

Python Turtle Data Types

Textbook

Python Turtle Data Types



[Variables](#) are like boxes. We can put things inside variables, take things out, and replace what is in there. The data we put inside variables can take different forms. These different forms of variables are called data types.

What is a Data Type?

[Data types](#) are bits of information which tell the computer how you plan on using the variable. Not all data is the same. We have words and numbers that will be used differently. For example, a variable named `first_name` is most likely going to hold a word: someone's name, and not a number.

Below we will go through some different data types.

String

- [string](#): A string is a text value. By placing a variable's value inside quotation marks, you create a string.

- You can use either single quotes `'Good Morning'` or double quotes `"Good Morning"` . Both are valid strings.

```
name = "Jordan"
```

```
name = 'Jordan'
```

Integer

- [int](#): This is short for integer. Integers do not need quotation marks.

```
age = 24
```

```
pies = 3
```

Float

- [float](#): A float is an integer with a decimal value. Floats do not need quotation marks.

```
gpa = 3.89
```

```
distance = 4.5
```

Boolean

- [boolean](#): You can also assign the value to be True or False. Booleans do not need quotation marks.
- *Note: the first letter of True and False MUST be capitalized in Python.*

```
name = True
```

```
name = False
```

Printing Data Types

Sometimes it's hard to tell which data types are being shown in the console.

```
1 example = 34
2 example2 = "34"
3 print(example)
4 print(example2)
```

This will print out `34 34` . They look the same, but one is an integer and another is a string. This differentiation will be VERY very important in upcoming lessons! Make sure you keep your data types straight as you program!

Another example

```
1 example = True
2 example2 = "True"
3 print(example)
4 print(example2)
```

This will print out `True True` . Again, they look the same but one is a string and one is a Boolean.

A Note About Strings

It's not always immediately obvious what kind of data type something is. For example, a string can hold numbers like this:

"56"

This data type looks like an integer, but it's actually a string because it has quotation marks. The same goes for a Boolean value.

"True"

This example is actually a string, even though it looks like a Boolean. We need to be very careful when looking at data to make sure we are using the correct data type.

Review

What kind of data type is this? 43

Show answer/example

What kind of data type is this? .43

Show answer/example

What kind of data type is this? 3.00

Show answer/example

What kind of data type is this? "3.00"

Show answer/example

What kind of data type is this? "891"

Show answer/example

What kind of data type is this? "False"

Show answer/example

What kind of data type is this? False

Show answer/example

Checkpoint

Data Types with Turtles

Practice putting different data types into variables!

1. Include the necessary code to start up a Python screen (import the library and generate a screen).
2. Create a variable named `name` and assign it to a **string** data type.
3. Create a variable named `age` and assign it to an **integer** data type.
4. Create a variable named `gpa` and assign it to a **float** data type.
5. Create a variable named `homework` and assign it to a **Boolean** data type.

Requirements:

- Include the necessary code to start up a Python screen (import the library and generate a screen).

- Create a variable named `name` and assign it to a **string** data type.
- Create a variable named `age` and assign it to an **integer** data type.
- Create a variable named `gpa` and assign it to a **float** data type.
- Create a variable named `homework` and assign it to a **Boolean** data type.

Questions (10)

1. Which of the following is most like a variable?

MULTIPLE CHOICE

Choose the correct answer:

- A. Doors
- B. Windows
- C. Boxes
- D. Shelves

2. How are strings created in Python?

MULTIPLE CHOICE

Choose the correct answer:

- A. Using parentheses ().
- B. Placing the value inside curly braces { }.
- C. Placing the value inside quotation marks " ".
- D. Using square brackets [].

3. Which of the following are correct ways to represent a string in Python? Select all that apply.

SELECT MULTIPLE

Select all that apply:

- A. `name = Jordan`
- B. `name = "Jordan"`
- C. `name = 'Jordan'`
- D. `name = [Jordan]`

4. What is the purpose of data types in Python?

Choose the correct answer:

- A. To give variables variety.
- B. To determine the size of the variable.
- C. To tell the computer how the variable will be used.
- D. To restrict the use of variables.

5. Which of the following is an example of a float?

Choose the correct answer:

- A. "4"
- B. 4
- C. 4.0
- D. "4.0"

6. Which of the following is an example of an integer data type?

Choose the correct answer:

- A. "7"
- B. 7
- C. 7.0
- D. "7.0"

7. What does the "int" data type stand for?

Choose the correct answer:

- A. Integer
- B. Integral
- C. Interesting
- D. Interpolation

MULTIPLE CHOICE

8. In Python, how should you represent a Boolean value?

Choose the correct answer:

- A. name = True
- B. name = true
- C. name = "True"
- D. name = "true"

MULTIPLE CHOICE

9. Why is it important to keep data types straight while programming?

Choose the correct answer:

- A. To increase program speed.
- B. To avoid syntax and logic errors.
- C. To save memory.
- D. To streamline the code.

MULTIPLE CHOICE

10. What is the following data type?

example = "True"

Choose the correct answer:

- A. Boolean
- B. String
- C. Integer
- D. Float

Challenges (5)

1. Coins

Create some variables that contain float data types. These values will be how much each coin is worth. For example, a nickel would be .05, since a nickel is 5 cents.

Note: for this challenge, give each float value 2 decimal places.

1. Include the necessary code to start up a Python screen (import the library and generate a screen).
2. Create a variable named `penny` and assign it to the appropriate float value.
3. Create a variable named `nickel` and assign it to the appropriate float value.
4. Create a variable named `dime` and assign it to the appropriate float value (Include 2 decimal points).
5. Create a variable named `quarter` and assign it to the appropriate float value.
6. Create a variable named `dollar` and assign it to the appropriate float value (Include 2 decimal points).

Requirements:

- Include the necessary code to start up a Python screen (import the library and generate a screen).
- Create a variable named `penny` and assign it to the appropriate float value.
- Create a variable named `nickel` and assign it to the appropriate float value.
- Create a variable named `dime` and assign it to the appropriate float value (Include 2 decimal points).
- Create a variable named `quarter` and assign it to the appropriate float value.
- Create a variable named `dollar` and assign it to the appropriate float value (Include 2 decimal points).

2. Baird's Beaked Whale

Let's learn some cool facts about a certain kind of whale called Baird's Beaked Whale.

-They have 13 stomachs!

-They can hold their breath for up to 60 minutes.

-They can reach up to 36 feet long!

-They weigh up to 26,000 pounds!

1. Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
2. Create a variable named `stomachs` and assign it to the correct integer.
3. Create a variable named `breath` and assign it to the correct integer.
4. Create a variable named `length` and assign it to the correct integer.
5. Create a variable named `weight` and assign it to the correct integer. (Don't include the comma.)
6. On separate lines of code, print out all four variables.

Requirements:

- Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
- Create a variable named `stomachs` and assign it to the correct integer.
- Create a variable named `breath` and assign it to the correct integer.
- Create a variable named `length` and assign it to the correct integer.
- Create a variable named `weight` and assign it to the correct integer.
- On separate lines of code, print out all four variables.

3. Tricky Data Types

Sometimes it can be tricky to tell what kind of data type something is. Practice creating some data types that look similar, but are actually different.

Consider the following examples of data.

```
"True"
```

```
False
```

```
5.0
```

```
"35"
```

```
2
```

Assign them to the following appropriate variable names. Make sure each one goes to its correct variable type.

1. Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
2. Create a variable named `is_string` . Assign it to one of the above values that is actually a string.
3. Create a variable named `is_string2` . Assign it to one of the above values that is actually a string.
4. Create a variable named `is_integer` . Assign it to the above value that is actually an integer.
5. Create a variable named `is_float` . Assign it to the above value that is actually a float.
6. Create a variable named `is_boolean` . Assign it to the above value that is actually a Boolean.

Note: If you try printing out your variables, you'll see that it's hard to tell what variable type they are from the console. This is why it's important to keep your variable types straight as you code. It will make your coding and debugging easier in upcoming lessons.

Requirements:

- Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
- Create a variable named `is_string` . Assign it to one of the above values that is actually a string.
- Create a variable named `is_string2` . Assign it to one of the above values that is actually a string.
- Create a variable named `is_integer` . Assign it to the above value that is actually an integer.
- Create a variable named `is_float` . Assign it to the above value that is actually a float.
- Create a variable named `is_boolean` . Assign it to the above value that is actually a Boolean.

4. About You

Create some boolean values that would help someone get to know you.

1. Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
2. Create a variable named `likes_tacos` and assign it to a Boolean value.
3. Create a variable named `likes_sports` and assign it to a Boolean value.
4. Create a variable named `likes_lime` and assign it to a Boolean value.
5. Create a variable named `likes_dancing` and assign it to a Boolean value.
6. Create a variable named `likes_travel` and assign it to a Boolean value.

Requirements:

- Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
- Create a variable named `likes_tacos` and assign it to a Boolean value.
- Create a variable named `likes_sports` and assign it to a Boolean value.
- Create a variable named `likes_lime` and assign it to a Boolean value.
- Create a variable named `likes_dancing` and assign it to a Boolean value.
- Create a variable named `likes_travel` and assign it to a Boolean value.

5. Create Your Own

Create your own variables! Create at least 4 with one of each variable type.

1. Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
2. Create 4 variables, one with each variable type.
3. On separate lines of code, print each variable out.

Requirements:

- Include the necessary code to start up a Python screen. (Import the library and generate a screen.)
- Create 4 variables, one with each variable type.
- On separate lines of code, print each variable out.

Answer Keys & Solutions

Checkpoint Solutions

Data Types with Turtles

```
1 import turtle
2 turtle.getscreen()
3
4
5 name = "John"
6
7 age = 12
8
9 gpa = 3.8
10
11 homework = True
```

Questions

1. Which of the following is most like a variable?

MULTIPLE CHOICE

Correct Answer:

- A. Doors ✗ Incorrect
- B. Windows ✗ Incorrect
- C. Boxes ✓ Correct
- D. Shelves ✗ Incorrect

Explanation:

A variable is like a container that holds information.

2. How are strings created in Python?

MULTIPLE CHOICE

Correct Answer:

- A. Using parentheses (). ✗ Incorrect
- B. Placing the value inside curly braces { }. ✗ Incorrect

C. Placing the value inside quotation marks " ".

✓ Correct

D. Using square brackets [].

✗ Incorrect

Explanation:

This is an example of a string " "

3. Which of the following are correct ways to represent a string in Python? Select all that apply.

SELECT MULTIPLE

Correct Answers:

A. name = Jordan

✗ Incorrect

B. name = "Jordan"

✓ Correct

C. name = 'Jordan'

✓ Correct

D. name = [Jordan]

✗ Incorrect

Explanation:

Single or double quotes are both valid ways to create strings.

4. What is the purpose of data types in Python?

MULTIPLE CHOICE

Correct Answer:

A. To give variables variety.

✗ Incorrect

B. To determine the size of the variable.

✗ Incorrect

C. To tell the computer how the variable will be used.

✓ Correct

D. To restrict the use of variables.

✗ Incorrect

Explanation:

Variable types give the computer a clue about how it will be used.

5. Which of the following is an example of a float?

Correct Answer:

- A. "4" ✗ Incorrect
- B. 4 ✗ Incorrect
- C. 4.0 ✓ Correct
- D. "4.0" ✗ Incorrect

Explanation:

Floats have a decimal value

6. Which of the following is an example of an integer data type?

Correct Answer:

- A. "7" ✗ Incorrect
- B. 7 ✓ Correct
- C. 7.0 ✗ Incorrect
- D. "7.0" ✗ Incorrect

Explanation:

Integers don't have quotation marks or decimal values

7. What does the "int" data type stand for?

Correct Answer:

- A. Integer ✓ Correct
- B. Integral ✗ Incorrect
- C. Interesting ✗ Incorrect
- D. Interpolation ✗ Incorrect

Explanation:

This is an example of an int: 84

8. In Python, how should you represent a Boolean value?

MULTIPLE CHOICE

Correct Answer:

- A. name = True ✓ Correct
- B. name = true ✗ Incorrect
- C. name = "True" ✗ Incorrect
- D. name = "true" ✗ Incorrect

Explanation:

Boolean values are capitalized in Python

9. Why is it important to keep data types straight while programming?

MULTIPLE CHOICE

Correct Answer:

- A. To increase program speed. ✗ Incorrect
- B. To avoid syntax and logic errors. ✓ Correct
- C. To save memory. ✗ Incorrect
- D. To streamline the code. ✗ Incorrect

Explanation:

Using incorrect data types in the wrong place will cause the program to throw an error

10. What is the following data type?

MULTIPLE CHOICE

Correct Answer:

- A. Boolean ✗ Incorrect
- B. String ✓ Correct
- C. Integer ✗ Incorrect

D. Float

✖ Incorrect

Explanation:

Booleans do not have quotation marks

Challenges

1. Coins

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4
5 penny = .01
6
7 nickel = .05
8
9 dime = .10
10
11 quarter = .25
12
13 dollar = 1.00
```

2. Baird's Beaked Whale

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 stomachs = 13
5 breath = 60
6 length = 36
7 weight = 26000
8
9 print(stomachs)
10 print(breath)
11 print(length)
12 print(weight)
```

3. Tricky Data Types

Solution:

```
1 import turtle
2 turtle.getscreen()
```

```
3
4 is_string = "True"
5 is_string2 = "35"
6 is_integer = 2
7 is_float = 5.0
8 is_boolean = False
```

4. About You

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4
5 likes_tacos = True
6
7 likes_sports = False
8
9 likes_lime = True
10
11 likes_dancing = True
12
13 likes_travel = False
```

5. Create Your Own

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 sport = "basketball"
5 baskets_made = 10
6 accuracy = .85
7 practice = True
8
9 print(sport)
10 print(baskets_made)
11 print(accuracy)
12 print(practice)
```