MINI PROJECT
on
Scientific Calculator
&
Book Management

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Page 2: Abstract

IntelliJ IDE will be suggested to use as it is faster and integrates the environment in a better manner.

Procedure

Step — 1: -

Create a file named Calculator.java inside IntelliJ IDE, where we are going to write all the code for the project.

Step — 2: -

Import all the packages that are useful for the project.

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

Step — 3: -
Write the body matter for the project: -
Given all the commented code.

(Code)

```
import java.util.Scanner;

public class Calculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int arith=-1;
        int conver = -1;
        int digi =-1;
        try{
            System.out.println("Scientific Calculator");
            System.out.println("Select the type of Operation: \n 1. Press A for
Arithemetic Operations \n 2. Press B for Conversion Operations \n 3. Press C for
Digital Operations \n 4. Press D to exit" );
            String operation = scanner.nextLine();
            //while(operation != "D"){
            switch(operation){
                case "A":
                {
                    System.out.println("Welcome to Arithemetic ");
                    while(arith!=0)
```

```
                    {
                    System.out.println("Enter an option: \n 1. Press 1 for Addition(+)
\n 2. Press 2 for Subtraction(-) \n 3. Press 3 for Multiplication(*) \n 4. Press 4
for Division(/)\n 5. Press 5 for Modulus(%)\n 6. Press 6 for Square \n 7. Press 7 for
Cube \n 8. Press 8 for Square-Root \n 0. Press 0 to Exit");
                    arith = scanner.nextInt();
                    switch (arith)
                    {
                        case 1:
                            System.out.println("Enter first number:");
                            double a = scanner.nextDouble();
                            System.out.println("Enter second number:");
                            double b = scanner.nextDouble();
                            System.out.println("------------------------");
                            System.out.println("|                       |");
                            System.out.println("|       "+(a+b)+"           |");
                            System.out.println("|                       |");
                            System.out.println("------------------------");
                            System.out.println("Sum of "+a +"& "+b+" is: " + (a+b));
                            break;
                            case 2:
                            System.out.println("Enter first number:");
                            double minuend = scanner.nextDouble();
                            System.out.println("Enter second number:");
                            double subtrahend = scanner.nextDouble();
                            System.out.println("------------------------");
                            System.out.println("|                       |");
                            System.out.println("|       "+(minuend-
subtrahend)+"           |");
                            System.out.println("|                       |");
                            System.out.println("------------------------");
                            System.out.println("Result: " + (minuend - subtrahend));
                            break;
                            case 3:
                            System.out.println("Enter first number:");
                            double multiplicand = scanner.nextDouble();
                            System.out.println("Enter second number:");
                            double multiplier = scanner.nextDouble();
                            System.out.println("------------------------");
                            System.out.println("|                       |");
                            System.out.println("|        "+(multiplicand*multiplier)+
"         |");
                            System.out.println("|                       |");
                            System.out.println("------------------------");
                            System.out.println("Result: " + (multiplicand *
multiplier));
                            break;
                            case 4:
                            System.out.println("Enter numerator:");
                            double numerator = scanner.nextDouble();
                            System.out.println("Enter denominator:");
                            double denominator = scanner.nextDouble();
```

```
                        if (denominator == 0) {
                            System.out.println("-----------------------");
                            System.out.println("|                      |");
                            System.out.println("|       "+"Error"+"
        |");
                            System.out.println("|                      |");
                            System.out.println("-----------------------");
                            System.out.println("Error: Division by zero");
                        } else {
                            System.out.println("-----------------------");
                            System.out.println("|                      |");
                            System.out.println("|        "+(numerator/denominator)
+"           |");
                            System.out.println("|                      |");
                            System.out.println("-----------------------");
                            System.out.println("Result: " + (numerator /
denominator));
                        }
                        break;
                        case 5:
                        System.out.println("Enter first number:");
                        double dividend = scanner.nextDouble();
                        System.out.println("Enter second number:");
                        double divisor = scanner.nextDouble();
                        if (divisor == 0) {
                            System.out.println("-----------------------");
                            System.out.println("|                      |");
                            System.out.println("|"+"Error"+"                    |
");
                            System.out.println("|                      |");
                            System.out.println("-----------------------");
                            System.out.println("Error: Division by zero");
                        } else {
                            System.out.println("-----------------------");
                            System.out.println("|                      |");
                            System.out.println("|          "+(dividend %
divisor)+"         |");
                            System.out.println("|                      |");
                            System.out.println("-----------------------");
                            System.out.println("Result: " + (dividend % divisor));
                        }
                        break;
                        case 6:
                        System.out.println("Enter the number:");
                        double num = scanner.nextDouble();
                        System.out.println("-----------------------");
                        System.out.println("|                      |");
                        System.out.println("|          "+(num*num)+"         |");
                        System.out.println("|                      |");
                        System.out.println("-----------------------");
                        System.out.println("Result: " + (num*num));
                        break;
```

```
                        case 7:
                        System.out.println("Enter the number:");
                        double num2 = scanner.nextDouble();
                        System.out.println("------------------------");
                        System.out.println("|                       |");
                        System.out.println("|          "+(num2*num2*num2)+"
   |");
                        System.out.println("|                       |");
                        System.out.println("------------------------");
                        System.out.println("Result: " + (num2*num2*num2));
                        break;
                        case 8:
                        System.out.println("Enter the number:");
                        double num1 = scanner.nextDouble();
                        if (num1 < 0) {
                            System.out.println("------------------------");
                            System.out.println("|                      |");
                            System.out.println("|"+("Error")+"
 |");
                            System.out.println("|                      |");
                            System.out.println("------------------------");
                        System.out.println("Cannot take the square root of a
negative number!");
                        break;
                        }
                        double sqrt = Math.sqrt(num1);
                        System.out.println("sqrt(" + num1 + ") = " + sqrt);
                        break;
                        case 0:
                        System.out.println("------------------------");
                        System.out.println("|                       |");
                        System.out.println("|         "+("Exiting...")+"   |");
                        System.out.println("|                       |");
                        System.out.println("------------------------");
                        System.out.println("Exiting...");
                        System.exit(0);
                    }
                }
            }

            case "B":
            {
                System.out.println("Welcome to Conversion");
                while(conver!=0){
                    System.out.println("Enter an option: \n 1. Press 1 for
Liters-milliliters \n 2. Press 2 for Kilometers-meters \n 3. Press 3 for Centimeters-
millimeters \n 4.Press 4 for Meters-centimeters \n 0.Press 0 for Exit");
                    conver = scanner.nextInt();
                    switch (conver)
                    {
                        case 1:
                            System.out.println("Enter value in liters:");
```

```
                                double liters = scanner.nextDouble();
                                double milliliters = liters * 1000;
                                System.out.println("---------------------------------
-");
                                System.out.println("|
|");
                                System.out.println("|"+(liters + " liters = " +
milliliters + " milliliters")+"|");
                                System.out.println("|
|");
                                System.out.println("---------------------------------
-");
                                System.out.println(liters + " liters = " +
milliliters + " milliliters");
                                break;

                            case 2:
                                System.out.println("Enter value in kilometers:");
                                double kilometers = scanner.nextDouble();
                                double meters = kilometers * 1000;
                                System.out.println("---------------------------------
-");
                                System.out.println("|
|");
                                System.out.println("|"+(kilometers + " kilometers = "
+ meters + " meters")+"|");
                                System.out.println("|
|");
                                System.out.println("---------------------------------
-");
                                System.out.println(kilometers + " kilometers = " +
meters + " meters");
                                break;

                            case 3:
                                System.out.println("Enter value in centimeters:");
                                double centimeters = scanner.nextDouble();
                                double millimeters = centimeters * 10;
                                System.out.println("---------------------------------
-");
                                System.out.println("|
|");
                                System.out.println("|"+(centimeters + " centimeters =
" + millimeters + " millimeters")+"|");
                                System.out.println("|
|");
                                System.out.println("---------------------------------
-");
                                System.out.println(centimeters + " centimeters = " +
millimeters + " millimeters");
                                break;
```

```
                            case 4:
                                System.out.println("Enter value in meters:");
                                double m = scanner.nextDouble();
                                double cm = m * 100;
                                System.out.println("---------------------------------
-");
                                System.out.println("|
|");
                                System.out.println("|"+(m + " meters = " + cm + "
centimeters")+"|");
                                System.out.println("|
|");
                                System.out.println("---------------------------------
-");
                                System.out.println(m + " meters = " + cm + "
centimeters");
                                break;

                            case 0:
                                System.out.println("---------------------------------
-");
                                System.out.println("|
|");
                                System.out.println("|"+("Exiting...")+"|");
                                System.out.println("|
|");
                                System.out.println("---------------------------------
-");
                                System.out.println("Exiting...");
                                System.exit(0);
                                break;

                            default:
                                System.out.println("Invalid choice!");
                        }
                    }
                }
                case "C":
                {
                    System.out.println("Welcome to Digital");
                    while(digi!=0)
                    {
                        System.out.println("Enter an option: \n 1. Press 1 for
Binary-to-Decimal Conversion \n 2. Press 2 for Decimal-to-Binary Conversion \n 3.
Press 3 for Decimal-to-Hexadecimal Conversion \n 0. Press 0 for Exit");
                        digi = scanner.nextInt();
                        switch (digi)
                        {

                        case 1:
                            System.out.println("Enter a binary number: ");
                            scanner.nextLine();
```

```
                        String binaryStr = scanner.nextLine();
                        int decimal = 0, power = 0;
                        for (int i = binaryStr.length() - 1; i >= 0; i--) {
                            if (binaryStr.charAt(i) == '1') {
                                decimal += Math.pow(2, power);
                            }
                            power++;
                        }
                        System.out.println("---------------------------------");
                        System.out.println("|                               |");
                        System.out.println("|"+("Decimal equivalent: " +
decimal)+"|");
                        System.out.println("|                               |");
                        System.out.println("---------------------------------");
                        System.out.println("Decimal equivalent: " + decimal);
                        break;
                    case 2:
                        System.out.println("Enter decimal number:");
                        int deciml = scanner.nextInt();
                        String binary = Integer.toBinaryString(deciml);
                        System.out.println("---------------------------------");
                        System.out.println("|                               |");
                        System.out.println("|"+("Binary equivalent: " +
binary)+"|");
                        System.out.println("|                               |");
                        System.out.println("---------------------------------");
                        System.out.println("Binary equivalent: " + binary);
                        break;
                    case 3:
                        Scanner input = new Scanner(System.in);
                        System.out.print("Enter a decimal number: ");
                        int deci = input.nextInt();
                        String hexadecimal = "";

                        while (deci > 0) {
                            int remainder = deci % 16;
                            if (remainder < 10) {
                                hexadecimal = remainder + hexadecimal;
                            } else {
                                char hexChar = (char) ('A' + remainder - 10);
                                hexadecimal = hexChar + hexadecimal;
                            }
                            deci /= 16;
                        }
                        System.out.println("---------------------------------");
                        System.out.println("|                               |");
                        System.out.println("|"+("The hexadecimal equivalent is: "
+ hexadecimal)+"|");
                        System.out.println("|                               |");
                        System.out.println("---------------------------------");
                        System.out.println("The hexadecimal equivalent is: " +
hexadecimal);
```

```
                        break;
                    case 0:
                            System.out.println("Exiting...");
                        System.exit(0);
                    default:
                        System.out.println("Error: Unsupported operation");
                        break;
                    }
                }
            }
        }
        catch(Exception e){
            System.out.println("Error:  WARNING || SOMETHING WENT WRONG!! CHECK YOUR
INPUT!! THANKYOU !!");
        }
            scanner.close();
        System.out.println("Exit...");
    }
}
```

Source Code of Calculator

For this java project, we will use the java.io.File & java.io.FileWrite toolkit.

IntelliJ IDE will be suggested to use as it is faster and integrates the environment in a better manner

Procedure
Step — 1:-
Create a file named project.java inside IntelliJ IDE, Where we are going to write all the code for the project

Step — 2:-
Import all the packages that are useful for the project

Step — 3:-
Write the body matter for the project:-

```
public class code {
    // The public class of java and the file name

    static Scanner in = new Scanner(System.in);
    // This is to take the inputs from the users

    static String PathName1 =
"C:\\Users\\hp\\OneDrive\\Desktop\\Project\\BooksName.txt";
    static String PathName2 =
"C:\\Users\\hp\\OneDrive\\Desktop\\Project\\AuthorsName.txt";
    static String PathName3 =
"C:\\Users\\hp\\OneDrive\\Desktop\\Project\\Quantity.txt";
    static String PathName4 = "C:\\Users\\hp\\OneDrive\\Desktop\\Project\\Price.txt";
    static String PathName5 = "C:\\Users\\hp\\OneDrive\\Desktop\\Project\\Temp.txt";
    static String PathName6 =
"C:\\Users\\hp\\OneDrive\\Desktop\\Project\\Receipt.txt";
    // These are the PathNames of the files that contains the information of the Book
Store

    static String ans;
    // This is to ask user whether he wants to proceed the transaction or not

    public static void main(String[] args) {
        // The Driver method

        int TOTAL_BOOKS_SOLD = 0;
```

```
        // Total books bought by the user

        System.out.println(" ");
        System.out.println("----- Welcome to OOP Mini Project Book Store -----");
        System.out.println(" ");

        while (true) {

            System.out.print("Do you want to buy any Book(yes/no): ");
            String answer = in.next();
            System.out.println(" ");

            if (answer.equals("no")) {
                System.out.println("No Problem, Thanks for visiting !");
                System.out.println("Total Books sold were: " + TOTAL_BOOKS_SOLD);
                return;
            }

            else if (answer.equals("yes")) {

                System.out.print("Enter the Name of the Book that you want to buy: ");
                in.nextLine();
                String Name = in.nextLine();
                System.out.println(" ");

                try {

                    File Book_Name = new File(PathName1);
                    File Author_Name = new File(PathName2);
                    File Quantity = new File(PathName3);
                    File Price = new File(PathName4);
                    File Temp = new File(PathName5);
                    // Opening all the necessary files

                    Scanner BookName = new Scanner(Book_Name);
                    Scanner AuthorName = new Scanner(Author_Name);
                    Scanner QuantityAvailable = new Scanner(Quantity);
                    Scanner PricePerBook = new Scanner(Price);
                    // Using Scanner Objects to read from the Files

                    int count = 0;
                    int num = 0;

                    while (BookName.hasNextLine()) {

                        count++;
                        String temp1 = BookName.nextLine();

                        if (temp1.equals(Name)) {
                            // If the Book is found, Display all the details of the
Book
                            System.out.println("Book Name: " + temp1);
```

```
                        System.out.println("Book ID: " + count);

                        for (int i = 0; i < count - 1; i++) {
                            AuthorName.nextLine();
                            QuantityAvailable.nextLine();
                            PricePerBook.nextLine();
                        }

                        String temp2 = AuthorName.nextLine();
                        int temp3 = QuantityAvailable.nextInt();
                        int temp4 = PricePerBook.nextInt();
                        System.out.println("Author Name: " + temp2);
                        System.out.println("Available Quantity: " + temp3);
                        System.out.println("Price of One Book: " + temp4);
                        System.out.println(" ");

                        do {

                            System.out.print("Enter the Number of Copies you want
to buy: ");
                            num = in.nextInt();
                            // Asking the User, how many copies are needed

                            if (num > temp3) {
                                System.out.println("Sorry but only " + temp3 + "
copies are left");
                                System.out.println(" ");
                            }

                        }
                        while (num > temp3);

                        System.out.println(" ");

                        Calculate_Price(num, temp4, temp1, temp2);
                        // This will Calculate the Price to be paid by the user

                        if (ans.equals("yes") && Temp.createNewFile()) {

                            Scanner QuantityModify = new Scanner(Quantity);
                            FileWriter modify = new FileWriter(PathName5);
                            // This is to modify the information in the Inventory

                            int i = 1;

                            while (i != count) {
                                modify.write(QuantityModify.nextInt() + "\n");
                                i++;
                            }

                            modify.write(temp3 - num + "\n");
                            i += 1;
```

```
                        QuantityModify.nextInt();

                        while (i != 101) {
                            modify.write(QuantityModify.nextInt() + "\n");
                            i++;
                        }

                        modify.close();
                        QuantityModify.close();
                        // Closing the Scanners and FileWriters

                    }
                    break;
                }

                else if (!BookName.hasNextLine()){
                    count += 1;
                }

                else {
                    continue;
                }
            }

            if (!BookName.hasNextLine() && count != 100) {
                System.out.println("Sorry but this Book is not available
right now");
                System.out.println(" ");

                BookName.close();
                AuthorName.close();
                QuantityAvailable.close();
                PricePerBook.close();
                // Closing the Scanners and FileWriters

            }

            else if (ans.equals("no")){

                BookName.close();
                AuthorName.close();
                QuantityAvailable.close();
                PricePerBook.close();
                // Closing the Scanners and FileWriters

            }

            else {
                BookName.close();
                AuthorName.close();
                QuantityAvailable.close();
```

```
                    PricePerBook.close();
                    // Closing the Scanners and FileWriters

                    Quantity.delete();
                    Temp.renameTo(Quantity);
                    Temp.delete();
                    TOTAL_BOOKS_SOLD += num;
                }
            }

            catch (Exception e) {
                System.out.println(" ");
                System.out.println("Error has occurred");
                System.out.println(e);
                System.out.println(" ");
                if (e.toString().contains("Input")) {
                    String temp = in.next();
                }
            }

        }

        else {
            System.out.println("Please Enter the Correct data !");
            System.out.println(" ");
        }
    }
}

    private static void Calculate_Price(int quantity, int price, String Book, String
Author) throws IOException {

        int total = price * quantity;
        System.out.println("Total Amount to be paid: " + total);
        System.out.println(" ");

        while (true) {

            System.out.print("Would you like to proceed the transaction(yes/no): ");
            ans = in.next();
            System.out.println(" ");

            if (ans.equals("yes")) {

                System.out.print("Please enter your Name: ");
                in.nextLine();
                String name = in.nextLine();
                System.out.print("Please enter your Mobile number: ");
                long phone = in.nextLong();
                System.out.println(" ");
                System.out.println("Thank you for visiting, Here is your Receipt");
                System.out.println(" ");
```

```
                File Receipt = new File(PathName6);
                // Creating a new Text File to Display the Receipt

                if (Receipt.createNewFile()){

                    FileWriter info = new FileWriter(PathName6);
                    info.write("-----  MINI PROJECT BOOK STORE USING JAVA  -----\n");
                    info.write(" \n");
                    info.write("Name: " + name + "\n");
                    info.write("Mobile number: " + phone + "\n");
                    info.write("Name of the Purchased Book: " + Book + "\n");
                    info.write("Name of Author: " + Author + "\n");
                    info.write("Number of copies purchased: " + quantity + "\n");
                    info.write("Total Amount: " + total + "\n");
                    info.write("Paid Amount: " + total + "\n");
                    info.write(" \n");
                    info.write("Transaction Successful\n");
                    // Writing the information inside the Receipt

                    info.close();
                    Desktop desktop = Desktop.getDesktop();
                    desktop.open(Receipt);

                }

                Receipt.deleteOnExit();
                break;
            }

            else if (ans.equals("no")) {
                return;
            }

            else {
                System.out.println("Please enter the correct data !");
                System.out.println(" ");
            }

        }
    }
}
```

Source Code of Book Management System

Introduction to Technology

Java is a software development-oriented computer/programming language. Java has so many features including object-oriented programming, Robust, Platform independent, and High Performance, and also provides a very wide range of toolkits or software development kits (SDK) for example java awt or java swing which are going to use later in this project.

Introduction to project

The calculator is like a part of every daily life, it is a very powerful and general-purpose tool. We as human beings tend to forget many things hence calculation is also a part of it. And what makes this project more interesting is that we are building a Scientific Calculator. Unlike basic calculators that can only handle smaller values, a scientific calculator can handle numbers on a much vaster scale, which can be useful when it comes to collecting data or working as a physicist or chemist.

System Requirements:

Hardware: 8 Gb ram/512 Gb SSD

Software: Vs Code/ IntelliJ IDE

Conclusion:

Creating a calculator on the command line interface (CLI) using Java was an excellent opportunity to sharpen our programming skills. We learned how to implement basic arithmetic operations like addition, subtraction, multiplication, and division, and how to take user input through the CLI.

Throughout the project, we focused on creating efficient and readable code, following the principles of object-oriented programming. We encapsulated the code into methods and classes, making it modular and easier to maintain.

Implementing error handling was an essential part of the project, ensuring that the calculator can handle different types of user inputs and avoid runtime errors. We also implemented a help menu to assist users in understanding how to use the calculator.

Overall, the calculator project helped us develop fundamental programming concepts, including algorithm design, code modularity, and error handling. It also provided us with valuable experience working on the command line interface, which is a vital skill for any programmer.

In conclusion, the book management system developed on CLI using Java provides a simple yet effective solution for managing books in a library. The system allows users to add, edit, delete, and search for books easily through a user-friendly interface. It also includes features such as borrowing and returning books, as well as keeping track of book availability and overdue fines.

This project demonstrates the use of Java programming language and its various features such as classes, objects, inheritance, and exception handling. It also shows the importance of proper data structure and algorithm design to efficiently manage data and optimize performance.

Overall, this project serves as a solid foundation for further development and improvement of book management systems, especially for small to medium-sized libraries. With some additional enhancements and features, this system could become an even more valuable tool for librarians and book lovers alike.

Future reference:

We are looking forward to add the interface using GUI for calculator.

A book management system is a software application that enables users to manage a collection of books. The system allows users to add, update, delete, and view books in the collection. It also allows users to search for books based on various criteria, such as author, title, genre, or ISBN.

The system typically has a user-friendly interface, which can be implemented using a GUI or a CLI. The GUI provides a graphical interface that allows users to interact with the system using buttons, menus, and forms. The CLI provides a text-based interface that allows users to interact with the system using command-line commands.

The book management system typically has a database that stores information about the books in the collection. The database can be implemented using various database management systems, such as MySQL, Oracle, or SQLite. The database stores information about each book, such as its title, author, genre, ISBN, publication date, and availability status.

References:

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Geek for geeks
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