Introduction to Python Programming

4 – Iteration using WHILE loops.

Resources created by Andy Colley (@MrAColley)

Learning Goals/Objectives

Be able to read, comprehend, trace, adapt and create Python code that:

- Iterates using **WHILE** loops
- Sets Boolean **conditions** to trigger loops
- Uses **counters** in loop conditions

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Boolean Operators - Used in Conditions

==	Equal to/The same as
!=	Not equal to
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to

Boolean Operators are used to compare TWO pieces of data

data1 ***boolean operator*** data2

Iteration

Starts the iteration statement.

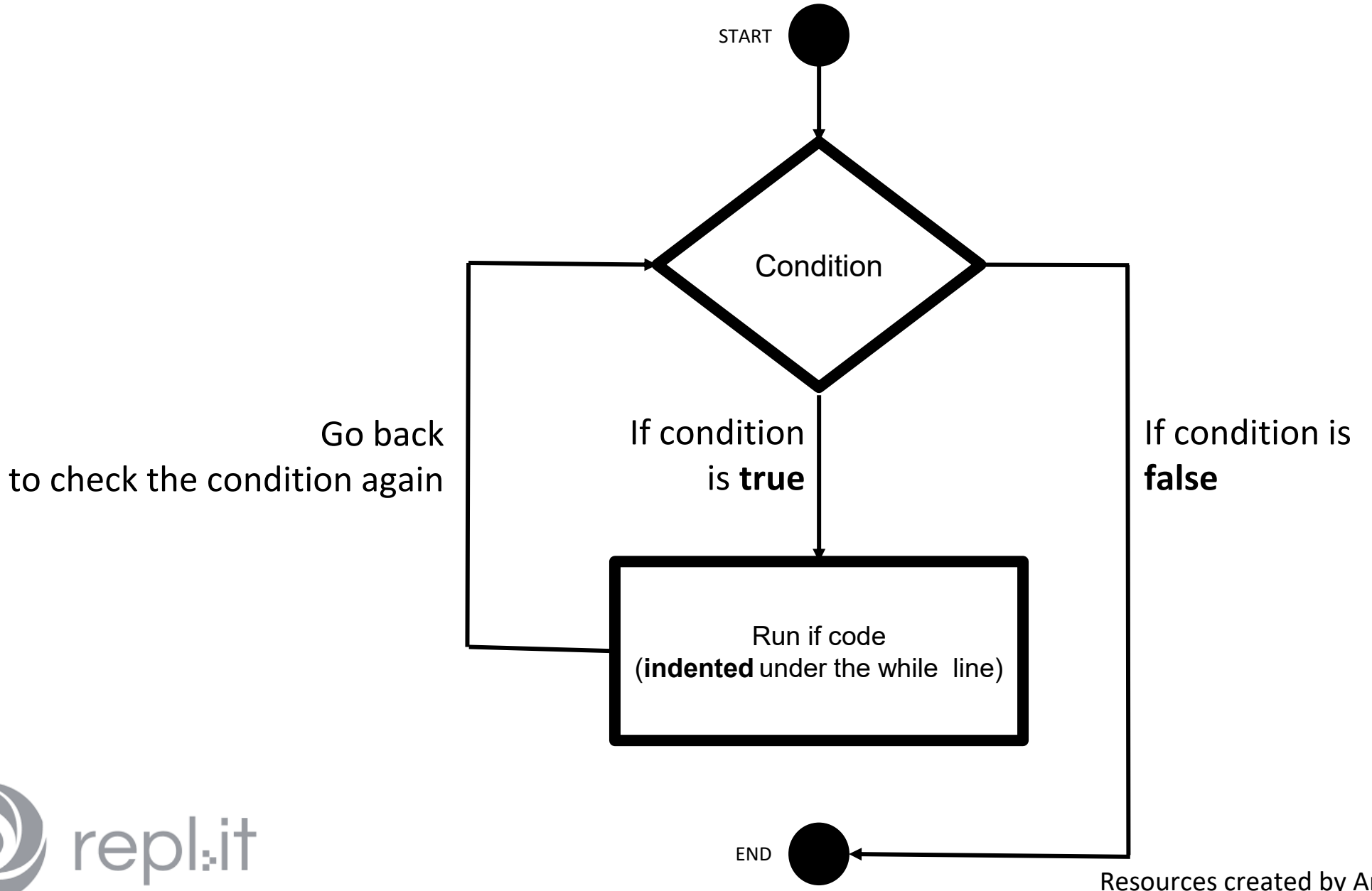
Colon - because syntax

```
while boolean condition:
    do this
```

This instruction is repeated while the condition is TRUE.

Indented - use the tab key.
Your code won't work if you don't indent inside the iteration statement.

Iteration With While - **Flowchart**



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Iteration with while - **Coding Tips**

Not part of the loop (comes before 'while').
Runs **before the loop starts.**

```
answer = input("What is the capital of France?")
while answer != "Paris":
    print("Incorrect! Try again.")
    answer = input("What is the capital of France?")

print("Correct!")
```

1. Start with while

2. Write the Boolean condition
(usually what you DON'T want the user to input).

3. DON'T FORGET THE COLON after the condition.

4. Code that is repeated while the condition is **true.**
DON'T FORGET TO INDENT (use the **tab** key)

Not part of the loop (not indented).
Runs **after the loop ends**.

Iteration - Tasks Part 2

Task

Write a program that stores a secret number in a variable
(you decide the number and the name of the variable)

The user has to guess the secret number, the program should loop until they get it right.

Once the user has guessed correctly they get a congratulations message

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Iteration With A Counter

```
counter = 1

while counter < 5
    print(“Hello”)

print (“The loop has ended”)
```

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Iteration With A Counter

```
counter = 1

while counter < 5
    print(“Hello”)
    counter +=1

print (“The loop has ended”)
```

Iteration With A Counter

```
counter = 1

while counter < 5
    print(“The counter is ” + counter)
    counter +=1

print (“The loop has ended”)
```

Add to the counter as
the last command inside the loop

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Iteration With A Counter - Tasks Part 1

```
# Task 1

  # Add comments to explain what the counter variable is used for, and what +=1 does.
  # Add a comment that explains what the condition checks for.
  # Add a line of code inside the loop that outputs the counter variable every time the loop runs.  What do
  you notice about what happens to it each time the loop repeats?
  # Add a line of code after the loop that outputs the message 'The loop has finished'

counter = 1

while counter < 5:
  print("This code is inside the loop")
  counter += 1


# Task 2

  # Add a line of code to the loop that subtracts one from the counter every time the loop runs
  # Add a line of code after the loop that outputs 'Blast off'
  # EXTRA CHALLENGE - Adapt the code so that the user inputs the start value of the counter variable.

counter = 10

while counter > 0:
  print(counter)
```

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Iteration With A Counter - Tasks Part 2

Task

Write a program that uses a loop to output the seven times table up to 12 x 7
(HINT - use the counter variable and combine it with what you learned about maths with variables.)

Output the multiplied number as part of a sentence. *Example - '1 times 7 is 7'*

EXTRA CHALLENGE - ask the user to input a number and output the multiplication table for the input.

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Homework Challenge - Cubes Cubes Cubes

The cubed number sequence starts: 1, 8, 27, 64, 125.

Write a program that:

- Asks the user to input a number
- Display N numbers in the cubed sequence according to user input.

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