Project Work: Building a Mortgage Calculator

Project Title:

Mortgage Calculator

Objective:

The objective of this project is to design and develop a Mortgage Calculator application that allows users to calculate their monthly mortgage payments based on the principal amount, interest rate, and loan period. This project aims to provide students with practical experience in software development, focusing on user input handling, mathematical computations, and command-line interactions.

Project Description:

In this project, students will create a Java-based Mortgage Calculator. The application will take three inputs from the user: the principal loan amount, the annual interest rate, and the loan period in years. Using these inputs, the calculator will compute and display the monthly mortgage payment.

Key Features:

1. **User Input Handling**:
    - Prompt the user to enter the principal amount (e.g., $200,000).
    - Prompt the user to enter the annual interest rate (e.g., 5%).
    - Prompt the user to enter the loan period in years (e.g., 30 years).
2. **Calculation**:
    - Implement the formula to calculate the monthly mortgage payment:

$$M = P \times \frac{r(1+r)^n}{(1+r)^n - 1}$$

Where:

- M is the monthly payment.
- P is the principal loan amount.
- r is the monthly interest rate (annual interest rate divided by 12).
- n is the number of payments (loan period in years multiplied by 12).

3. **Output**:
   - Display the calculated monthly mortgage payment to the user.
   - Optionally, provide a detailed amortization schedule showing the breakdown of each monthly payment into principal and interest components.

Requirements:

1. **Programming Language**:
   - The project should be implemented in Java.
2. **Development Tools**:
   - Use an Integrated Development Environment (IDE) such as IntelliJ IDEA, Eclipse, or NetBeans.
3. **Documentation**:
   - Provide clear and concise comments within the code.

Evaluation Criteria:

1. **Functionality**:
   - Correctness of the mortgage calculation.

- Accuracy of user input handling.
- Proper display of output.

2. **Code Quality**:
   - Code readability and organization.
   - Use of appropriate data structures and algorithms.
   - Error handling and validation.
3. **Documentation**:
   - Completeness and clarity of comments in the code.

Deliverables:

1. **Source Code**: Submit the complete source code of the project.

Deadline:

August 1, 2024

This project will give students a practical understanding of applying mathematical formulas in software, handling user inputs, and creating user-friendly command-line applications. Good luck, and happy coding!