

PART 1: Multiple Choice Questions

Circle the letter(s) corresponding to the correct answer(s).

1. Select all of the following statements about sorting algorithms that are not true. Note: That we define space as memory slots needed and we are assuming the average case.
 - A. Merge Sort is faster than Selection Sort
 - B. Selection Sort uses less space than Insertion Sort
 - C. Simple Sort uses more space than Insertion Sort
 - D. Simple Sort will take longer than Selection Sort.

2. Select all of the following that are examples of computational thinking applications.
 - A. Abstraction
 - B. Data mining
 - C. Sorting Algorithms
 - D. Moore's law
 - E. Computer animation
 - F. Decomposition

3. Select all of the following statements that are not true about programs and programming
 - A. Programs are a way of encoding algorithms in a precise enough way for computers to understand the instructions
 - B. A program will execute exactly in the order that it is written
 - C. A variable does not need to be defined before it is used
 - D. Most programs are written in machine code so that they can be used on different machines
 - E. In Snap, sprites send information to each other through broadcast

4. In the context of classification, select all the statements below that are true
 - A. Training data is the data that classifiers learn the patterns from and it has the correct grouping.
 - B. The data must always be split 50 – 50 for training and test data to avoid bias.
 - C. It is not necessary to measure the accuracy of the classifier if the training data accurately represents the population.
 - D. Classifiers are derived from patterns from the test data.
 - E. It is not necessary to measure the accuracy of the classifier if the test data accurately represents the population.

5. Select all of the following statements that are true
 - A. Cache is slow memory that exists on the chip
 - B. RAM is bigger than cache and is faster to access than data on the hard drive
 - C. Hard drive is on the motherboard and is very slow to access
 - D. Registers are very large and very fast to access
 - E. The largest stores of data exist on the CPU

PART 2: Short Answer Questions

Use the following to answer questions 6 to 8.

Let's imagine a world where movies were borrowed at a local store. As an employee of the local DVD rental store, you are charged with arranging the highest rated movies of all time in a display case. Let's consider a case in which you need to swap the three movies that are on display and change it from last week's arrangement to the arrangement for this week.

Last Week's Arrangement

Slot	Initial Value
1	Black Panther
2	Sound of Music
3	Mission Impossible

Arrangement for this week

Slot	Desired Value
1	Sound of Music
2	Mission Impossible
3	Black Panther

6. What is the minimum number of **swap spaces** you need to update the arrangement?

7. What would your algorithm be? Your algorithm should include steps like:
 1. Move DVD in slot 1 to slot 2 etc

8. Regardless of the number of swap spaces, what is the minimum number of swaps that are needed to perform this operation?

9. What is one disadvantage of writing code in assembly language?

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

11. If you were sorting 5 cards, in ascending order, how much space is needed to sort the cards using the Simple Sort algorithm discussed in class?

12. If you were sorting 5 cards, in descending order, on average, how many comparisons are needed when using the Selection Sort algorithm discussed in class?

13. _____ takes a high-level programming language and translates it into something the computer can understand, regardless of which high-level language is used.

14. _____ is used in defining patterns and generalizing from instances. It is used to let one object stand for many.

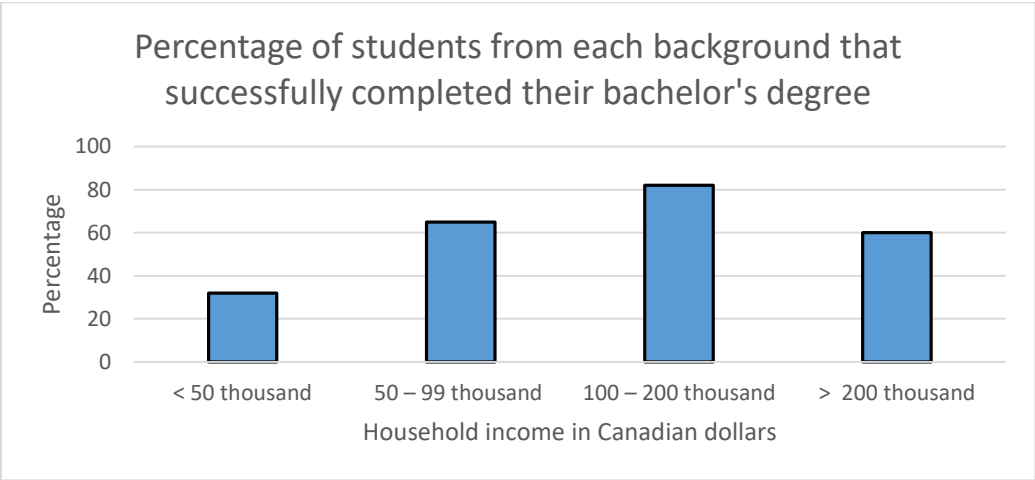
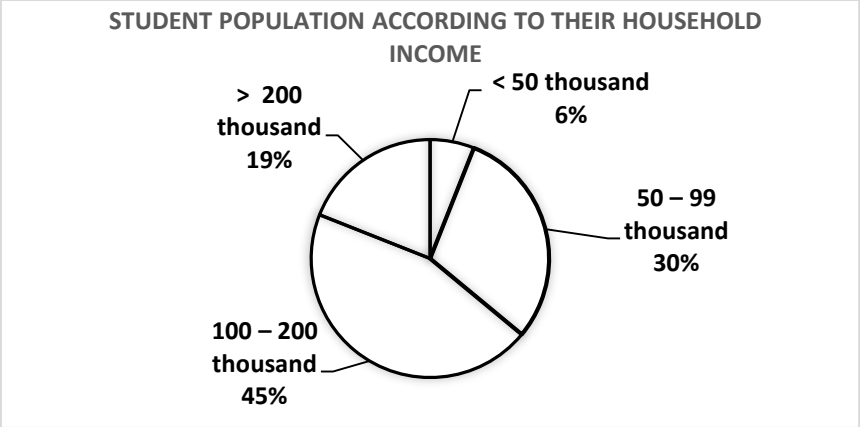
PART 3: Longer-form Question

Use the space provided below to answer the each question. Your answers do not have to be long. Suggested length 2 – 4 sentences.

15. In the context of algorithms, what does the phrase “garbage in garbage out” refer to and give at least 2 real-world examples.


16. In the year 2020, attending university in Canada is free but each school only accepts a limited number of students each year. Students are only admitted into university if they are deemed likely to succeed. To help aid the admission process a software is being developed. The software currently uses historical enrollment data (from 1990 – 2015) and student’s high school exit exam scores to determine the likelihood of success. The data shown in the pie chart and bar chart span 1990 – 2015. The pie chart shows the make up of the student population by household income. The bar chart shows the graduation rates for each group. For instance, between 1990 – 2015, 65% of students whose parents’ income was between 50 and 100 thousand successfully completed their degree.

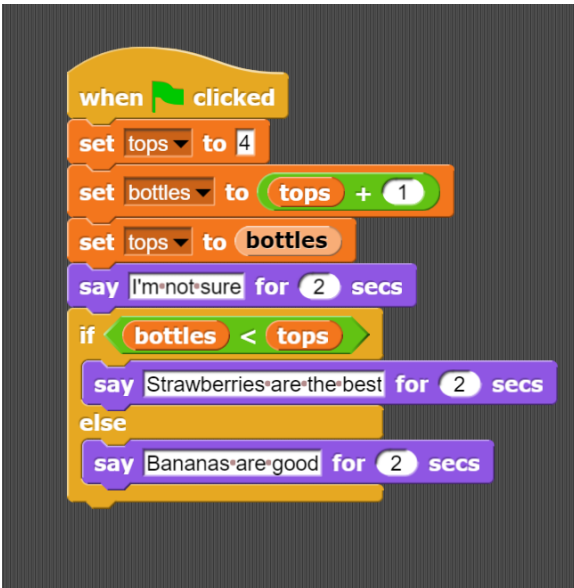
Should the people who are designing the software have considered socio-economic status when testing the software? Why or why not?




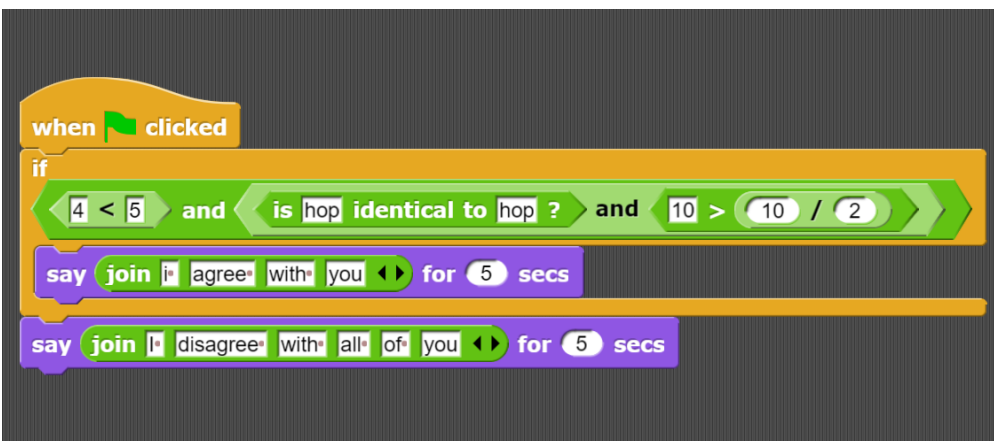
PART 4 : Tracing Through Snap Programs


When asked about the output, you do not need to indicate the number of seconds the message is displayed on the screen. Just write down the message.

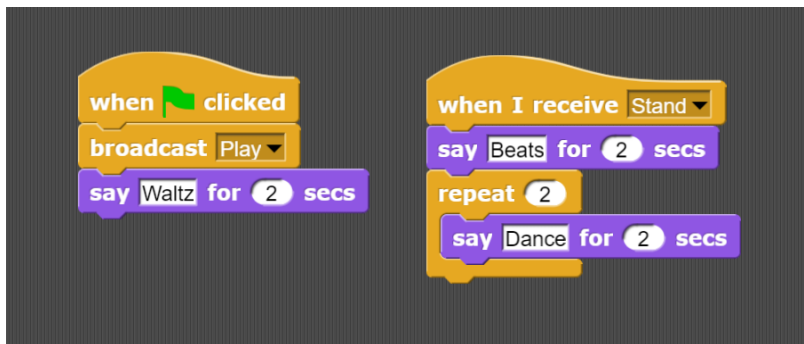
17. What is the output when  is clicked?




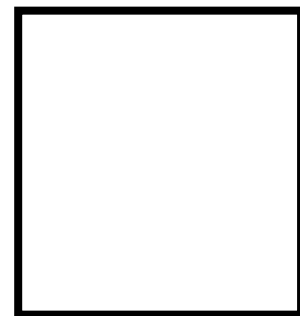
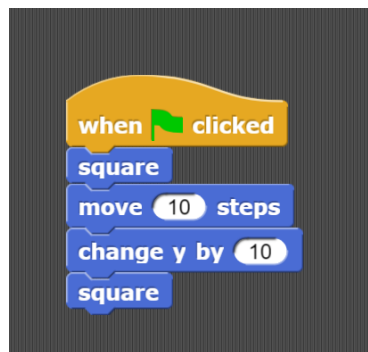
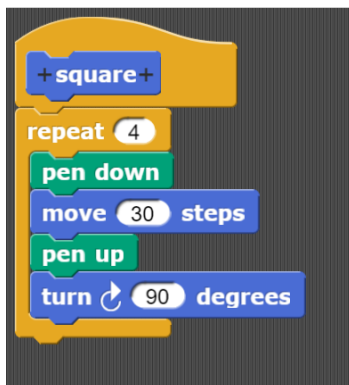
18. What is the output when  is clicked?



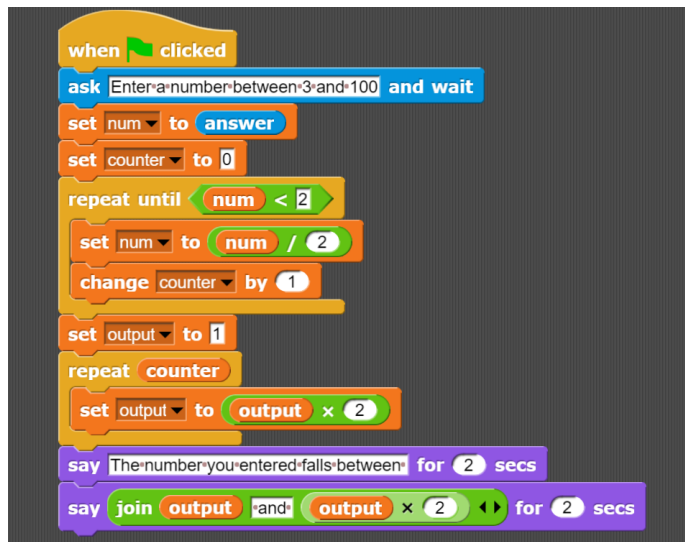
19. Given the two blocks below, what is the output when  is clicked?




20. Given the two blocks below, what is the output when  is clicked? Put your answer in the black box.





Use the block below for the next 4 questions



21. What kind of loop is the repeat until loop?

22. When  is clicked, if the user input is 7, how many times does the repeat until loop run?

23. When  is clicked, if the user input is 21, how many times does the repeat until loop run?

24. What is the output when  is clicked and the user has input 21 as the answer?

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Nothing on this page will be graded.