

CSADPRG MCO Project Specifications

Comparative Analysis of Programming Languages

1. Activity Overview

This activity is designed to reinforce the theoretical concepts of programming languages covered in class by comparing and evaluating various language features. In this term project, groups will analyze Go, Kotlin, R, and Ruby. The project is divided into three main components:

1. A comparative language evaluation paper.
2. Development of two applications using different programming languages.
3. A class presentation of findings.

By the end of this project, students will have gained insights into the different paradigms supported by these languages and will appreciate their unique features and similarities.

2. Software Application 1: Loan Calculator

Create a loan calculator using **Go**, **Kotlin**, **R**, or **Ruby** that computes the monthly repayment and total interest for a loan based on user input. This calculator will apply a simplified formula, enabling straightforward implementation and comparison across languages.

Inputs:

- **Loan Amount:** Total loan amount in PHP (e.g., PHP 100,000).
- **Annual Interest Rate:** Percentage rate (e.g., 5%).
- **Loan Term:** Loan duration in years (e.g., 2 years).

Process:

1. Monthly Interest Rate:

$$\text{monthly interest rate} = \frac{\text{annual interest rate}}{12}$$

2. Loan Term in Months:

$$\text{loan terms in months} = \text{loan terms in years} \times 12$$

3. Total Interest:

$$\text{total interest} = \text{loan amount} \times \text{monthly interest rate} \times \text{loan term in months}$$

4. Monthly Repayment:

$$\text{monthly repayment} = \frac{\text{loan amount} + \text{total interest}}{\text{loan terms in months}}$$

Outputs:

- **Loan Amount:** PHP value.
- **Annual Interest Rate:** Percentage value.
- **Loan Term:** Duration in months.
- **Monthly Repayment:** PHP value.
- **Total Interest:** PHP value.

Example:

Input	Output
Loan Amount: PHP 100,000 Annual Interest Rate: 5% Loan Term: 2 years	Loan Amount: PHP 100,000 Annual Interest Rate: 5% Loan Term: 24 months Monthly Repayment: PHP 4,583.33 Total Interest: PHP 10,000
Loan Amount: PHP 240,000 Annual Interest Rate: 7.5% Loan Term: 4 years	Loan Amount: PHP 240,000 Annual Interest Rate: 7.5% Loan Term: 48 months Monthly Repayment: PHP 6,500 Total Interest: PHP 72,000

Evaluation Criteria (Total: 20 points): The loan calculator will be evaluated based on the following criteria:

Criteria	Description	Points	Details
Code Simplicity	Measures how straightforward and minimal the code is.	5	5 pts: Code is simple and efficient. 3-4 pts: Mostly simple, with minor inefficiencies. 1-2 pts: Code has unnecessary complexity. 0 pts: Code is overly complex or unclear.
Performance	Evaluates how quickly the program executes, especially with large inputs.	5	5 pts: Excellent performance across all inputs. 3-4 pts: Minor performance issues with large inputs. 1-2 pts: Noticeable lags. 0 pts: Poor performance.
Code Readability	Assesses the clarity of the code, including formatting, variable naming, and use of comments.	5	5 pts: Clean, well-organized code. 3-4 pts: Some minor readability issues. 1-2 pts: Difficult to follow. 0 pts: Unreadable code.
Correctness	Checks if the program produces the correct outputs and handles edge cases.	3	3 pts: Correct outputs for all cases. 2 pts: Minor mistakes in edge cases. 1 pt: Frequent errors. 0 pts: Fails to provide correct output.

User Experience	Measures how intuitive and user-friendly the program is, including clear input/output and instructions.	2	2 pts: Smooth, intuitive experience. 1 pt: Somewhat confusing interface. 0 pts: Poor user experience.
------------------------	---	---	---

Note: There will be another specification for MCO2.