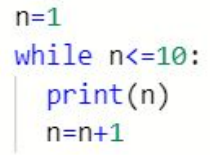
Session Code	CODR-912-BC-005
Module	Basic
Teaching Unit	Loops
Learning Outcome	Loops: while, for
Resources	Teacher: 1. Laptop along with audio and video exchange 2. Notebook and Pen(To note any development from session) Student Resources 1. Laptop along with audio and video exchange 2. Notebook and Pen(To keep note of important parts in the session)
Duration	50 Mins

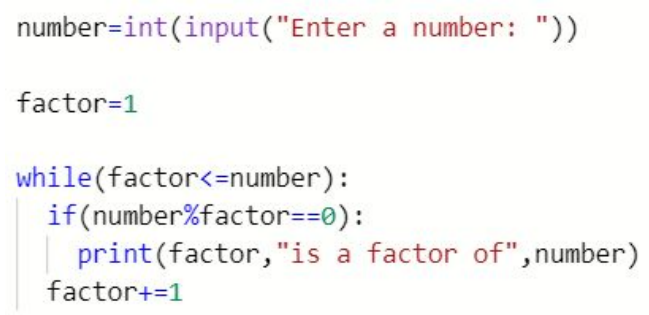
Structure	**Warm-up** **Pace-up Activity** **Knowledge Transfer** **Student Led Activity** **Short Quiz** **Heads up tip for next class**	2 Mins 5 Mins 10 Mins 20 Mins 8 Mins 5 Mins

Things to keep in mind while using the script

1. **The examples given in the scripts are suggestive, you can use them exactly as they are or build upon them.**
2. **Cover each concepts with different examples (even if it is not mentioned in script)**
3. **If the student catches up quickly, build upon the content covered, for example after the program to display factors, you can teach find sum of factors and check if a number is "Perfect" or not, or find number of factors and check if a number is Prime or not.**
4. **If the student is able to catch a+=b easily, explain a-=b, a*=b, a/=b with examples.**

Step	Say	Perform
Warm up (2 Mins)	Hi *student name*, how are you? Are you excited for the class? Do you remember the last class?	Try to make the student speak. Engage with the student in conversation.
Interaction (5 Mins)	In the last class, we learnt about some data structures in Python: Lists, Tuples, Dictionary, Sets, String We also used a few functions on these data structures.	Revise the concepts learned in the previous class.
	Today we will learn about Loops in Python. Loops are iterative statements in Python. Iteration means repetition. If we want to execute a command again and again, we use Loops.	
Teacher shares the screen and open Repl.it		
Knowledge Transfer (10 min)	In python we have two kinds of loops, **while** loop and **for** loop.	
	Let's first study **while** loop. In "While loop", the set of statements gets executed as long as the given condition is true.	Teacher Activity 1: While loop syntax Show the image and explain the syntax
	To understand the while loop let's take an example, let's write a program to display numbers from 1 to 10	
	First we define variable **n** with the initial value **1,** Now, we will display n and increase its value by 1, this has to be done until the value of n becomes 10. So the **conditional statement** of the loop is **n<=10**	
	The statement which changes the value of n is called an **update statement.** Another way of writing this statement is **n+=1** It increases the value of n by one, and is called increment operator.	

	Similarly, **n-=1** is called decrement operator and it will decrease the value of n by 1. Both these increment and decrement operators make up the update statements.	
	After displaying 1 on screen and changing the value of n from 1 to 2, the condition is again checked and the lines are again executed. This process happens unless the condition becomes false, which in this case is n becoming 11.	Ask students what will happen if there is no update statement in loop.
	So the loop had three basic parts, • Initial value of variable, n=1 • Conditional statement, n<=10 • Update statement, n+=1 Now, it's your turn to try the while loop.	
• **Stop sharing your screen** • **Ask the student to share screen and click on Student Activity 1:**		
	In this activity, we have to take a number as input from the user and display all its factors Factors of a given number are all the numbers which divide the given number completely.	Ask a student the meaning of factor.
	For example, factors of the number 6 are 1,2,3 and 6 itself.	Ask for factors of another number from the student.
	To find all the factors of a given number we start from 1 to the number itself. All the numbers which divide the given number are its factors.	Student Activity 1: While Loop
	So, our loop will start at **factor=1** and will increment by 1, i.e. **factor+=1** The condition will be **factor<number.**	
	To check if **factor divides the number completely,** we need a **if statement.** **if(number%factor==0):**	Explain the statement. Revising Modulus operator.

		Remind them the input function and the need of int function
	Great!! So, we displayed all the factors of a number. We can modify the same program, to find the sum or count of the factors.	Give hints on how we can find the sum and count of factors.
	• **Ask the student to stop sharing screen** • **Share your screen and open repl.it**	
	Now, it's time to learn about **for** loop. For loop can be used to iterate over a sequence. And this sequence can be a list, set, dictionary, tuple or string. The syntax of for loop is simple.	Teacher Activity 2: For loop syntax
	Let's consider a list of items **ds=["list","tuples","set","dictionary","String"]** To display all the elements of list **ds** we can simply use for loop as: **for i in ds:** **print(i)**	Show examples of list, tuple, set, dictionary and String to explain the for loop.
	Another way of using for loop is using the function **range()** It is used to form a sequence of numbers. We can input three things in this function, • Starting value • Ending value • Stepping value	Explain each point with different examples.
	For eg. **range(10,15,1)** will have numbers	

	10,11,12,13,14 So the number less than the ending value is returned, not the ending value itself.	
	Also the default value of stepping value is one, so the function can work even without putting the stepping value.	
	Even the starting value is optional and its default value is 0	
	Now let's use range in for loop.	
	To display all the even numbers between 100 and 120 **for i in range(100,121,2):** **print(i)**	Explain any example of your choice
	Now it's your turn to use for loop.	
• **Stop sharing screen** • **Ask the student to share screen and click on Student activity 2**		
	In the first activity we need to display multiplication table of 25	Student Activity 2: For Loop
	So for this we need to run the for loop ten times and that can be simply done by using the function range	
	for i in range(1,11): **print(25,"x",i,"=",(25*i))**	Remember the ending value is not included
	Now, for the second activity we need to take number as input from the user	Help the student to solve both activities.
• **Ask the student to stop sharing the screen**		
Revision	So today we learned about for loop, while loop and range function.	Revise all the concept learned in class briefly
	Q. Can you tell me what are the three parts necessary in a while loop? A. Initial value, Conditional statement and Update statement	Ask basic questions and prompt the student to give

	Q. What will happen if there is no update statement in loop and the condition is true? A. The loop will run infinitely. Q. What is the use of range function? A. It returns a sequence of numbers.	answers
	You did great today, all these concepts we are learning are the building blocks of coding, learning these will help us build programs with more functions.	
Heads up for the next class	In the next class we will be using all the concepts we have learned so far and also learn about Functions.	
BID GOOD BYE & END CLASS		

Resources:

Activity	Name	Links
Teacher Activity 1	Repl link	https://repl.it/languages
Teacher Activity 2	While loop syntax	https://drive.google.com/file/d/1Yr7j2FuTz6veHKQERjn9_fs5yi6fSsig/view?usp=sharing
Teacher Activity 3	For Loop syntax	https://repl.it/@ShailjaGupta/forLoop#main.py
Student Activity 1	While Loop	https://repl.it/@ShailjaGupta/whileLoop
Student Activity 2	For Loop	https://repl.it/@ShailjaGupta/forLoop#main.py
Student Activity 3		