

Lists

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What follows below is only a brief introduction to lists in Python. For more informations, see <http://effbot.org/zone/python-list.htm> or <http://docs.python.org/tutorial/datastructures.html>.

Assignment In this document, I will ask you a few questions about how to do things with lists. Your answer should be in the form of a single line of code. Create a file (word document would be fine) that contains all your answers to turn in.

Note: All example code in this document can be typed directly into the IDLE. You do not need to save the code in a separate file. Text that appears after a `>>>` is entered into the IDLE, text in blue is Python's response.

1 Basics

Lists allow you to collect a bunch of related things together in one place. Lists are easiest to understand by example, so let's start there. To create a list containing the integers 1 through 5 and store it in the variable `MyList` you can type

```
>>> MyList = [1, 2, 3, 4, 5]
```

The square brackets indicate that this is a list, and the commas separate elements of the list. We can print the list:

```
>>> print MyList
[1, 2, 3, 4, 5]
```

We can access individual elements of the list. To print the first element of your list you can type

```
>>> print MyList[0]
1
```

Notice that the first element in our list was element 0. This is a quirk of computer science: **computers count starting with 0!** This means the third element of my list is `MyList[2]`.

Question 1: How do you print the 5th element of your list?

Python can tell us how many elements are in our list. This is called the **length** of the list.

```
>>> len(MyList) # get the length of MyList
5
```

2 Altering Lists

You can change an element in a list:

```
>>> MyList = [1, 2, 3, 4, 5] # Create MyList
>>> print MyList
[1, 2, 3, 4, 5]
>>> MyList[0] = 7 # Change the first element of MyList to a 7
>>> print MyList
[7, 2, 3, 4, 5]
```

Question 2: How can you make the 4th element of `MyList` be a 9?

You can also add a new element to the end of your list:

```
>>> MyList = [1, 2, 3, 4, 5] # Create MyList
>>> print MyList
[1, 2, 3, 4, 5]
>>> MyList = MyList + [6] # Add a 6 to the end of MyList
>>> print MyList
[1, 2, 3, 4, 5, 6]
```

Question 3: How can you add a 7 to the end of `MyList`?

3 Constructing Lists: Range

The `range` function allows you to construct lists quickly and will be far more convenient, typically, than typing in the full list yourself. `Range` has three different usages:

1. `range(stop)` creates the list of integers from 0 to `stop`, not including `stop`.

```
>>>range(5)
[0, 1, 2, 3, 4]
```

2. `range(start, stop)` creates the list of integers from `start` to `stop`, not including `stop`.

```
>>> range(1, 5)
[1, 2, 3, 4]
```

3. `range(start, stop, step)` creates the list of integers from `start` to `stop`, not including `stop`, counting by `step`.

```
>>> range(1, 20, 3)
[1, 4, 7, 10, 13, 16, 19]
```

`step` can also be negative:

```
>>> range(0, -10, -1)
[0, -1, -2, -3, -4, -5, -6, -7, -8, -9]
```

For each of the following questions, construct the given list using the range function.

Example: [5, 6, 7, 8]

Answer: `range(5, 9)`

Question 4: [10, 11, 12, 13, 14, 15, 16]

Question 5: [10, 12, 14, 16]

Question 6: [-35, -36, -37, -38, -39]

Question 7: The list of the multiples of 5 that are less than 100: [5, 10, 15, ..., 95]

4 Strings are Lists

Strings are lists of characters. This means we can access the individual letters in a word:

```
>>> S = "Computer" # Store the string "Computer" in the variable S
>>> print S[0] # Print the first character in the string S
'C'
```

Question 8: How do you print the 5th letter in “Computer”?

Question 9: How do you print the ‘r’ in “Computer”?

Question 10: How do you find the number of characters in “Comptuer”?