

**GALGOTIAS UNIVERSITY**

# **CGPA CALCULATOR**

**Java-Based Academic Performance System**

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# 01 / Introduction

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## What is the CGPA Calculator?

It is a dedicated desktop application built in Java, designed to provide students with an immediate, accurate assessment of their academic standing by calculating the Cumulative Grade Point Average (CGPA).

## Technology Stack

- ✓ **Language:** Core Java SE (JDK 17+)
- ✓ **GUI Framework:** Java Swing (or similar library)
- ✓ **Paradigm:** Object-Oriented Programming (OOP)



### Java Power

Platform independence and robustness for secure arithmetic operations.



### Desktop Application

Provides a reliable, quick-access utility without needing web connectivity.

# 02 / Problem & Solution

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## The Challenge

- ✓ **Inaccuracy Risk:** Manual spreadsheet or paper calculations are highly susceptible to errors.
- ✓ **Non-Standardized:** Grade conversion and credit weighting can vary, leading to confusion.
- ✓ **Lack of Real-Time Feedback:** Students cannot easily model "what-if" scenarios for future performance.

## Our Solution (Key Features)

- ✓ **Weighted Average Engine:** Handles variable credit hours accurately.
- ✓ **Grade Mapping:** Built-in logic to convert letter grades to numerical grade points automatically.
- ✓ **User Interface (GUI):** Simple forms allow quick entry of course data (Course, Credits, Grade).

# 03 / Architecture & OOP Concepts

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## Modular Class Design

The application is structured around dedicated classes to enforce Single Responsibility Principle (SRP):

- ✓ **Course:** Encapsulates course data (Name, Credit, Grade).
- ✓ **Semester:** Manages a collection of Course objects.
- ✓ **CalculatorEngine:** Contains the core business logic for mathematical processing.



## OOP Pillars

### ENCAPSULATION

Data protection via private fields.

### ABSTRACTION

Hiding complex calculation logic.

# 04 / Mathematical Foundation

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## Weighted Average Formula

The CGPA is computed as the total weighted grade points divided by the total credit hours earned across all included semesters.

$$\text{CGPA} = \frac{\sum_{i=1}^n C_i \times P_i}{\sum_{i=1}^n C_i}$$

$C_i$ : Credit hours for course  $i$  |  $P_i$ : Grade Point for course  $i$

# 05 / Implementation Snippet

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## The Calculation Loop

The engine iterates over all courses, multiplying credits by points, and handles edge cases like division by zero.

```
// Core Logic within CalculatorEngine.java

public double calculateCGPA(List courses) {

    double totalPoints = 0.0;

    int totalCredits = 0;

    for (Course course : courses) {

        double gradePoint = GradeMapper.getPoint(course.getGrade());
```

# 06 / Future Scope & Expansion

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## Phase 2: Data Persistence



### Local Storage / Serialization

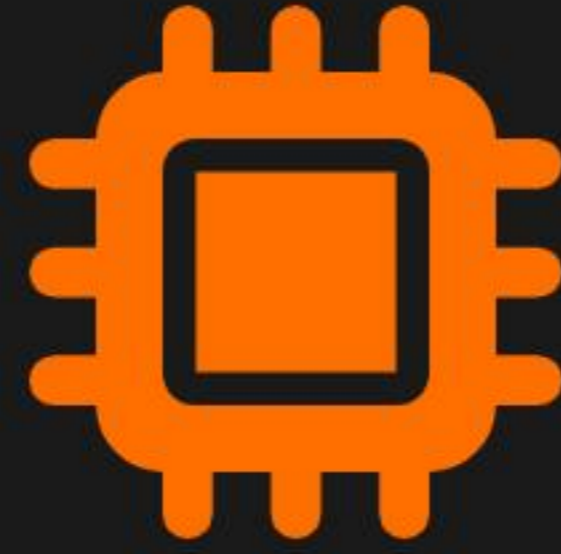
Implement Java Serialization or simple file I/O to save student data locally, allowing history retrieval.

## Phase 3: Extended Features



### Graphical Reporting

Integrate charting libraries to visualize semester-to-semester performance trends.



# THANK YOU

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## QUESTIONS?

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