

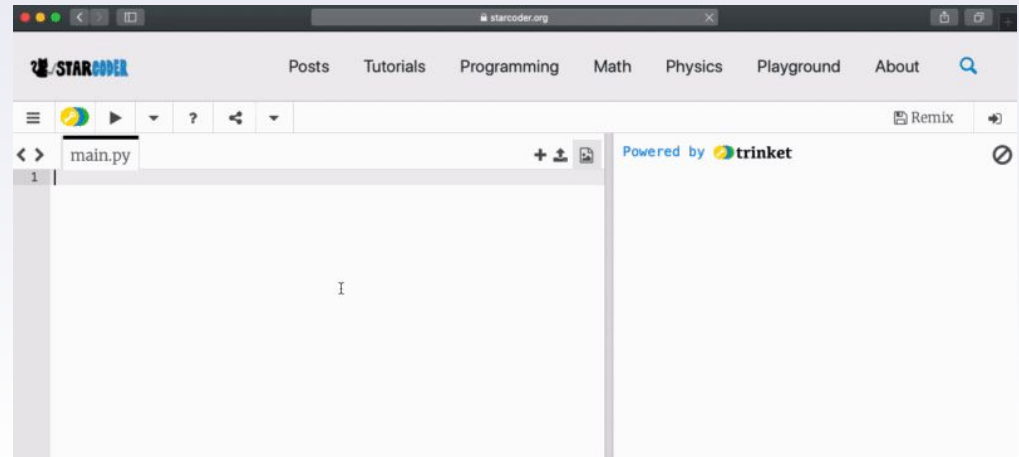


# Welcome to Lesson 3: Lists and Loops

# ▶ Today's Lesson

- ▶ Lists
- ▶ List commands
- ▶ Loops
  - ▶ For Loops
  - ▶ While Loops

# Python Lists



- ▶ Python List - sequence of comma separated items
  - ▶ Can be any value (str, int, bool, etc)
- ▶ Different types can be put into one list!

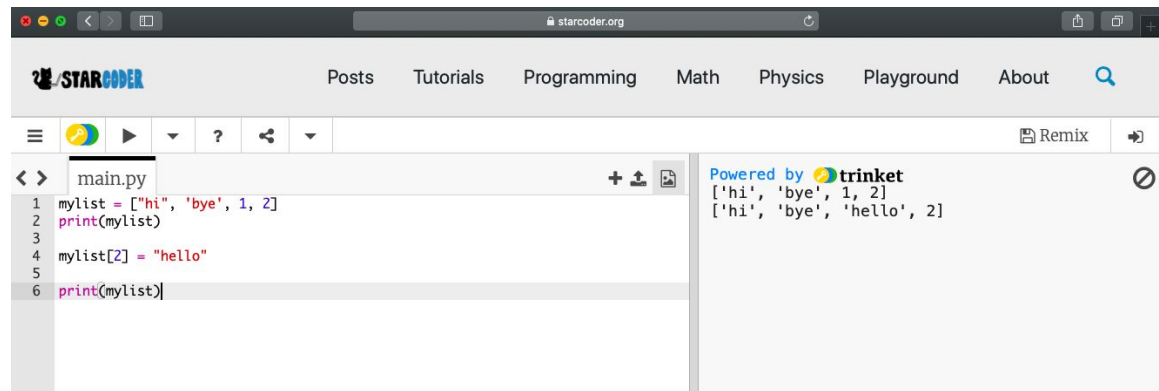
# List Indexing and Values

- ▶ Just like strings
- ▶ Starts from 0, not 1
  
- ▶ Index: the position
- ▶ Value: the actual value at the index

List = [ 0, 1, 2, 3, 4, 5]					
0	1	2	3	4	5
List[0] = 0					List[0:] = [0,1,2,3,4,5]
List[1] = 1					List[:] = [0,1,2,3,4,5]
List[2] = 2					List[2:4] = [2, 3]
List[3] = 3					List[1:3] = [1, 2]
List[4] = 4					List[:4] = [0, 1, 2, 3]
List[5] = 5					

# List Modifying

- ▶ Changing single values of the list
- ▶ `Listname[index] = newvalue`



The screenshot shows a web browser window with the URL `starcoder.org`. The page features a navigation menu with links for Posts, Tutorials, Programming, Math, Physics, Playground, and About. Below the menu is a toolbar with icons for running code, help, and sharing. The main area is split into two panes. The left pane, titled `main.py`, contains the following Python code:

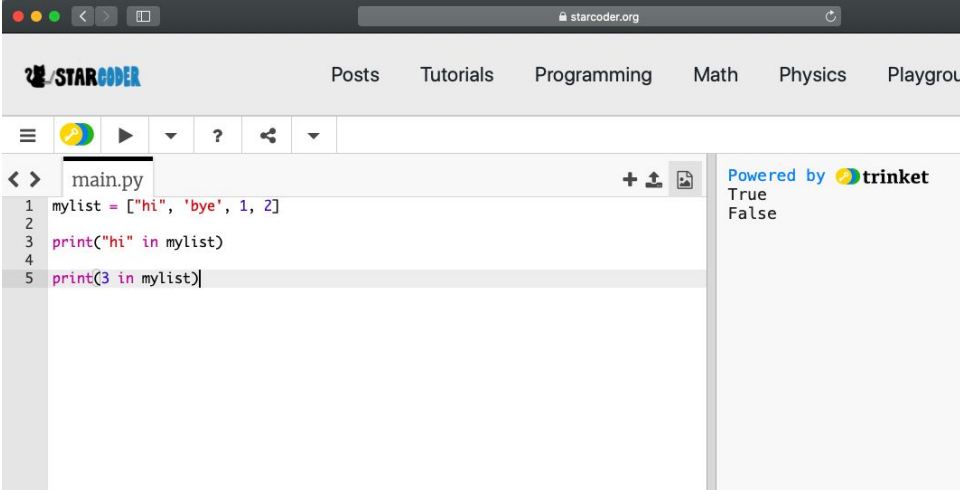
```
1 mylist = ["hi", 'bye', 1, 2]
2 print(mylist)
3
4 mylist[2] = "hello"
5
6 print(mylist)
```

The right pane shows the output of the code, indicating it is powered by `trinket`. The output is:

```
['hi', 'bye', 1, 2]
['hi', 'bye', 'hello', 2]
```

# List “in”

- ▶ in: Determine if object is in the list
- ▶ Returns True or False



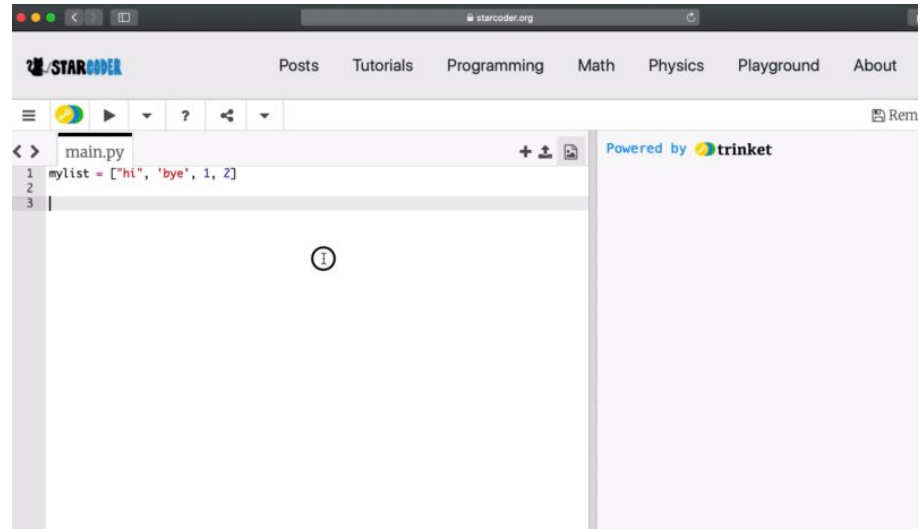
The screenshot shows a web browser window with the URL `starcoder.org`. The page header includes the **STARCODER** logo and navigation links for `Posts`, `Tutorials`, `Programming`, `Math`, `Physics`, and `Playgrou`. Below the header is a toolbar with icons for menu, run, help, and share. The main editor area shows a file named `main.py` with the following Python code:

```
1 mylist = ["hi", 'bye', 1, 2]
2
3 print("hi" in mylist)
4
5 print(3 in mylist)
```

On the right side of the editor, there is a panel titled "Powered by **trinket**" which displays the output of the code: `True` and `False`.

# List Append

- ▶ Append - adding something to the list
- ▶ Adds to end of list



The screenshot shows a web browser window with the URL `starcoder.org`. The page has a navigation bar with links for `Posts`, `Tutorials`, `Programming`, `Math`, `Physics`, `Playground`, and `About`. Below the navigation bar is a toolbar with icons for home, play, help, and share. The main area is a code editor with a file named `main.py`. The code in the editor is:

```
1 mylist = ["hi", 'bye', 1, 2]
2
3
```

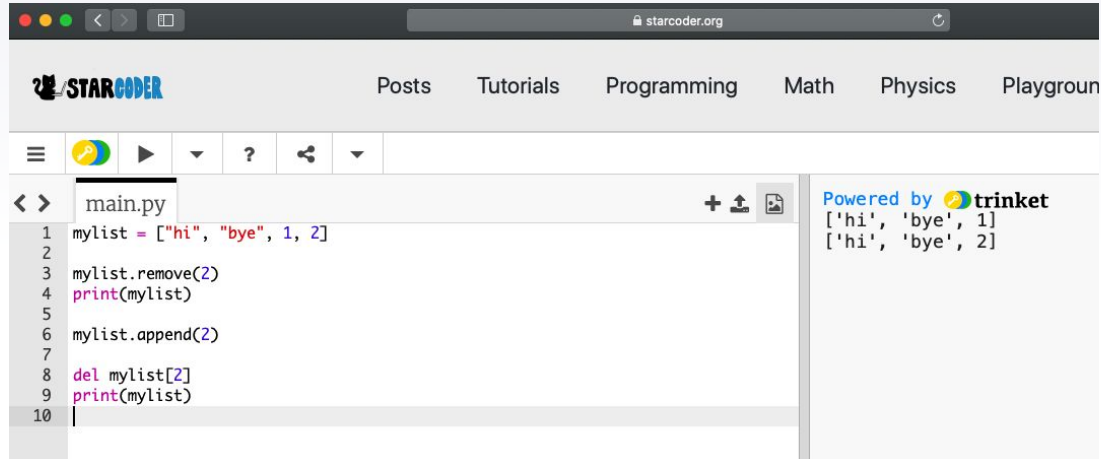
The editor also shows a "Powered by trinket" logo on the right side.

# ▶ List Removing

- ▶ 2 main ways to remove
  - ▶ `listname.remove(item value)`
  - ▶ `del listname[item index]`



# Example



The screenshot shows the StarCoder web interface. The browser address bar displays 'starcoder.org'. The navigation menu includes 'Posts', 'Tutorials', 'Programming', 'Math', 'Physics', and 'Playground'. The code editor is titled 'main.py' and contains the following Python code:

```
1 myList = ["hi", "bye", 1, 2]
2
3 myList.remove(2)
4 print(mylist)
5
6 myList.append(2)
7
8 del myList[2]
9 print(mylist)
10
```

The output on the right, powered by trinket, shows the state of the list after each operation:

```
['hi', 'bye', 1]
['hi', 'bye', 2]
```

"hi"	"bye"	1	2
0	1	2	3

# Range

- ▶ Range - creates a list of integers with the range

- ▶ 3 parameters →

PARAMETER	DESCRIPTION
start	Optional. An integer number specifying at which position to start. Default is 0
stop	Required. An integer number specifying at which position to end.
step	Optional. An integer number specifying the incrementation. Default is 1

- ▶ Examples

```
main.py
1 x = range(0, 10, 1)
2 print(x)
3
4 # We can omit the last parameter 1, as it is the default value
5 y = range(0, 10)
6 print(y)
7
8 # We can omit the first parameter 0 and last parameter 1
9 z = range(10)
10 print(z)
```

Powered by  trinket

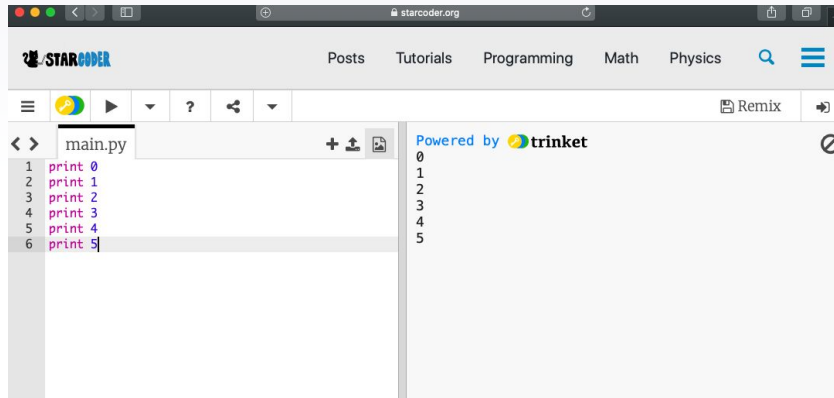
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

# ▶ Python Loops

- ▶ Python Loop - a statement that executes a block of code repeatedly
- ▶ Two types
  - ▶ for loop
  - ▶ while loop

# For Loop

- ▶ For loop - executes the block of code [ ] number of times.

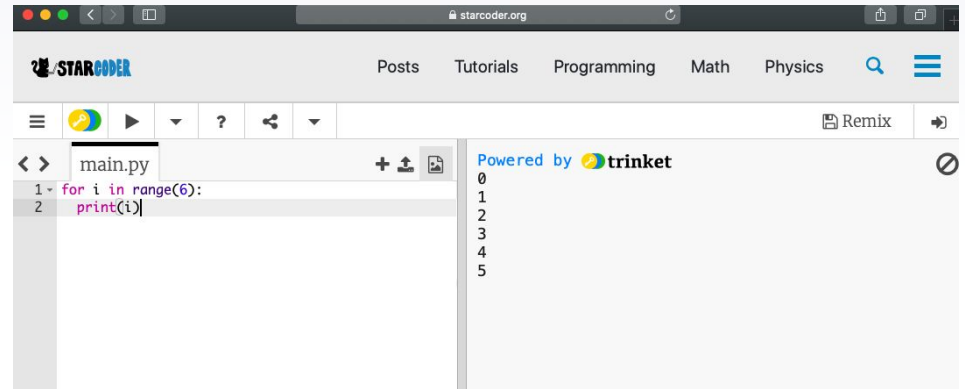


The screenshot shows the StarCoder IDE interface. The code editor on the left contains a Python script named `main.py` with the following code:

```
1 print 0
2 print 1
3 print 2
4 print 3
5 print 4
6 print 5
```

The output window on the right, titled "Powered by trinket", displays the execution results:

```
0
1
2
3
4
5
```



The screenshot shows the StarCoder IDE interface. The code editor on the left contains a Python script named `main.py` with the following code:

```
1 for i in range(6):
2     print(i)
```

The output window on the right, titled "Powered by trinket", displays the execution results:

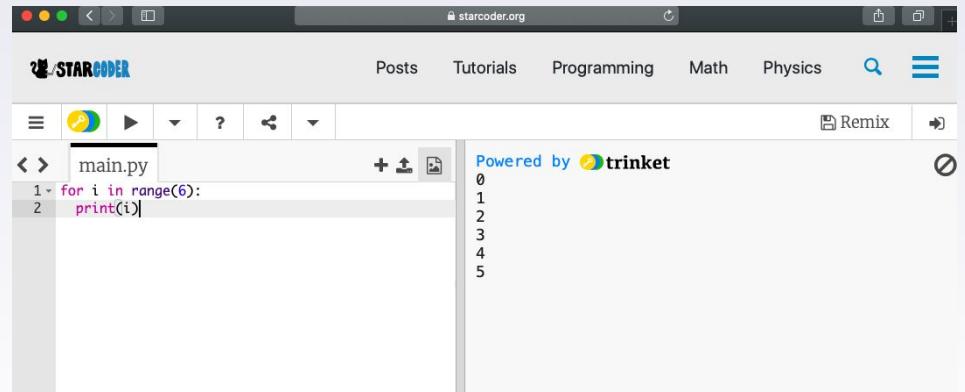
```
0
1
2
3
4
5
```

# ▶ For Loop

Amount of  
times it runs

for i in range(6):

Do something



The screenshot shows the StarCoder online IDE interface. The browser address bar displays 'starcoder.org'. The top navigation bar includes 'Posts', 'Tutorials', 'Programming', 'Math', and 'Physics'. The main editor area shows a file named 'main.py' with the following Python code:

```
1 - for i in range(6):  
2   print(i)
```

The output panel on the right, titled 'Powered by trinket', displays the execution results:

```
0  
1  
2  
3  
4  
5
```

- ▶ Three values possible
- ▶ (start, end, incrementation)
- ▶ End is the typical

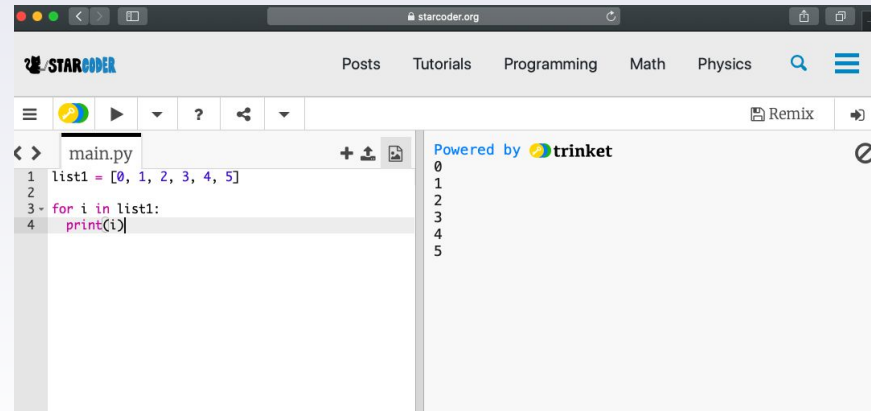
# ▶ For Loop + List

$i$  is the value, iterates through all values of listname

for  $i$  in listname:

Do something

Runs for the length of the list



The screenshot shows the StarCoder online IDE interface. The browser address bar displays 'starcoder.org'. The top navigation bar includes 'Posts', 'Tutorials', 'Programming', 'Math', and 'Physics'. The main editor area shows a file named 'main.py' with the following Python code:

```
1 list1 = [0, 1, 2, 3, 4, 5]
2
3 for i in list1:
4     print(i)
```

On the right side of the editor, the output is displayed as a list of numbers from 0 to 5, indicating that the for loop has successfully iterated through each element of the list and printed its value.

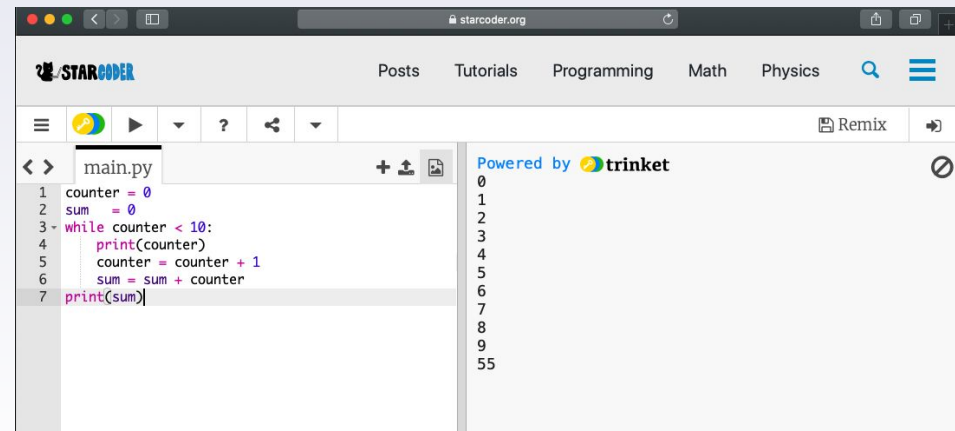
# ► For Loop + List

i is the value, iterates  
through all values of  
listname

Runs for the length of the list

for i in listname:  
    Do something

# While Loop



The screenshot shows the StarCoder online IDE interface. The browser address bar displays 'starcoder.org'. The top navigation bar includes links for 'Posts', 'Tutorials', 'Programming', 'Math', and 'Physics'. The main editor area shows a Python file named 'main.py' with the following code:

```
1 counter = 0
2 sum = 0
3 while counter < 10:
4     print(counter)
5     counter = counter + 1
6     sum = sum + counter
7 print(sum)
```

The output on the right side of the editor shows the execution results:

```
0
1
2
3
4
5
6
7
8
9
55
```

The IDE is powered by Trinket, as indicated by the 'Powered by trinket' text in the top right corner of the editor area.

- ▶ A loop that goes on over and over again until a certain condition is executed
  - ▶ Condition is boolean
  
- ▶ Example



# Break and Continue

- ▶ Break - stopping of the loop



```
main.py
1- for i in range(100):
2-     print(i)
3-     if i >= 5:
4-         break
```

0  
1  
2  
3  
4  
5

```
main.py
1 count = 0
2- while (count < 10):
3     count += 1
4-     if count % 2 == 1:
5         continue
6     print(count)
7
```

2  
4  
6  
8  
10

- ▶ Continue
  - ▶ continuing (doing nothing)





# Examples and Problems!

Type Your Answers in the Chat



```
count = 0
```

```
while count < 10:
```

```
    count += 1
```


```
    if count == 11:
```

```
        print("hi")
```

```
    if count == 2:
```

```
        print("bye")
```

**What does this print?**



```
list = ["one", "two", "three"];  
list[1] = "four"  
print(list)
```

**Try it!**