PYTHON IS FOR EVERYONE

Tutorial 7:

PYTHON PROGRAMMING - LISTS AND LIST OPERATIONS IN GOOGLE COLAB

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Objectives

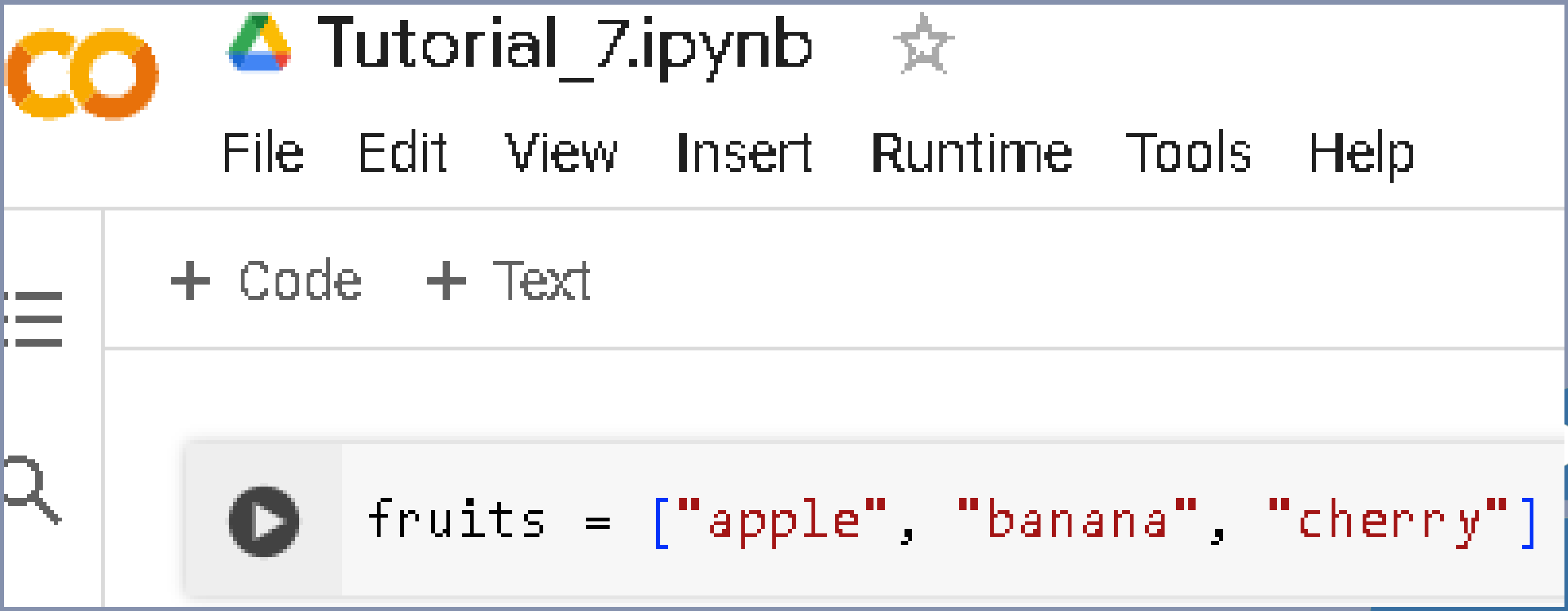
- Understand what lists are and how to create them.
- Learn how to access, modify, and manipulate list elements.
- Explore common list methods and operations.
- Practice working with lists.

What is a List?

A list is a collection of items that are ordered and changeable. Lists can contain items of different data types, including numbers, strings, and even other lists.

Creating a List

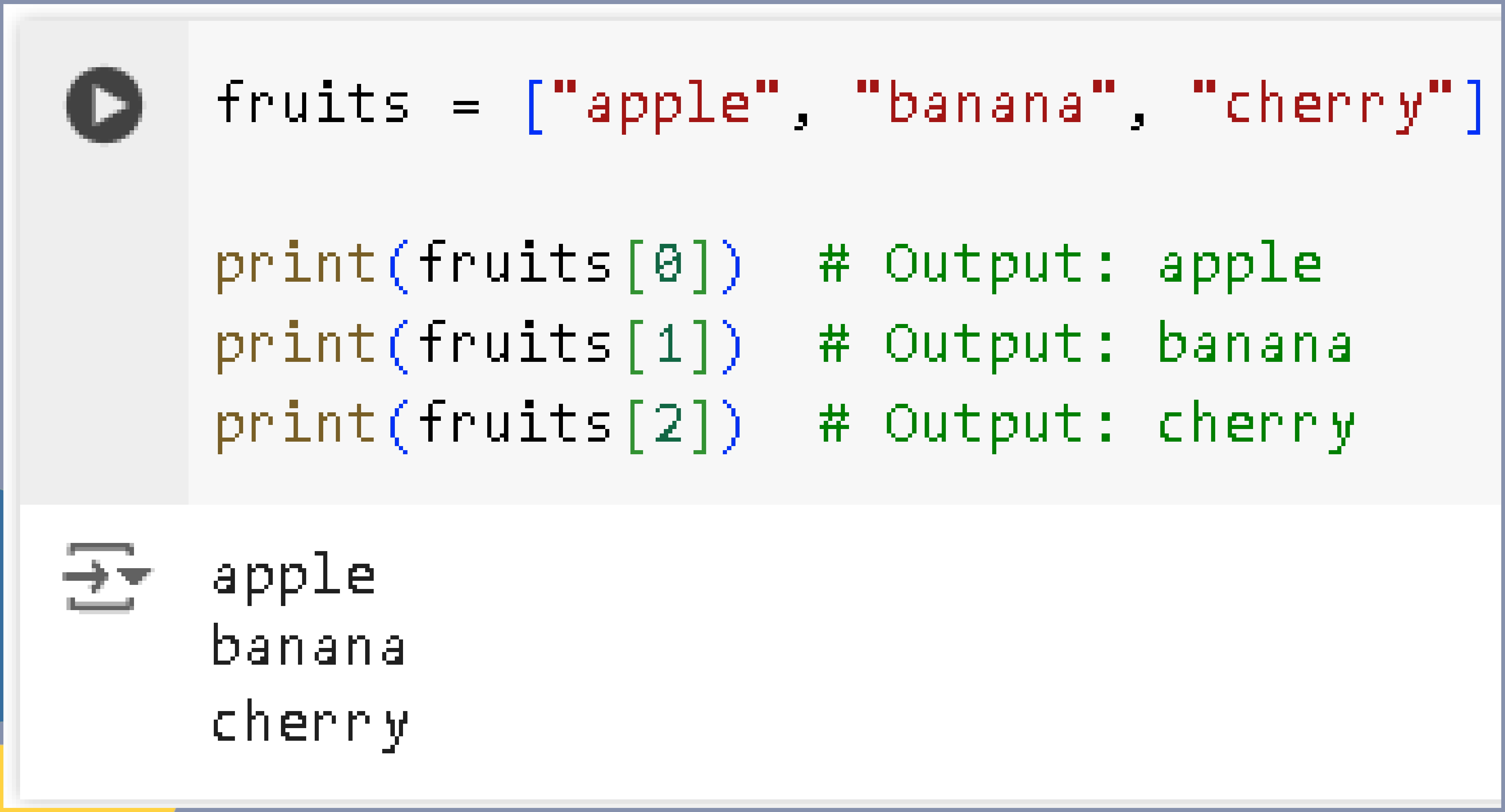
You can create a list by placing items inside square brackets “[]”, separated by commas.



```
fruits = ["apple", "banana", "cherry"]
```

Accessing List Elements

You can access elements in a list using their index. Python uses zero-based indexing, meaning the first element has an index of 0.



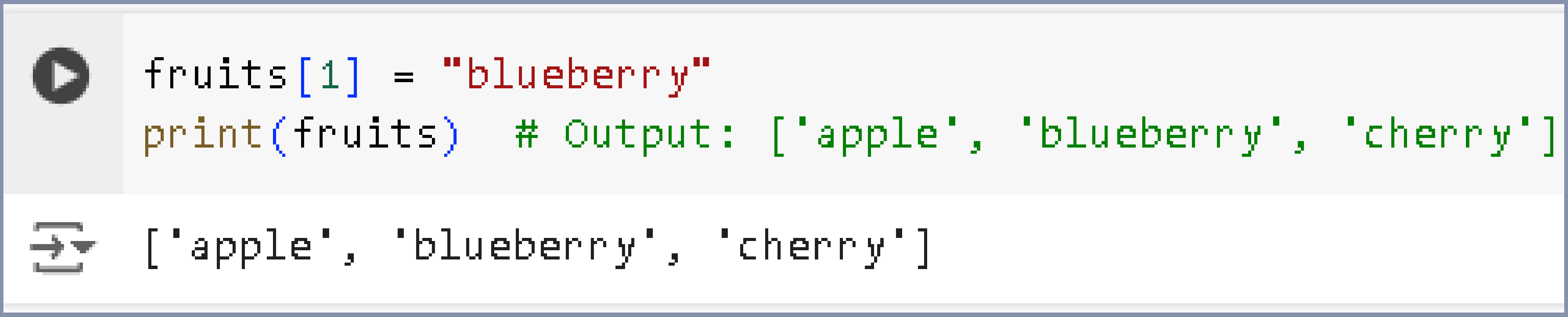
```python
fruits = ["apple", "banana", "cherry"]

print(fruits[0])  # Output: apple
print(fruits[1])  # Output: banana
print(fruits[2])  # Output: cherry
```

```
apple
banana
cherry
```

Modifying List Elements

You can change the value of a specific element in a list by accessing it via its index.



```
fruits[1] = "blueberry"
print(fruits)  # Output: ['apple', 'blueberry', 'cherry']
```

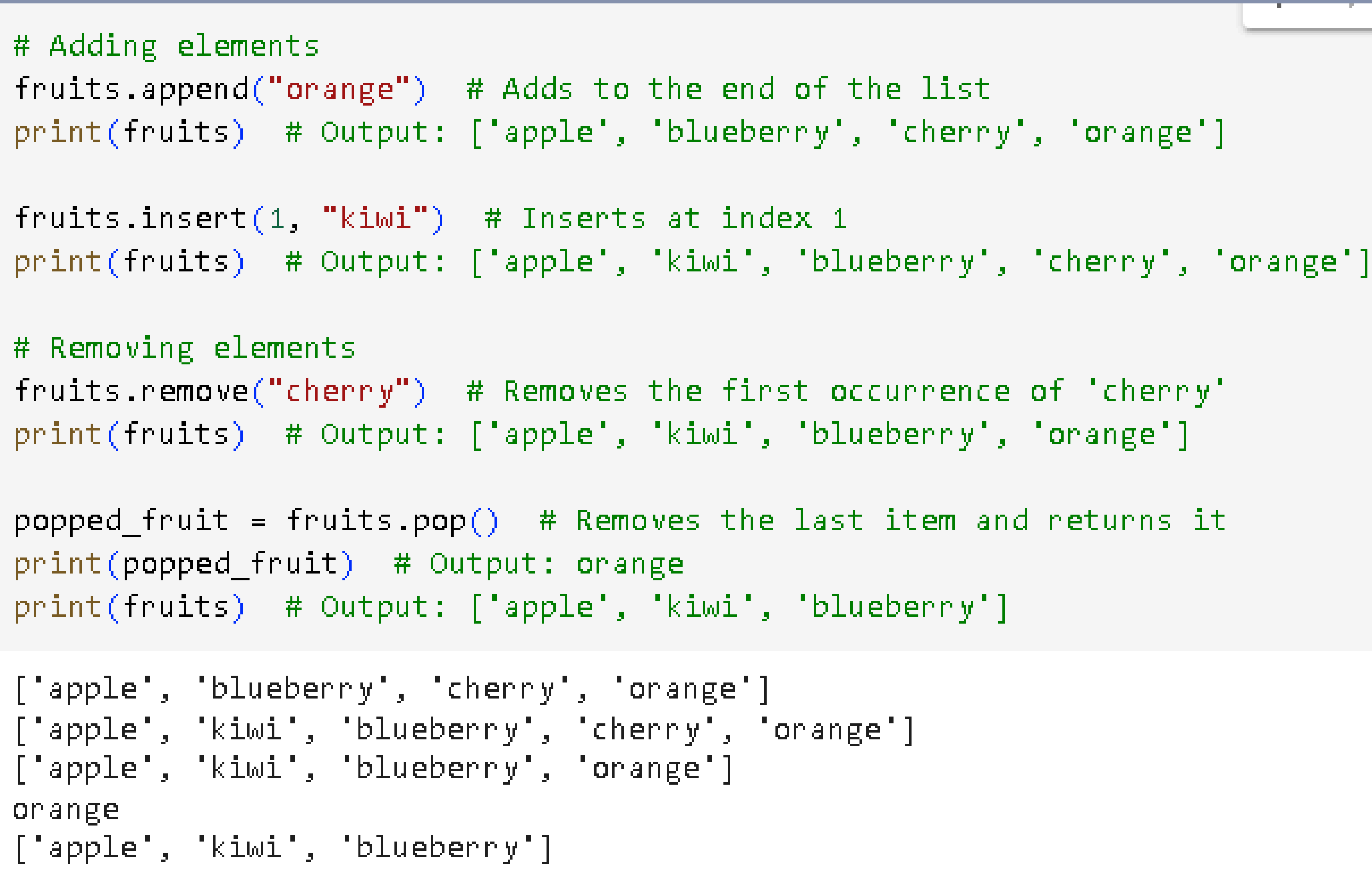
```
['apple', 'blueberry', 'cherry']
```

“Banana” has been changed to “blueberry” in your list now, but left the other items in the list unchanged.

Adding and Removing Elements

You can add elements to a list using the “append()” method or the “insert()” method, and remove elements using the “remove()” method or the “pop()” method.

Adding and Removing Elements



```
# Adding elements
fruits.append("orange")  # Adds to the end of the list
print(fruits)  # Output: ['apple', 'blueberry', 'cherry', 'orange']

fruits.insert(1, "kiwi")  # Inserts at index 1
print(fruits)  # Output: ['apple', 'kiwi', 'blueberry', 'cherry', 'orange']

# Removing elements
fruits.remove("cherry")  # Removes the first occurrence of 'cherry'
print(fruits)  # Output: ['apple', 'kiwi', 'blueberry', 'orange']

popped_fruit = fruits.pop()  # Removes the last item and returns it
print(popped_fruit)  # Output: orange
print(fruits)  # Output: ['apple', 'kiwi', 'blueberry']
```

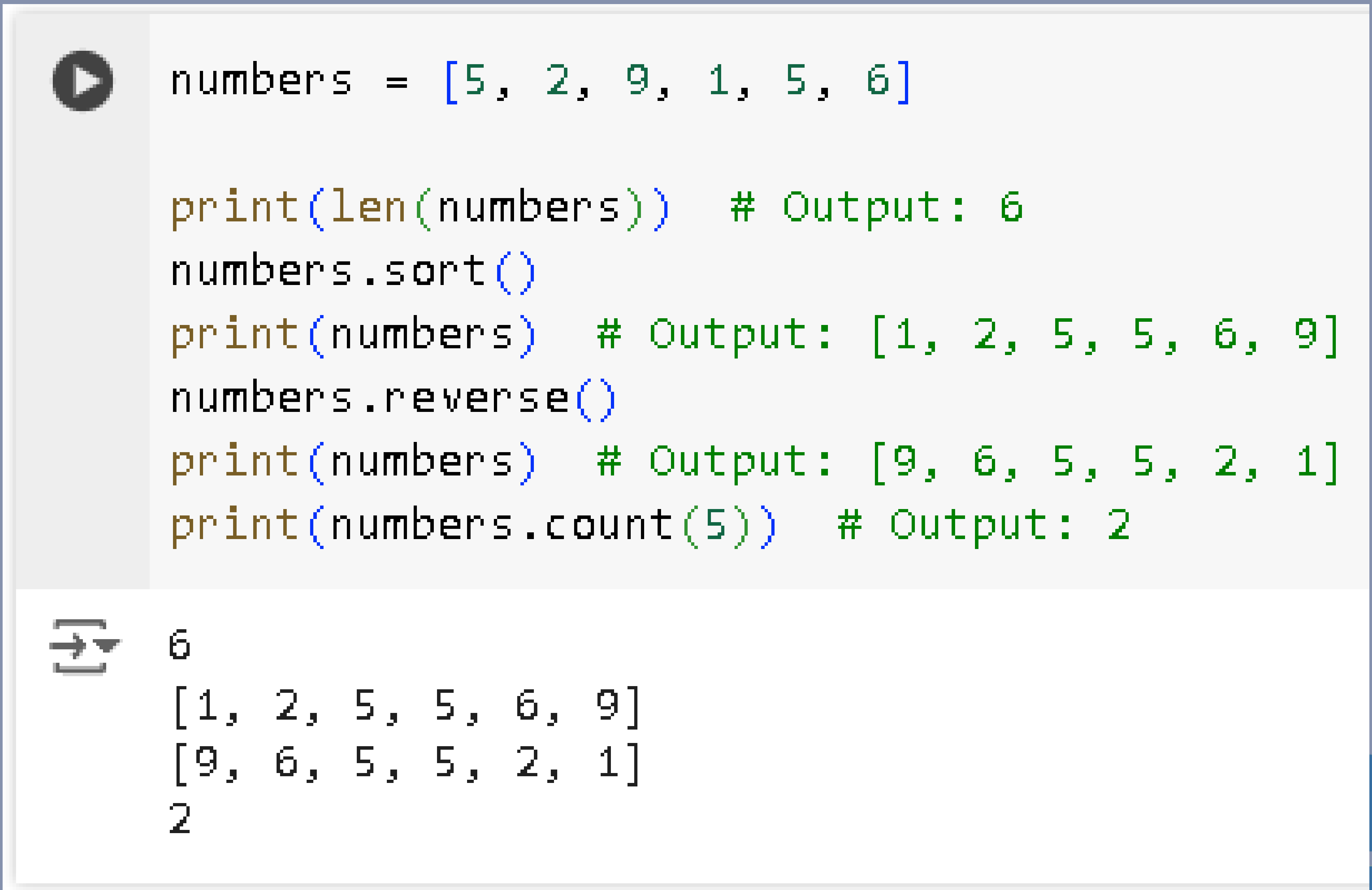
```
['apple', 'blueberry', 'cherry', 'orange']
['apple', 'kiwi', 'blueberry', 'cherry', 'orange']
['apple', 'kiwi', 'blueberry', 'orange']
orange
['apple', 'kiwi', 'blueberry']
```

Common List Methods

Here are some common methods you can use with lists:

- len(list): Returns the number of items in the list.
- list.sort(): Sorts the list in ascending order.
- list.reverse(): Reverses the order of the list.
- list.count(item): Returns the number of occurrences of an item in the list.

Common List Methods



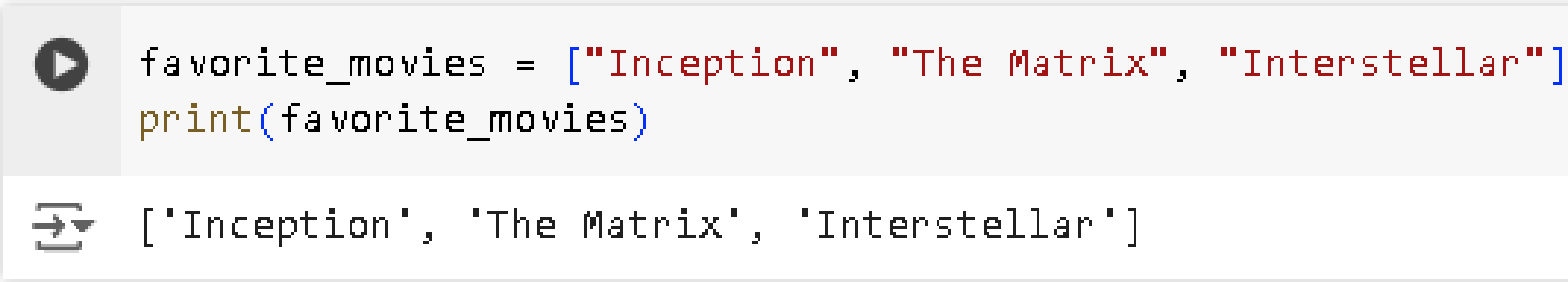
```python
numbers = [5, 2, 9, 1, 5, 6]

print(len(numbers))  # Output: 6
numbers.sort()
print(numbers)  # Output: [1, 2, 5, 5, 6, 9]
numbers.reverse()
print(numbers)  # Output: [9, 6, 5, 5, 2, 1]
print(numbers.count(5))  # Output: 2
```

```
6
[1, 2, 5, 5, 6, 9]
[9, 6, 5, 5, 2, 1]
2
```

Practice Exercises

Create a List: Create a list of your favorite movies and print it.

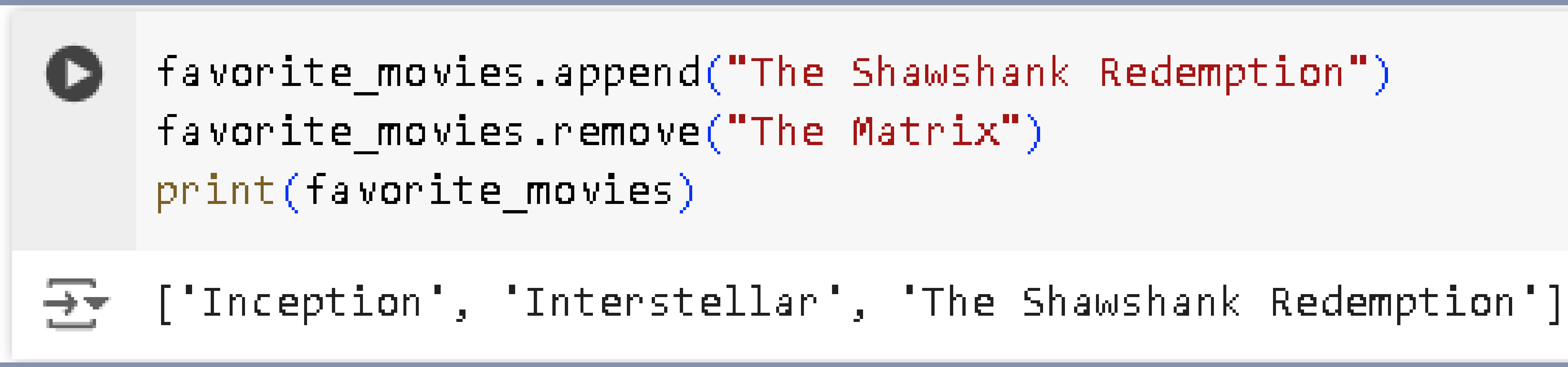


```
favorite_movies = ["Inception", "The Matrix", "Interstellar"]
print(favorite_movies)
```

```
['Inception', 'The Matrix', 'Interstellar']
```

Practice Exercises

Modify the List: Add a new movie to your list and remove one movie from it.

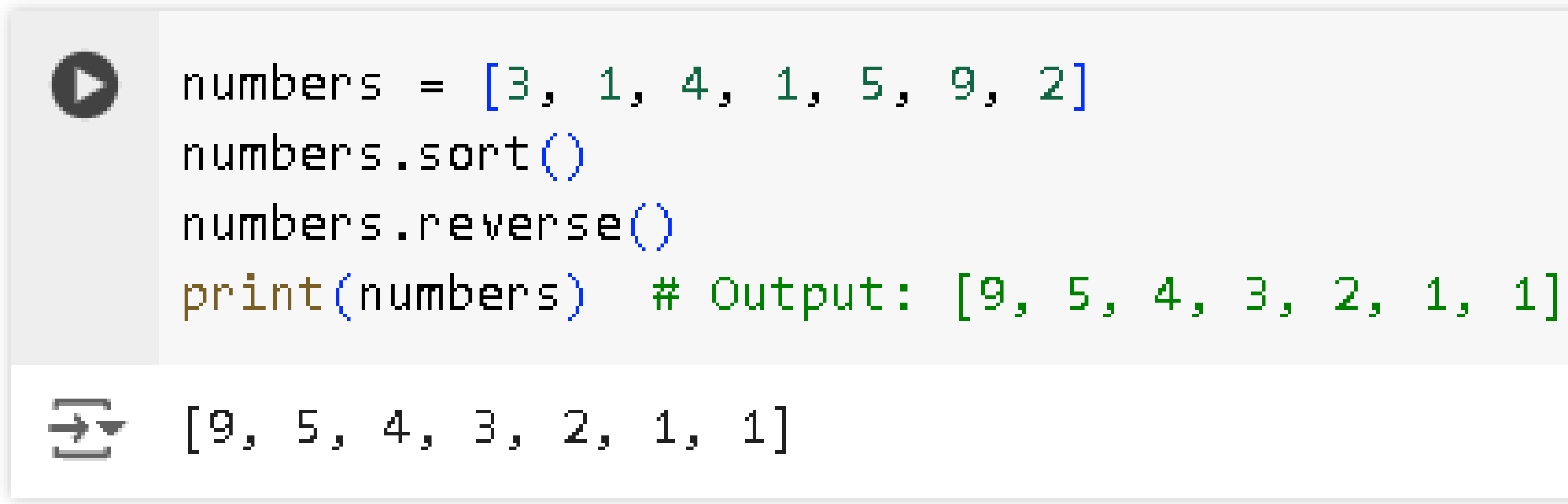


```python
favorite_movies.append("The Shawshank Redemption")
favorite_movies.remove("The Matrix")
print(favorite_movies)
```

```
['Inception', 'Interstellar', 'The Shawshank Redemption']
```

Practice Exercises

Sort and Reverse: Write a program that sorts a list of numbers and then reverses it.

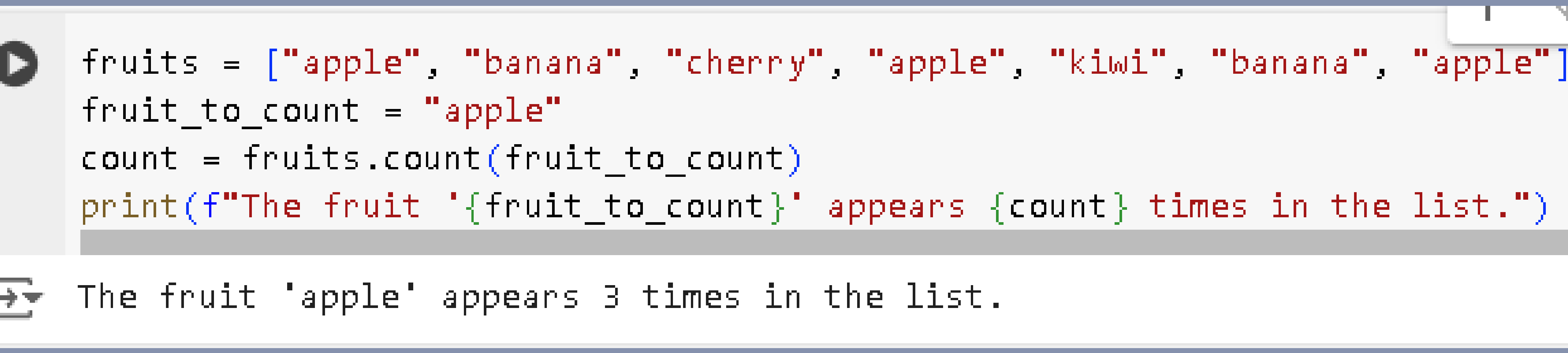


```
numbers = [3, 1, 4, 1, 5, 9, 2]
numbers.sort()
numbers.reverse()
print(numbers)  # Output: [9, 5, 4, 3, 2, 1, 1]
```

```
[9, 5, 4, 3, 2, 1, 1]
```

Practice Exercises

Count Occurrences: Write a program that counts how many times a specific fruit appears in a list of fruits.

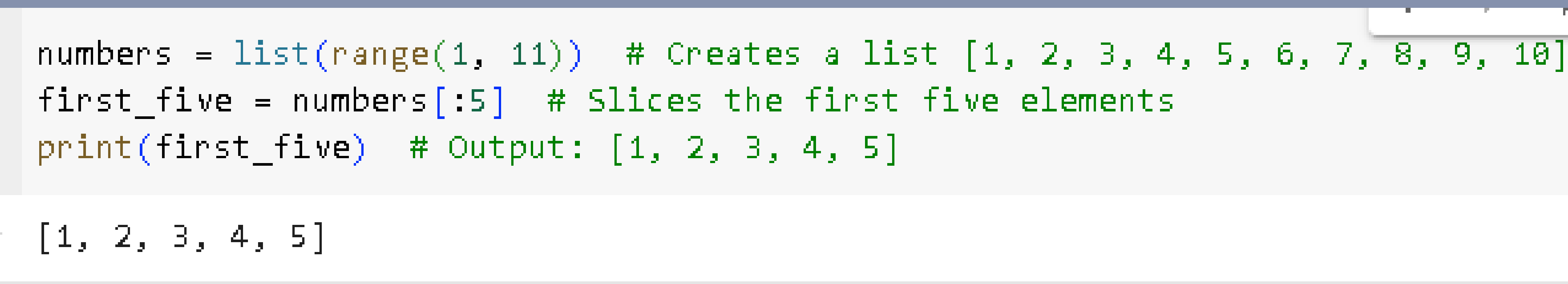


```python
fruits = ["apple", "banana", "cherry", "apple", "kiwi", "banana", "apple"]
fruit_to_count = "apple"
count = fruits.count(fruit_to_count)
print(f"The fruit '{fruit_to_count}' appears {count} times in the list.")
```

```
The fruit 'apple' appears 3 times in the list.
```

Practice Exercises

List Slicing: Write a program that creates a list of numbers from 1 to 10 and then prints the first five numbers using slicing.



```
numbers = list(range(1, 11))  # Creates a list [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
first_five = numbers[:5]  # Slices the first five elements
print(first_five)  # Output: [1, 2, 3, 4, 5]
```

```
[1, 2, 3, 4, 5]
```

Conclusion

In this tutorial, you learned about lists in Python, including how to create, access, modify, and manipulate them. You explored common list methods and practiced working with lists through various exercises. Lists are a fundamental data structure in Python that allow you to store and manage collections of items efficiently.

Next Steps

In tutorial 7, we will cover cover how to create and manipulate dictionaries, which are key-value pairs that allow for efficient data retrieval.

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