above
    5. all of the above
    6. none of the above
18. Which of the following types of memory has direct access?
    1. RAM
    2. CD-ROM
    3. Floppy disk
    4. two of the above
    5. all of the above
    6. none of the above
19. Suppose you are working in Excel, and after making some significant modifications, you save the spreadsheet file. What data transfer is taking place when you save?
    1. the file is copied from RAM to the CPU
    2. the file is copied from the CPU to RAM
    3. the file is copied from disk to the CPU
    4. the file is copied from the CPU to disk
    5. the file is copied from disk to RAM
    6. the file is copied from RAM to disk
20. Which of the following is true about ASCII code?
    1. the values corresponding to letters in the alphabet are consecutive
    2. it uses the same values for lowercase letters as it does for capital letters
    3. non-printing, invisible characters all have value 0
    4. two of the above
    5. all of the above
    6. none of the above
21. Estimate the amount of memory needed to store the contents of a book, assuming the book has 500 pages, and on average each page has 2000 characters of text and one indexed-color image measuring 200x300 pixels.
    1. 1 MB
    2. 3 MB
    3. 10 MB
    4. 30 MB
    5. 100 MB
    6. none of the above
22. If the ASCII code for ‘A’ is 65, then the ASCII code for ‘M’ should be:
    1. 12
    2. 13
    3. 53
    4. 54
    5. 77
    6. 78
23. The person who came up with the ideas of the instruction execute cycle and the stored program concept was \_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Claude Shannon
    2. Charles Babbage
    3. Alan Turing
    4. Konrad Zuse
    5. John von Neumann
    6. Herman Hollerith
24. In Excel, which command will take a cell, or group of cells, and duplicate them elsewhere in the worksheet, without changing the original cell references?
    1. copy command, provided relative addresses were specified
    2. copy command, provided absolute addresses were specified
    3. move command, provided relative addresses were specified
    4. move command, provided absolute addresses were specified
    5. none of the above
25. Once a chart is created in Excel, which of the following modifications is/are possible?
    1. change what range of cell data is included in the chart
    2. change the type of chart
    3. insert a text box onto chart
    4. two of the above
    5. all of the above
    6. none of the above
26. Suppose the formula =B3+C4 is stored in cell D5. How will this formula appear if we insert a row above the second row in the worksheet?
    1. =C3+D4
    2. =B3+D4
    3. =B4+C5
    4. =B3+C5
    5. =B2+C3
    6. =B3+C4
27. Which column contains the value returned by the formula =VLOOKUP(J12,$C3:$G9,3) ?
    1. column C
    2. column D
    3. column E
    4. column F
    5. column G
    6. none of the above
28. In a real-number representation, the purpose of the mantissa is \_\_\_\_\_\_\_.
    1. to indicate which precise number within some range is being represented
    2. to indicate whether the number is very large or very small
    3. to indicate whether the number is positive or negative
    4. to signify that overflow has occurred
    5. to signify that underflow has occurred
    6. to signify that the desired value cannot be represented
29. Consider this spreadsheet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** |
| **1** | 1 | 2 | 3 |  |
| **2** | 4 | 5 | 6 |  |
| **3** | 7 | 8 | 9 |  |
| **4** |  |  |  |  |

If cell A4 contains the formula =COUNTIF(A1:B3, “<=6”), then this formula evaluates to \_\_\_\_\_\_\_.

* 1. 2
  2. 3
  3. 4
  4. 6
  5. 8
  6. none of the above

1. In a 6-bit signed representation, the largest number would be \_\_\_\_\_\_\_.
   1. 111111
   2. 111110
   3. 011111
   4. 000000
   5. 000001
   6. 100000
2. Which is not a legitimate BCD?
   1. 00000000
   2. 01000010
   3. 10011000
   4. 01111001
   5. 10110010
   6. 10011001
3. Overflow occurs when \_\_\_\_\_\_\_.
   1. we go beyond the highest number that can be represented
   2. we go below the lowest number that can be represented
   3. we get too close to zero
   4. two of the above
   5. all of the above
   6. none of the above
4. Which is/are true about real number representation?
   1. only a finite number of values can be represented
   2. the distribution of representable values gets more dense as the values increase
   3. more bits are allocated for the exponent than for the mantissa
   4. two of the above
   5. all of the above
   6. none of the above
5. The largest 32-bit unsigned number is approximately \_\_\_\_\_\_\_.
   1. 4 million
   2. 8 million
   3. 2 billion
   4. 4 billion
   5. 1038
   6. none of the above
6. In the von Neumann computer model, the step taken before executing an instruction is \_\_\_\_\_\_\_.
   1. fetching the instruction from memory
   2. decoding the instruction
   3. returning the previous instruction back to memory
   4. getting user input for the instruction
   5. performing the operation contained in the instruction
   6. none of the above
7. The decimal number 12.6 equals \_\_\_\_\_\_\_ in binary.
   1. 1100.110
   2. 1100.101
   3. 1100.1001 1001 1001 1001 …
   4. 1100.1100 1100 1100 1100 …
   5. 1100.0011 0011 0011 0011 …
   6. none of the above
8. Which is/are true about RAM, in general?
   1. It has a smaller capacity than the hard drive.
   2. It requires a constant supply of electricity to maintain data.
   3. It contains the registers that the CPU uses to perform operations.
   4. two of the above
   5. all of the above
   6. none of the above
9. Suppose x is a 30-bit unsigned number, and y is a 32-bit unsigned number. If the first 30 bits of y are the same as x, and the last two bits of y are 11, then what is the relationship between the values of x and y?
   1. y = 2x
   2. y = 2x + 2
   3. y = 2x + 3
   4. y = 4x
   5. y = 4x + 2
   6. y = 4x + 3
10. The highest digit in hexadecimal is \_\_\_\_\_\_\_, and its value is \_\_\_\_\_\_\_.
    1. f, 15
    2. f, 16
    3. g, 15
    4. g, 16
    5. z, 35
    6. z, 36
11. What is the purpose of a pivot table in Excel? It allows you to:
    1. change multiple cell values at once to see their effect on the outcome of a formula
    2. see only certain rows that fulfill certain criteria you specify
    3. see only certain columns that fulfill certain criteria you specify
    4. determine the value of a cell that is required for a formula to equal some result
    5. view subtotals grouped by values from 2 columns
    6. none of the above
12. You want to create a table showing the monthly payment at a variety of interest rates for a fixed principal and term. You intend to enter the PMT function in the first cell of that table, then copy that formula to the remaining cells in the table. Which of the following should be specified as a relative reference?
    1. the interest rate
    2. the principal
    3. the term
    4. two of the above
    5. all of the above
    6. none of the above
13. Consider a finite state machine that has 4 states A-D. State A is the start state and state B is the accept state. Transitions between states are as follows:

From state A, go to state B on input 0 and stay in state A on input 1.

From state B, go to state C on input 0 and stay in state B on input 1.

From state C, stay in state C on input 0 and go to state D on input 1.

From state D, go to state C on input 0 or 1.

Suppose we run this machine with a 4-bit word. The first three bits of this word are 100. What should the 4th bit of the word be so that the word is accepted?

1. Either 0 or 1
2. Only 0
3. Only 1
4. Neither 0 nor 1 because the word cannot be accepted.
5. Cannot be determined.
6. Suppose we use the same finite state machine as the previous question, except now the accept state is C instead of B. Which of the following words is accepted by the new machine?
   1. 11
   2. 101
   3. 111101
   4. 01001
   5. 101011
   6. 011001
7. The following machine is designed to accept all words that begin with 00. The start state is A and the accept state is C. The transitions are as follows:

From state A, go to state B on input 0, and go to state D on input 1.

From state B, go to state C on input 0, and go to state D on input 1.

From state C, stay in state C on input 0 or 1.

From state D, stay in state D on input 0 or 1.

How can we modify this machine so that it will instead accept exactly those words that do not begin with 00?

* 1. Change the accept state to D.
  2. Change the accept state to B and C.
  3. Change the accept state to B, C and D.
  4. Change the start state to D.
  5. Change the start state to D and accept states to B and C.
  6. None of the above

1. Suppose a binary number needs 7 bits to be represented. In other words, 6 bits would not be enough and 8 bits are not necessary. If this number is written in hexadecimal, what is the first (leftmost) digit?
   1. 1
   2. 1, 2 or 3
   3. 2 or 3
   4. 4, 5, 6 or 7
   5. 8 or higher
   6. None of the above
2. How many cycles will a computer program take if it executes 20 instructions, uses a 5-stage pipeline, and there are no stalls?
   1. 24
   2. 25
   3. 26
   4. 80
   5. 99
   6. 100
3. If a processor’s clock period is 10 microseconds, what is its clock rate?
   1. 10 KHz
   2. 100 KHz
   3. 10 MHz
   4. 100 MHz
   5. 10 GHz
   6. None of the above
4. Suppose x and y are binary values used as input to a digital circuit. First, the value of x is fed to a NOT gate to produce x’. Then, x’ and y are combined in an XOR gate to produce output z. If z is 1, what can we assume about the original values x and y?
   1. x and y are the same value
   2. x and y are different values
   3. x = 1
   4. y = 1
   5. x = 0
   6. y = 0
5. Consider this spreadsheet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** |
| **1** | 1 | 2 | 3 |  |
| **2** | 4 | 5 | 6 |  |
| **3** |  | a | b | c |
| **4** |  |  |  |  |
| **5** |  |  |  |  |

If cell A5 contains the formula =COUNTA(A1:D4) then this formula evaluates to \_\_\_\_\_\_\_.

* 1. 3
  2. 6
  3. 7
  4. 9
  5. 13
  6. 16

1. The spreadsheet below considers how many houses in each state have 1 bedroom, 2 bedrooms, or 3+ bedrooms. We want to calculate the percentage of houses in each state with these numbers of bedrooms, as shown in columns B through D. We’ll enter a formula in cell B2, and then copy this formula to all the other cells in B2:D52. Assume that the cells in this range are already formatted to show a percent.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** |
| **1** | State | % 1 br | % 2 br | % 3+ br | Total | 1 br | 2 br | 3 br |
| **2** | Alabama |  |  |  | 1657609 | 137259 | 517602 | 1002748 |
| **3** | Alaska |  |  |  | 215681 | 38668 | 70555 | 106458 |
| **4** | Arizona |  |  |  | 1594863 | 284862 | 572437 | 737564 |
| **5** | Arkansas |  |  |  | 990056 | 89884 | 354815 | 545357 |
| **…** |  |  |  |  |  |  |  |  |
| **52** | Wyoming |  |  |  | 200154 | 22733 | 62764 | 114657 |

* 1. =f2/e2
  2. =f2/$e$2
  3. =$f$2/e2
  4. =$f2/e2
  5. =f2/$e2
  6. None of the above