Callysto Computational Thinking test (CCTt) (Teacher Version)

The questions in this test are intended to measure your computational thinking skills and attitudes. You may not know the answer to some of the questions. If you do not know the answer to a question, please answer with your best guess.

The test will take approximately 45 minutes to complete.

DEMOGRAPHICS

Gender:

- Male
- Female
- Other
- I prefer not to report

Age:

- Under 18
- 17-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75-84
- 85 or older
- I prefer not to report

Teaching Experience

Number of Years of Teaching Experience: _____

Grade levels taught (select all that you have experience teaching):

- Pre-Kindergarten
- Kindergarten – Grade 3
- Grade 4 – 6
- Grade 7 – 9
- Grade 10 – 12

Subjects you have taught:

- Art
- Biology
- Career and Life Management (CALM)
- Career and Technology Foundations (CTF)
  Please enter area of focus (e.g., cosmetology, foods, etc.): _____
- Career and Technology Studies (CTS)
  Please enter area of focus (e.g., cosmetology, foods, etc.): _____
- Chemistry
- Drama
- English/Language Arts
- English as a Second Language (ESL)
- Health
- Language Class (e.g., French, Spanish, etc.)
- Mathematics
- Music
- Physical Education
- Physics
- Science
- Social Studies

- Other: _____

Subjects and grade levels you are currently teaching (e.g., Grade 5, Social Studies 20, etc.):

_____

Workshop Participation

Have you attended a Callysto Project information and/or training workshop?

- Yes
- No

Are you planning on using any of the Callysto Project materials in your classroom?

- Yes
- No

If you selected Yes in the previous item:

Do you know what Callysto Modules you are planning to use (or are currently using) with students in your class? Please list them here:

_____

_____

PART 1

Indicate how well each of the following statements describes you:

	Strongly Disagree	Disagree	Agree	Strongly Agree
I enjoy using technology	○	○	○	○
I find it easy to use new technology	○	○	○	○
I am confident I can fix a computer myself when it is not working	○	○	○	○
People ask me for help with their computer	○	○	○	○

When answering the following questions, it may be helpful to think about how you would solve a complex problem. For example:

- planning a surprise birthday party for a friend
- repairing a flat tire on a bicycle
- designing a parachute and container that will protect an egg when it is dropped from the roof of your school

	Strongly Disagree	Disagree	Agree	Strongly Agree
I can figure out the steps to solve a complex problem	○	○	○	○
When I am solving a complex problem, I try to break it up into smaller or simpler problems	○	○	○	○
When I am solving a complex problem, I think about other problems I've solved before to see if I can solve this problem in a similar way	○	○	○	○
I can explain the steps of how I solved a complex problem	○	○	○	○

Callysto

Do you have any prior experience with coding/programming a computer?

- Yes
- No

If you selected Yes in the previous item:

Please describe your experience with coding and/or computational thinking. Please list what languages and/or tools you have used and what experiences you have.

For example, "I ran a LEGO robotics club for 2 years" or "I attended a Scratch Programming PD day and have experimented with it at home" or "I have taken a class in Python programming".

_____

_____

_____

Indicate how well each of the following statements describes you:

	Strongly Disagree	Disagree	Agree	Strongly Agree
The challenge of coding appeals to me	○	○	○	○
I am comfortable writing code to solve problems	○	○	○	○
I feel frustrated and want to give up when I encounter an error in my code	○	○	○	○
When my code has a bug, I try to fix it myself rather than ask someone else to fix it	○	○	○	○

In the following section, we will be asking you questions about "*data*".

Data means facts or information about the world collected for study or analysis. Data can be numbers, text, videos, images, or sounds. For example, data might be the heights of all the students in a class, pictures of all the birds in your neighbourhood, or the names of all the people who live in your city.

Indicate how well each of the following statements describes you:

	Strongly Disagree	Disagree	Agree	Strongly Agree
Presenting data in different ways (for example: a pie chart, a table of numbers, or a paragraph) can change the conclusions I draw from the data	○	○	○	○
I would rather explore data myself than have someone tell me what it means	○	○	○	○
I feel frustrated when trying to make sense of data	○	○	○	○

In the following section, we refer to "*computational thinking"* using the following definition:

Computational thinking is a problem-solving process that includes:

- formulating problems in a way that enables us to solve them using a computer
- logically organizing and analyzing data
- representing data through abstractions, such as models and simulations
- automating solutions through algorithmic thinking (a series of ordered steps)
- identifying, analyzing and implementing solutions to achieve the most efficient and effective combination of steps and resources
- generalizing and transferring this problem-solving process to a wide variety of problems

  - Barr, D., Harrison, J., & Conery, L. (2011). Computational thinking: A digital age skill for everyone. *Learning & Leading with Technology*, *38*(6), 20-23.

Indicate how well each of the following statements describes you:

	Strongly Disagree	Disagree	Agree	Strongly Agree
It is important that students develop computational thinking	○	○	○	○
I have the skills to teach computational thinking	○	○	○	○
I know how to increase student interest in computational thinking	○	○	○	○
I am excited by the idea of teaching and/or using computational thinking in my classroom	○	○	○	○

PART 2*

INSTRUCTIONS

The following questions have 4 answer options (A, B, C, or D) from which only one is correct. If you do not know the answer to a question, enter your best guess.

If you need to zoom in on any question to enlarge it, press ‘Ctrl+’ (or 'Command+' on a Mac computer) on your keyboard. To zoom out, press ‘Ctrl-’ (or 'Command-').

Before starting Part 2, we present you with an example so you can familiarize yourself with the kind of questions that you will encounter.

* The questions in Part 2 are based on the Computational Thinking Test (CTt) designed by Marcos Román-González (2015).

EXAMPLE

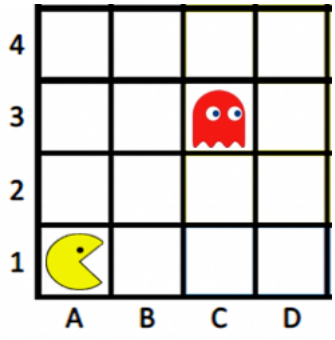
In this example, you are asked which instructions "Pacman" ( ) should follow to get to the "Ghost" ( ).

The "Move Forward" (move forward) instruction tells Pacman to move ***one step*** in the ***direction*** it is currently facing. Pacman can be facing left, right, up, or down.

Currently Pacman is starting at position **A1** on the grid.

Example Question:

Which instructions will take Pacman to the Ghost located at position **C3**?



Select the correct answer (in this example, the correct answer is ***C***):

(a)
- move forward
- move forward
- turn left
- turn right
- turn left

(b)
- turn right
- turn right
- turn left
- move forward
- move forward

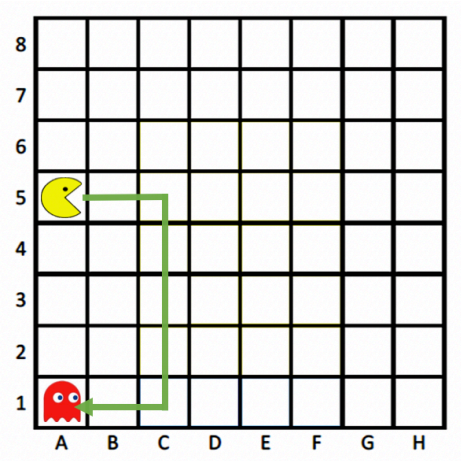
(c)
- move forward
- move forward
- turn left
- move forward
- move forward

(d)
- move forward
- move forward
- turn right
- move forward
- move forward

Now, you will answer some questions on your own.

Question 1:

Pacman is starting at position **A5** on the grid.



Which instructions will take Pacman to the Ghost located at position **A1**?

(a)
- turn right
- turn right
- move forward
- move forward
- move forward
- move forward
- turn left
- turn left

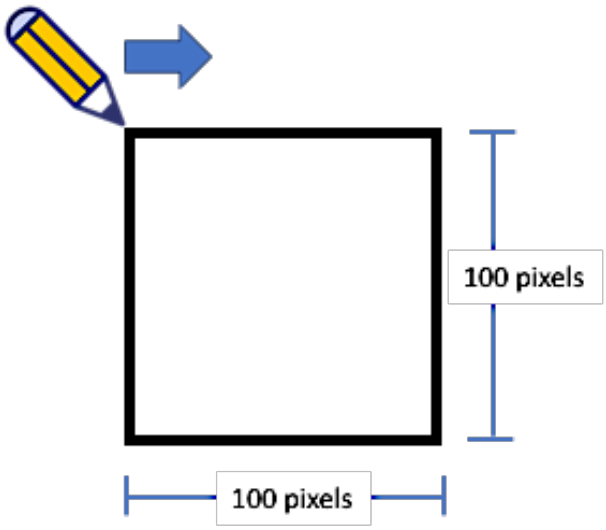
(b)
- turn right
- turn right
- move forward
- move forward
- move forward
- move forward
- turn right
- turn right

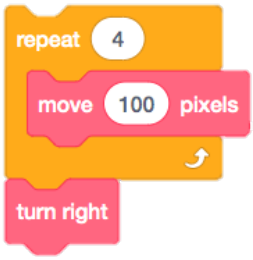
(c)
- move forward
- move forward
- turn right
- move forward
- move forward
- move forward
- move forward
- turn left
- move forward
- move forward

(d)
- move forward
- move forward
- turn right
- move forward
- move forward
- move forward
- move forward
- turn right
- move forward
- move forward

Question 2:

The instructions below should make the pencil draw the square **once**. The pencil starts at the upper-left corner position and moves in the direction of the arrow.



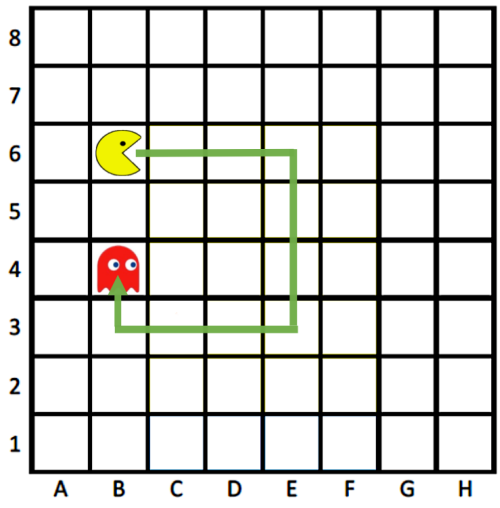


What is the ***error*** in the instructions?

(a) The "*repeat*" loop should repeat 2 times.
(b) The "*move*" block should be outside the loop.
(c) The "*turn right*" block should be inside the loop, after the "*move*" block.
(d) The "*turn right*" block should be inside the loop, before the "*move*" block.

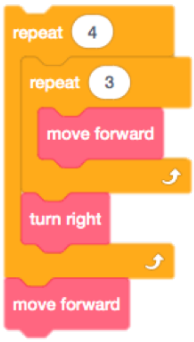
Question 3:

Which instructions take the “Pacman” (**B6**) to the “Ghost” (**B4**) using the path marked out?

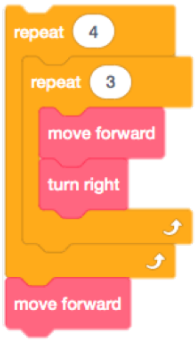


(a)

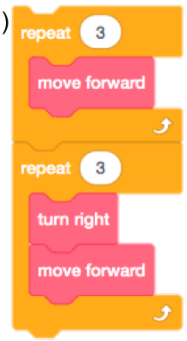
(b)



(c)



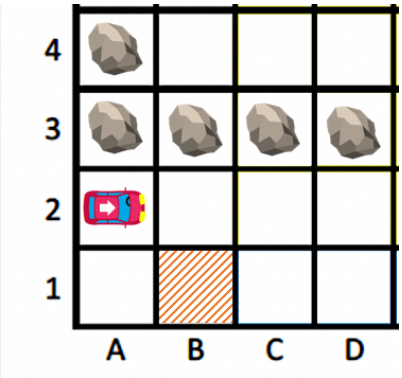
(d)



Question 4:

A car starts at position **A2** and faces in the *right* direction as shown by the white arrow on the roof of the car**.** The car can never pass through a rock or share the same position as a rock.

Which instructions correctly take the car to the orange patterned tile (**B1**)?



(a)

(b)

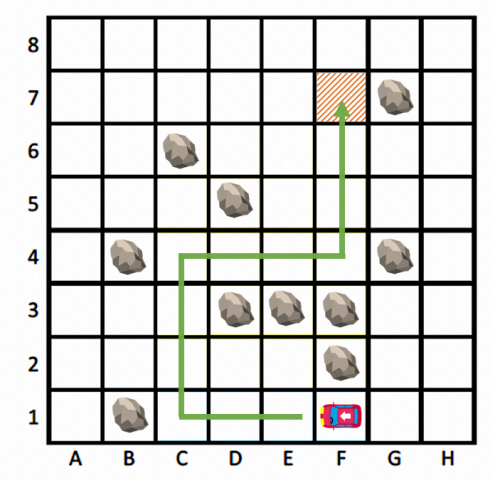
(c)

(d)

Question 5:

A car starts at position **F1** and faces in the *left* direction as shown by the white arrow on the roof of the car**.** The car can never pass through a rock or share the same position as a rock.

Which instructions correctly take the car to the orange patterned tile (**F7**) using the green path marked out?



(a)

(b)

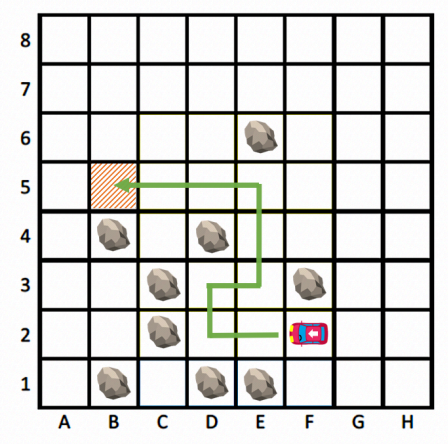
(c)

(d)

Question 6:

A car starts at position **F2** and faces in the *left* direction as shown by the white arrow on the car**.** The car can never pass through a rock or share the same position as a rock.

Which instructions correctly take the car to the orange patterned tile (**B5**) using the path marked out?

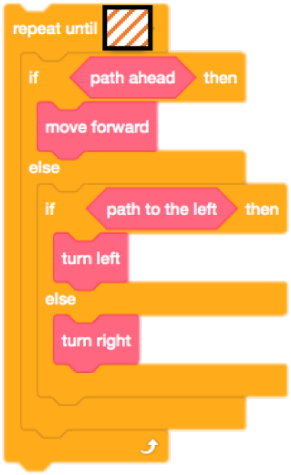


(a)

(b)

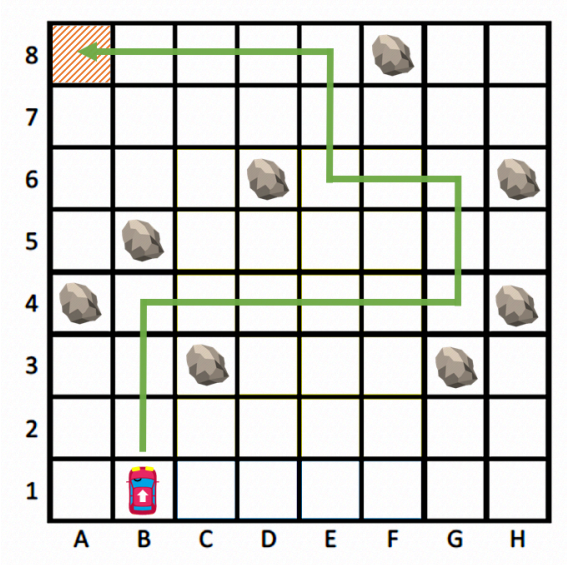
(c)

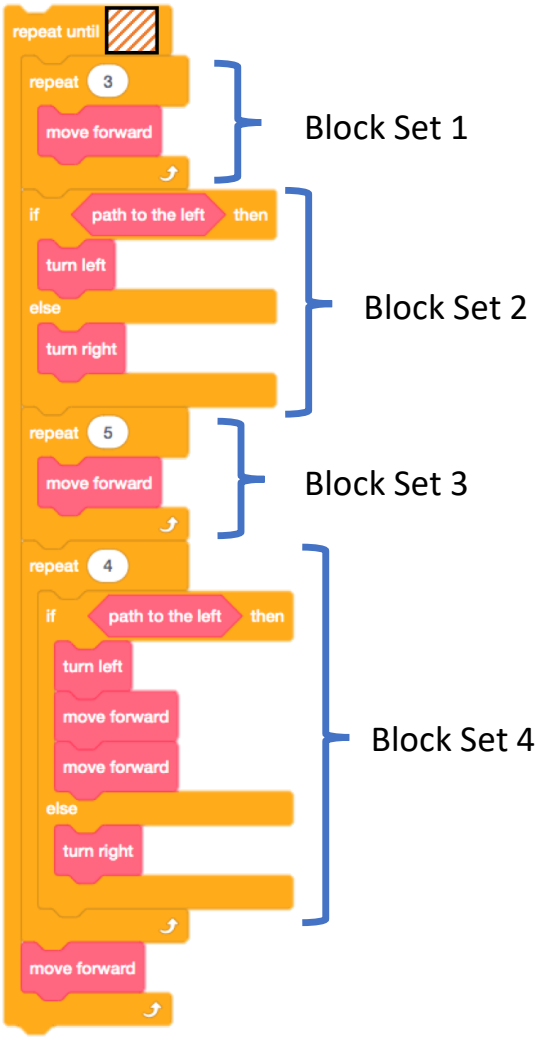
(d)



Question 7:

The following instructions should move the car from **B1** to the orange patterned tile **(A8)** using the path marked out.



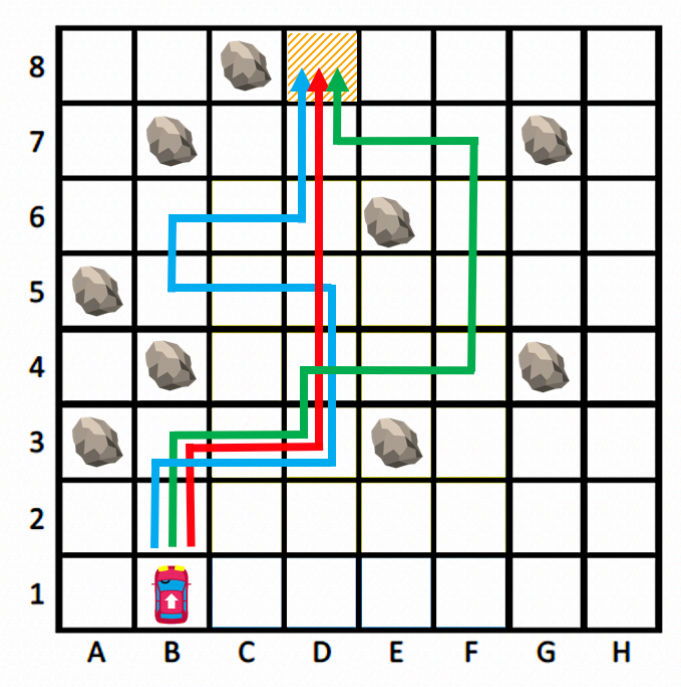


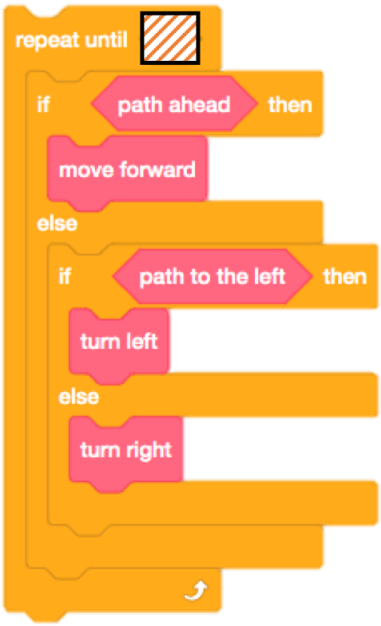
Which instructions contain a ***mistake***?

(a) Block Set 1 & 2
(b) Block Set 2 & 3
(c) Block Set 3 & 4
(d) Block Set 4 only

Question 8:

The following instructions move the car ***(B1)*** to the orange patterned tile ***(D8)*** using one of the paths marked out.



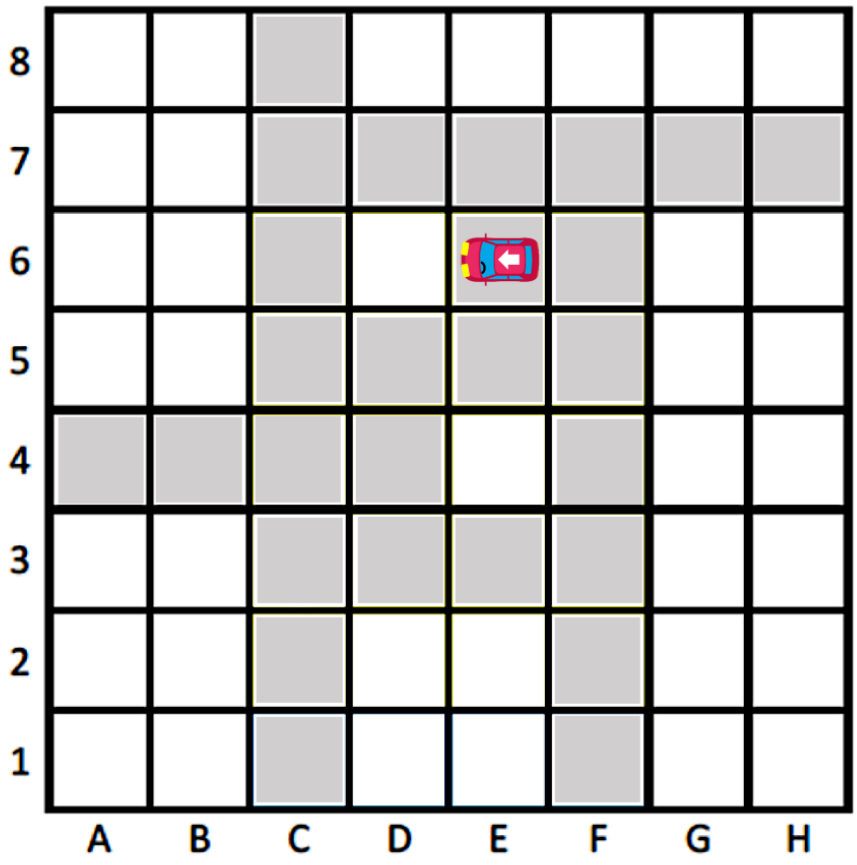


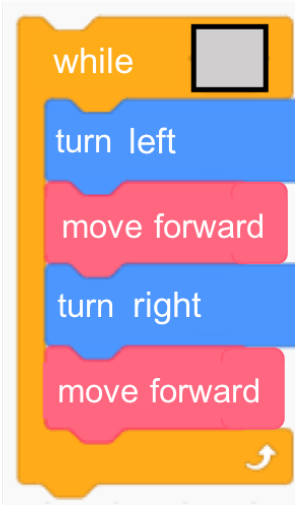
According to the instructions, which coloured path will the car take?

(a) The red path
(b) The blue path
(c) The green path
(d) None of the above

Question 9:

A car starts at position E6, facing left.





If the car follows the instructions above, where will it end up?

(a) B3
(b) C3
(c) D4
(d) E4

Question 10:

At the end of the instructions, which direction will the car face?

(a) Up
(b) Left
(c) Right
(d) Down

Question 11:

You are flipping through a deck of cards following this simple rule: Flip a card. If the card is a heart, you discard (without looking at) a number of cards equal to the total number of heart cards you have already flipped. You continue repeating this step until you run out of cards.

Which of the following algorithms implements your rule?

(a)

```
n = 0
while there are cards in the deck:
    flip card
    if card is a heart:
        n = n + 1
        repeat n times:
            discard card
```

(b)

```
while there are cards in the deck:
    flip card
    while the current card is a heart:
        discard card
```

(c)

```
n = 0
while there are cards in the deck:
    flip card
    repeat n times:
        discard card
        if card is a heart:
        n = n + 1
```

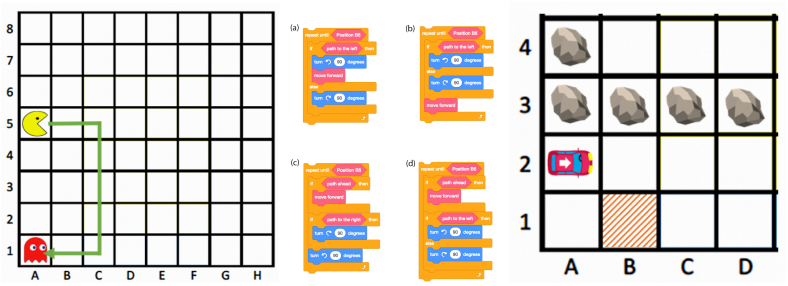
(d)

```
n = 0
while there are cards in the deck:
    flip card
    while the current card is a heart:
        n = n + 1
        discard card
        flip card
```

FEEDBACK

From 0 to 10, how do you think you did on the questions in Part 2?

Note: Part 2 includes all the questions where you were asked to solve coding problems like this:



0 1 2 3 4 5 6 7 8 9 10

Awful ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Excellent

PART 3

Please answer the following long form questions.

Question 1:

There are two nearby cities. In the larger city, about forty-five (45) babies are born each day. In the smaller city, about fifteen (15) babies are born each day.

Of the children born each day, about 50 percent are girls. However, the exact percentage of baby girls varies from day to day. Sometimes it may be higher than 50 percent, sometimes lower.

For one year, each city recorded the days in which more than 60 percent of babies born on that day were girls.

(a) Which city do you think recorded more such days?

- The larger city
- The smaller city
- About the same (within 5% of each other)

(b) Why do you think so? Please explain or support your answer above.

_____

_____

_____

_____

_____

_____

_____

Question 2:

You have ten (10) coins. Nine (9) of them weigh the same amount. One (1) is lighter. You have a balance scale (like in the picture below) that you can use to weigh the coins. How would you find the lighter coin by using the scale the fewest number of times?

_____

_____

_____

_____

_____

_____

Thank You for Participating!
Please enter any comments you have about the survey:

_____

_____

_____

_____

_____

Acknowledgements:

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Citation:

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