Discussion 14: Final Review

Binary

1. YouTube now uses 64 instead of 32 bits to count views. How many more is that? ____

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.

<table>
<thead>
<tr>
<th>move forward</th>
<th>rotate left</th>
<th>rotate right</th>
<th>turn around</th>
</tr>
</thead>
<tbody>
<tr>
<td>can move left?</td>
<td>can move forward?</td>
<td>can move right?</td>
<td>dead end</td>
</tr>
</tbody>
</table>

The robot moves **INPUT 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 can’t move left, forward and right.

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

```plaintext
A B C D E F G H
```

Question 2: Magical Mystery Tour

Consider the following two blocks and setup code:

```plaintext
Mystery length # with n # helper levels
if n = 0
move length steps
else
Mystery length / 2 with n - 1 helper levels
Helper length / 2
Mystery length / 2 with n - 1 helper levels

when clicked
clear
click pen down
Mystery 16 with LEVELS helper levels
pen up

turn 90 degrees
move length steps
turn 90 degrees
```
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)

```
L  1/2*L  N  1/2*N  L+N  1/2*L+N  L^2  1/2*L^2  N^2  1/2*N^2  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:
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,

```
set? data:
```

```
report empty? data or
not all but first of data contains item 1 of data and
set? all but first of data
```

b. 

```
set? data:
```

```
if empty? data
report true
else
if all but first of data contains item 1 of data
report false
else
report true
```

```
report set? all but first of data
```

c. 

```
set? data:
```

```
for each A of data
for each B of data
if A = B
report true
```

```
report false
```

```
O A
O B
O C
O D
O F
O G
O 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.
Question 1: Syntax
Write the output of the following lines of code.

```
>>> ['cal', 'berkeley', 'stanford'][1][2]

```

```
>>> [x*10 for x in range(3) if x != 1]

```

---

Question 2: Reversing a Dictionary
We want to write a dictionary reverser that takes in a dictionary and returns a new dictionary with the original values as the new keys and the original keys as a list of values.

```
>>> dictionary_reverser({1:3, 2:3, 8:9})
{3: [1, 2], 9: [8]}
```

Write this function by filling in the blanks in the skeleton code below.

```python
def dictionary_reverser(dict):
    r = {}
    for k in dict:
        if ________________ in ________________:
            ____________________.append(____________________)
        else:
            ______________________ = _____________________
    return r
```