UNIVERSITY OF CALIFORNIA, BERKELEY

Department of Electrical Engineering and Computer Sciences Computer Science Division

CS10 Spring 2025





TA: Victoria

Discussion 3: Domain / Range, HOFs

Instructions:

- If you're attending this section in-person, please log into iClicker!
- If you missed this discussion, fill out this entire worksheet, and upload it to the Gradescope assignment titled "Discussion 3" by next Discussion.
- Please open up snap.berkeley.edu/run on your computer.
- For today's discussion during the Snap! Scavenger Hunt, you can either explain the process in words, show a screenshot, or draw the block/process.

Group Activity / Question of the Day

• Ask the person to you – in front / right / left / behind / – if they'd rather live in a house that's always a bit too hot, or a house that's always a bit too cold. Why? What's the average temperature in your hometown?

Required (Pages 2 - 5):

Assigned Reading

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	Туре	Domain	Range
move 10 steps			
1 + 2			
is 5 a number ▼ ?			
☐ contains ☐			

2. Now, suppose that 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		

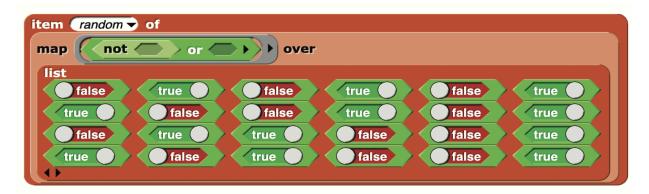
function foo all but first of mystery 1

Function Name	Domain	Range
mystery		
all but first of		
foo		
function		

Section II - Higher Order Functions (HOFs)

1. Using HOFs, find the square of each number in list [1, 2, 3, 4, 5] and then sum them all together.

2. What does the following block report?



- OTrue
- \bigcirc False
- O It errors, because we can't pass in predicates in map blocks
- O It depends the output could be True or False, since selection is random.
 - 3. What does the following block report?

```
combine map split by letter contains a over using list apple banana mango blueberry and and
```

pas	t exam question!
	a list of numbers. I want to verify that the minimum value in L is larger than s, and smaller b, where s and b are numbers. Basically, we're reporting whether $s < min(L) < b$.
-20	example: suppose L is the list [50, 0, 20, -10]. The minimum value is -10. If $s = and b = 20$, then we report True since -20 < -10 < 20. But if $s = -20$ and $b = and b = -20$ then we'd report False since -20 < -10 but -10 > -15.
We'l	l do this in Snap! using higher-order functions, with the following block:
	combine map A over L using C and combine map B over L using D
	: In the following problems, you may not use the following blocks: , min, length of, item of
[4pts] 1	. What should we place in the spot labeled 'A'? Write the block and any needed arguments.
[4pts] 2	. What should we place in the spot labeled 'B'? Write the block and any needed arguments.
[4pts] 3	. What should we place in the spot labeled 'C'? Write the block and any needed arguments.
[4pts] 4	. What should we place in the spot labeled 'D'? Write the block and any needed arguments.

4. Answer the following questions based on the prompt below. This is a challenging,

Optional Section (Extra Practice):

Optional Section I - Data-types, Domain, & Range

1.	Suppose	that f a	nd g ar	e two <i>monadic</i> blocks	ϵ . The ϵ	expression	on f(g(x)) does not
	error for	any val	ue x th	at's within the domair	n of g.	This imp	lies th	at the
	a	of	b	is a subset of the _	c_	of _	d	What
	should a	, b, c, d	be?					

2. 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
Split _ by _		
mystery		
map		
function		
foo		
Letter _ of _		

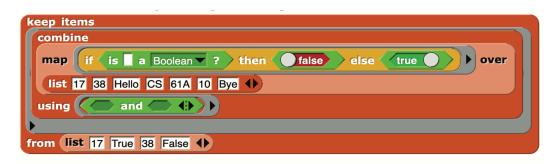
Optional Section II - Higher Order Functions (HOFs)

1. What does the following block

combine (list a a a a + b using =

report?

2. What does the following block report?



3. Suppose we have a list of names and grades. Write a function that converts the "Exam" for each person into a "Pass" or "No Pass". Passing is a 70 or higher.



4. Using one **map** block, and without defining any other helper procedures, write a block that takes in a list like [1, 2, 0, 2, 3], and shifts every element one place to the right, replacing the left-most element with "Oops", i.e. it would return: ["Oops", 1, 2, 0, 2].