**Bangladesh-Bharot Digital Service for Employment & Training (BDSET)**

**Module: Python Programming**

**Lab 03  
Problem Solving using Basics of Python for Artificial Intelligence**

**Loops in Python**

**What is Loop?**

A loop is a control structure used to execute a block of code repeatedly

Which avoids redundancy and reduces code length.

Example: Office commute, Railway weekly Schedule etc.

**Types of Loops in Python**

**For Loop:** keyword is for

Syntax: for item in iterable:

It can iterate over sequences (e.g., lists, tuples, strings, ranges). Example: for item in myList:

**Example:**

for i in range(5):

print("Iteration:", i)

**while Loop**

Syntax: while condition:

Executes as long as the condition is true.

There are 3 parts in a loop

#initialization

#Condition

#Increment/Decrement

Example:

count = 0

while count < 5:

print("Count:", count)

count += 1

**Control Statements**

**break**

Stops the loop immediately.

Example:

for i in range(10):

if i == 5:

break

print(i)

**continue**

Skips the current iteration and moves to the next.

Example:

for i in range(5):

if i == 2:

continue

print(i)

**pass**

A placeholder to maintain loop structure.

Example:

for i in range(5):

if i == 3:

pass

print(i)

**Nested Loops**

Definition: Loops inside another loop.

Example:

for i in range(3):

for j in range(2):

print(f"i={i}, j={j}")

**Infinite Loops**

What happens when a loop runs indefinitely?

Example of an infinite loop:

while True:

print("This will run forever unless stopped!")

Ways to avoid or break out of infinite loops.

**Exercise:**

1. Write a program that print the summation of all numbers from 0 to 100.
2. Print average of all numbers divisible by 3 and less than 100.
3. Use a while loop to print the multiplication table of a given number.
4. Use a for loop to reverse a string entered by the user.
5. Write a program to print whether the number is Prime number or not.
6. Calculate the factorial of a number using a for loop.
7. Write a program to print all prime numbers between 1 and 100.