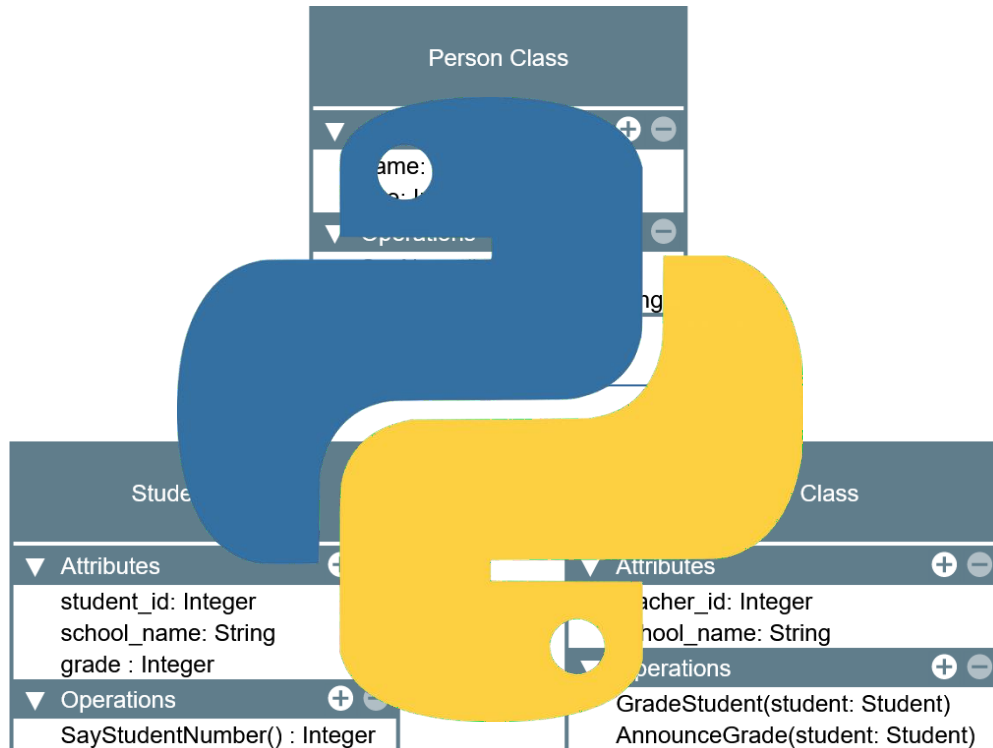




UNIVERSITY OF CALOOCAN CITY
Caloocan, 1400 Metro Manila, Philippines

COLLEGE OF ENGINEERING
Computer Engineering
2nd Semester, School Year 2024-2025



LABORATORY MANUAL

Object-Oriented Programming (CPE 103)



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Laboratory Activity No. 2.1

Literals, Operators, and Variables

Course Code: CPE103	Program: BSCPE
Course Title: Object-Oriented Programming	Date Performed: 02/ 01/ 25
Section: 1A	Date Submitted: 02/ 07/ 25
Name: Nerio, Hannah Grace A.	Instructor: Engr. Maria Rizette Sayo

1. Objective(s):

The objective of this lab activity is to help students understand and apply Object-Oriented Programming (OOP) concepts by creating a Python program that calculates the final grade of students in a COE course. The program should handle grade calculations based on various components, such as exams, class standing, and activities.

2. Intended Learning Outcomes (ILOs):

By the end of this lab activity, students should be able to:

- 2.1 Implement a Python program that calculates student grades based on various components, such as exams, class standing, and activities.
- 2.2 Understand and apply OOP concepts like classes, objects, methods, and inheritance to solve real-world problems.
- 2.3 Use conditional statements and functions to perform grade calculations based on user input.
- 2.4 Test the program with multiple students and ensure it correctly calculates and displays the Prelim, Midterm and Final Grades.
- 2.5 Translate the final grade into a UCC numerical grade based on a given grading scale.

3. Discussion:

In Python programming, variables, constants, and literals are essential for managing data within a program. Variables store values that can change during the program's execution, such as exam scores and class standing components in the grade calculation program. For example, `selim_exam`, `midterm_exam`, and `final_exam` store the students' exam scores, while `band_activity`, `quiz`, and `assignment` hold the averages for activities and assignments. Constants represent fixed values that don't change, such as the weightages for each grading component, like `PRELIM_WEIGHT = 0.50`. These constants ensure consistency and can be modified easily in one place. Literals are fixed values directly used in the code, like percentages (e.g., 0.50, 0.30, 0.20) for calculating class standing and numerical grades, or strings like "A" to represent the UCC numerical grade. By combining variables, constants, and literals, the program remains flexible, readable, and easy to maintain, ensuring proper grade calculations and simplifying potential modifications.

4. Materials and Equipment:





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Desktop Computer with Anaconda Python
/Python Colab Windows Operating System

5. Procedure:

Perform the activity using the Jupyter Notebook

This activity can be done either locally on Anaconda's Jupyter Notebook or online through Google Collaboratory which offers a free Jupyter Notebook environment for Google Users. IPython Notebook files (.ipynb) that are saved in the Google Drive can be opened on Google Collaboratory. Additional guides are available on the IPython Notebook template file that is provided with this activity. If the template is not present, these are the valuable links for reference:

Tasks

1. A teacher wants to calculate the final grade in a CpE course and wants to write it in a python program. The following are the requirements:
 1. PRELIM GRADE = 50% Prelim Exam + 50% Prelim Class Standing (CS)
 2. PRELIM CS = 50% Hands-on activity + 30% Quiz + 20% Assignment
 3. MIDTERM GRADE = 1/3 of PRELIM GRADE + 2/3 of (50% Midterm Exam + 50% Midterm Class Standing (CS))
 4. MIDTERM CS = 50% Hands-on activity + 30% Quiz + 20% Assignment
 5. FINAL GRADE = 1/3 of MIDTERM GRADE + 2/3 of (50% Final Exam + 50% Final Class Standing (CS))
 6. FINAL CS = 50% Hands-on activity + 30% Quiz + 20% Assignment
 7. HOAs, Quizzes and Assignments are inputted as average of all submissions and are out of 100%.
 8. Major exams are inputted out of 100%.
 9. Show the codes that successfully run the program.
 10. Provide comments or documentation strings for your program.

FOR CHECKING PLEASE REFER TO THIS LINK:

<https://colab.research.google.com/drive/1F2EhkWDYOjfiOlqsqmHYh8BQqtn7yjgd?usp=sharing>



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6. Supplementary Activity:

1. Test 3 students from the program you created.
2. The program should show the name of the student, the PRELIM, MIDTERM and FINAL grades.
3. Convert the final grade into the UCCs numerical grade. Please refer to the grading system.

FOR CHECKING PLEASE REFER TO THIS LINK:

<https://colab.research.google.com/drive/1F2EhkWDY0jfiOlqsqmHYh8BQqtn7yjgd?usp=sharing>

Questions:

1. What is the difference between a **literal** and a **variable** in Python?

A **literal** is a fixed value that you directly write in your code, like 10, "Hello", or 3.14. It doesn't change. On the other hand, a **variable** is a name that stores a value, and the value can change. For example, in the code `x = 10`, 10 is a literal, and `x` is a variable that holds the value 10.

2. What are **operators** in Python, and how are they used in calculations?

Operators are symbols used to perform operations on values or variables. For example, `+` is used for addition, `-` for subtraction, `*` for multiplication, and `/` for division. These operators help you perform calculations in your program. For instance, to calculate the average of three numbers, you can use the `+` operator to add them and the `/` operator to divide the sum by 3, like this: `average = (10 + 20 + 30) / 3`. Here, 10, 20, and 30 are literals, and `average` is a variable that stores the result of the calculation. Together, literals, variables, and operators allow you to write programs that can solve problems and perform tasks efficiently.

7. Conclusion:

In this laboratory activity, we created a Python program to compute students' final grades based on their exam scores and class standing. By applying operations and expressions, we performed calculations such as averaging scores, weighting percentages, and combining different grade components. These





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mathematical operations were essential in accurately determining the Prelim, Midterm, and Final Grades according to the given formula. Additionally, we used conditional statements to classify the final grades based on the UCC grading system. By checking the final grade range, the program assigned the correct grade equivalent, ensuring that the grading system followed a structured decision-making process. This activity helped us understand how basic programming concepts like arithmetic operations and conditions are applied in real-life scenarios, such as academic grading. It also reinforced the importance of organizing calculations properly to get accurate results. Overall, this exercise improved our problem-solving skills and gave us hands-on experience in using Python for practical applications.

8. Assessment Rubric:

