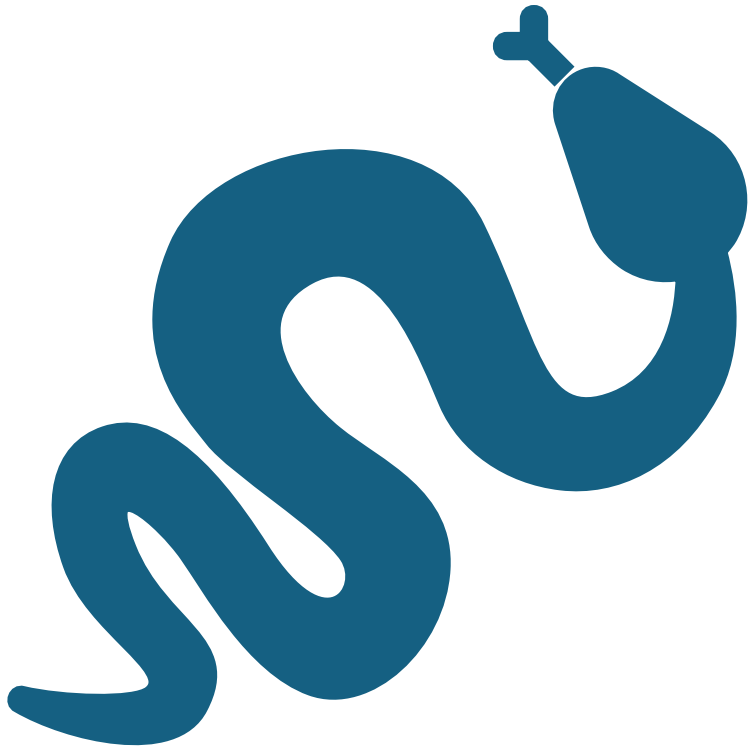


Lesson 2

Python Fundamental

Revisit

Input-Process-Ouput Concept

Setup Python and MU Editor

Math Operators

Data Types: string, integer, float

Variables: how it works, rules

Functions: print(), input(), float(), int()

Exercise: Calculate area of square and triangle

Random Number

```
1. import random
2. dice = random.randint(1, 6)
3. print(dice)
```

What it does:

- **Line 1** – include a random library for the program to call **`random.randint`** function
- **Line 2** – setup a variable in memory named dice. Use function **`random.randint`** to generate a number tween 1 and 6.
- **Line 3** – print out the result of variable dict

649 ticket

- How to generate a 6/49 ticket?

Lab

- Write a program to generate **6 random numbers** between **1 and 49**

Decision Making - `if-elif-else`

- `if, elif` (short for 'else if'), and `else` allow program to make decisions based on conditions
- The line of **`if – elif - else`** statement must end with a colon :
- Code block inside **`if – elif - else`** must be **indented** using **[Tab] key or 4 spaces**
- Example:

```
if age >= 13 and age <= 19:
    # below line execute if condition is True
    print("You are a teenager!")
# below line executes regardless the condition of if condition
print("Program is finish!")
```

Rules of `if-elif-else`

- Only one if block for each decision
- Zero or More elif blocks within an if block
- At most one else block
- Indentation is crucial for blocks of code

Example 1 – only if block and no elif and else

```
age = 15
if age >= 13 and age <= 19:
    print("You are a teenager!")
```

Example 2 – one if block, one elif and zero else

```
age = 10
if age >= 18:
    print("You are an adult.")
elif age >= 13:
    print("You are a teenager.
```

Example3 – one if, elif and else

```
temperature = 35
if temperature > 30:
    print("It's a hot day.")
elif temperature > 20:
    print("It's a warm day.")
else:
    print("It's cold outside.")
```

Logical Operators

Operator Name	Operator	Sample
Equal to	==	if age == 0:
Not Equal to	!=	if age != 0:
Less than	<	if age < 0:
Less than or equal to	<=	if age <= 0:
Greater than	>	if age > 0:
Greater than or equal to	>=	if age >= 0:

Example 1

```
age = 15
if age >= 13 and age <= 19:
    print("You are a teenager!")
```

Example 2

```
# Example: Password check
password = input("Enter your password: ")

if password == "python123":
    print("Access granted. Welcome!")
elif password != "python123":
    print("Access denied. Incorrect
password.")
```

Boolean Operators

Evaluate expressions and return a Ture or False as a Boolean values.

- and
- or
- not

Example 1

```
age = 25
is_student = True

if age > 18 and is_student:   #this condition is True
    print("Eligible for a student discount.")
```

Example 2

```
is_weekend = True
is_holiday = False

if is_weekend or is_holiday:  #this condition is True
    print("You can sleep in!")
```

Boolean Values

- Only True and False
- The first letter is upper case

True
False

Example

```
is_weekend = True
is_holiday = False

if is_weekend or is_holiday:
    print("You can sleep in!")
```

Quiz 1

- What is the output?

```
age = 25
if age > 30:
    print("Older than 30")
elif age > 20:
    print("Older than 20")
else:
    print("20 or younger")
```

Quiz 2

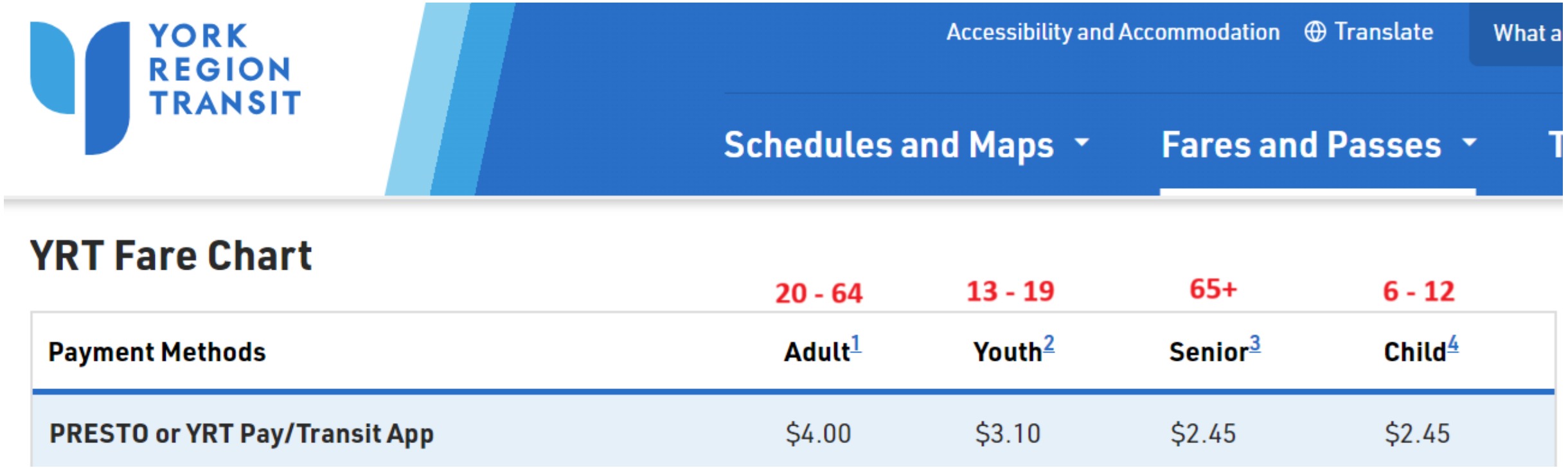
- What is the output?
- Try to update '**temperature**' to 25 and see the output.

```
temperature = 15

if temperature > 20:
    print("It's warm outside.")

print("Program Completed")
```

Lab

- Generate a random number between 1 to 6
- Ask user to guess the number
- If the answer match the random number, print 'Correct'
- Otherwise, print 'Incorrect' and show the random number

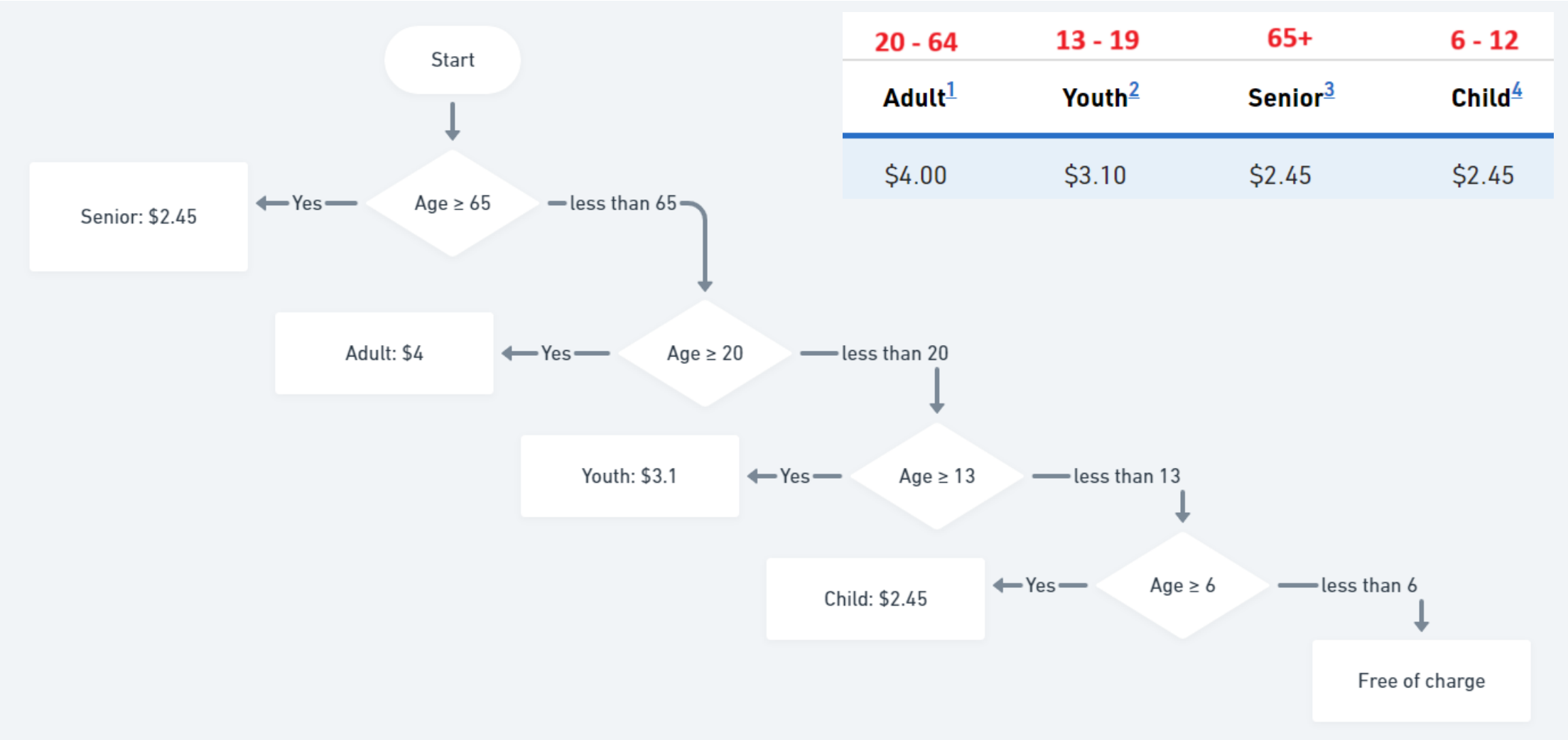
Calculate YRT fare?



YRT Fare Chart

	20 - 64	13 - 19	65+	6 - 12
Payment Methods	**Adult[1]**	**Youth[2]**	**Senior[3]**	**Child[4]**
PRESTO or YRT Pay/Transit App	$4.00	$3.10	$2.45	$2.45

Calculate YRT Fare



20 - 64	13 - 19	65+	6 - 12
Adult[1]	Youth[2]	Senior[3]	Child[4]
$4.00	$3.10	$2.45	$2.45

Lab

1

Develop a program to calculate YRT fare

2

Ask user to input age

3

Determine the age group (senior, adult, youth, child, and little child)

4

Print out the fare amount

Function: `range()`

- Generate a sequence of numbers
- Syntax:

```
range(start, stop, step)
```

- start - beginning of the sequence. The beginning of the sequence. If omitted, the default value is 0
- stop - end of the sequence - the sequence will include numbers up to but not including this value
- step - interval between numbers in the sequence

Examples of `range()` Usage

```
1  # generate number list: 0, 1, 2, 3, 4
2  num1 = range(5)
3  print(f"The output of range(5) is : {list(num1)}")
4
5  # generate number list: # 2, 3, 4, 5, 6, 7
6  num2 = range(2, 8)
7  print(f"The output of range(2, 8) is : {list(num2)}")
8
9  # generate number list: # 0, 2, 4, 6, 8
10 num3 = range(0, 10, 2)
11 print(f"The output of range(0, 10, 2) is : {list(num3)}")
12
```

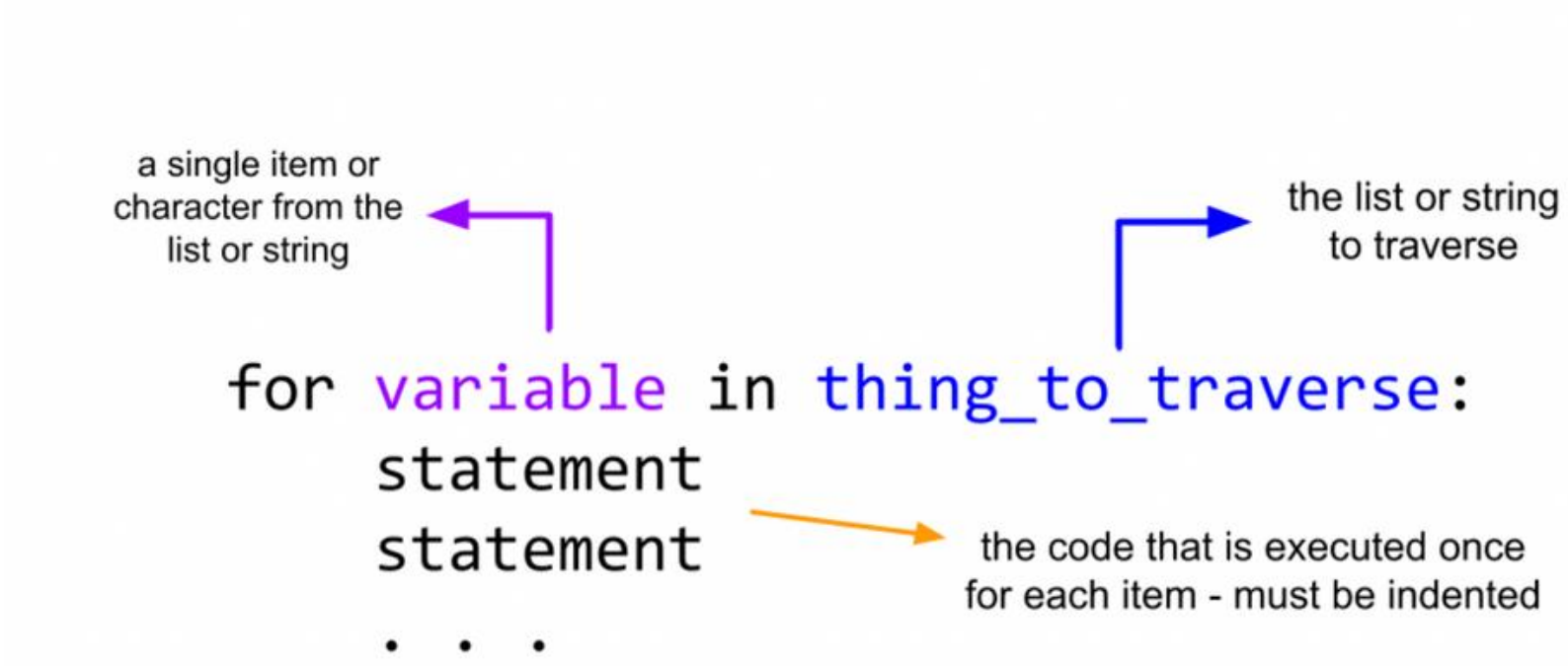
Running: fundamental-lesson1-range.py

```
The output of range(5) is : [0, 1, 2, 3, 4]
The output of range(2, 8) is : [2, 3, 4, 5, 6, 7]
The output of range(0, 10, 2) is : [0, 2, 4, 6, 8]
>>>
```

We'll cover the function of `list()` in the lesson later

for Loop

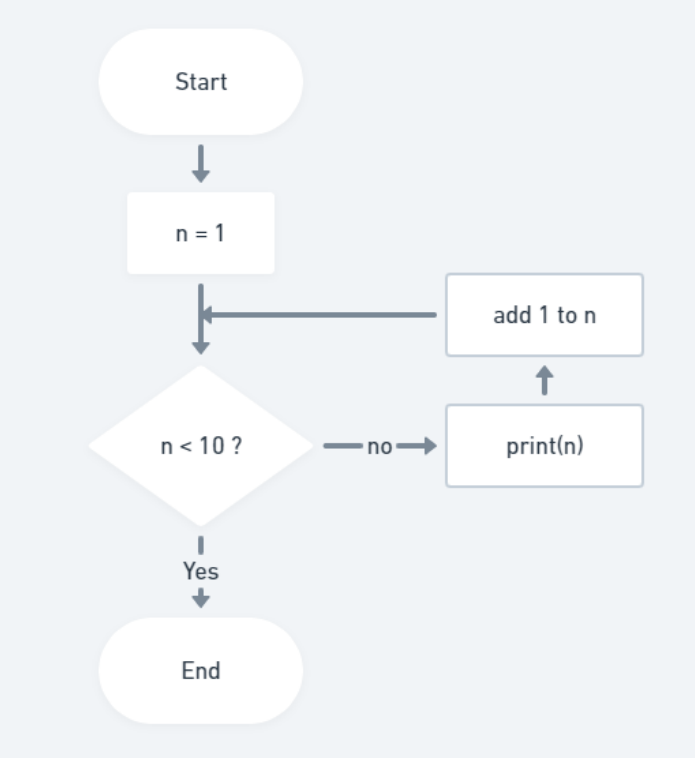
Repeat a block of code multiple times



for loop

Below code executes print function **9** times.

‘start’ parameter is set to 1 and ‘stop’ parameter is set to 10 in the range function below.




```
1 for n in range(1, 10):
2     print(n)
3
```

Running: lab2-2.py

```
1
2
3
4
5
6
7
8
9
>>>
```

Exercise

- Generate **10 random numbers** between **1 and 100**
- Print only the **even numbers**
- For odd numbers **greater than 50**, print "High Odd"