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

CS10 Fall 2026 **TA: Nahee Jeong**



Discussion 3: Domain/Range, Scoping, Iteration, Lists

Instructions:

- Open snap.berkeley.edu/run on your computer.
- Make a copy of this document and work on it with a peer or as a group! You're welcome to type or write your answers.
- You do not need to submit this worksheet. It's purely for your learning and won't be graded.

Optional Reading Questions:

What is an example of abstraction in your daily life? Using this example, give one reason why abstraction is helpful and another reason how it can do more harm than good.

Section I - Data-types, Domain, & Range

1. **Write down the following for the blocks below: 'type', domain, and range:**

Block	*Type*	*Domain*	*Range*
			
			
			
			

2. Now, suppose that f(g(f(g(f(g(x)))))) does not error for any x that is part of g's domain. Which of the following statements must be True? Circle your answer(s).

A. g's range is a subset of f's domain.

B. g's range is a subset of f's range.

C. g's domain is a subset of f's range.

D. g's domain is a subset of f's domain.

E. g's range is equal to f's domain.

F. g's range is equal to f's range.

G. g's domain is equal to f's domain.

H. g's domain is equal to f's range.

I. f's range is a subset of g's domain.

J. f's range is a subset of g's range.

K. f's domain is a subset of g's range.

L. f's domain is a subset of g's domain.

3. **Consider the following expression. Determine the data types of each function's input and output. If the function does not have an output, enter:** none



Function Name	*Domain*	*Range*
foo		
sqrt		
function		

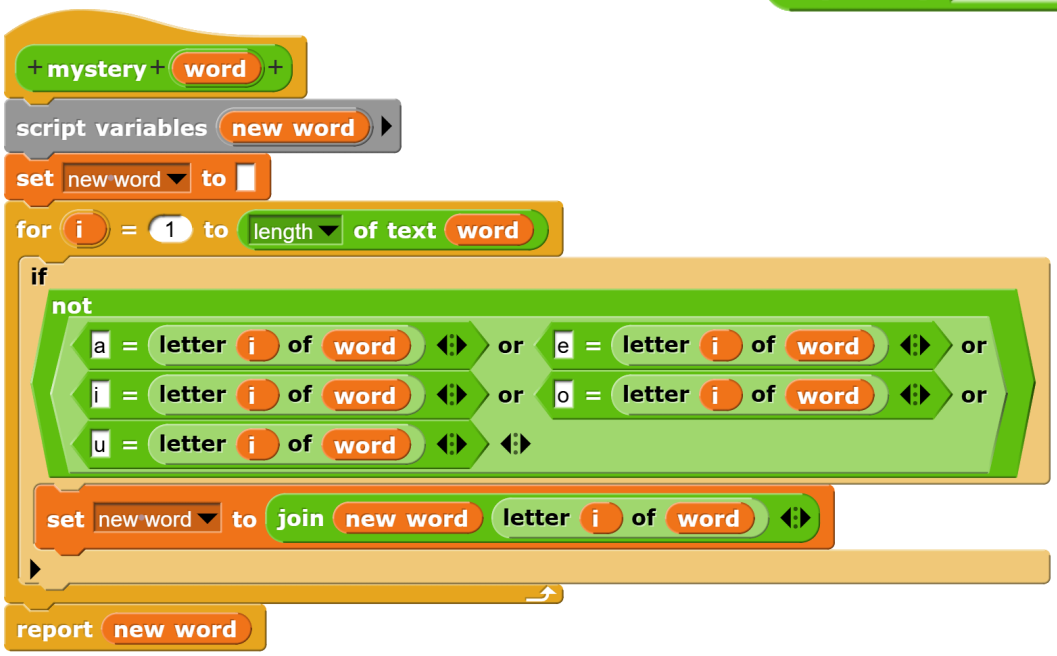


Function Name	*Domain*	*Range*
mystery		
all but first of		
foo		
function		

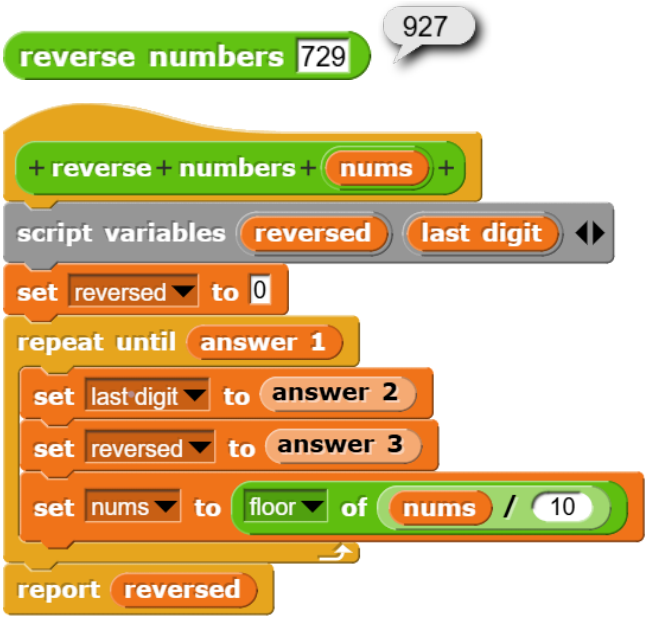
Section II - Iteration

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1. **What will the following function return for the input:** 



1. **Complete the function *`reverse numbers (nums)`* that takes a positive integer *nums* and returns its digits in reverse order. Use the repeat until block and mathematical operations—do not use string manipulation or the join block.**



   a. What should `answer 1` be?

   b. What should `answer 2` be?

   c. What should `answer 3` be?

Section III - Lists

1. Select all the ways I can find the smallest number in a list of numbers:

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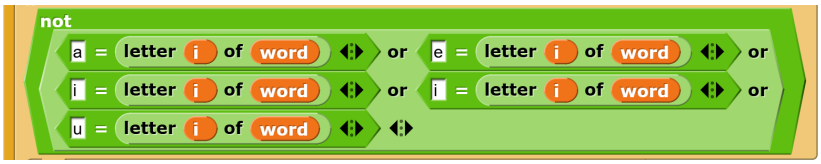
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2. Using the problem from Section. Iteration, Question 1, is there an easier way to write this problem using lists. Specifically, how can we rewrite the if condition with less blocks using list operators?



3. **Write a `for loop` that goes through a list of numbers and doubles each item from the list. You will just need to fill out the inside of the `for loop` for this problem. Fill out the rest of the script for each problem:**
    a. For this example, you will not be mutating the original list. Instead, you will be returning "`new list`".



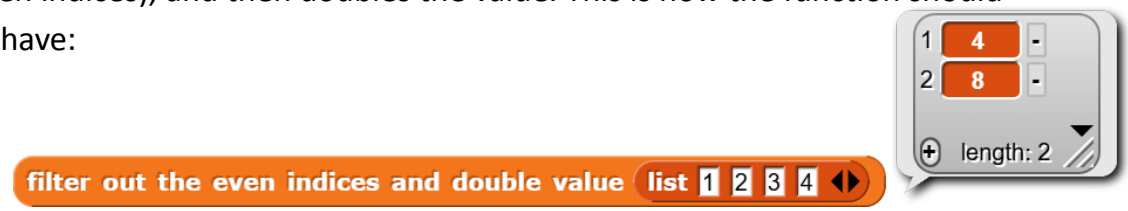
b. Now, you will do the same problem, but you will need to mutate the list using different blocks. You should not create any more script variables, and you should be returning the original list.



4. Write a function called `decreasing?(list)` which takes in a list of numbers and outputs a boolean. The function should return `true` if all the numbers in the list are in descending order and `false` otherwise



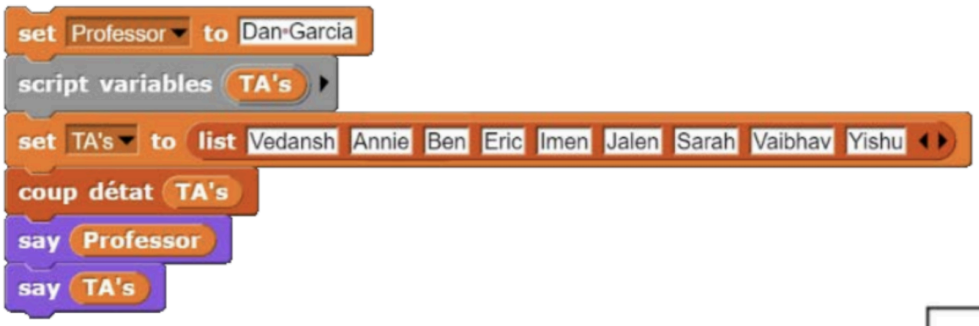
5. Using iteration, write a function that filters out the odd indices (only keep the even indices), and then doubles the value. This is how the function should behave:



Section III - Mutability vs. Immutability

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1. Assume we create a global variable named `Professor` and then run the script:





Professor: ☐

TAs: ☐

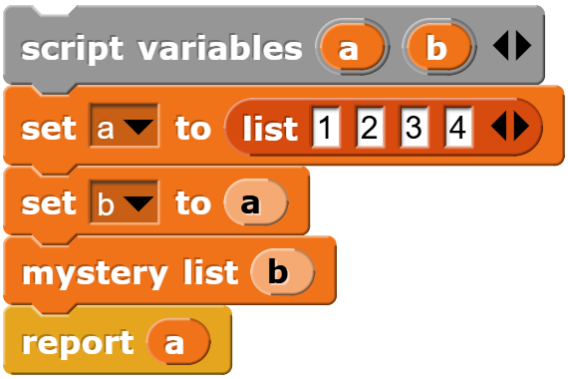
2. For each script below, determine what will be reported / said:



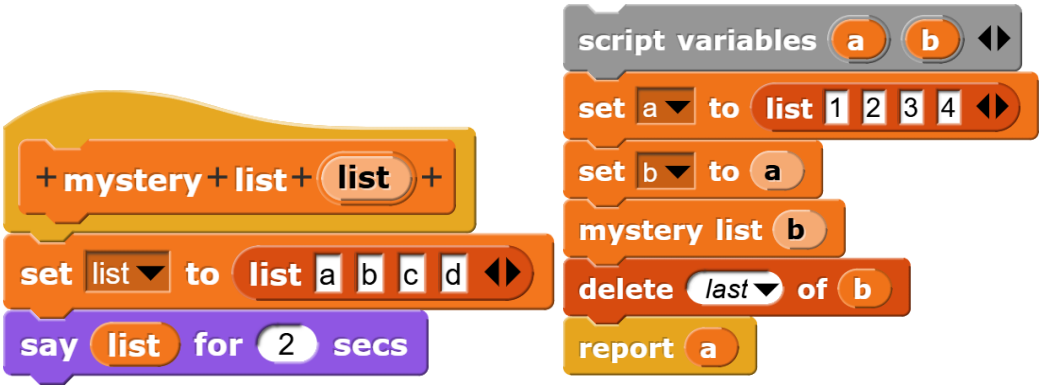


3. Using the function, determine what the scripts will output/say





4. Using the function, determine what the scripts will output/say



Optional Extra Practice:

Optional Section I - Lists

Extra Practice

1. You are given a list of pets. Each pet has a name, species, and age. For example, here are the first 3 pets.



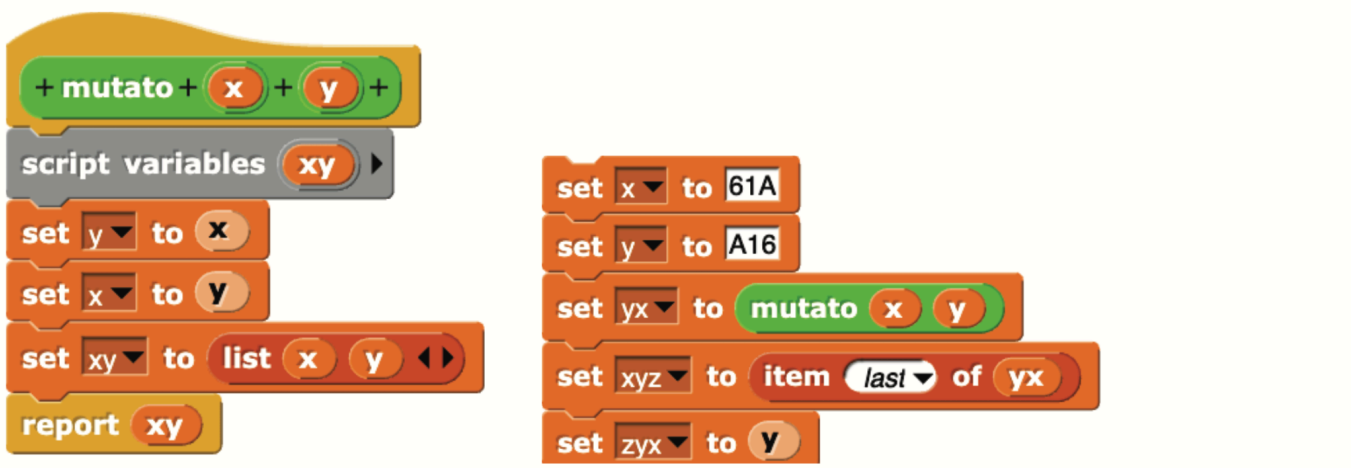
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b. Return the age of the oldest pet.

Optional Section II - Mutability vs. Immutability

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5. List the values of the global variables: `x, y, yx, xyz, zyx` after the following scripts are executed. Assume `mutato` is defined before the script on the right is executed. If an error is caused, mark the "`ERROR`" bubble instead.



x: ☐ y: ☐ yx: ☐ xyz: ☐ zyx: ☐

◯ ERROR