Department of Computer Science and Engineering
Academic Year 2024 – 2025 (Odd Semester)

Degree, Semester & Branch: I Semester B.E. Computer Science and Engineering-'B'
Course Code & Title: GE3151 Problem Solving and Python Programming
Name of the Faculty member (s): Dr.R.Venkatesh, ASP/CSE

Innovative Practice Description

Unit / Topic: Unit II / Operators

Course Outcome: CO 2

Topic Learning Outcome: TLO 5

Activity Chosen: Virtual Laboratory

Justification:

A virtual laboratory in computer science is an online platform that simulates a laboratory environment and allows users to perform experiments and access resources virtually. Virtual laboratories can be used for a variety of purposes, including Modeling, Standardizing experiments. As a playground for experimentation and exploration, a virtual laboratory is an interactive area developed for the design and implementation of simulated experiments. In short, it is a calculator or simulator that runs on a screen, giving students a way to test concepts and observe results. Through the use of replicated laboratory equipment, these virtual laboratories allow students to interact with and closely replicate real-world behavior.

Time Allotted for the Activity: 15 minutes

Procedure of the Implementation:

- The instructor delivered a comprehensive 35-minute session covering the specific topic in class.
- Students can access the virtual lab using the following link: ***https://python-iitk.vlabs.ac.in/exp/arithmetic-operations/index.html.***
- After accessing the link, navigate to the Computer Science and Engineering section to explore a variety of virtual labs.
- Select the Python Programming Lab from the available options.
- After selecting the Python lab, navigate to the "List of Experiments" drop-down menu, which will display a variety of experiments related to Python programming.

- From this list, choose the **"Arithmetic Operations"** experiment. This specific experiment focuses on basic arithmetic operations, such as **addition,** subtraction, multiplication, division, and modulus, using Python code.

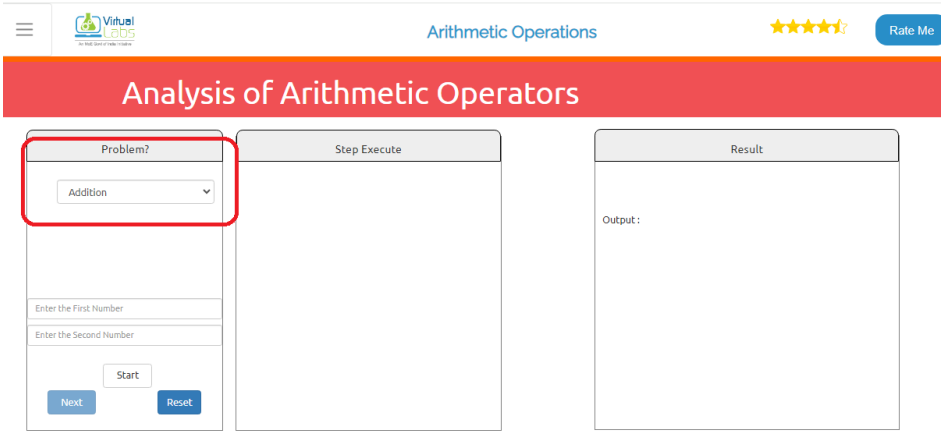

Figure 1: Selection of Arithmetic Operations – Addition Problem

- Before starting the simulation, students are encouraged to answer the Class Poll Questions, which assesses their understanding of arithmetic operations in Python.
- The class poll consists of a few multiple-choice questions to understanding their knowledge prior to performing the experiment.
- On this interface, students will see instructions on how to perform arithmetic **"Addition"** operations **step-by-step using Python code.**
- The interface allows us to enter first and second number for the operations, and when you click the **"Start" button**, the steps for are generated in real-time.

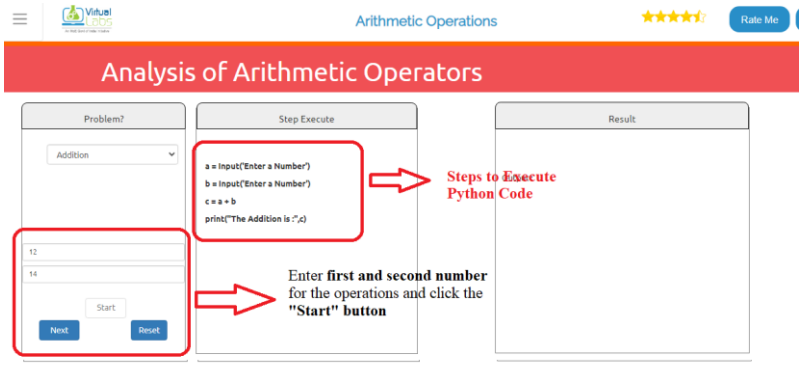

Figure 2: Provide Input and Start the Execution

- Pressing the **"Next"** button will navigate to the following step, while tracking the code execution through a simulation of each step.

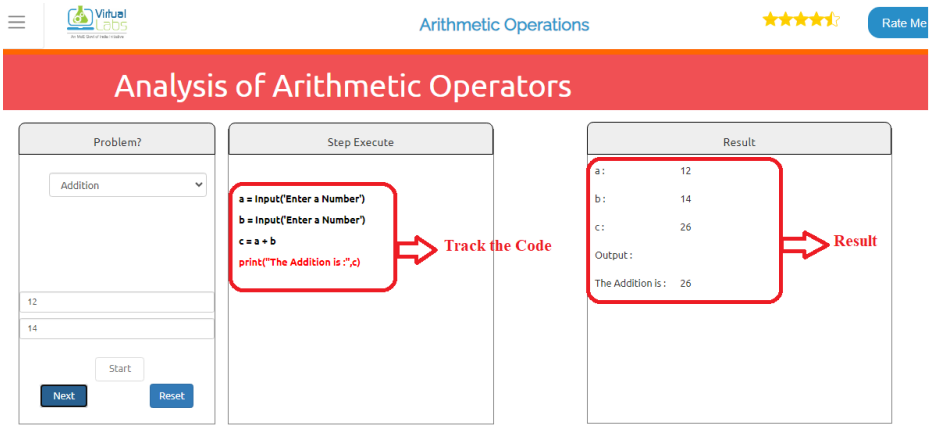

Figure 3: Track the Execution and Get the Result

- Clear instructions were given for navigating through the simulator steps.
- The operations were demonstrated using the simulation button.
  - **CO – PO / PSO mapping:**

CO	PO1	PO2	PO3	PO3	PSO1
CO 2	2	1	1	1	1

(1 – Low 2 – Moderate 3 – High)

PO / PSO mapped:

Innovative practice	**PO1**	**PO2**	**PO3**	**PSO1**
	2	1	1	1
Justification for correlation	Students can be able to apply logical thinking and think about problem-solving approaches.	Students will be able to approach the problem by applying the types of operators they learned and solving simple and complex engineering problems.	Students will be able to interpret the complex engineering problems using the precedence of operators.	The problem solving skill earned through this activity helps the students in solving various problems in information and communication engineering.

- **Images / Screenshot of the practice:**

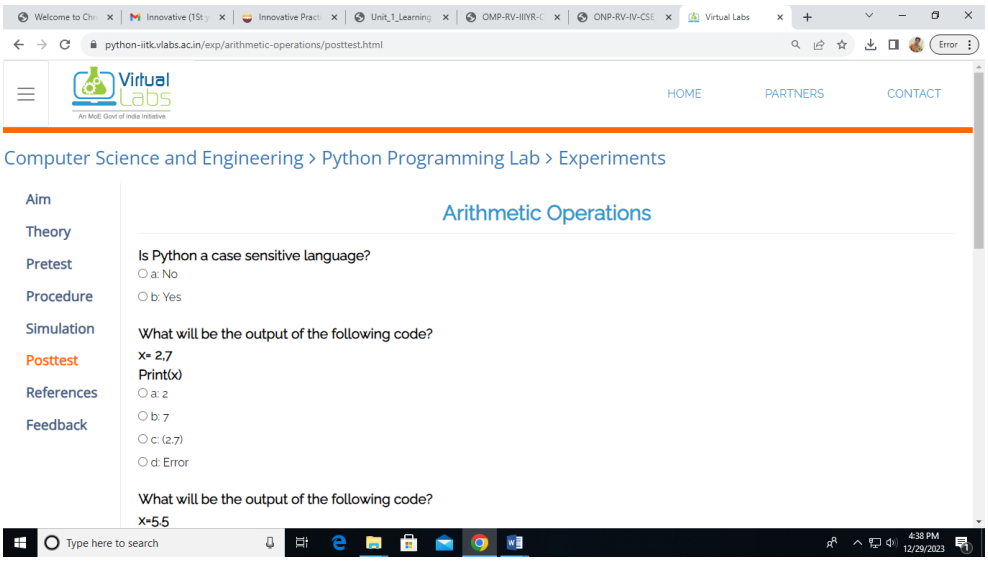

Figure 4: Demonstration on Posttest in operators

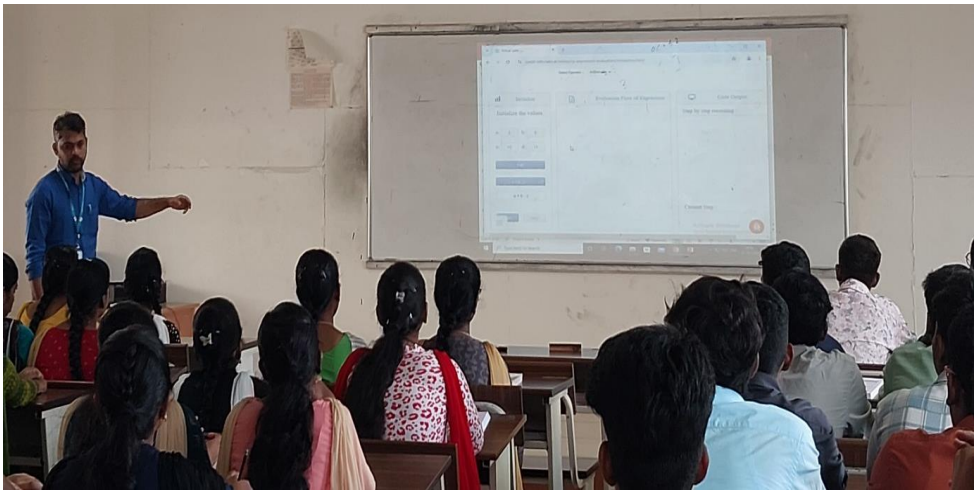

Figure:5 Demonstration on analysis of arithmetic operators

- **Reflective Critique:**
  - ❖ ***Feedback of practice from students and other stakeholders:***
    - The practice received positive feedback from students, facilitating their understanding of the fundamentals of Arithmetic Operations in the Python Programming Language through an interactive simulator.
    - Students found the pretest and posttest to be valuable tools for reinforcing and recalling key concepts.
  - ❖ ***Benefit of the practice:***
    - The activity contributed to a clear comprehension of the concept, as expressed by the students.
    - Active participation was observed among most students, with a sense of enjoyment, particularly when answering correctly in the pretest.

❖ ***Challenges faced in implementation:***

- Some students were less engaged in the demonstration activity.
- The same activity will be planned in the laboratory session to make all the students familiar in the virtual environment.

References:

1. https://python-iitk.vlabs.ac.in/exp/arithmetic-operations/index.html
2. https://www.ritrjpm.ac.in/images/computer-science/Virtual%20Lab-Routing%20in%20MANET.pdf
3. https://www.ritrjpm.ac.in/images/computer-science/40.EC8393_virtual%20lab.pdf

Signature of Faculty Member **HOD-CSE**