

UNIVERSITY OF CALIFORNIA, BERKELEY
Department of Electrical Engineering and Computer Sciences
Computer Science Division

CS10 Fall 2026

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Discussion 5: HOFs + Quest Practice

Instructions:

- If you're attending this section in-person, please log into the iClicker app for attendance!

Group Activity / Question of the Day

- Look at the person diagonally across from you (or, if in a line, pick someone two spots away). Ask them, "If you could time travel, but ONLY in one direction, would you rather go 500 years into the past or 500 years into the future? Why?"
- And what's something from today you'd bring with you or do to help survive (or thrive) in that time?

Required (Pages 2 - 5):

Section I - HOFs4z

1. Determine which of the following expressions will produce the following correct results:

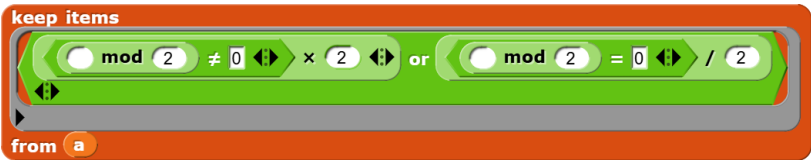
a. You are given a list of numbers: [10, 2, 7, 6, 4] which is set to the variable a

i. You need to create a new list based on the following rules:

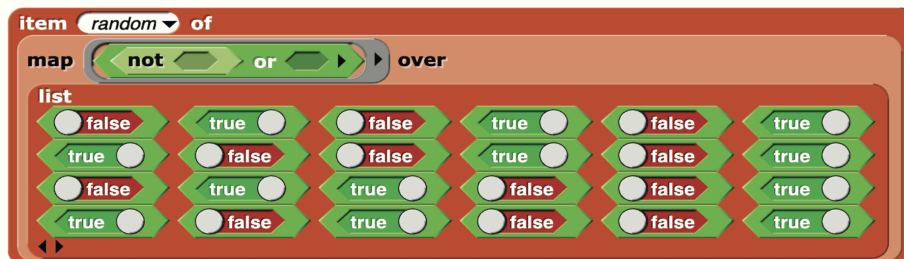
1. If an item is even, divide it by 2.

2. If an item is odd, multiply it by 2.

ii. The result should be: [5, 1, 14, 3, 2]

- A Scratch 'map' block with 'over a' at the bottom. The condition slot contains '(x 2) or (/ 2)'.
- A Scratch 'keep items' block with 'from a' at the bottom. The condition slot contains '(mod 2 != 0) x 2 or (mod 2 = 0) / 2'.
- A Scratch 'map' block with 'over a' at the bottom. The condition slot contains '(mod 2 != 0) x 2 or (mod 2 = 0) / 2'.
- A Scratch 'map' block with 'over a' at the bottom. The condition slot contains 'if (mod 2 = 0) then (/ 2) else (x 2)'.
- A Scratch 'keep items' block with 'from a' at the bottom. The condition slot contains 'if (mod 2 = 0) then (/ 2) else (x 2)'.

2. What does the following block report?



- ☐ True
- ☐ False
- ☐ It errors, because we can't pass in predicates in map blocks
- ☐ It depends - the output could be True or False, since selection is random.

3. Using HOFs and named inputs, write a function that filters out the odd indices (only keep the even indices), and then doubles the value. Any HOFs you implement must use the named inputs. This is how the function should behave:

filter out the even indices and double value

list 1 2 3 4



Section II - Quest Practice

- Perform the following calculation and conversions
 - $0b1011 + 0b11010$. Return the hex representation
 - $0xD8 + 17_{10}$. Return the binary representation
 - $0b110011 + 3_{10}$. Return the decimal representation
- Now, suppose we have a composite function $z(x) = 2|(x + 1)|^2$. Using the functions below, how can compose $h(x)$ to be in its current form. Represent your answer as $a(b(c(d(e(f(g(h(x)))))))$ form.

$$a(x) = x^2 \quad b(x) = x + 1$$

$$c(x) = 2x. \quad d(x) = |x|$$

$$e(x) = \sqrt{x} \quad f(x) = x^3$$

$$a(x) = x^2 \quad b(x) = x + 1$$

$$g(x) = x \div 2 \quad h(x) = \log x$$

- a. Now suppose we have $e(b(g(x)))$. How would this function be based on this composition using the functions above?

3. Write a truth table for the following expression

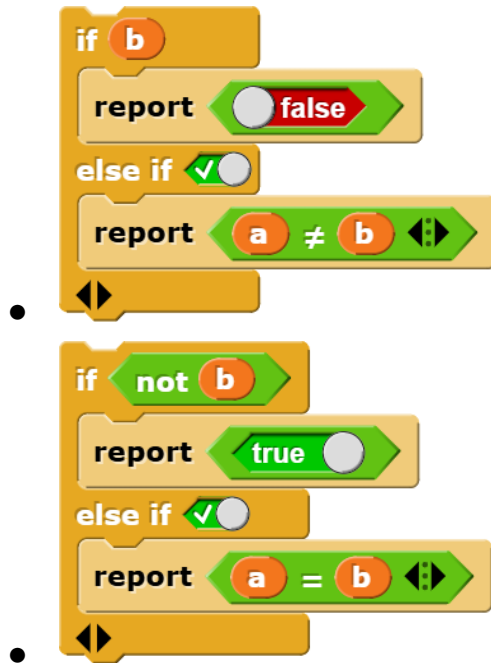


a	b	
T	T	
T	F	
F	T	
F	F	

- a. If the output is `True`, what will `a` be? (either `True`, `False`, or `Neither`)
- b. If the output is `False`, what will `b` be? (either `True`, `False`, or `Neither`)

- c. Which of the following statements are equivalent to the expression above?





4. What will the following function return if the input $n = 4$?

a. In terms of n , what mathematical expression represents the mystery function outputs?

- n
- n^2
- $n^2 - 1$
- $-(n^2 - 1)$
- $-n$
- $n!$
- $-n!$
- $(-n)!$
- $n*(-n)!$
- $n*n!$
- $n*(-n!)$

