

Python

Python Module 5 Lesson 1



Name: _____

Date: _____

Recap:

1. Module 2 (For Loops) recap
2. Module 3 (User Input) recap
3. Congratulations on passing Module 4

Learning Outcomes:

1. Difference between For Loops and While loops.
2. Use of while loops when there is an unknown end

Breakdown of Lesson Plan:

Lesson 1.1 Introduction to Flowcharts	15 min
Lesson 1.2 Recap Module 1 - 4	40 min
Lesson 1.3 Introduction to while loops	35 min

Lesson 1.1

In this module, we will be using flowcharts in order to visually represent our code as well as to show the data flow. Below is an example of a while loop. When reading the while loop, we will trace the flowchart starting from **start** and move in the direction of the arrows until it reaches **stop**.

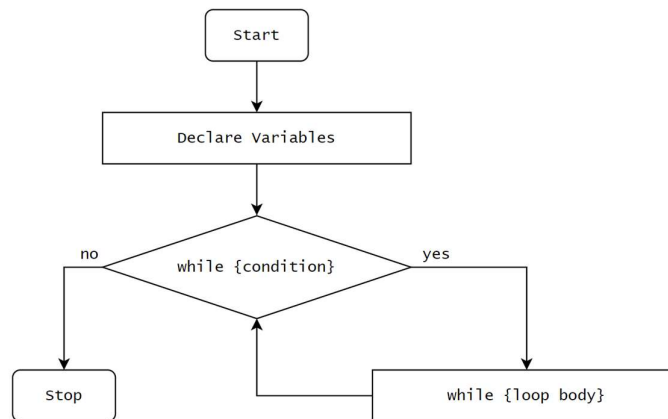
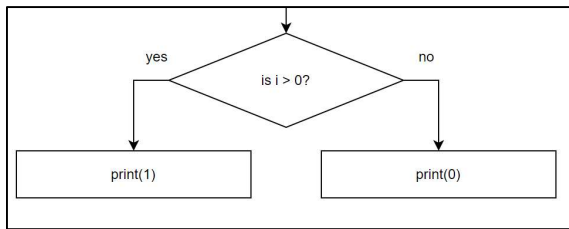


Figure 1: Template of a while loop flowchart

Once we enter the diamond shape, we will make a decision. This is where the conditional statement is located. When it comes to writing code, we will do as follows

# Code Representation	# Flowchart Representation
<pre>if i > 0: print(1) else: print(0)</pre>	 <pre>graph TD; Entry(()) --> Decision{is i > 0?}; Decision -- yes --> Print1[print(1)]; Decision -- no --> Print0[print(0)];</pre>

Lesson 1.1

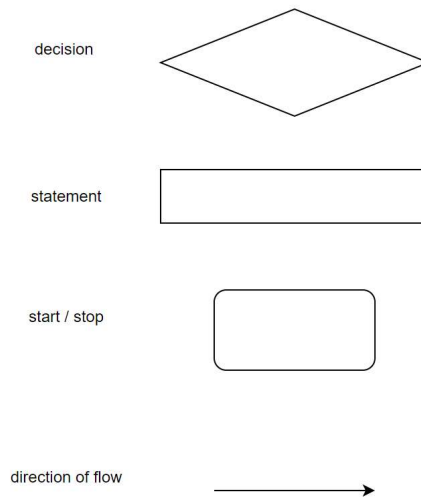
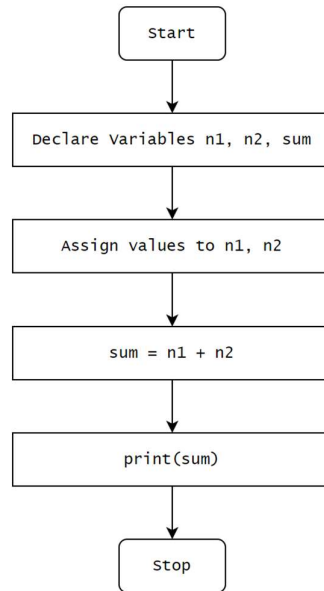


Figure 2: Legend of a while loop flowchart

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Lesson 1.2.1 Recap on Input()



Example Code

```
n1 = int(input())
n2 = int(input())
sum = n1 + n2
print(sum)
```

Example Code

1	name = input("Enter your name: ")
2	print("Hello ", name)

Expected Output

1	Enter your name: Ryan
2	Hello Ryan

Example Code

1	name = input("Enter your name: ")
2	print(name)
3	print(type(name))

Expected Output

1	Enter your name: Ryan
2	Ryan
3	<class 'str'>

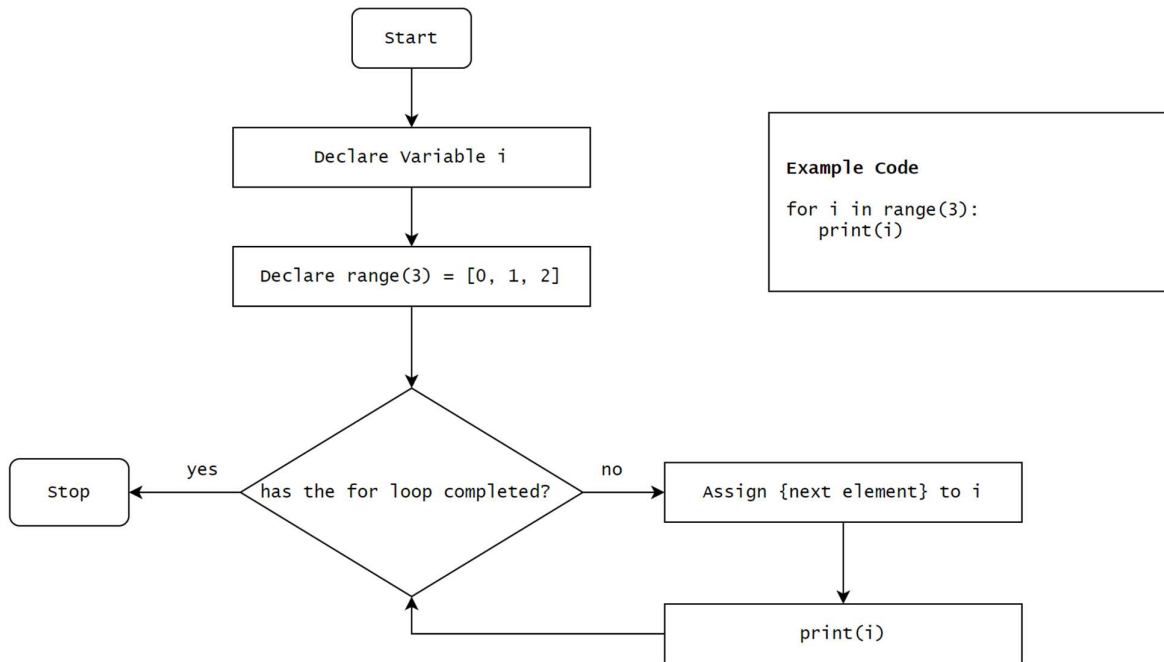
Example Code

1	age = int(input("Enter your age: "))
2	print("Your age is", age)
3	print(type(age))

Expected Output

1	Enter your age: 10
2	Your age is 10
3	<class 'int'>

Lesson 1.2.2 Recap for loops



Example Code

1	for i in range(3):
2	print(i)
3	

Expected Output

1	0
2	1
3	2

Example Code

1	for i in [1,3,5]:
2	print(i)
3	

Expected Output

1	1
2	3
3	5

Example Code

1	for i in "abc":
2	print(i)
3	

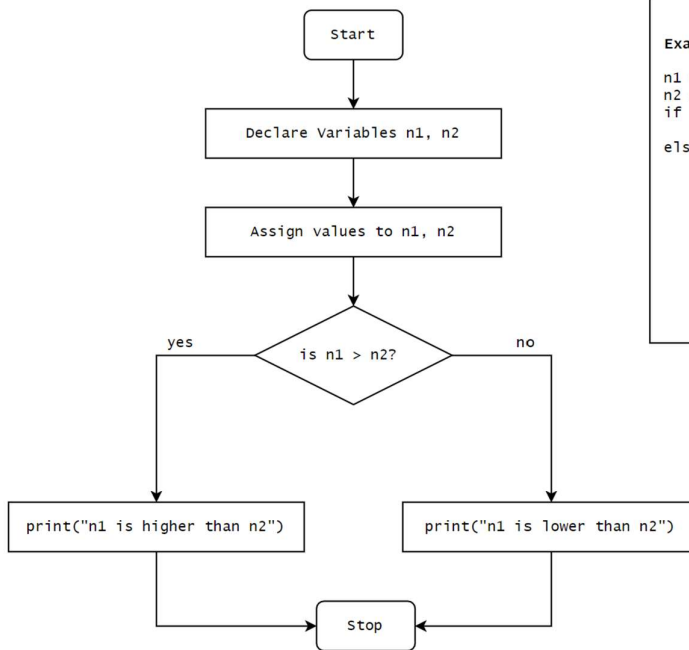
Expected Output

1	a
2	b
3	c

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Lesson 1.2.3 Recap on using conditionals and If Else statements



Example Code

```

n1 = int(input())
n2 = int(input())
if (n1 > n2):
    print("n1 is higher than n2")
else:
    print("n1 is lower than n2")
  
```

Example Code

1	age = int(input("Enter your age: "))
2	if (age < 18):
3	print("You are not old enough")
4	else:
5	print("You are old enough")
6	

Expected Output

1	Enter your age: 10
2	You are not old enough

Expected Output

1	Enter your age: 20
2	You are old enough

Example Code

1	score = int(input("Enter your score: "))
2	if (score > 50):
3	print("Invalid score")
4	elif (score > 40):
5	print("Great! ")
6	else:
7	print("Fail!")

Expected Output

1	Enter your score: 55
2	Invalid score

Expected Output

1	Enter your score: 45
2	Great!

Expected Output

1	Enter your score: 35
2	Fail!

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Lesson 1.2.4 Application

In the following 4 Tasks, write a code to revise your understanding on the above topics. For every Task, you are expected to also draw out a flowchart diagram in order to explain the decision-making process within the code. If you are unsure of how to do a flowchart, refer to the diagrams above with their respective sample code.

Example

Write a code to check if a number, N, is a cube number where $20 > N > 0$ using `input()` to read input. You are also expected to draw a flowchart diagram.
Your output should be in the following format:

Either

{number} is a cube number.

Or

{number} is not a cube number.

Input	Output
N = 8	8 is a cube number.
N = 9	9 is a not cube number.
N = 10	10 is not a cube number.

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Lesson 1.2.4 Application

Sample Solution

Code	Flowchart
<pre>N = int(input()) isCube = False i = 1 while i < N: if N == i ** 3: isCube = True break i += 1 if isCube: print(N, 'is a cube number.') else: print(N, 'is not a cube number.')</pre>	

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Lesson 1.2.4 Application

Task 1:

Write a code to print the max value among the elements in the list K using *input()* to read input. You are also expected to draw a flowchart diagram. Do not use **max()**.

Your output should be in the following format:

Max = {max value}

Input	Output
K = [1, 2, 3, 4, 5]	Max = 5
K = [5, 4, 3, 2, 1]	Max = 5
K = [1, 2, 3, 3, 2]	Max = 3

Draw the Flowchart in the box provided.

Write your code separately either on the computer or at the last page.

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Lesson 1.2.4 Application

Task 2:

Write a code to print the min value among the elements in the list K . You are also expected to draw a flowchart diagram. Do not use **min()**.

Your output should be in the following format:

Min = {min value}

Input	Output
K = [1, 2, 3, 4, 5]	Min = 1
K = [5, 4, 3, 2, 1]	Min = 1
K = [1, 2, 3, 3, 2]	Min = 1

Draw the Flowchart in the box provided.

Write your code separately either on the computer or at the last page.

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Lesson 1.2.4

Task 3.

Write a code to print the average value of the list. Leave your answer to round to 1 decimal point. You are also expected to draw a flowchart diagram.

Your output should be in the following format:

Average = {Average value}

Input	Output
K = [1, 2, 3, 4, 5]	Average = 3.0
K = [5, 4, 3, 2, 1]	Average = 3.0
K = [1, 2, 3, 3, 2]	Average = 2.2

Draw the Flowchart in the box provided.

Write your code separately either on the computer or at the last page.

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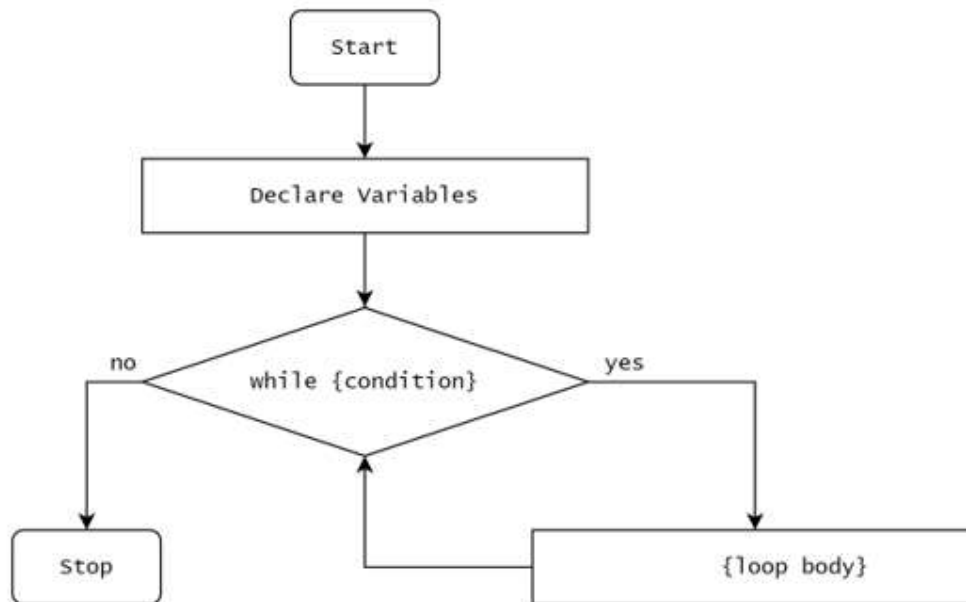
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Lesson 1.3

A while loop statement in Python programming language repeatedly executes a target statement as long as a given condition is **True**.

In while loops, there are key features that you will need to know.

1. What is the exit condition of the loop? This is represented as {condition}.
2. Will the {condition} ever become **False**?
3. Within the loop body, what is the exit condition? If there is no way of exiting, then the loop will run forever (infinite)

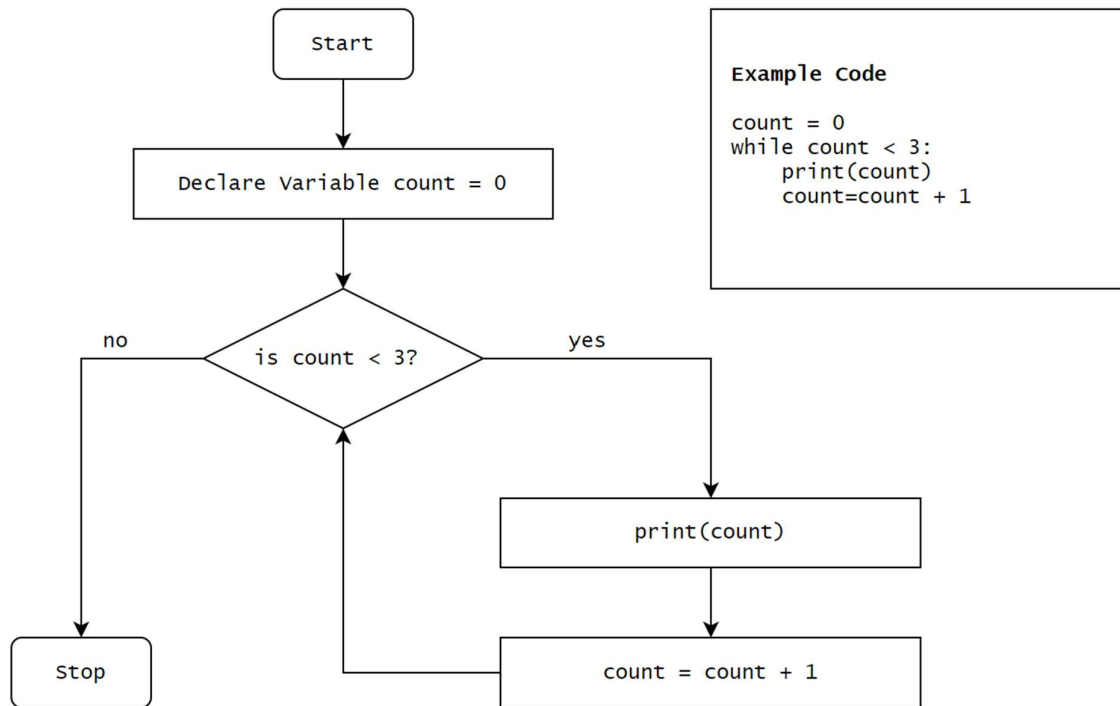


Syntax

Example Code

1	while {condition}:
2	{loop body}

Lesson 1.3



Example Code

1	count = 0
2	while count < 3:
3	print(count)
4	count=count + 1

Expected Output

1	0
2	1
3	2

Question

What is the condition? **count < 3**

Upon exiting the loop, what is the value of count? **3**

When is count being updated? **Line 4**

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Lesson 1.3

Task 1

1	count=1
2	while count < 4:
3	print(count)
4	count=count + 1

Output

1	
2	
3	
4	

Draw the Flowchart in the box provided.

Question

What is the condition? _____

Upon exiting the loop, what is the value of count? _____

When is count being updated? _____

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Lesson 1.3

Task 2

1	count=4
2	while count > 2:
3	print(count)
4	count=count - 1

Output

1	
2	
3	
4	

Draw the Flowchart in the box provided.

Question

What is the condition? _____

Upon exiting the for-loop, what is the value of count? _____

When is count being updated? _____

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Lesson 1.3

Task 3

1	count=1
2	while count < 4:
3	count=count + 1
4	print(count)

Output

1	
2	
3	
4	

Draw the Flowchart in the box provided.

Question

What is the condition? _____

Upon exiting the for-loop, what is the value of count? _____

When is count being updated? _____

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Lesson 1.3

Task 4

1	count=4
2	while count > 2:
3	count=count - 1
4	print(count)

Output

1	
2	
3	
4	

Draw the Flowchart in the box provided.

Question

What is the condition? _____

Upon exiting the loop, what is the value of count? _____

When is count being updated? _____

END OF LESSON 1

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Reference

Unique case whereby we are unable to hit the escape condition

Example Code

1	count = 0
2	while count < 3:
3	print(count)
4	count=count - 1

Expected Output

1	0
2	1
3	2
.	.

This is a template example of the While Loop.

