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Note that any work that you do on this page will NOT be graded.

1. What is Moore's Law?

Computer speed and memory on a chip will double every 18 months to 2 years.

Does Moore's law still hold true?

No

List one effect of Moore's law on society?

Faster computers

Small computers

2. You are at a fundraising banquet and sitting on your table two individuals are arguing about computers and the different memory options that exist. Some of the statements that they make are listed below. First, determine which statements are false. Circle the letter next to the incorrect statements. Next, fix the **incorrect** statements in the space provided.

A. **Registers are very large and very fast to access**

_Registers are very small and very fast to access_____

B. **Cache is slow memory that exists on the chip**

Cache is fast memory that exists on the chip_____

C. **RAM is bigger than cache**

D. **RAM is faster to access than data on the hard drive**

E. **Hard drive is on the motherboard and is very slow to access**

Hard drive is not on the motherboard and is very slow to access.

3. Define computational thinking

involves solving problems, designing systems, and understanding human behavior, by drawing on the concepts fundamental to computer science.

4. Give an example of an object or effect that it is difficult to represent as a vector-based image. State one reason why it is difficult.

Anything with a lot of detail will be difficult.

Hazy landscapes, portraits, blurry images

Reason: vectors are good at outlining, but when it comes to filling in they are limited. If you try to do detail the vector gets too complex to be useful.

5. Why is it a good idea for a company to have a vector based version of their logo?

Certain products require vectors to affix logos to them (t-shirts, hats, vinyl cuts) OR Because sometimes the company will need a lightweight logo for websites and things like that OR It's good to have an image that can scale well, for large billboards and things.

Use the scenario below to answer the next two questions. You ran into a friend from high school while shopping and she mentioned that she was interested in learning how to write computer programs and has decided to learn an assembly language. Your friend has no prior programming experience.

6. What are two reasons why learning an assembly language might be a bad idea?

Assembly language is particular to a computer architecture and operating system

Assembly language is difficult to learn.

7. What other type of programming language would be a better choice for your friend to learn?

_High level programming language

8. What is unconscious bias?

Unconscious bias is when you're biased... and you may not know it (and if you do, you're sorry)

9. In class we discussed the situation at Facebook involving trending topics, give an example of unconscious bias that may have existed.

__Social medium pressure from twitter to actively match what they do

- Suppress conservative views because you went to a liberal arts school and have different views

Plain disregard for topics

Looking at the name of the publication may bias you towards thinking it is reputable or not

Use the scenario to answer the next four questions. As a manager of an exclusive clothing boutique you are tasked with instructing store employees on the best way to arrange store items. The clothing needs to be arranged by designer (alphabetically) and then by item price (ascending order). The exclusive nature of the boutique and the clientele that you cater too necessitates that the store be optimized for customer comfort. To make this possible, the space in the store for employees to arrange and sort through clothing items is limited.

10. In class we discussed a series of sorting algorithms, if the employees were familiar with the simple and insertion sort algorithm, which algorithm would you recommend that they use and why would you recommend that algorithm?

_Insertion Sort because space is limited

11. If an employee was sorting 10 clothing items, on average, how many comparisons are needed using the Selection Sort algorithm discussed in class?

__45_____

12. If an employee was sorting 10 clothing items, on average, how much space (i.e., memory slots) is needed to sort the items when using the Simple Sort algorithm discussed in class?

_____20_____

13. One of the other supervisors had previously given the employees instructions (i.e., algorithm) for arranging the items, but the instructions only worked for shirts, it did not work for skirts. Which computational building block did the supervisor's algorithm violate?

__Abstraction, generalizability

14. Explain the difference between unambiguous and ambiguous tasks and give an example of each type of task.

Unambiguous - Tasks in which there is a clear input, output and way to evaluate

- *Input – clear*
- *Mode of evaluation – clear*
- *Output – clear*

Example Sorting cards by color

Ambiguous - Ambiguous:

- *Input – variable*
- *Mode of evaluation - subjective*
- *Output – clear or variable*

Example Determining who gets a loan.

For the number conversion problems, Write the answer in the space provided. Use the provided extra sheet for your rough work. The conversion table exists on the last page of the exam.

15. Convert 0x10A to decimal

____266_____

16. Convert decimal 202 to hexadecimal

____CA_____

17. Convert decimal 157 to binary

____1001 1101_____

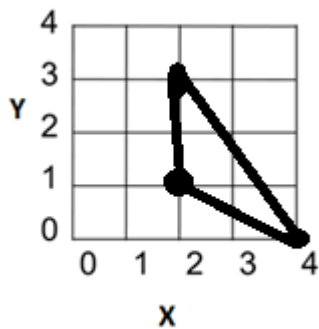
18. Convert 0b10101111 to decimal

____175_____

19. Convert 0b1111000100 to hexadecimal

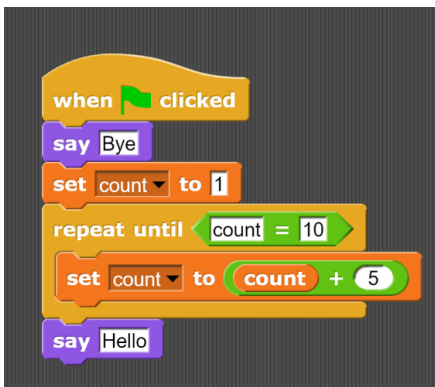
____3C4_____

20. What image is represented by the following sequence?
 4,0, 2,3, 2,1, 4,0



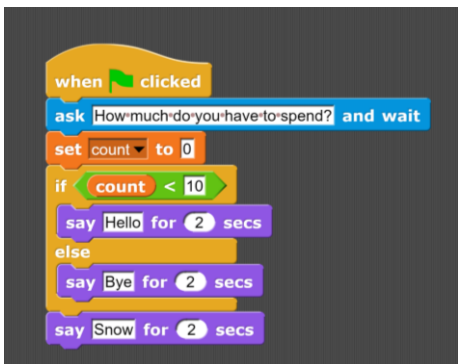
For the following snap programs when asked **What does the sprite say when this program is run?**, you do not need to indicate the number of seconds the message is displayed on the screen. Just write down the message in the space provided.

21. What does the sprite say when this program is run?



_____Bye_____

22. If the user input is 5, what does the sprite say when this program is run?



Hello
 Snow

23. What does the sprite say when this program is run?

```
when clicked
  set count to 1
  set num to 0
  repeat 3
    change num by 1
    set count to count x num
  say count for 2 secs
```

6

24. For the given input what does the sprite say when the program is run? Fill in the table for each input

```
when clicked
  ask Enter a number between 1 and 5 and wait
  if answer > 3
    broadcast SnowBird
    repeat until count = 0
      set count to answer
      change count by -1
    say Sleep in the Fall
  say Fly in the Spring
```

```
when I receive SnowBird
  say Dance in the winter for 2 secs
```

Enter a number between 1 and 5?	Output
4	__Dance in the winter__
2	_____Fly in the spring_____

25. For the given input what does the sprite say when the program is run? Fill in the table for each input



What is the temperature in Celsius?	What province are you in?	Output
5	AB	It is cold It is cold for Ontario It is cold for British Columbia It is cold for Nova Scotia
15	BC	It may be cold It is cold for Quebec It isn't cold for British Columbia

26. As a photographer for the Canadian Broadcasting Company, you constantly find yourself taking pictures, all around the country. Currently you are trying to determine which compression to use so that you can send the pictures to your boss. If you wanted to preserve the original quality of the image which bitmap compression should you use and what is the limitation of your chosen compression?

lossy compression

The limitation of this approach is that it takes up more space

27. As an employee of an advertising agency, you are tasked with developing a classifier that will correctly determine if a potential Super bowl ad will be considered controversial or not. You have data that includes all the past ads for your company and whether or not they were controversial. List the steps that you need to engage in, in order to create the classifier. You are not required to write out the algorithm or create the classifier, just list the steps for creating a classifier.

1. Start with the data
2. Split it into training and test sets
3. Find a pattern in the training data
4. Test the classifier on the test data
5. Calculate accuracy

28. As a painter you are in the habit of using a color palette that clearly states each color. You are now working on a project that requires you to work with the hex representation of each color. In order to make your work progress seamlessly you decided to create a cell phone app that consumes a hex color and produces the color palette equivalent. For instance, if your app is given the hex code **#F109DF**, it should produce **“a shade of purple”**. Create an algorithm that reads in a hex code and produces the color palette shade. Assume that you have a lookup table stored on your phone that details the combination of primary colors. A snippet of the table is shown below

Primary Color 1	Primary Color 2	Result
Red	Blue	Purple
Red	Green	Yellow
...		

Note: you are not asked to complete the lookup table. The full lookup table already exists on your phone.

1. Take input and separate into RGB
 - a. Remove the # from the front
 - b. Store the first two values as R
 - c. Store the second two values as G
 - d. Store the last two values as B
 2. For each stored value
 - a. Convert to a decimal number
 - b. Convert to percentage
 - i. Divide the value by 255 and then multiple by 100 to find the percentage
 - c. Store this percentage
 3. Compare the values
 - a. If all 3 percentages are close to 100 produce white
Close means – between 80 and 100
 - b. If all 3 percentages are close to 0 produce black
Close means – between 0 and 20
 - c. Else determine the two values with the highest percentage
 - d. If the difference between the two values is small (i.e. < 20) use the lookup table select the shade
 - e. If the difference isn't small store the name of the biggest value
 4. Combined **a shade of** with the color that we have from the previous step
-
-

[illegible]

Information you may find useful. This sheet will NOT be graded.

Powers of two

2 raised to the power of	
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512

Hexadecimal digits

Binary Representation	Hexadecimal representation
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

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