

Python Dictionaries

Textbook

Python Dictionaries



Remember that Python groups information in 4 ways: Lists, Dictionaries, Tuples, and Sets

[Lists](#): We have learned about lists in previous lessons.

```
holidays = ["Christmas", "Hanukkah", "Thanksgiving", "Halloween"]
```

[Dictionaries](#): We will learn more about dictionaries in this lesson.

[Tuples](#): We will learn more about tuples in a future lesson.

[Sets](#): We will learn more about sets in a future lesson.

You can learn about the differences between the data sets below.

Group Type	Symbol	Are the items ordered?	Can they be changed?	Can it have duplicate items?
List	[]	Yes	Yes	Yes
Dictionary	{ : }	Yes	Yes	No
Tuple	()	No	No (<i>immutable</i>)	Yes

Set	{ }	No	No (<i>immutable</i>)	No
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Each of these group types are useful in different situations.

Dictionaries

[Dictionaries](#) are ordered, changeable, and indexed.

```
1 classmates = {  
2     "Billy" : 8,  
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 print(classmates)
```

Try it!

This will print out `{'Billy': 8, 'Vance': 12, 'Alice': 10}` . Notice the use of curly braces { } and how each item in the dictionary is a pair. This pairing is a big difference between dictionaries and lists. Dictionary values appear as pairs.

The first item in the pairing is called a [key](#).

The second item in the pairing is called a [value](#).

Here is another example of a dictionary that uses strings as the value.

```
1 names = {  
2     "person1": "George",  
3     "person2": "Brenda",  
4     "person3": "Larry",  
5     "person4": "Aaliyah",  
6 }  
7  
8 print(names)
```

Try it!

Keys()

You can use the `keys()` method to display all the keys in a dictionary. It looks like this.

```
1 classmates = {  
2     "Billy" : 8,  
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 print(classmates.keys())
```

Try it!

This will return

```
dict_keys(['Billy', 'Vance', 'Alice'])
```

Notes: This is just a way to view the keys, they cannot be accessed or used in this form.

Values()

You can use the values() method to display all the values in a dictionary. It looks like this.

```
1 classmates = {  
2     "Billy" : 8,  
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 print(classmates.values())
```

Try it!

This will return

```
dict_values([8, 12, 10])
```

Notes: This is just a way to view the values, they cannot be accessed or used in this form.

Items()

You can use the items() method to display the items in the dictionary. It looks like this.

```
1 classmates = {  
2     "Billy" : 8,  
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 print(classmates.items())
```

Try it!

This will display the following.

```
dict_items([('Billy', 8), ('Vance', 12), ('Alice', 10)])
```

Notes: This is just a way to view the items, they cannot be accessed or used in this form.

Accessing Items in the Dictionary

You can also access certain items within the dictionary. This is done by naming the dictionary and then using brackets.

```
1 classmates = {  
2     "Billy" : 8,
```

```
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 print(classmates["Vance"])  
8
```

Try it!

This will print out `12`.

Notice that this method accesses the [value](#) paired with the [key](#) named Vance.



Changing Values in the Dictionary

```
1 classmates = {  
2     "Billy" : 8,  
3     "Vance" : 12,  
4     "Alice" : 10  
5 }  
6  
7 classmates["Alice"] = 15  
8  
9 print(classmates)
```

Try it!

This will print out `{'Billy': 8, 'Vance': 12, 'Alice': 15}`.

Checkpoint

Python Dictionaries

1. Create a dictionary named `mountains` .
2. Inside the dictionary, include the 4 mountain names as key values.
`Timpanogos Everest Kilimanjaro Vesuvius`
3. Pair the key values with a number indicating which one is shortest and which one is tallest. (Do an internet search to find out the order)
4. Print the dictionary named `mountains` .
5. Print just the value for `Vesuvius` .
6. Replace the value assigned to `Kilimanjaro` with a higher number.

Requirements:

- Create a dictionary named `mountains` .
- Inside the dictionary, include the 4 mountain names as key values. `Timpanogos Everest Kilimanjaro Vesuvius`
- Print the dictionary named `mountains` .
- Print just the value for `Vesuvius` .
- Replace the value assigned to `Kilimanjaro` with a higher number.

Questions (8)

1. Select all that apply: Dictionaries are...

SELECT MULTIPLE

Select all that apply:

- A. ordered
- B. changeable
- C. indexed
- D. fixed

2. The first item in the pairing of a dictionary is called the...

MULTIPLE CHOICE

Choose the correct answer:

- A. key
- B. value
- C. property
- D. item

MULTIPLE CHOICE

3. The second item in a dictionary pairing is called the...

Choose the correct answer:

- A. key
- B. value
- C. property
- D. item

MULTIPLE CHOICE

4. What is the biggest difference between dictionaries and lists in Python?

Choose the correct answer:

- A. Dictionaries have pairings while lists don't.
- B. Dictionaries appear in alphabetical order.
- C. Items in dictionaries can be replaced while items in lists cannot.
- D. Dictionaries automatically organize information.

MULTIPLE CHOICE

5. Which data structure is ordered, changeable, and indexed in Python?

Choose the correct answer:

- A. Sets
- B. Dictionaries
- C. Tuples

MULTIPLE CHOICE

6. How is data stored in a Python dictionary?

Choose the correct answer:

- A. As a single value
- B. As a list of values
- C. As a pair of key-value items
- D. As an ordered sequence

7. What is the purpose of curly braces ({}) in a dictionary?

Choose the correct answer:

- A. To group individual key-value pairs
- B. To indicate a list
- C. To enclose all dictionary items
- D. To represent a function

8. How do you access the value associated with the key "Vance" in the classmates dictionary?

MULTIPLE CHOICE

Choose the correct answer:

- A. `classmates["Vance"]`
- B. `classmates(Vance)`
- C. `classmates.key("Vance")`
- D. `classmates.get("Vance")`

Challenges (5)

1. Dictionary Author

Have you ever wondered who wrote the dictionaries you've used to look up what words mean?

Now you are the author!

Create a dictionary with at least **10 key/value pairs**.

Print the dictionary.

Requirements:

- Create a dictionary with at least 10 key/value pairs
- Print the dictionary

2. Dictionaries and Lists

Compare the difference between Python Dictionaries and Python Lists.

1. Create a **dictionary** with at least **5 pairs in it**.
2. Create a **list** with at least **5 items in it**.
3. **Print both** the dictionary and the list.

Requirements:

- Create a dictionary with at least 5 pairs in it.
- Create a list with at least 5 items in it.
- Print out both the dictionary and the list in separate print statements.

3. Survival

You have been stranded on a desert island. You need to figure out how to survive. You need to find food and water. You need to build a shelter as you know hurricane season is coming. What supplies are the most needed in this situation?

1. Create **5 separate inputs**.
2. Each input will ask the user to rate an item on how important they are in this kind of situation.
3. **1 is not at all important and 10 is very important**.
4. The 5 inputs will ask for an importance rating for the following: **knife fire starter pot rope tarp**
5. Using the user rating, create a dictionary that lists out the item and its rating.
6. Print the dictionary you created.

For example:

Inputs: 9 , 10 , 6 , 6 , 7

Output: {'knife': 9, 'fire starter': 10, 'pot': 6, 'rope': 6, 'tarp': 7}

Another example:

Inputs: 5 , 8 , 9 , 2 , 9

Output: {'knife': 5, 'fire starter': 8, 'pot': 9, 'rope': 2, 'tarp': 9}

4. Color Dictionary

1. Create a dictionary named `colors` .
2. Add at least 5 pairs to the dictionary.
3. Make sure to include the keys `red` , `blue` , `orange` , and `purple` in the dictionary.
4. In a print statement, pull out the value for the key `orange` .
5. In another print statement, pull out the value for the key `purple` .
6. Replace the value for the key `red` .
7. Replace the value for the key `blue` .
8. Print the dictionary named colors at the end.

Requirements:

- Create a dictionary with at least 5 pairs in it.
- In a print statement, pull out the value for the key `orange` .
- In another print statement, pull out the value for the key `purple` .
- Replace the value for the key `red` .
- Replace the value for the key `blue` .
- Print the dictionary named colors at the end.

5. All the Pets

1. Let's say you are a pet lover and have a lot of animals at your house. Create a dictionary named `pets` . Inside the dictionary, include the following information as pairs. The name of the animal will be the key and the integers will be the values.

You have `30 fish` , `2 dogs` , `5 chickens` , `2 cats` , and `1 bunny` .

2. Using the approaches learned in the lesson, replace the values in your dictionary according to the following information.

10 of your fish died and your bunny had 6 babies.

3. Using the approach in the lesson to access items in a dictionary, create the following sentence in a print statement.

`"Because 10 fish died, and the bunny had 6 babies, you now have (number of fish) fish and (number of bunnies) bunnies at your house."`

4. Print the dictionary at the end of your program with the updated values.

Requirements:

- Create a dictionary named `pets` .
- Include this information in the dictionary: `30 fish` , `2 dogs` , `5 chickens` , `2 cats` , and `1 bunny` .
- Replace the appropriate value for `Fish` because 10 fish died.
- Replace the appropriate value for `Bunnies` because the bunny had 6 babies.
- Create the designated print statement.
- Print the dictionary at the end with the updated values.

Answer Keys & Solutions

Checkpoint Solutions

Python Dictionaries

```
1 mountains = {"Timpanogos" : 5, "Everest": 10, "Kilimanjaro": 6, "Vesuvius": 7}
2
3 print(mountains)
4 print(mountains["Vesuvius"])
5
6 mountains["Kilimanjaro"] = 7
7
8 print(mountains)
```

Questions

1. Select all that apply: Dictionaries are...

SELECT MULTIPLE

Correct Answers:

- | | |
|---------------|-------------|
| A. ordered | ✓ Correct |
| B. changeable | ✓ Correct |
| C. indexed | ✓ Correct |
| D. fixed | ✗ Incorrect |

Explanation:

Dictionaries are not fixed.

2. The first item in the pairing of a dictionary is called the...

MULTIPLE CHOICE

Correct Answer:

- | | |
|-------------|-------------|
| A. key | ✓ Correct |
| B. value | ✗ Incorrect |
| C. property | ✗ Incorrect |

D. item

✗ Incorrect

Explanation:

Keys are paired up with values.

3. The second item in a dictionary pairing is called the...

MULTIPLE CHOICE

Correct Answer:

A. key

✗ Incorrect

B. value

✓ Correct

C. property

✗ Incorrect

D. item

✗ Incorrect

Explanation:

Keys are paired up with values.

4. What is the biggest difference between dictionaries and lists in Python?

MULTIPLE CHOICE

Correct Answer:

A. Dictionaries have pairings while lists don't.

✓ Correct

B. Dictionaries appear in alphabetical order.

✗ Incorrect

C. Items in dictionaries can be replaced while items in lists cannot.

✗ Incorrect

D. Dictionaries automatically organize information.

✗ Incorrect

Explanation:

Lists do not have pairings.

5. Which data structure is ordered, changeable, and indexed in Python?

MULTIPLE CHOICE

Correct Answer:

A. Sets

✗ Incorrect

B. Dictionaries

✓ Correct

C. Tuples

✗ Incorrect

6. How is data stored in a Python dictionary?

MULTIPLE CHOICE

Correct Answer:

A. As a single value

✗ Incorrect

B. As a list of values

✗ Incorrect

C. As a pair of key-value items

✓ Correct

D. As an ordered sequence

✗ Incorrect

Explanation:

Dictionaries have pairs

7. What is the purpose of curly braces ({}) in a dictionary?

MULTIPLE CHOICE

Correct Answer:

A. To group individual key-value pairs

✗ Incorrect

B. To indicate a list

✗ Incorrect

C. To enclose all dictionary items

✓ Correct

D. To represent a function

✗ Incorrect

Explanation:

Curly braces surround the whole dictionary

8. How do you access the value associated with the key "Vance" in the classmates dictionary?

MULTIPLE CHOICE

Correct Answer:

A. `classmates["Vance"]`

✓ Correct

B. `classmates(Vance)`

✗ Incorrect

C. `classmates.key("Vance")`

✗ Incorrect

D. `classmates.get("Vance")`

✗ Incorrect

Explanation:

Square brackets are used to retrieve items from a dictionary.

Challenges

1. Dictionary Author

Solution:

```
1 holidays = {"January" : "New Years", "February" : "Valentines Day", "March" : "St
  Patricks Day", "April" : "Easter", "May" : "Mothers Day", "June" : "Fathers Day",
  "July" : "4th of July", "August" : "Summer", "September" : "Back to School",
  "October" : "Halloween", "November" : "Thanksgiving", "December" : "Christmas"}
2
3 print(holidays)
```

2. Dictionaries and Lists

Solution:

```
1 packing = { "shoes": 2, "socks": 5, "shirts": 5, "pants": 3, "pjs": 1}
2
3 print(packing)
4
5 packing_list = ["shoes", "socks", "shirts", "pants", "pjs"]
6
7 print(packing_list)
```

3. Survival

Solution:

```
1 knife = int(input("From 1-10, how important is a knife?"))
2 fire_starter = int(input("From 1-10, how important is a fire starter?"))
3 pot = int(input("From 1-10, how important is a pot?"))
```

```
4 rope = int(input("From 1-10, how important is a rope?"))
5 tarp = int(input("From 1-10, how important is a tarp?"))
6
7 survive = { "knife" : knife, "fire starter": fire_starter, "pot": pot, "rope": rope,
8             "tarp": tarp}
9 print(survive)
```

4. Color Dictionary

Solution:

```
1 colors = { "red": 4, "orange": 1, "yellow": 2, "green": 10, "blue": 5, "purple": 6}
2
3 print(colors["orange"])
4 print(colors["purple"])
5
6
7 colors["blue"] = 20
8 colors["red"] = 100
9
10 print(colors)
```

5. All the Pets

Solution:

```
1 pets = {"Fish" : 30, "Dogs": 2, "Chickens": 5, "Cats": 2, "Bunnies": 1}
2
3 pets["Fish"] = 20
4
5 pets["Bunnies"] = 7
6
7 print("Because 10 fish died, and the bunny had 6 babies, you now have " +
8       str(pets["Fish"]) + " fish and " + str(pets["Bunnies"]) + " bunnies at your house.")
9
10 print(pets)
```