

Project-Title

Basic interest calculator that computes both Simple Interest (SI) and Compound Interest (CI)

Project Report

Object Oriented Programming using Java (PGCSA111)

Master of Computer Application

PROJECT GUIDE:

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ACKNOWLEDGEMENT

*I have taken this opportunity to express my gratitude and humble regards to the Vivekananda Global University to provide an opportunity to present a project on the “**Basic interest calculator that computes both Simple Interest (SI) and Compound Interest (CI)**” which is a Java programming based project.*

*I would also be thankful to my project guide **Mr. Narayan Vyas** to help me in the completion of my project and the documentation. I have taken efforts in this project but the success of this project would not be possible without their support and encouragement.*

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Place: Jaipur

Date: 10-04-2025

DECLARATION

We hereby declare that this Project Report titled “**Basic interest calculator that computes both Simple Interest (SI) and Compound Interest (CI)**” submitted by us and approved by our project guide, to the Vivekananda Global University, Jaipur is a bonafide work undertaken by us and it is not submitted to any other University or Institution for the award of any degree diploma / certificate or published any time before.

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Project Guide:

Mr. Narayan Vyas

Table of Contents

- 1. Introduction**
- 2. Objectives**
- 3. Interest Concepts**
 - Simple Interest (SI)
 - Compound Interest (CI)
- 4. Overview**
 - Language used
 - Features
 - Code Explanation
- 5. Applications**
- 6. Future Enhancements**
- 7. Conclusion**
- 8. Reference**

1. Introduction

This section provides a brief overview of the topic. You explain what interest is, why it's important in financial systems, and how it affects savings, loans, and investments. Mention that your project or program focuses on calculating **Simple Interest (SI)** and **Compound Interest (CI)** using a programming language.

Example:

Interest is the cost of borrowing money or the reward for saving it. It plays a critical role in personal finance and business transactions. This project demonstrates how to compute simple and compound interest through a computer program.

2. Objectives

Clearly state what the project aims to achieve. Objectives should be concise and focused.

Example Objectives:

- To understand and implement formulas for SI and CI.
- To develop a program that calculates interest based on user input.
- To compare SI and CI over time.
- To demonstrate the impact of different parameters (rate, time, principal) on interest.

3. Interest Concepts

This section explains the theoretical background of interest, split into two subtopics:

3.1 Simple Interest (SI)

- **Definition:** SI is calculated only on the principal amount.
- **Formula:**

$$\text{SI} = \frac{P \times R \times T}{100}$$

where:

- PPP = Principal
- RRR = Rate of Interest per annum
- TTT = Time in years
- **Use case:** Often used in short-term loans or basic savings schemes.

3.2 Compound Interest (CI)

- **Definition:** CI is calculated on the principal and also on the interest earned previously.
- **Formula:**
$$\text{CI} = P \times (1 + \frac{R}{100})^T - P$$
$$\text{PCI} = P \times (1 + \frac{R}{100})^T - P$$
- **Use case:** Used in investments, recurring deposits, and long-term savings.
- CI grows faster than SI due to interest on interest.

4. Program Overview

Describe the software/program you created to calculate SI and CI.

4.1 Language Used

Mention the programming language used (e.g., Python, C++, Java).

Example:

The program was written in **Python** because of its simplicity, readability, and support for mathematical operations.

4.2 Features

Highlight the key functionalities of your program.

Example Features:

- User-friendly input prompts for Principal, Rate, and Time.
- Separate outputs for SI and CI.
- Option to compare SI and CI.
- Clear and formatted output display.

4.3 Code Explanation

Provide a brief walkthrough of your code logic:

- Input section (user provides P, R, T)
- Calculation using formulas
- Displaying results
- Error handling (optional)

Optionally, include code snippets and explain them line by line.

CODE :-**Part 1. GUI**

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class GUI extends JFrame {
    private JTextField principalField, rateField, timeField, compoundField;
    private JLabel resultLabel;

    public GUI() {
        setTitle("Interest Calculator");
        setSize(400, 300);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new GridLayout(6, 2, 10, 10));

        // Creating UI Components
        add(new JLabel("Principal Amount:"));
        principalField = new JTextField();
        add(principalField);

        add(new JLabel("Rate of Interest (% per year):"));
        rateField = new JTextField();
        add(rateField);

        add(new JLabel("Time (years):"));
        timeField = new JTextField();
        add(timeField);

        add(new JLabel("Compounded per Year (Enter 1 for Simple Interest:"));
        compoundField = new JTextField();
        add(compoundField);

        JButton calculateButton = new JButton("Calculate");
```

```
add(calculateButton);

resultLabel = new JLabel("Result will be shown here.");
add(resultLabel);

// Action Listener for Button Click
calculateButton.addActionListener(new ActionListener() {
    @Override
    public void actionPerformed(ActionEvent e) {
        calculateInterest();
    }
});

setVisible(true);
}

private void calculateInterest() {
    try {
        double principal = Double.parseDouble(principalField.getText());
        double rate = Double.parseDouble(rateField.getText());
        double time = Double.parseDouble(timeField.getText());
        int n = Integer.parseInt(compoundField.getText());

        double simpleInterest = (principal * rate * time) / 100;
        double compoundInterest = principal * Math.pow((1 + (rate / (100 * n))), n
* time) - principal;

        resultLabel.setText("<html>Simple Interest: " + simpleInterest +
"<br>Compound Interest: " + compoundInterest + "</html>");
    } catch (Exception ex) {
        resultLabel.setText("Invalid input. Please enter numeric values.");
    }
}

public static void main(String[] args) {
```



```
        new GUI();  
    }  
}
```

Output:

Interest Calculator

Principal Amount: 200

Rate of Interest (% per year): 15

Time (years): 3

Compounded per Year (Enter 1 for Simple Interest): 1

Calculate

Simple Interest: 90.0
Compound Interest: 104.17499999999995

Part 2. FOR CALCULATE SI AND CI

```
import java.util.Scanner;
```

```
public class TEXT{  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        // Get user input  
        System.out.print("Enter Principal Amount: ");  
        double principal = scanner.nextDouble();  
  
        System.out.print("Enter Rate of Interest (% per year): ");  
        double rate = scanner.nextDouble();  
  
        System.out.print("Enter Time (years): ");
```

```
double time = scanner.nextDouble();

System.out.print("Enter Number of Times Interest is Compounded per Year:
");
int n = scanner.nextInt();

// Calculate Simple Interest
double simpleInterest = calculateSimpleInterest(principal, rate, time);
System.out.println("Simple Interest: " + simpleInterest);

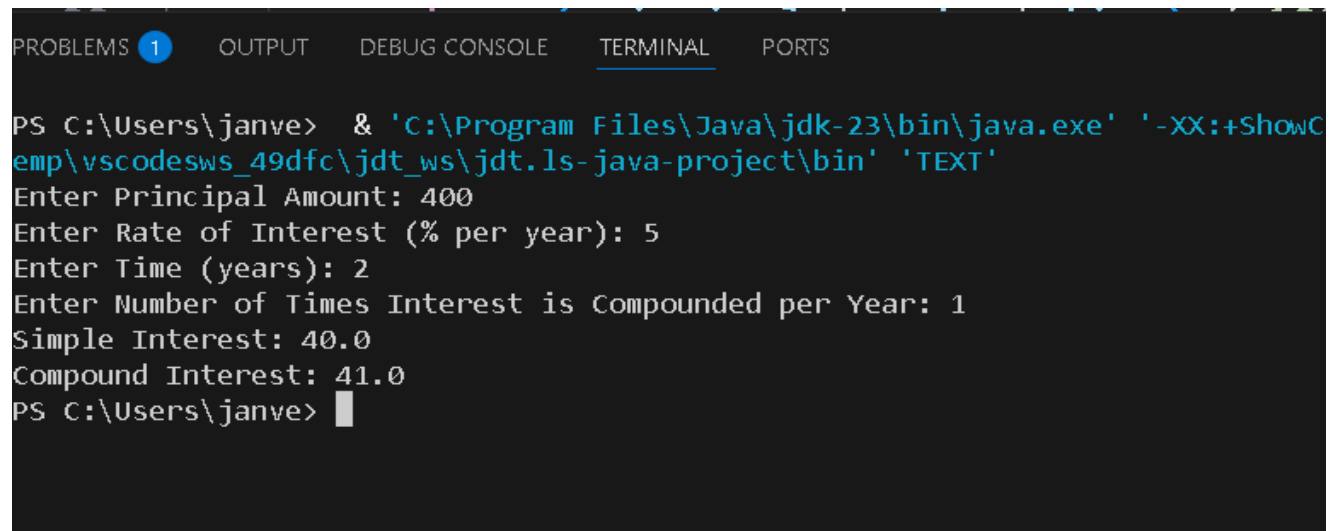
// Calculate Compound Interest
double compoundInterest = calculateCompoundInterest(principal, rate, time,
n);
System.out.println("Compound Interest: " + compoundInterest);

scanner.close();
}

// Method to calculate Simple Interest
public static double calculateSimpleInterest(double principal, double rate, double
time) {
    return (principal * rate * time) / 100;
}

// Method to calculate Compound Interest
public static double calculateCompoundInterest(double principal, double rate,
double time, int n) {
    return principal * Math.pow((1 + (rate / (100 * n))), n * time) - principal;
}
}
```

Output:



```
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\janve> & 'C:\Program Files\Java\jdk-23\bin\java.exe' '-XX:+ShowC
emp\vscodesws_49dfc\jdt_ws\jdt.ls-java-project\bin' 'TEXT'
Enter Principal Amount: 400
Enter Rate of Interest (% per year): 5
Enter Time (years): 2
Enter Number of Times Interest is Compounded per Year: 1
Simple Interest: 40.0
Compound Interest: 41.0
PS C:\Users\janve> █
```

5. Applications

Describe real-world scenarios where SI and CI calculations are important:

- **Banking:** Calculating interest on loans and savings.
- **Education:** Student loans or savings plans.
- **Business:** Investment returns, project evaluations.
- **Personal Finance:** Home loans, car loans, credit card interest.

6. Future Enhancements

Mention possible upgrades to your project in the future.

Examples:

- Add GUI using Tkinter (Python) or JavaFX (Java).
- Include monthly/yearly compounding options.
- Store user data and interest history.
- Create a mobile or web app version.

7. Conclusion

Summarize what was achieved through the project.

Example:

This project successfully demonstrates how to calculate and compare Simple and Compound Interest using a basic program. It reinforces mathematical understanding and shows practical financial applications.

8. Reference

The program is based on standard financial formulas and uses basic Java programming principles. Below are the key references:

1. Mathematical Formulas:

- Simple Interest:

$$SI=P \times R \times T / 100$$

- Compound Interest:

$$CI=P(1+R/n \times 100)^n \times T - P$$

2. Java Programming Concepts:

- Scanner class for user input: [Oracle Java Documentation - Scanner](#)
- Math.pow() for exponentiation: [Oracle Java Documentation - Math](#)

3. Java Language Specification: Oracle Java SE Documentation :
<https://docs.oracle.com/javase/specs/>