Discussion 8: Recursion II

Mystery Blocks

What do each of the blocks below do?

| +mystery1 + ist : +) if empty? ist report false else if is item of ist a number ? report true else report mystery1 all but first of ist | + mystery2 + word + letter + if length of word = 0 report 0 else if letter = letter 1 of word report 1 + mystery2 all but first letter of word letter else report 0 + mystery2 all but first letter of word letter | + mystery3 + num + num2 + if num2 = 0 report 1 else report num x mystery3 num num2 - 1 |
|---|---|--|
| 1 | | |
| 2 | | |
| 3 | | |

More Practice

(a) Write a block that reports the index of the first occurrence of a letter in a word. You may assume the letter appears at least once.

position of letter u in word public funds position of letter (letter) in word (word): if ______: report _____: else:

report ____

(b) Write a block that counts the instances of an item in a list



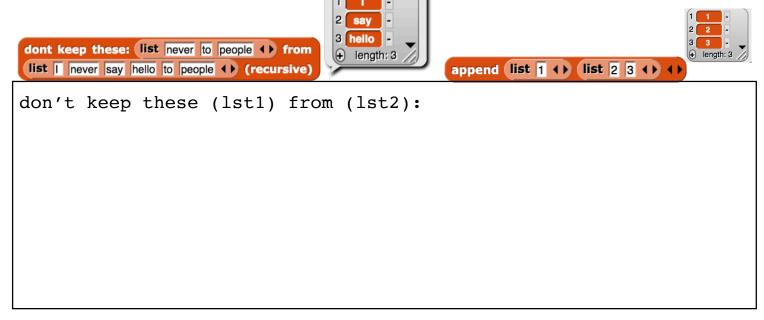
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count (item) in (lst):
```

(c) Write a block that finds the max item in a list. You may find the following block useful: max of 4, 2



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maximum item in (lst):
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(d) Write a block that removes items in the first list from the second list. You may find the append block, pictured below, useful.



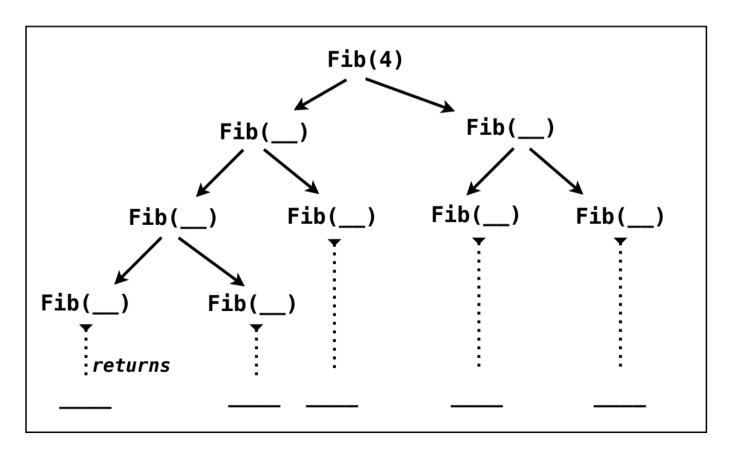
Fibonacci

The Fibonacci sequence is defined as follows: 1, 1, 2, 3, 5, etc., where each number is the sum of the two previous numbers in the sequence.

(a) Fill in the code below to find the nth Fibonacci number:

| Fibonacci(n) | | | | |
|--------------|--------|----|--|--|
| if | | _: | | |
| | report | _ | | |
| if | | _: | | |
| | report | | | |
| else: | | | | |
| | report | | | |

(b) Fill in the recursive tree below representing the call: Fib(4)



(c) What is the runtime of Fibonacci? _____