

Model 1 Lists

A variable can hold multiple values in the form of a *list*. The values are separated by commas and wrapped in square brackets. For example:

```
primes = [2, 3, 5, 7, 11, 13, 17, 19, 23, 29]
```

Each *element* of the list can be referenced by an *index*, which is the sequential position starting at 0. For example, `primes[4]` is 11.

index	0	1	2	3	4	5	6	7	8	9
value	2	3	5	7	11	13	17	19	23	29

Do not type anything yet! Read the questions first!

Python code	Shell output
<code>odd = [1, 3, 5, 7]</code>	
<code>odd</code>	
<code>odd[2]</code>	
<code>odd[4]</code>	
<code>len(odd)</code>	
<code>number = odd[1]</code>	
<code>number</code>	
<code>odd[1] = 2</code>	
<code>odd</code>	
<code>number</code>	

Questions (10 min)

Start time: _____

1. What is the index of the second element of `primes`? What is the value at that index?
2. How does the index number compare to the position of the element?

3. Type each line of code in a Python Shell and write the corresponding output in the space above. If an error occurs, write what type of error. Place an asterisk (*) next to any output for which you were surprised.
4. How did you reference the value of the 3rd element of odd?
5. What did the output of the len() function tell you about the list?
6. The output of Model 1 displayed an error. Explain the reason for the error.
7. Write a statement that assigns a list of three integers to the variable run.
8. Write a statement that assigns the value 100 to the last element of run.
9. Write a statement that assigns the first value of run to a variable named first.

Model 2 Sequences

Lists and strings are examples of *sequence* types. Complete the table below to explore how sequences work.

Python code	Shell output
<code>seq1 = "one two"</code>	
<code>type(seq1)</code>	
<code>len(seq1)</code>	
<code>seq1[1]</code>	
<code>seq1[1] = '1'</code>	
<code>seq2 = "one", "two"</code>	
<code>type(seq2)</code>	
<code>len(seq2)</code>	
<code>seq2[1]</code>	
<code>seq2[1] = '1'</code>	
<code>seq3 = ["one", "two"]</code>	
<code>type(seq3)</code>	
<code>seq3[1]</code>	
<code>seq3[1] = 1</code>	
<code>seq4 = ("one", 1)</code>	
<code>type(seq4)</code>	
<code>number = 12345</code>	
<code>number[3]</code>	

Questions (15 min)

Start time: _____

10. How does a sequence type differ from a number? (See the last row of the table.)
11. What are the names of the three sequence types introduced in Model 2?

12. How does the syntax of creating a tuple differ from creating a list?

13. Is there more than one way (syntax) to create a tuple? Justify your answer.

14. Which sequence types allow their elements to be changed? Which do not?

15. Is it possible to store values of different types in a sequence? If yes, give an example from the table; if no, explain why not.

16. Summarize the difference between lists and tuples. How do they look differently, and how do they work differently?