

Discussion 14: Final Review

Binary

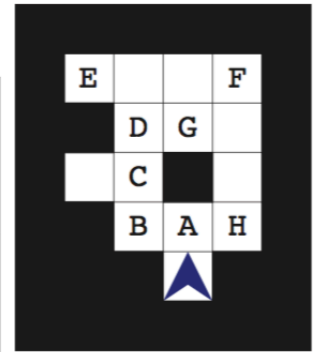
1. YouTube now uses 64 instead of 32 bits to count views. How many more is that? $2^{32} \times$

Drawing/Movement in Snap

Question 1: Mr. Robot 2

We tried to rewrite our midterm maze script to visit all the letters A-H in the maze. Here are our four attempts, let us know the letters they each visit.

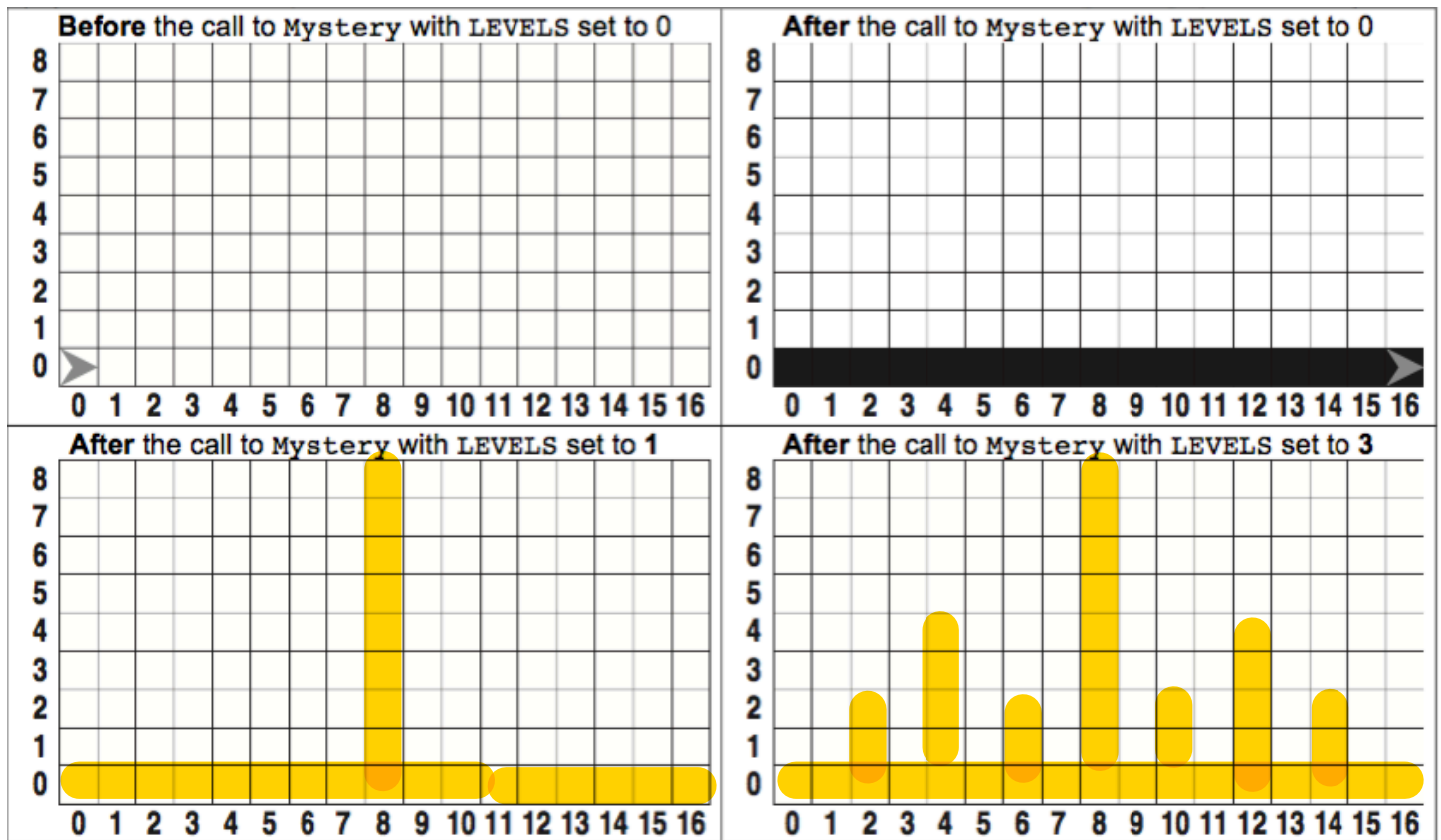
The robot moves <i>INPUT</i> squares forward in the direction it's facing.	The robot turns, in-place. {left = counterclockwise, right = clockwise, around = u-turn}	Reports true if the robot has a free square to its {left, front, right}; otherwise reports false. The last one reports true if <i>can't</i> move left, forward and right.



Question 2: Magical Mystery Tour

Consider the following two blocks and setup code:

a. Now, given that the sprite starts out in the bottom left corner facing right, and that the pen is in the middle of the sprite, shade in the pixels that will be colored after calls to Mystery with levels set to 1 and levels set to 3. You may use the top left grid for scratch work. Levels = 0 has been given to you.



b. Runtime

We're told that it actually costs a *dollar* to fill in all the pixels drawn by Helper. Which expression best captures the cost (in dollars) for this call? (select ONE)

Mystery **L** with **N** helper levels

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L	$\frac{1}{2} * L$	N	$\frac{1}{2} * N$	L * N	$\frac{1}{2} * L * N$	L^N	$\frac{1}{2} * L^N$	N^L	$\frac{1}{2} * N^L$	None of these

Recursion

Question 1: Ready, Set, Go!

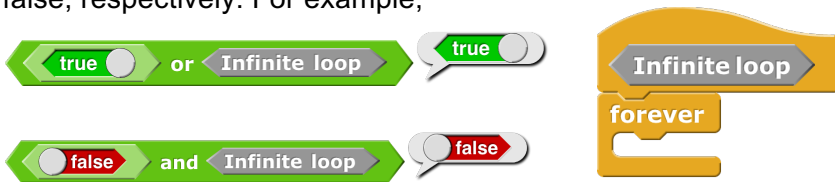
In this problem, we have created three different blocks to see if a given list is a set, that is, it has no duplicates. For each of the blocks below, select one of the following answer choices:

Example calls to set?



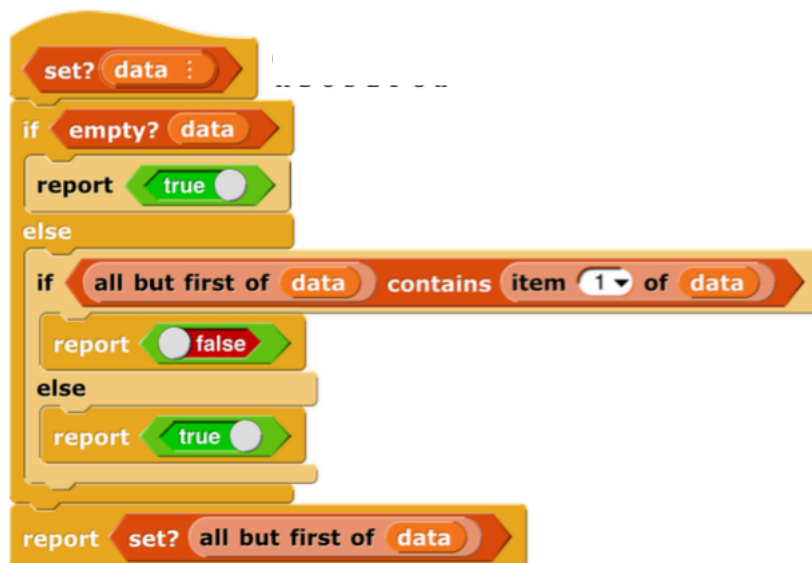
- A = it works fine.
- B = It will cause an error or run forever.
- C = It always returns *true*.
- D = It always returns *false*.
- E = If it's the empty list, *true*, otherwise it always returns *false*
- F = If it's the empty list, *false*, otherwise it always returns *true*
- G = If it's the empty list, *true*, otherwise it only returns whether the *first* element is in the list multiple times
- H = If it's the empty list, *true*, otherwise it only returns whether the *last* element is in the list multiple times

a. For this subpart, note that the *or* and *and* blocks don't even look at their right input if the left one is true or false, respectively. For example,



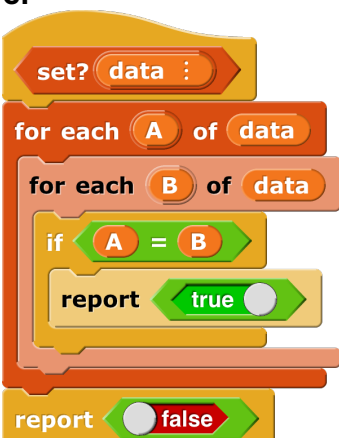
- ☒ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E
- ☐ F
- ☐ G
- ☐ H

b.



- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E
- ☐ F
- ☒ G
- ☐ H

c.



- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☒ E
- ☐ F
- ☐ G
- ☐ H

Question 2: Constructing the set block

How could we construct the set block using the following *occurrences of* block? Note that you may only choose one option from each section A-C.

occurrences of **item** in **data** :

report length of keep items such that **item** = from **data**

A

- ☐ set **A** to 0
- ☒ set **A** to 1
- ☐ set **A** to 2
- ☐ set **A** to length of **data**

B

- ☐ set **B** to occurrences of in **data** = **A**
- ☐ set **B** to occurrences of **data** in = **A**
- ☐ set **B** to occurrences of **data** in = **A**
- ☐ set **B** to occurrences of = **A** in **data**
- ☒ set **B** to not occurrences of in **data** = **A**
- ☐ set **B** to not occurrences of **data** in = **A**
- ☐ set **B** to occurrences of **data** in not = **A**
- ☐ set **B** to occurrences of not = **A** in **data**

C

- ☒ set **C** to empty? keep items such that **B** from **data**
- ☐ set **C** to empty? not keep items such that **B** from **data**
- ☐ set **C** to not empty? keep items such that **B** from **data**
- ☐ set **C** to not keep items such that **B** from **data**

report **C**

What is the running time of this set? block?

- ☐ Constant
- ☐ Logarithmic
- ☐ Linear
- ☒ Quadratic
- ☐ Exponential

(select ONE)