Discussion 9B: Midterm Review

Recursion

1. In the space below, write a block that recursively converts binary to decimal. You may find the following blocks helpful:


```
convert (bitstring) to decimal
```

What is the runtime of your block?

○ Constant ○ Logarithmic ○ Linear ○ Quadratic ○ Exponential

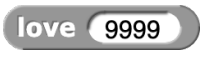
2. You have just gotten into a relationship and have written the block `love` to track your affection through your relationship (x = kisses, o = hugs, - = hanging out). The `reverse` block, which reverses its input text, has been provided to you.

a. What is 

? _____

b. What is 

? _____

c. What are the first three and last three letters of 

? _____, _____

d. Which of the following are possible?

☐ Hanging out four times in a row (i.e. “----“)

☐ Hug immediately followed by a kiss (i.e. “ox”)

☐ Hug twice in a row (i.e. “oo”)

3. **Short Changed**

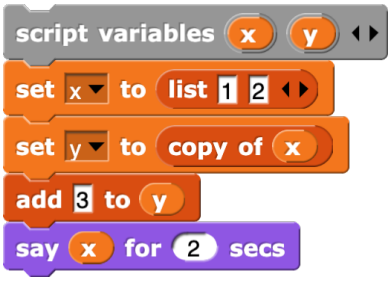
When you get change back, you don't care about how many possibilities there are (silly **`Count Change`**). What you do want to know is what are the fewest number of coins you need to carry in your pocket. Write the **`Short Changed`** block that will return the minimum number of coins you can make change with.

Hint 1: We don't need to use a minimum block.
Hint 2: This block has a few similarities with **`Count Change`**, but has its differences as well.
Hint 3: This block can be solved in 101_2 + (0x7B – 0b11) ÷ 100_2 ÷ F_{16} lines of code.

Mutability

1. We've created the copy of block to make a copy of a list, but it doesn't work as we expected. Write out what the sprite would say after the following blocks of code have been run.

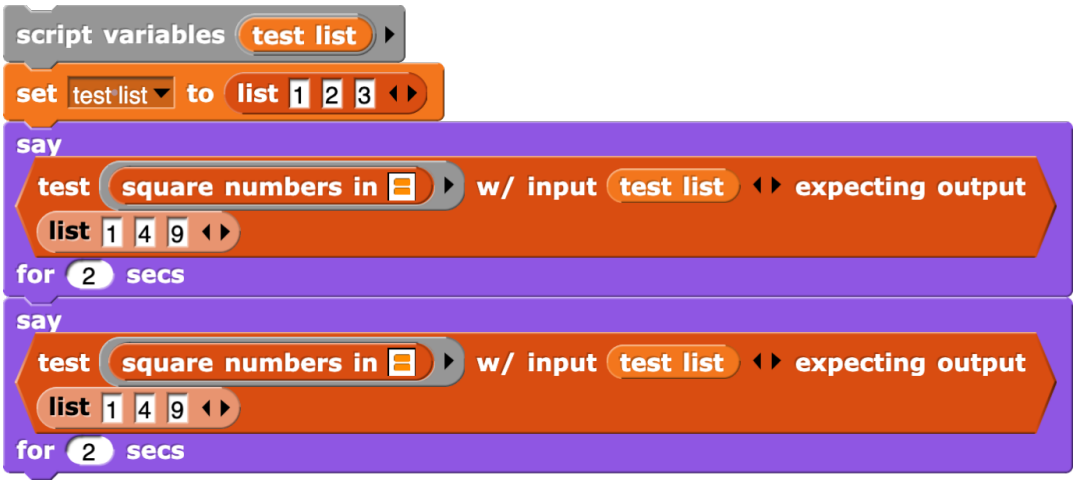
   a.



   b.

2. We've created a block to square all the numbers in a list, as shown to the right. However, our tests are giving us puzzling results. Answer the questions below to help us understand the behavior of our block.

   a. When we run the script below, the sprite first says "true", but then says "false." Why does this happen, and how can we fix it?



b. Assuming we haven't changed the `square numbers` block, what do we expect the sprite to say when we run the code below? Why is this different from part a?