

Animal Tracking and If Statements

Textbook

Animal Tracking and If Statements

[If statements](#) are instructions that tell a computer to do something IF a certain condition occurs. An IF statement starts with the key word if, and then has parentheses that contain a [condition](#). After the parentheses there is a new line of code that is indented, indicating that this is the code to be executed if the condition is met.



```
1 if condition:
2     # code to be run
3
```

We will learn more about the conditions in the next lesson.

Notice how the code here is [indented](#). **Indenting is very important in Python.** If your code is incorrectly indented, it will not run right. If a line of code is indented, that means it is dependent on the code above it that is not indented the same. Code that is on the same line if it is indented are both dependent on the code above it that is not indented the same. For example:

```
1 Frank_age = 23
2 Bob_age = 40
3 if Bob_age > Frank_age:
```

```
4 print("Bob is older than Frank")
5 print("Bob is pretty old")
```

Try it!

This will print out both "Bob is older than Frank" and "Bob is pretty old".

Notice the correct way to indent this code. Both print statements are indented, indicating that they are dependent on the if statement above.



Else

The [else statement](#) will catch everything that is not included in the If statement.

```
1 Janet_age = 16
2 Eva_age = 5
3 if Eva_age > Janet_age:
4     print("Eva is older than Janet")
5 else:
6     print("Eva is younger")
```

Try it!

This will print out "Eva is younger".

"=" Sign Use as a Conditional

An important note about the use of the "=" equals sign. If we are trying to see if conditions are equal, we need to use TWO equals signs. One equals sign is used when declaring variables.

The following example declares the variable:

time = 10

The following example checks to see if time is truly equal to 10:

time == 10

```
1 Janet_age = 16
2 Eva_age = 5
3 if Eva_age == Janet_age:
4     print("Eva and Janet are the same age!")
5 else:
6     print("They are different ages")
```

Try it!

Python Else If Statements

You can combine multiple IF statements. When you check for more than one condition, you can add an Else if statement. Else if is shortened down to [elif](#).

```
1 price = 10
2 your_cash = 8
3
4 if your_cash > price:
5     print("You have MORE than enough money to buy it.")
6 elif your_cash == price:
7     print("You have exactly enough money to buy it.")
8 else:
9     print("You do not have enough money to buy it.")
```

Try it!

Checkpoint

Tracking Animals If Statements

Create **two** variables with integer values.

Create an if statement that has one conditional. The conditional of the if statement is meant to compare the two variables.

Create a print statement that runs **if the conditional is met**.

Create an **Else statement**.

Create a print statement that runs **if the conditional is not met**.

Requirements:

- Create 2 variables with integer values
- Create an if statement that has one conditional
- Create a print statement if the condition is met
- Create a print statement if the condition is not met

Questions (6)

1. True or False: It's okay if your indentation isn't lined up in Python, it won't affect how your code runs.

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

2. What statement will catch everything that is not included in the IF statement?

MULTIPLE CHOICE

Choose the correct answer:

- A. The ELSE statement
- B. The THEN statement
- C. The CATCH statement
- D. The OTHER statement

3. True or False: Every If statement must have a colon ":" after the condition.

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

4. Which of the following will truly check to see if candies is equal to 5?

MULTIPLE CHOICE

Choose the correct answer:

- A. candies = 5
- B. candies == 5
- C. candies - 5
- D. candies is 5

5. What will the following code print out?

```
fish = 4 if fish == 5: print("We have five fish.") else: print("We have a different number than five fish.")
```

Choose the correct answer:

- A. We have five fish.
- B. We have a different number than five fish.
- C. 4
- D. 5

6. What will the following code print out?

```
favorite = "blue" if favorite == "blue": print("Blue is your favorite color.") else: print("Blue is not your favorite color.")
```

Choose the correct answer:

- A. blue
- B. Blue is your favorite color.
- C. Blue is not your favorite color.
- D. favorite

Challenges (3)

1. Plastic and Chemicals in the Water

Let's say you are a marine biologist and are taking water samples. You are trying to see the level of human pollution in the water. You are checking for the amount of microplastics as well as the level of unnatural chemicals that end up in the ocean. What kind of human behaviors lead to microplastics being found in every ocean? Let's say that in a certain area, **the pollution only poses a threat if there is *both* plastic and chemical problems.**

Create a program that will print if the pollution is a problem for wildlife.

Create 2 inputs. One input will ask if there was plastic pollution in the water sample. The other input will ask if there was chemical pollution in the water sample.

It will then print one of two print statements:

```
The human pollution here is a problem for wildlife.
```

```
The human pollution here is not a problem for wildlife.
```

For example:

Input 1 (plastic pollution): `yes`

Input 2 (chemical pollution): `no`

Output : `The human pollution here is not a problem for wildlife.`

Another example:

Input 1: `no`

Input 2: `no`

Output: `The human pollution here is not a problem for wildlife.`

NOTE ABOUT THE AUTOGRADER

The autograder will check for the correct output exactly. This means it will check capitalization, spacing, spelling, and punctuation to see if it matches exactly.

It also checks all the print statements. So if you have multiple print statements, it will assume that is part of your answer. So before hitting "submit", make sure that you have only 1 print statement total in your code.

2. The Current Current

The ocean is full of different currents. The water is constantly moving in certain directions. These directions can depend on the weather, location, or time of year. What other factors can you think of that might affect ocean currents?

Go to oceantracks.org/map. In Data and Tools select **Overlays**. Underneath "**Select Environmental Overlays**" select the box that says "**Show Currents**." Here you can see what kind of currents might affect animal movement patterns. On any day of your animal tracking, you will get a notification telling you which direction the current is going.

Create a program that will determine how the current affects the animal's movement.

Create an input that will say which direction the current is moving, north, south, east, or west using the letters `n`, `s`, `e`, or `w`.

The program will then print out one of these print statements:

If current is moving to the north or west, print `The current helped the animal swim farther.`

If the current is moving to the east, print `The current didn't affect the animal's swimming distance.`

If the current is moving to the south, print `The current made it harder for the animal to swim very far.`

For example:

Input: `n`

Output: `The current helped the animal swim farther.`

Another example:

Input: `e`

Output: `The current didn't affect the animal's swimming distance.`

NOTE ABOUT THE AUTOGRADER

The autograder will check for the correct output exactly. This means it will check capitalization, spacing, spelling, and punctuation to see if it matches exactly.

3. Movement by Month

Go to oceantracks.org/map. This will pull up the movement of a certain elephant seal from June to January. It should automatically pull up Elephant Seal #302.

Click on the Data and Tools tab on the left and select "Tracks" to make sure you are looking at Elephant Seal #302. Select Tools. At the upper right of that tools section is a button that says "Show Animal Movement." This will show where the animal was on certain days. You can see the date count up on the right of the screen.

You'll notice that the seal is generally moving away from California during certain months and moving towards California in certain months. You'll also notice that there is one month where the seal stays in pretty much the same area for a whole month. What do you think the seal was doing during that month? What kind of environmental factors would make the seal want to stay there? What kind of human or nonhuman aspects would affect the seal's behavior?

Create a program that will print generally which direction the seal was going depending on the month. Account for months **June through January**.

The program will take in the NUMBER of month as an input and will print out one of three options: `The seal is generally moving away from California.`

`The seal is staying in the same general location.`

`The seal is generally moving back towards California.`

For example:

Input (number of month in the year): `10`

Output: `The seal is generally moving back towards California.`

Another example:

Input: `6`

Output: `The seal is generally moving away from California.`

Hint: if you look closely at the chart, the seal is generally moving away from California in June, July, and August. In September, it tends to stay in the same general area. October and later, it moves back towards California.

Answer Keys & Solutions

Checkpoint Solutions

Tracking Animals If Statements

```
1 sharks = 3
2 seals = 7
3
4 if sharks > seals:
5     print("More sharks than seals")
6 else:
7     print("Fewer sharks than seals")
```

Questions

1. True or False: It's okay if your indentation isn't lined up in Python, it won't affect how your code runs.

MULTIPLE CHOICE

Correct Answer:

A. True

✗ Incorrect

B. False

✓ Correct

2. What statement will catch everything that is not included in the IF statement?

MULTIPLE CHOICE

Correct Answer:

A. The ELSE statement

✓ Correct

B. The THEN statement

✗ Incorrect

C. The CATCH statement

✗ Incorrect

D. The OTHER statement

✗ Incorrect

3. True or False: Every If statement must have a colon ":" after the condition.

MULTIPLE CHOICE

Correct Answer:

- A. True ✓ Correct
- B. False ✗ Incorrect

4. Which of the following will truly check to see if candies is equal to 5?

MULTIPLE CHOICE

Correct Answer:

- A. candies = 5 ✗ Incorrect
- B. candies == 5 ✓ Correct
- C. candies - 5 ✗ Incorrect
- D. candies is 5 ✗ Incorrect

Explanation:

One equals sign is for assigning a variable. Two is for checking for equivalence.

5. What will the following code print out?

MULTIPLE CHOICE

Correct Answer:

- A. We have five fish. ✗ Incorrect
- B. We have a different number than five fish. ✓ Correct
- C. 4 ✗ Incorrect
- D. 5 ✗ Incorrect

Explanation:

If the condition is not met, the code will look for what else it could do.

MULTIPLE CHOICE

6. What will the following code print out?

Correct Answer:

A. blue

✗ Incorrect

B. Blue is your favorite color.

✓ Correct

C. Blue is not your favorite color.

✗ Incorrect

D. favorite

✗ Incorrect

Explanation:

If the condition is not met, the code indented below it will run.

Challenges

1. Plastic and Chemicals in the Water

Solution:

```
1 plastic = input("Was there plastic pollution in the water? yes or no")
2
3 chemical = input("Was there chemical pollution in the water? yes or no")
4
5
6 if plastic == "yes" and chemical == "yes":
7     print("The human pollution here is a problem for wildlife.")
8 else:
9     print("The human pollution here is not a problem for wildlife.")
```

2. The Current Current

Solution:

```
1 current = input("What direction was the current flowing? n s e or w")
2
3 if current == "n" or current == "w":
4     print("The current helped the animal swim farther.")
5 elif current == "e":
6     print("The current didn't affect the animal's swimming distance.")
7 else:
```

```
8 print("The current made it harder for the animal to swim very far.")
```

3. Movement by Month

Solution:

```
1 month = int(input("What month is it? Enter as a number 1-12"))
2
3 if month == 6 or month == 7 or month == 8:
4     print("The seal is generally moving away from California.")
5 elif month == 9:
6     print("The seal is staying in the same general location.")
7 else:
8     print("The seal is generally moving back towards California.")
```