**Project 1: Basic Calculator**

**Code:**

java

Copy code

import java.util.Scanner;

class Main {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Prompt user for the first number

System.out.print("Enter first number: ");

double num1 = scanner.nextDouble();

// Prompt user for the second number

System.out.print("Enter second number: ");

double num2 = scanner.nextDouble();

// Prompt user for the operator

System.out.print("Enter operator (+, -, \*, /): ");

char operator = scanner.next().charAt(0);

double result;

// Perform the operation based on the user input

switch (operator) {

case '+':

result = num1 + num2;

break;

case '-':

result = num1 - num2;

break;

case '\*':

result = num1 \* num2;

break;

case '/':

if (num2 != 0) {

result = num1 / num2;

} else {

System.out.println("Error! Division by zero.");

return;

}

break;

default:

System.out.println("Error! Invalid operator.");

return;

}

// Display the result

System.out.println("The result is: " + result);

}

}

**Explanation:**

1. **Importing Scanner Class:**
   * import java.util.Scanner; imports the Scanner class which is used to get user input.
2. **Main Class and Method:**
   * class Main { public static void main(String[] args) { ... }} defines the main class and method where the program execution starts.
3. **Creating Scanner Object:**
   * Scanner scanner = new Scanner(System.in); creates a Scanner object to read input from the user.
4. **Reading User Input:**
   * The program prompts the user to enter the first and second numbers and reads them using scanner.nextDouble().
   * It then prompts the user to enter an operator and reads it using scanner.next().charAt(0);.
5. **Switch Statement:**
   * A switch statement is used to perform the appropriate arithmetic operation based on the user input.
   * The result of the operation is stored in the variable result.
6. **Division by Zero Check:**
   * For division, it checks if the denominator is zero to avoid division by zero error.
7. **Output the Result:**
   * The result of the operation is printed to the console.

**Expected Output:**

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Enter first number: 10

Enter second number: 5

Enter operator (+, -, \*, /): /

The result is: 2.0

**Project 2: Simple To-Do List**

**Code:**

java

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import java.util.ArrayList;

import java.util.Scanner;

class Main {

public static void main(String[] args) {

ArrayList<String> tasks = new ArrayList<>();

Scanner scanner = new Scanner(System.in);

int choice;

do {

System.out.println("\nTo-Do List Menu:");

System.out.println("1. Add a task");

System.out.println("2. View tasks");

System.out.println("3. Remove a task");

System.out.println("4. Exit");

System.out.print("Enter your choice: ");

choice = scanner.nextInt();

scanner.nextLine(); // Consume the newline

switch (choice) {

case 1:

System.out.print("Enter the task: ");

String task = scanner.nextLine();

tasks.add(task);

System.out.println("Task added.");

break;

case 2:

System.out.println("Tasks:");

for (int i = 0; i < tasks.size(); i++) {

System.out.println((i + 1) + ". " + tasks.get(i));

}

break;

case 3:

System.out.print("Enter the task number to remove: ");

int taskNumber = scanner.nextInt();

if (taskNumber > 0 && taskNumber <= tasks.size()) {

tasks.remove(taskNumber - 1);

System.out.println("Task removed.");

} else {

System.out.println("Invalid task number.");

}

break;

case 4:

System.out.println("Exiting the To-Do List.");

break;

default:

System.out.println("Invalid choice. Please try again.");

}

} while (choice != 4);

}

}

**Explanation:**

1. **Importing Necessary Classes:**
   * import java.util.ArrayList; imports the ArrayList class to manage the list of tasks.
   * import java.util.Scanner; imports the Scanner class to get user input.
2. **Main Class and Method:**
   * class Main { public static void main(String[] args) { ... }} defines the main class and method where the program execution starts.
3. **Creating ArrayList and Scanner Objects:**
   * ArrayList<String> tasks = new ArrayList<>(); creates an ArrayList to store tasks.
   * Scanner scanner = new Scanner(System.in); creates a Scanner object to read input from the user.
4. **Displaying Menu and Handling Choices:**
   * The program displays a menu with options to add, view, remove tasks, or exit.
   * It reads the user's choice using scanner.nextInt(); and scanner.nextLine(); to consume the newline character.
5. **Switch Statement:**
   * The switch statement handles the user's choice:
     + **Add a task:** Prompts the user to enter a task and adds it to the tasks list.
     + **View tasks:** Displays all tasks in the list.
     + **Remove a task:** Prompts the user to enter the task number to remove and removes it from the list.
     + **Exit:** Exits the program.
   * For invalid choices, it displays an error message.
6. **Loop Until Exit:**
   * The do-while loop repeats the menu until the user chooses to exit.

**Expected Output:**

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To-Do List Menu:

1. Add a task

2. View tasks

3. Remove a task

4. Exit

Enter your choice: 1

Enter the task: Buy groceries

Task added.

To-Do List Menu:

1. Add a task

2. View tasks

3. Remove a task

4. Exit

Enter your choice: 2

Tasks:

1. Buy groceries

To-Do List Menu:

1. Add a task

2. View tasks

3. Remove a task

4. Exit

Enter your choice: 3

Enter the task number to remove: 1

Task removed.

To-Do List Menu:

1. Add a task

2. View tasks

3. Remove a task

4. Exit

Enter your choice: 4

Exiting the To-Do List.