

What is a Collection?

A collection is nice because we can put more than one value in it and carry them all in one convenient package.

We have a bunch of values in a single “variable”

We do this by having more than one place “in” the variable

We have ways of finding the different places in the variable.

What is not a Collection?

Most of our variables have one value in them - when we put a new value in the variable - the old value is overwritten.

- ```
x = 5
x = 9
print(x)
9
```

## A Story of Two Collections

### List

- A linear collection of values that stay in order.
- Lists index their entries based on the position in the List.

### Dictionary

- A “bag” of values, each with its own label.
  - [https://en.wikipedia.org/wiki/Associative\\_array](https://en.wikipedia.org/wiki/Associative_array)
    - Dictionaries are Python’s most powerful data collection
    - Dictionaries allow us to do fast database-like operations in Python
    - Dictionaries have different names in different languages
    - Associative Arrays - Perl / PHP
    - Properties or Map or HashMap - Java
    - Property bag - C# / .NET
      - Dictionaries are like bags - No order
      - We index the things we put in the Dictionary with a “lookup tag”

```
purse = dict()
purse['money'] = 12
purse['candy'] = 3
purse['tissues'] = 75
• print(purse)
 ['money':12, 'tissues':75, 'candy': 3]
 ○ print(purse['candy'])
 3
 ■ purse['candy'] = purse['candy'] + 2
 print(purse)
 ['money': 12, 'tissues': 75, 'candy': 5]
```

## Comparing Lists and Dictionaries

Dictionaries are like Lists except that they use keys instead of numbers to look up values.

| <u>List</u>                                                                                                  | <u>Dictionary</u>                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>lst = list() lst.append(21) lst.append(183) print(lst) [21, 183] lst[0] = 23 print(lst) [23, 183]</pre> | <pre>ddd = dict() ddd['age'] = 21 ddd['course'] = 182 print(ddd) {'course': 182, 'age': 21} ddd['age'] = 23 print(ddd) {'age': 23, 'course': 182}</pre> |

| <u>List</u>                                                                                                                                    | <u>Dictionary</u> |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--|-------|--|-----|----|-----|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--|-------|--|------------|-----|---------|----|
| <table><tr><td>Key</td><td></td></tr><tr><td>Value</td><td></td></tr><tr><td>[0]</td><td>21</td></tr><tr><td>[1]</td><td>183</td></tr></table> | Key               |  | Value |  | [0] | 21 | [1] | 183 | <table><tr><td>Key</td><td></td></tr><tr><td>Value</td><td></td></tr><tr><td>['course']</td><td>182</td></tr><tr><td>['age']</td><td>21</td></tr></table> | Key |  | Value |  | ['course'] | 182 | ['age'] | 21 |
| Key                                                                                                                                            |                   |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| Value                                                                                                                                          |                   |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| [0]                                                                                                                                            | 21                |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| [1]                                                                                                                                            | 183               |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| Key                                                                                                                                            |                   |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| Value                                                                                                                                          |                   |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| ['course']                                                                                                                                     | 182               |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |
| ['age']                                                                                                                                        | 21                |  |       |  |     |    |     |     |                                                                                                                                                           |     |  |       |  |            |     |         |    |

## Dictionary Literals (Constants)

Dictionary literals use curly braces and have a list of Key:Value pairs.

- ```
jjj = {'chuck': 1, 'fred': 42, 'jan': 100}
print(jjj)
{'jan': 100, 'chuck': 1, 'fred': 42}
```

You can make an empty Dictionary using empty curly braces.

- ```
ooo = {}
print(ooo)
{}
```