

Discussion 3: Lists and HOFs

Domain and Range

1. Determine the domain and range of the following Snap! blocks:



Domain: First blank: list, second blank: any value

Range: Booleans (True/False)




Domain of foo: Numbers

Range of foo: Booleans (True/False)

Data type of var: Booleans (True/False), since the type of var is the same as the output type of foo

2. Fill in the table with the domain and range of the following higher order functions:

Higher Order Function	Domain	Range	Notes
	First blank: reporter, with at least one of its input slots left blank Second blank: list	List with same length as input list	<ul style="list-style-type: none"> The reporter must be able to take in all the data types in the input list without erroring. For example, if the input list to map has numbers and words, the input reporter must be able to handle numbers and words. The output type of the reporter determines the data types of the values in the output list. For example, if the reporter outputs Booleans, then the output list will only have Boolean values.
	First blank: predicate, with at least one of its input slots left blank Second blank: list	List with length less than or equal to length of input list	<ul style="list-style-type: none"> The domain of the predicate must include ALL data types in the input list. For example, if the list contains booleans and numbers, the predicate must be able to handle both booleans and numbers. Keep should never modify the items in the

			input list when creating its output list. Every item in the list outputted by keep MUST also be in the input list.
	<p>First blank: reporter with two input slots left blank</p> <p>Second blank: list</p>	A single value	<ul style="list-style-type: none"> The type of the output value is the same as the output type of the reporter. For example, if the reporter outputs numbers, combine will output a number. The input reporter must be able to handle all data types from the input list, as in map and keep.

Higher Order Function Practice

1. Fill in the blanks so the keep block returns a list of the numbers from MyList.

MyList = [3, hello, goodbye, 5, 6]

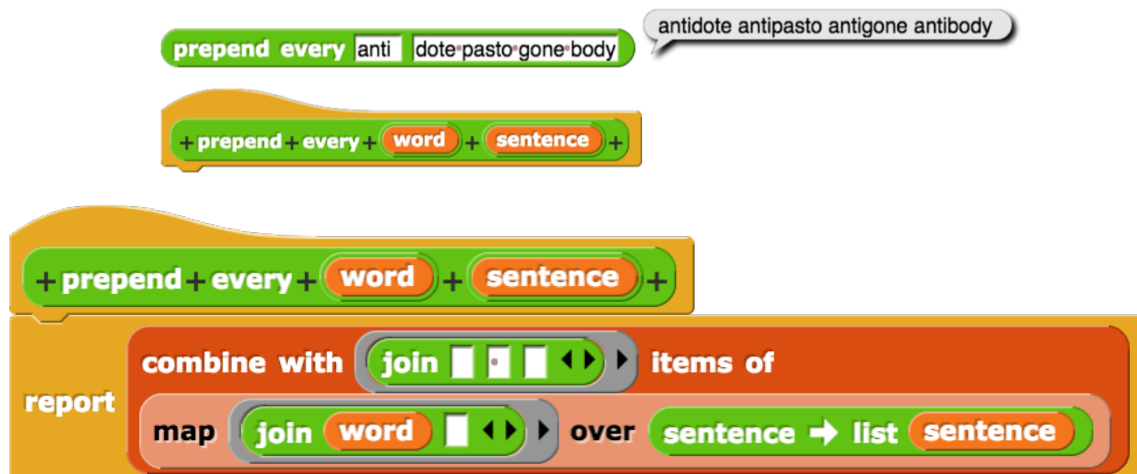
Keep items such that  from MyList

2. Write an expression that returns the sum of the squares of the numbers in YourList.

YourList = [1, 2, 3, 4]



3. Complete the following block so it works as described. Note: You may find the sentence -> list block helpful.



4. What does the following block output? OurList is a list of words.

```

combine with join items of
map letter length of of over OurList

```

It outputs a word consisting of the last letter of each word from our list.

Challenge

1. For the following questions, which higher order functions can you use to get the desired output?

a. Given the following list: `list list Schuyler 1 list Matthew 2 list Mansi 3`
 Output: `list 1 2 3`

- Map only
 Keep only
 Map and Keep
 None of the above

```

map item 2 of over
list list Schuyler 1 list Matthew 2 list Mansi 3

```

b. Given: A list of lists containing at least one letter and one number (they needn't appear in the same order)
 Output: The max number from all of the lists

- Map Only
 Keep Only
 Combine Only
 Map & Combine
 Keep & Combine
 Map & Keep
 Map, Keep, & Combine
 None of the above

```

combine with max of and items of
keep items such that is a number ? from
combine with append items of
list list d 3 i list c 8 9 list 4 3 l

```

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2. Given a list of rooms, and a list of time slots, use HOFs return a list of rooms that are free during one of the given time slots. You are given a helper function, `when is free`, that takes in a room number and outputs when that room is free. Note: Each room is free at exactly one time.

```

keep items such that list 12-1 1-2 2-3 contains when is free
from list 777-Soda 200-SD 145-Dwinelle

```