



# Introduction to Lists




Computer Science Principles

# What are Lists?



- Lists are a type of data structure.
  - This is a way to hold similar information in one 'container.'
  - This is very useful as it allows us to store information such as a list of player's names.




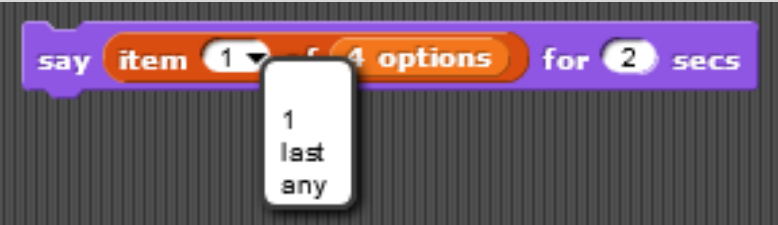



# List Blocks

Block	Purpose
	Will create a variable that can become a list.
	<p>Reports a newly created list with the given items. Use arrows to change the number of items. It is not required to be used with a variable as it is not required to create a named list in SNAP. A list not using a variable is called an “anonymous” list.</p>  <p>The screenshot shows a workspace with a script containing a 'set' block: 'set three stooges to list larry moe curly'. To the right, a 'three stooges' list monitor displays the items 'larry', 'moe', and 'curly' in a numbered list, with a 'length: 3' indicator. Below the script, an 'list' block is shown with the items 'chocolate', 'vanilla', and 'strawberry'. To its right, an 'anonymous' list monitor displays these items in a numbered list, also with a 'length: 3' indicator.</p>





# List Blocks

Block	Purpose
	<p>Reports a new list that extends a list with a new item.</p> <div></div>

# List Blocks

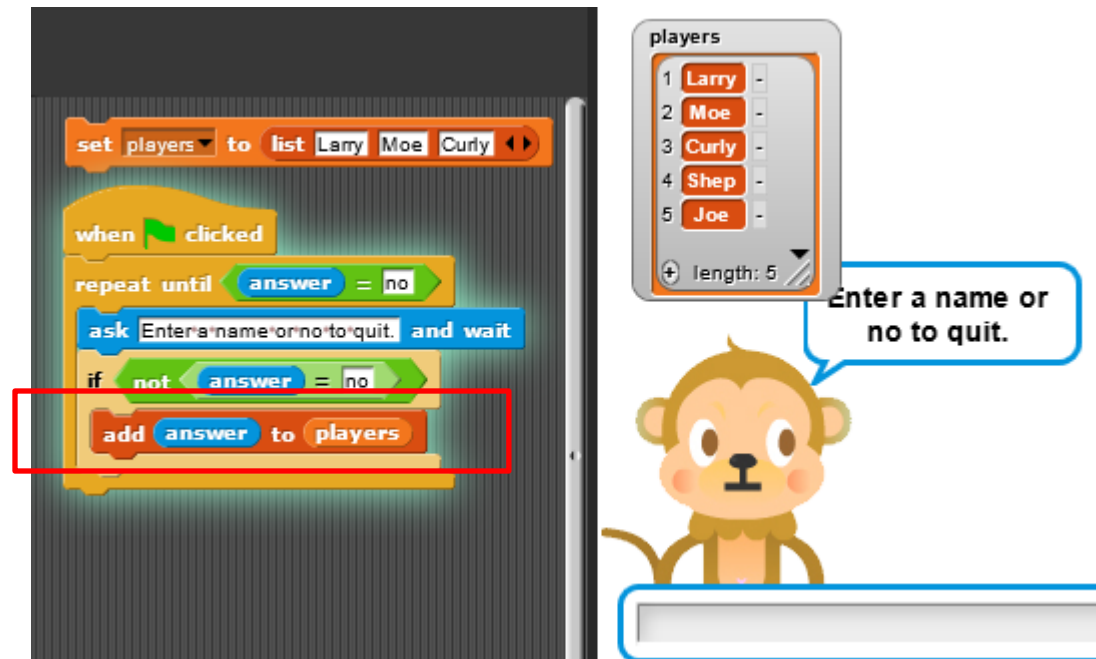
Block	Purpose
	Reports an item from the list. You have the option of entering a number or numeric variable or choosing the 1, last, or any options. 
	Reports all but the first value in a list.
	Reports the length of the list
	Reports true or false; True if the list contains the value; False if not.

# List Blocks

Block	Purpose
	Adds the value to the end of the list.
	Deletes the value in the position of the list. You can choose 1, last, or all or use a numeric value or variable.
	Inserts the value at the position of the list. You can choose 1, last, or all or use a numeric value or variable.
	Replaces the value at the position of the list with the given value. You can choose 1, last, or all or use a numeric value or variable.

# Adding to the List

- Use the `add() to []` block to add names (strings) to a list called `Players`.
  - Note I have a loop to continuously ask for a name with an option of entering “no” to stop the loop.
  - After entering 4 names, then “no”, my List contents are as shown.



The image displays a Scratch script and a list widget. The script, on the left, begins with a 'set players to list' block containing 'Larry', 'Moe', and 'Curly'. This is followed by a 'when clicked' event block, a 'repeat until' loop with the condition 'answer = no', an 'ask' block with the text 'Enter a name or no to quit. and wait', and an 'if not' block with the condition 'answer = no'. Inside the 'if not' block is an 'add answer to players' block, which is highlighted with a red rectangle. To the right, the 'players' list widget shows a list of five names: Larry, Moe, Curly, Shep, and Joe, with a length of 5. A speech bubble from a monkey character says 'Enter a name or no to quit.' and a text input field is visible at the bottom.

```
set players to list Larry Moe Curly
```

```
when clicked
```

```
repeat until answer = no
```

```
ask Enter a name or no to quit. and wait
```

```
if not answer = no
```

```
add answer to players
```

players	
1	Larry
2	Moe
3	Curly
4	Shep
5	Joe

length: 5

Enter a name or no to quit.

# Reading from the List

- The following script uses the `[]contains()` block to see if the input is already in the list.
- If it is not in the Players list, the input is added to the list.

The image shows a Scratch script and its corresponding interface. The script is designed to manage a list of players.

**Script:**

- set players to list** Larry Moe Curly
- when clicked**
  - forever** loop:
    - ask** what's your name? **and wait**
    - if** **answer** = **exit**
      - say** I don't think your name is exit **for 2 secs**
      - stop script**
    - if** **players** **contains** **answer**
      - say** join Welcome back **answer** **for 2 secs**
    - else**
      - add** **answer** **to** **players**
      - say** join Thanks for joining us, **answer** **for 2 secs**

**Interface:**

- A **players** list monitor showing:

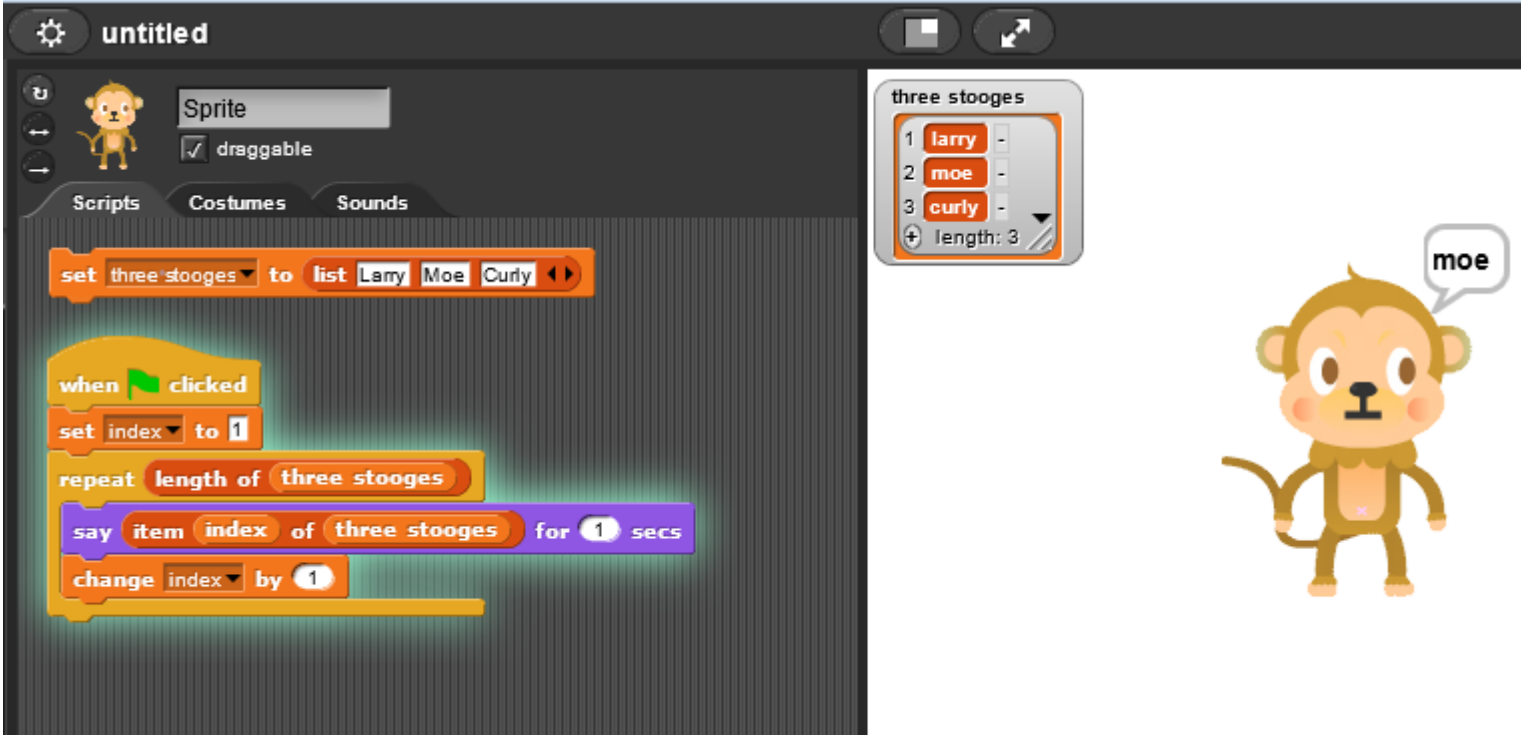
1	Larry
2	Moe
3	Curly
4	Shep
+ length: 4	
- A monkey character with a speech bubble saying "what's your name?"
- Navigation buttons (back, forward, search, etc.) at the bottom.



# Looping Through a List

- You can loop through a list in order to read all values in the list.
- Note in the example script, there is a variable called index.
  - This variable will represent a value's position in the list.
- List Blocks used
  - `length of []` returns the number of items in the list.
  - `Item() of []` will pull the value from the list at the position indicated by the index variable.

# Looping Through a List



The image shows a Scratch project window titled "untitled". The stage features a monkey sprite. The Scripts area contains the following code:

```
when green flag clicked
  set index to 1
  repeat (length of three stooges)
    say (item index of three stooges) for 1 secs
    change index by 1
```

The "three stooges" list is visible in the top right, containing the items "larry", "moe", and "curly". The length of the list is 3.

A speech bubble next to the monkey sprite says "moe".

Index	Item
1	larry
2	moe
3	curly