**Name : Chandrakanth HV**
**Assignment : Bridge Course Day 5**
**Date : 30-06-2025**

**SECTION 1 :**
**Problem Statement 1** :Create a class named `Dog` that has:

- Two class attributes:
  `species` and `numLegs`
- Three instance attributes:
  `name`, `breed`, and `age`
- A method called `bark()` that prints `"Woof!"`

**Pseudo code :**

```
Start
Define class Dog
    Define static variable species = "Canis familiaris"
    Define static variable numLegs = 4
    Define instance variables: name, breed, age
    Define constructor with name, breed, age
        Set this.name = name
        Set this.breed = breed
        Set this.age = age
    Define method bark()
        Print "Woof!"
    Create Scanner
    Ask user to enter dog's name
    Read name
    Ask user to enter dog's breed
    Read breed
    Ask user to enter dog's age
    Read age
    Create Dog object using input values
    Print dog's name, breed, age
    Print species and number of legs
    Call bark() method
    Close Scanner
```

- End

**Algorithm: steps**

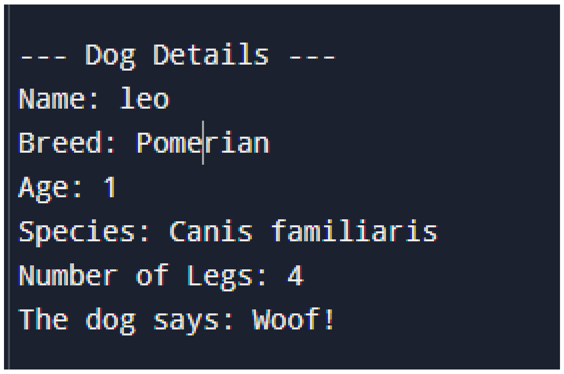
1. Start
2. Declare class-level variables: `species = "Canis familiaris"` and `numLegs = 4`
3. Declare instance variables: `name`, `breed`, `age`
4. Create a constructor to initialize `name`, `breed`, and `age`
5. Define method `bark()` to print "Woof!"
6. Create a `Scanner` object
7. Prompt the user to enter `name`, `breed`, and `age` of the dog
8. Create a `Dog` object using input values
9. Display dog details: `name`, `breed`, `age`, `species`, `numLegs`
10. Call the `bark()` method
11. Close the `Scanner`
12. Stop

**Code** :

```
import java.util.Scanner;

public class Dog {
    static String species = "Canis familiaris";
    static int numLegs = 4;
    String name;
    String breed;
    int age;
    public Dog(String name, String breed, int age) {
        this.name = name;
        this.breed = breed;
        this.age = age;
    }

    public void bark() {
        System.out.println("Woof!");
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter dog's name: ");
        String name = scanner.nextLine();

        System.out.print("Enter dog's breed: ");
        String breed = scanner.nextLine();

        System.out.print("Enter dog's age: ");
        int age = scanner.nextInt();
        Dog myDog = new Dog(name, breed, age);
        System.out.println("\n--- Dog Details ---");
        System.out.println("Name: " + myDog.name);
        System.out.println("Breed: " + myDog.breed);
        System.out.println("Age: " + myDog.age);
        System.out.println("Species: " + Dog.species);
        System.out.println("Number of Legs: " + Dog.numLegs);
        System.out.print("The dog says: ");
        myDog.bark();

        scanner.close();
    }
}
```

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter dog's name: leo<br>Enter dog's breed: Pomerian<br>Enter dog's age: 1 | Name: leo<br>Breed: Pomerian<br>Age: 1<br>Species: Canis familiaris<br>Number of Legs: 4<br>The dog says: Woof! | Name: leo<br>Breed: Pomerian<br>Age: 1<br>Species: Canis familiaris<br>Number of Legs: 4<br>The dog says: Woof! | Pass |
| TC2 | Enter dog's name: pet<br>Enter dog's breed: pomerian<br>Enter dog's age: 2 | Name: pet<br>Breed: pomerian<br>Age: 2<br>Species: Canis familiaris<br>Number of Legs: 4<br>The dog says: Woof! | Name: pet<br>Breed: pomerian<br>Age: 2<br>Species: Canis familiaris<br>Number of Legs: 4<br>The dog says: Woof! | Pass |

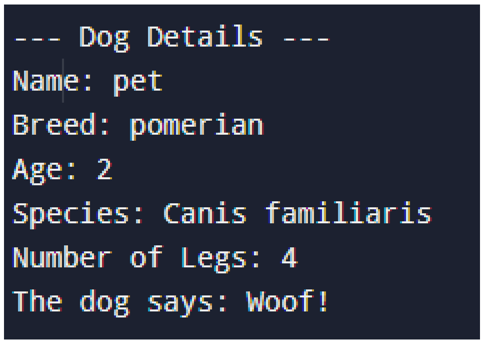
|  |  |  |  |  |
|---|---|---|---|---|
| TC3 | Enter dog's name: 12<br>Enter dog's breed: dog<br>Enter dog's age: df | ERROR! | ERROR! | Pass |



```
--- Dog Details ---
Name: leo
Breed: Pomerian
Age: 1
Species: Canis familiaris
Number of Legs: 4
The dog says: Woof!
```

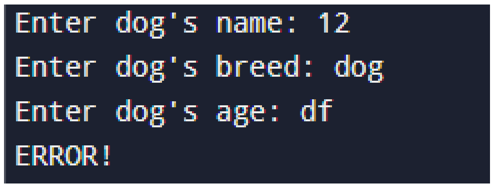
**TC1 :**

TC2 :



```
--- Dog Details ---
Name: pet
Breed: pomerian
Age: 2
Species: Canis familiaris
Number of Legs: 4
The dog says: Woof!
```

TC3 :



```
Enter dog's name: 12
Enter dog's breed: dog
Enter dog's age: df
ERROR!
```

## Observation:

In this activity, I learned how to create a simple class in Java using real-life examples. I understood the difference between class variables and object variables . I also learned how to use a constructor to set the values of an object when it is created.I practiced taking input from the user using the `Scanner` class, and I used that input to create a dog object. I also created a method called `bark()` that shows how an object can perform an action

**Problem Statement 2 :**Create a class named `Book`.

1. Inside the class, define three variables :`title`,`author`,`price`

2. In the main program:
   - Ask the user to enter the book's title, author, and price
   - Use these inputs to create a Book object
   - Then, call the `displayDetails()` method to show the entered book details

**Pseudo code :**

```
●  Start
●  Class Book:
●      Declare title, author, price
●      Constructor(title, author, price):
●          Set this.title = title
●          Set this.author = author
●          Set this.price = price
●      Method displayDetails():
●          Print title, author, price
●  Main Method:
●      Create Scanner
●      Ask user for title → Read title
●      Ask user for author → Read author
●      Ask user for price → Read pric
●      Create Book object using input
●      Call displayDetails(
●      Close Scanner
●  Stop
```

**Algorithm: steps**

1. Start
2. Define a class `Book` with variables: `title`, `author`, `price`
3. Create a constructor to initialize the values
4. Create a method `displayDetails()` to print book details
5. In the `main()` method:
6. Create `Scanner` object
7. Take input for `title`, `author`, and `pric`
8. Create a `Book` object using the input value

9. Call `displayDetails()` method
10. Close the scanner
11. Stop

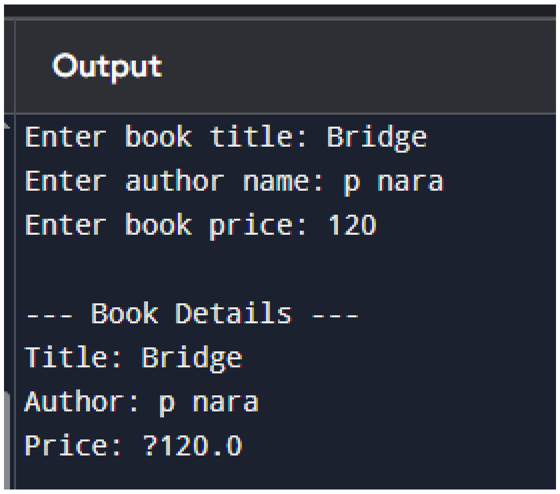
**Code** :

```
import java.util.Scanner;

public class Book {
    String title;
    String author;
    double price;
    public Book(String title, String author, double price) {
        this.title = title;
        this.author = author;
        this.price = price;
    }
    public void displayDetails() {
        System.out.println("\n--- Book Details ---");
        System.out.println("Title: " + title);
        System.out.println("Author: " + author);
        System.out.println("Price: ₹" + price);
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter book title: ");
        String title = scanner.nextLine();

        System.out.print("Enter author name: ");
        String author = scanner.nextLine();

        System.out.print("Enter book price: ");
        double price = scanner.nextDouble();
        Book myBook = new Book(title, author, price);

        myBook.displayDetails();

        scanner.close();
    }
}
```

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|

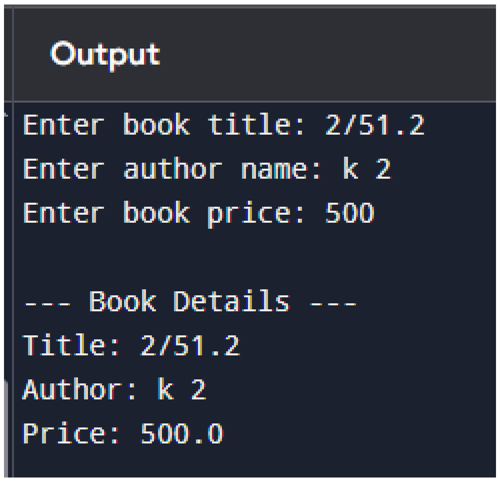
| | | | | |
|---|---|---|---|---|
| TC1 | Enter book title: Bridge<br>Enter author name: p nara<br>Enter book price: 120 | Enter book title: Bridge<br>Enter author name: p nara<br>Enter book price: 120<br><br>--- Book Details ---<br>Title: Bridge<br>Author: p nara<br>Price: ?120.0 | Enter book title: Bridge<br>Enter author name: p nara<br>Enter book price: 120<br><br>--- Book Details ---<br>Title: Bridge<br>Author: p nara<br>Price: ?120.0 | Pass |
| TC2 | Enter book title: 2/51.2<br>Enter author name: k 2<br>Enter book price: 500 | Enter book title: 2/51.2<br>Enter author name: k 2<br>Enter book price: 500<br><br>--- Book Details ---<br>Title: 2/51.2<br>Author: k 2<br>Price: 500.0 | Enter book title: 2/51.2<br>Enter author name: k 2<br>Enter book price: 500<br><br>--- Book Details ---<br>Title: 2/51.2<br>Author: k 2<br>Price: 500.0 | Pass |
| TC3 | Enter book title: alone<br>Enter author name: raj<br>Enter book price: 56.21 | Enter book title: alone<br>Enter author name: raj<br>Enter book price: 56.21<br><br>--- Book Details ---<br>Title: alone<br>Author: raj<br>Price: 56.21 | Enter book title: alone<br>Enter author name: raj<br>Enter book price: 56.21<br><br>--- Book Details ---<br>Title: alone<br>Author: raj<br>Price: 56.21 | Pass |

**TC1 :**



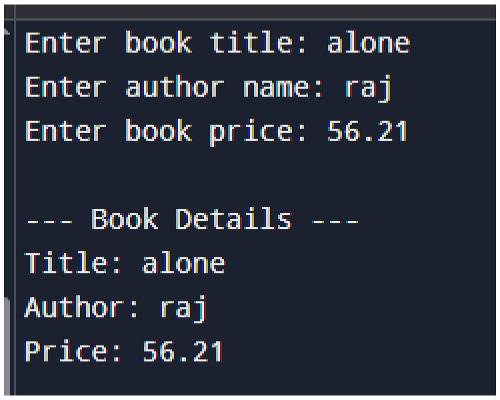
```
Enter book title: Bridge
Enter author name: p nara
Enter book price: 120

--- Book Details ---
Title: Bridge
Author: p nara
Price: ?120.0
```

TC2 :


Output

```
Enter book title: 2/51.2
Enter author name: k 2
Enter book price: 500

--- Book Details ---
Title: 2/51.2
Author: k 2
Price: 500.0
```

TC2 :



```
Enter book title: alone
Enter author name: raj
Enter book price: 56.21

--- Book Details ---
Title: alone
Author: raj
Price: 56.21
```

## Observation:

I learned how to define a class with multiple attributes.I used a constructor to initialize the values for `title`, `author`, and `price`.I learned how to take user input using the `Scanner` class.I used a method `displayDetails()` to print the book information.The program was compiled and executed successfully.

**Problem Statement 3 :**  Create a class called Car.

- Let the user enter details like model, color, and year.
- Create methods like startEngine() and drive().
- Add a class attribute: `numwheels = 4`.
- Display all the car's details and actions.

**Pseudo code :**

```
CLASS Car:
    STATIC numWheels = 4
    VARIABLES: model, color, year
    METHOD Constructor(model, color, year):
        SET instance variables with given values
    METHOD startEngine():
        PRINT "<model> engine started"
    METHOD drive():
        PRINT "<model> is driving"
    METHOD displayInfo():
        PRINT model, color, year, numWheel
MAIN:
    ASK user for model
    ASK user for color
    ASK user for year
    CREATE car object with input value
    CALL car.displayInfo()
    CALL car.startEngine()
    CALL car.drive()
END
```

**Algorithm: steps**

- Start the program.
- Create a class named `Car` with:
- A static variable `numWheels = 4`.
- Instance variables `model`, `color`, and `year`.
- A constructor to initialize these values.
- Methods: `startEngine()`, `drive()`, and `displayInfo()`.
- In the `main()` method:
- Ask the user to enter car model, color, and year.

- Store the inputs.
- Create an object of the `Car` class using the entered values.
- Call `displayInfo()` to show the car details.
- Call `startEngine()` to show the engine is started.
- Call `drive()` to show the car is driving.
- End the program

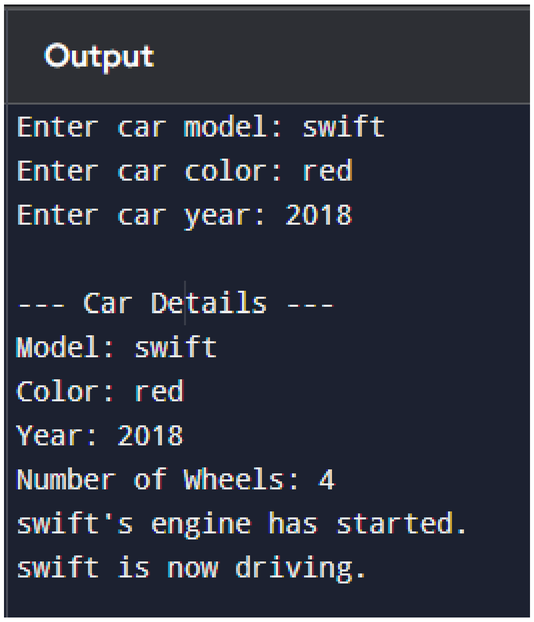
**Code** :

```
import java.util.Scanner;

public class Car {

    static int numWheels = 4;

    String model;
    String color;
    int year;


    public Car(String model, String color, int year) {
        this.model = model;
        this.color = color;
        this.year = year;
    }

    public void startEngine() {
        System.out.println(model + "'s engine has started.");
    }

    public void drive() {
        System.out.println(model + " is now driving.");
    }

    public void displayInfo() {
        System.out.println("\n--- Car Details ---");
        System.out.println("Model: " + model);
        System.out.println("Color: " + color);
        System.out.println("Year: " + year);
        System.out.println("Number of Wheels: " + numWheels);
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter car model: ");
        String model = scanner.nextLine();

        System.out.print("Enter car color: ");
        String color = scanner.nextLine();

        System.out.print("Enter car year: ");
        int year = scanner.nextInt();

        Car myCar = new Car(model, color, year);

        myCar.displayInfo();
        myCar.startEngine();
        myCar.drive();

        scanner.close();
    }
}
```

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter car model: swift<br>Enter car color: red<br>Enter car year: 2018 | Model: swift<br>Color: red<br>Year: 2018<br>Number of Wheels: 4<br>swift's engine has started.<br>swift is now driving. | Model: swift<br>Color: red<br>Year: 2018<br>Number of Wheels: 4<br>swift's engine has started.<br>swift is now driving. | Pass |
| TC2 | Enter car model: indigo<br>Enter car color: blue<br>Enter car year: 2015 | Model: indigo<br>Color: blue<br>Year: 2015<br>Number of Wheels: 4<br>indigo's engine has started. | Model: indigo<br>Color: blue<br>Year: 2015<br>Number of Wheels: 4<br>indigo's engine has started.<br>indigo is now driving. | Pass |

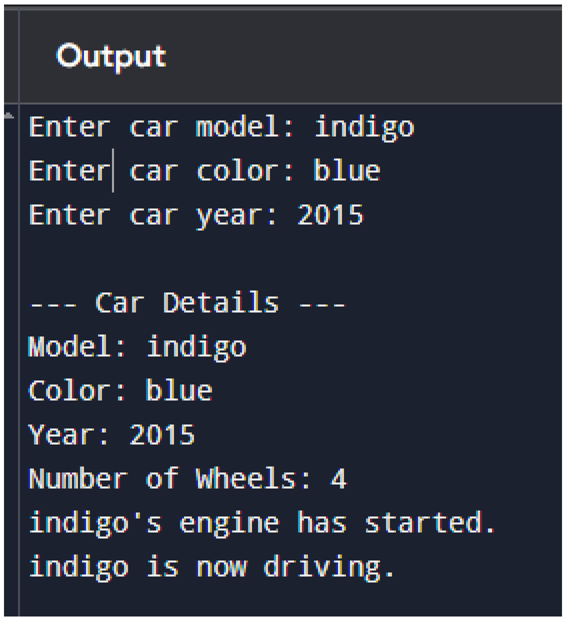
| | | | | |
|---|---|---|---|---|
| | | indigo is now driving. | | |
| TC3 | Enter car model: kia<br>Enter car color: white<br>Enter car year: 2024 | Model: kia<br>Color: white<br>Year: 2024<br>Number of Wheels: 4<br>kia's engine has started.<br>kia is now driving. | Model: kia<br>Color: white<br>Year: 2024<br>Number of Wheels: 4<br>kia's engine has started.<br>kia is now driving. | Pass |

**TC1 :**



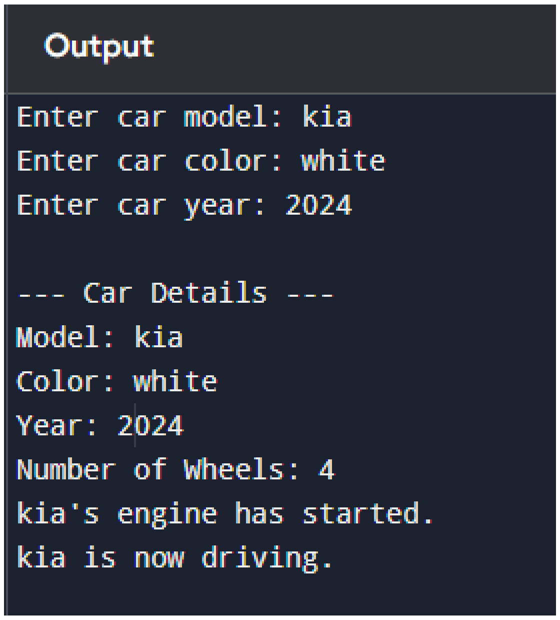
```
Enter car model: swift
Enter car color: red
Enter car year: 2018

--- Car Details ---
Model: swift
Color: red
Year: 2018
Number of Wheels: 4
swift's engine has started.
swift is now driving.
```

TC2 :


Output

```
Enter car model: indigo
Enter car color: blue
Enter car year: 2015

--- Car Details ---
Model: indigo
Color: blue
Year: 2015
Number of Wheels: 4
indigo's engine has started.
indigo is now driving.
```

TC2 :


Output

```
Enter car model: kia
Enter car color: white
Enter car year: 2024

--- Car Details ---
Model: kia
Color: white
Year: 2024
Number of Wheels: 4
kia's engine has started.
kia is now driving.
```

**Observation:** You understood how to define a class with both instance and static (class-level) attributes.You learned how to use constructors to initialize object data.You saw how to take user input in Java and use it to create an object.You used object methods to represent actions (like starting engine and driving).You saw how one class attribute (numWheels) is shared across all car objects.

**Section 2 :**
**Problem Statement 1 :**Create a class for a Dog.
Then, make two dogs:

- On named Buddy, breed Golden Retriever, age 5
- Another named Lucy, breed Poodle, age 2

After creating them:

- Print their name and age
- Make both dogs bark

**Pseudo code :**

```
● Start
● Class Dog:
●     Variables: name, breed, age
●     Constructor(name, breed, age):
●         Set this.name = name
●         Set this.breed = breed
●         Set this.age = age
●     Method bark():
●         Print name + " says: Woof!"
●     Method displayInfo():
●         Print name and age
● Main Method:
●     Create Scanner
●     Input Dog 1:
●         Ask name, breed, age → store in name1, breed1, age1
●     Input Dog 2:
●         Ask name, breed, age → store in name2, breed2, age2
●     Create Dog objects dog1 and dog2
●     Call displayInfo() and bark() for dog1 and dog 2
●     Close Scanner
● Stop
```

**Algorithm: steps**

1. Start
2. Create a class `Dog` with attributes: `name`, `breed`, and `age`
3. Create a constructor to initialize the dog's values
4. Create a method `bark()` to print the dog's name with "Woof!"
5. Create a method `displayInfo()` to show name and age
6. In the `main()` method:
7. Create Scanner for user inpu
8. Take input for Dog 1 → name, breed, age
9. Take input for Dog 2 → name, breed, age
10. Create 2 Dog objects using the inputs
11. Call `displayInfo()` and `bark()` for both dogs
12. Close the Scanner
13. Stop

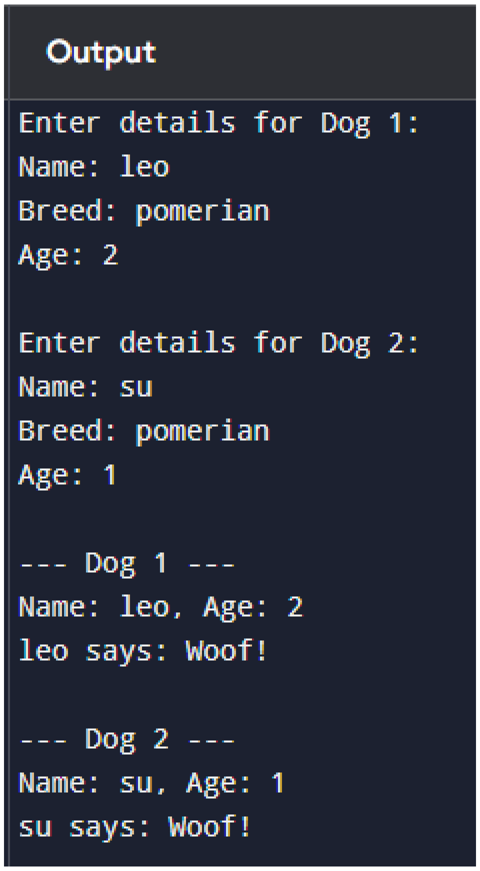
**Code** :

```
import java.util.Scanner;

public class Dog {

    String name;
    String breed;
    int age;

    public Dog(String name, String breed, int age) {
        this.name = name;
        this.breed = breed;
        this.age = age;
    }

    public void bark() {
        System.out.println(name + " says: Woof!");
    }

    public void displayInfo() {
        System.out.println("Name: " + name + ", Age: " + age);
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter details for Dog 1:");
        System.out.print("Name: ");
        String name1 = scanner.nextLine();
        System.out.print("Breed: ");
        String breed1 = scanner.nextLine();
        System.out.print("Age: ");
        int age1 = scanner.nextInt();
        scanner.nextLine();

        System.out.println("\nEnter details for Dog 2:");
        System.out.print("Name: ");
        String name2 = scanner.nextLine();
        System.out.print("Breed: ");
        String breed2 = scanner.nextLine();
        System.out.print("Age: ");
        int age2 = scanner.nextInt();
        Dog dog1 = new Dog(name1, breed1, age1);
        Dog dog2 = new Dog(name2, breed2, age2);
        System.out.println("\n--- Dog 1 ---");
        dog1.displayInfo();
        dog1.bark();
        System.out.println("\n--- Dog 2 ---");
        dog2.displayInfo();
        dog2.bark();

        scanner.close();
    }
}
```

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter details for Dog 1:<br>Name: leo<br>Breed: pomerian<br>Age: 2<br><br>Enter details for Dog 2:<br>Name: su<br>Breed: pomerian<br>Age: 1 | --- Dog 1 ---<br>Name: leo, Age: 2<br>leo says: Woof!<br><br>--- Dog 2 ---<br>Name: su, Age: 1<br>su says: Woof! | --- Dog 1 ---<br>Name: leo, Age: 2<br>leo says: Woof!<br><br>--- Dog 2 ---<br>Name: su, Age: 1<br>su says: Woof! | Pass |

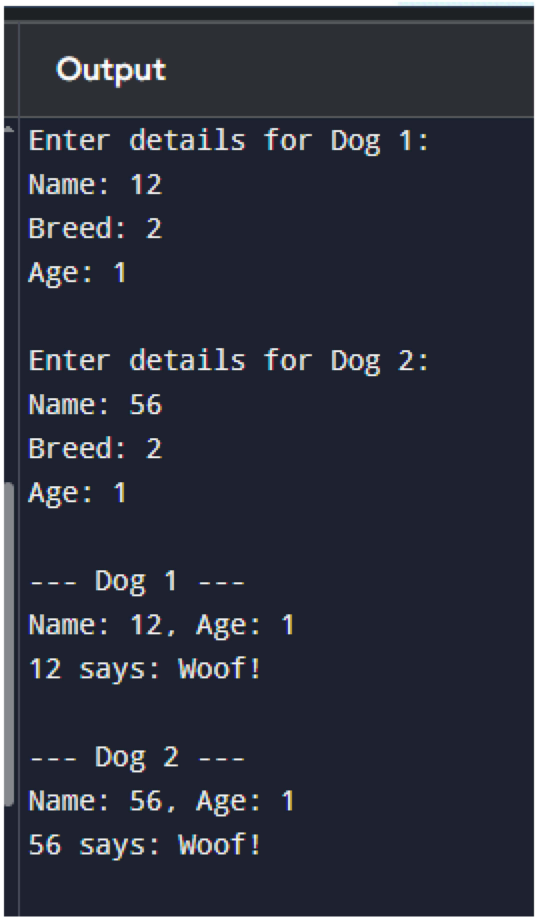
|  |  |  |  |  |
|---|---|---|---|---|
| TC2 | Enter details for Dog 1:<br>Name: 12<br>Breed: 2<br>Age: 1<br><br>Enter details for Dog 2:<br>Name: 56<br>Breed: 2<br>Age: 1 | --- Dog 1 ---<br>Name: 12, Age: 1<br>12 says: Woof!<br><br>--- Dog 2 ---<br>Name: 56, Age: 1<br>56 says: Woof! | --- Dog 1 ---<br>Name: 12, Age: 1<br>12 says: Woof!<br><br>--- Dog 2 ---<br>Name: 56, Age: 1<br>56 says: Woof! | Pass |
| TC3 | Enter details for Dog 1:<br>Name: k<br>Breed: 12<br>Age: 1<br><br>Enter details for Dog 2:<br>Name: p<br>Breed: breed<br>Age: 2 | --- Dog 1 ---<br>Name: k, Age: 1<br>k says: Woof!<br><br>--- Dog 2 ---<br>Name: p, Age: 2<br>p says: Woof! | --- Dog 1 ---<br>Name: k, Age: 1<br>k says: Woof!<br><br>--- Dog 2 ---<br>Name: p, Age: 2<br>p says: Woof! | Pass |

**TC1 :**



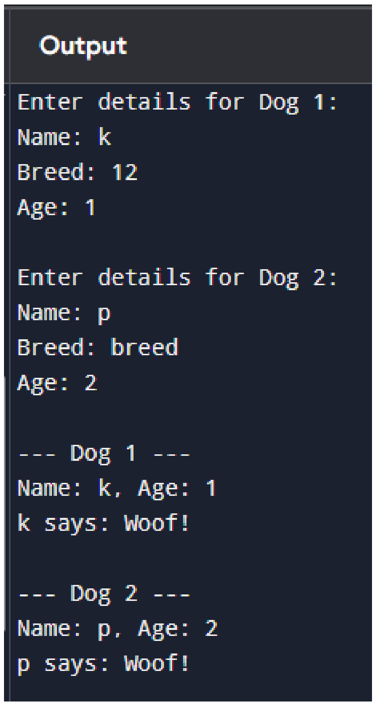
```
Enter details for Dog 1:
Name: leo
Breed: pomerian
Age: 2

Enter details for Dog 2:
Name: su
Breed: pomerian
Age: 1

--- Dog 1 ---
Name: leo, Age: 2
leo says: Woof!

--- Dog 2 ---
Name: su, Age: 1
su says: Woof!
```

TC2 :


Output

```
Enter details for Dog 1:
Name: 12
Breed: 2
Age: 1

Enter details for Dog 2:
Name: 56
Breed: 2
Age: 1

--- Dog 1 ---
Name: 12, Age: 1
12 says: Woof!

--- Dog 2 ---
Name: 56, Age: 1
56 says: Woof!
```

TC2 :


Output

```
Enter details for Dog 1:
Name: k
Breed: 12
Age: 1

Enter details for Dog 2:
Name: p
Breed: breed
Age: 2

--- Dog 1 ---
Name: k, Age: 1
k says: Woof!

--- Dog 2 ---
Name: p, Age: 2
p says: Woof!
```

**Observation:**

I learned how to create multiple objects using the same class.I took input for two dogs, each with name, breed, and age.I used a constructor to set values and methods to print info.The `bark()` method shows how to give behavior to an object.The program helped me understand how to use methods and constructors with real user input.

**Problem Statement 2 :** Create a class called `Book`.
Each book should have:Title,Author,A status: whether it is open or close

Then:

- Create two book objects using a constructor.
- Add a method `displayStatus()` that prints:
    - If the book is open: `"Title by Author is Open"`
    - If the book is closed: `"Title by Author is Closed"`

**Pseudo code :**

```
Start
Class Book:
    Variables: title, author, isOpen
    Constructor(title, author, isOpen):
        Set this.title = title
        Set this.author = author
        Set this.isOpen = isOpen
    Method displayStatus():
        If isOpen is true
            Print "<title> by <author> is Open"
        Else
            Print "<title> by <author> is Closed"
Main Method:
    Create Scanner
    Input Book 1:
        Ask for title, author, isOpen → save in title1, author1, open1
    Input Book 2:
        Ask for title, author, isOpen → save in title2, author2, open2
    Create Book objects book1 and book2
    Call displayStatus() for book1
    Call displayStatus() for book2
    Close Scanner
Stop
```

**Algorithm: steps**

1. Start
2. Create a class `Book` with variables: `title`, `author`, `isOpen`
3. Create a constructor to initialize book details

4. Create a method `displayStatus()` to check if the book is open or closed
5. In the `main()` method:
6. Create Scanner for user input
7. Take input for `title`, `author`, and `isOpen` for Book 1
8. Take input for `title`, `author`, and `isOpen` for Book 2
9. Create two Book objects using the input
10. Call `displayStatus()` for both books
11. Close the scanner
12. Stop

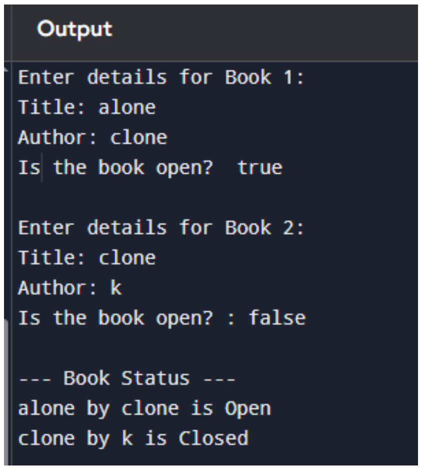
**Code** :

```
import java.util.Scanner;
public class Book {
    String title;
    String author;
    boolean isOpen;
    public Book(String title, String author, boolean isOpen) {
        this.title = title;
        this.author = author;
        this.isOpen = isOpen;
    }

    public void displayStatus() {
        String status = isOpen ? "Open" : "Closed";
        System.out.println(title + " by " + author + " is " + status);
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter details for Book 1:");
        System.out.print("Title: ");
        String title1 = scanner.nextLine();
        System.out.print("Author: ");
        String author1 = scanner.nextLine();
        System.out.print("Is the book open?  ");
        boolean open1 = scanner.nextBoolean();
        scanner.nextLine();
        System.out.println("\nEnter details for Book 2:");
        System.out.print("Title: ");
        String title2 = scanner.nextLine();
        System.out.print("Author: ");
        String author2 = scanner.nextLine();
        System.out.print("Is the book open? : ");
        boolean open2 = scanner.nextBoolean();
        Book book1 = new Book(title1, author1, open1);
        Book book2 = new Book(title2, author2, open2);
        System.out.println("\n--- Book Status ---");
        book1.displayStatus();
        book2.displayStatus();
        scanner.close();
    }
}
```

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter details for Book 1:<br>Title: alone<br>Author: clone<br>Is the book open? true<br><br>Enter details for Book 2:<br>Title: clone<br>Author: k<br>Is the book open? : false | --- Book Status ---<br>alone by clone is Open<br>clone by k is Closed | --- Book Status ---<br>alone by clone is Open<br>clone by k is Closed | Pass |
| TC2 | Enter details for Book 1:<br>Title: self<br>Author: Mr k<br>Is the book open? true<br><br>Enter details for Book 2:<br>Title: presence<br>Author: Mr s<br>Is the book open? : false | --- Book Status ---<br>self by Mr k is Open<br>presence by Mr s is Closed | --- Book Status ---<br>self by Mr k is Open<br>presence by Mr s is Closed | Pass |
| TC3 | Enter details for Book 1:<br>Title: silence | --- Book Status ---<br>silence by @123 is Open | --- Book Status ---<br>silence by @123 is Open<br>presence by @45 is Closed | Pass |

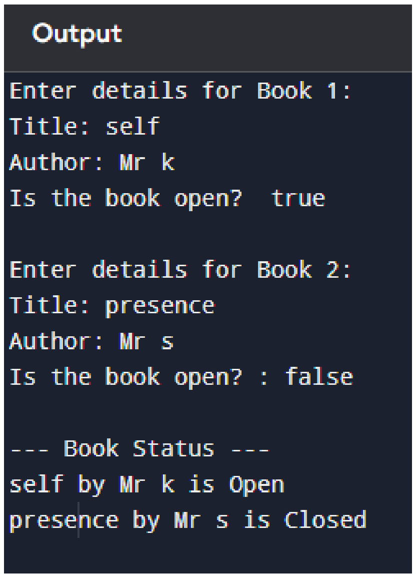
|  |  |  |  |  |
|---|---|---|---|---|
|  | Author: @123<br>Is the book open?<br>true<br><br>Enter details for<br>Book 2:<br>Title: presence<br>Author: @45<br>Is the book open? :<br>false | presence by @45 is<br>Closed |  |  |

**TC1 :**



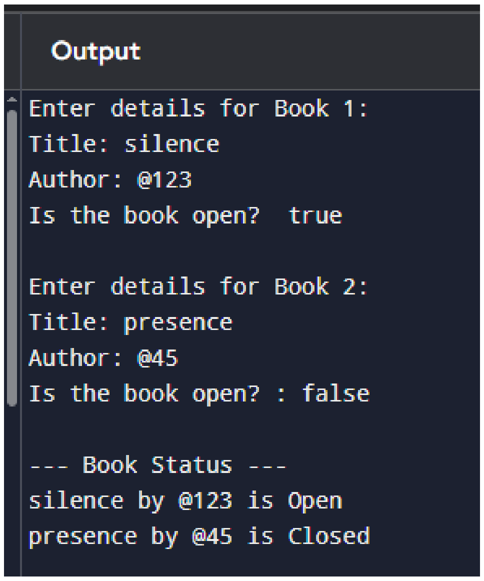
```
Output
Enter details for Book 1:
Title: alone
Author: clone
Is the book open?  true

Enter details for Book 2:
Title: clone
Author: k
Is the book open? : false

--- Book Status ---
alone by clone is Open
clone by k is Closed
```

TC2 :



```
Output
Enter details for Book 1:
Title: self
Author: Mr k
Is the book open?  true

Enter details for Book 2:
Title: presence
Author: Mr s
Is the book open? : false

--- Book Status ---
self by Mr k is Open
presence by Mr s is Closed
```

TC3 :



```
Enter details for Book 1:
Title: silence
Author: @123
Is the book open?  true

Enter details for Book 2:
Title: presence
Author: @45
Is the book open? : false

--- Book Status ---
silence by @123 is Open
presence by @45 is Closed
```

## Observation:

I learned how to take boolean input (true/false) from the user.I created two Book objects using a constructor with different values.The method `displayStatus()` helped me practice if-else condition.The program checks if the book is open or closed and prints the correct message.This activity helped me understand how to use boolean logic with objects and methods.

**Problem Statement 3 :** ( Student Record) Create three Student objects and print their info using different Variables like  String name; String idNumber; String major;.

**Pseudo code :**

```
● Start
● Define student class with name, id, major
● Create constructor to initialize values
● Create getinfo() to return formatted string
● In main():
● create array to store 3 student objects
● for each student:
● prompt user to enter name, id, major
● create student object and store in array
● print all student information using getinfo()
● End
```

**Algorithm: steps**

1. Start
2. Define a Student class with name, idNumber, major
3. Define a constructor to initialize those fields
4. Define getInfo() method to return student details
5. In main():
    - Create array of 3 students
    - Loop 3 times to get user input (name, id, major)
    - Store each new Student in the array
6. Loop through the array and print each student's info using getInfo()
7. End

**Code** :

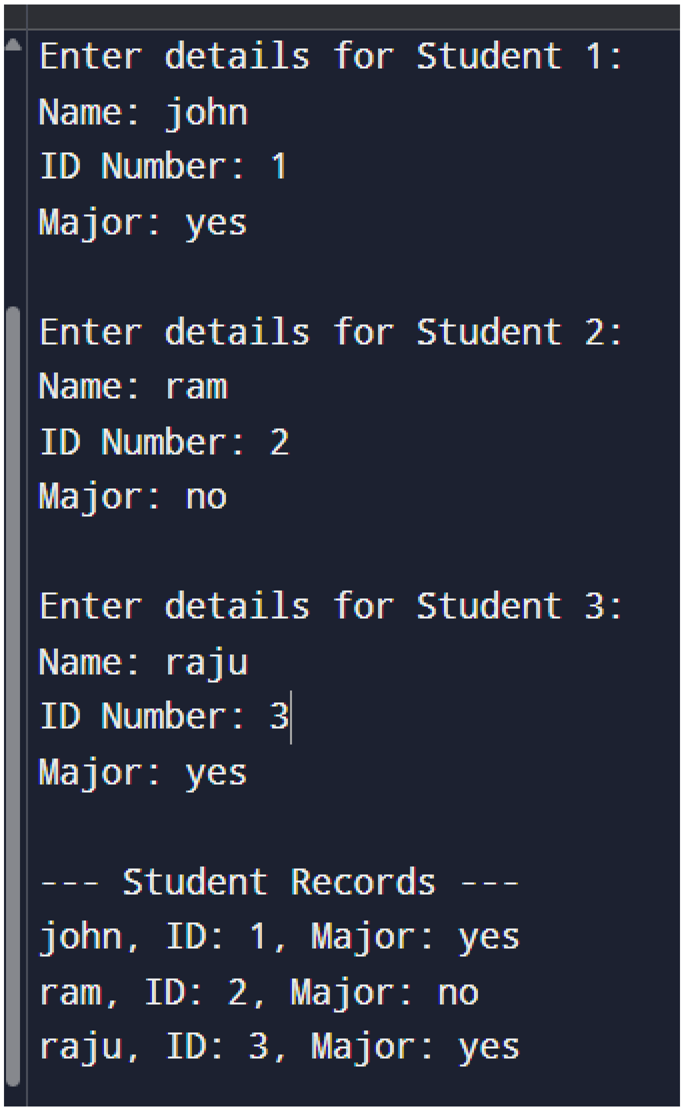
```
import java.util.Scanner;

public class Student {
    String name;
    String idNumber;
    String major;

    public Student(String name, String idNumber, String major) {
        this.name = name;
        this.idNumber = idNumber;
        this.major = major;
    }
    public String getInfo() {
        return name + ", ID: " + idNumber + ", Major: " + major;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Student[] students = new Student[3];

        for (int i = 0; i < 3; i++) {
            System.out.println("Enter details for Student " + (i + 1) + ":");

            System.out.print("Name: ");
            String name = scanner.nextLine();

            System.out.print("ID Number: ");
            String id = scanner.nextLine();

            System.out.print("Major: ");
            String major = scanner.nextLine();

            students[i] = new Student(name, id, major);
            System.out.println();
        }

        System.out.println("----- Student Records -----");
        for (Student student : students) {
            System.out.println(student.getInfo());
        }
    }
}
```

**Test Cases:**

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter details for Student 1:<br>Name: john<br>ID Number: 1<br>Major: yes | --- Student Records ---<br>john, ID: 1, Major: yes<br>ram, ID: 2, Major: no<br>raju, ID: 3, Major: yes | --- Student Records ---<br>john, ID: 1, Major: yes<br>ram, ID: 2, Major: no<br>raju, ID: 3, Major: yes | pass |

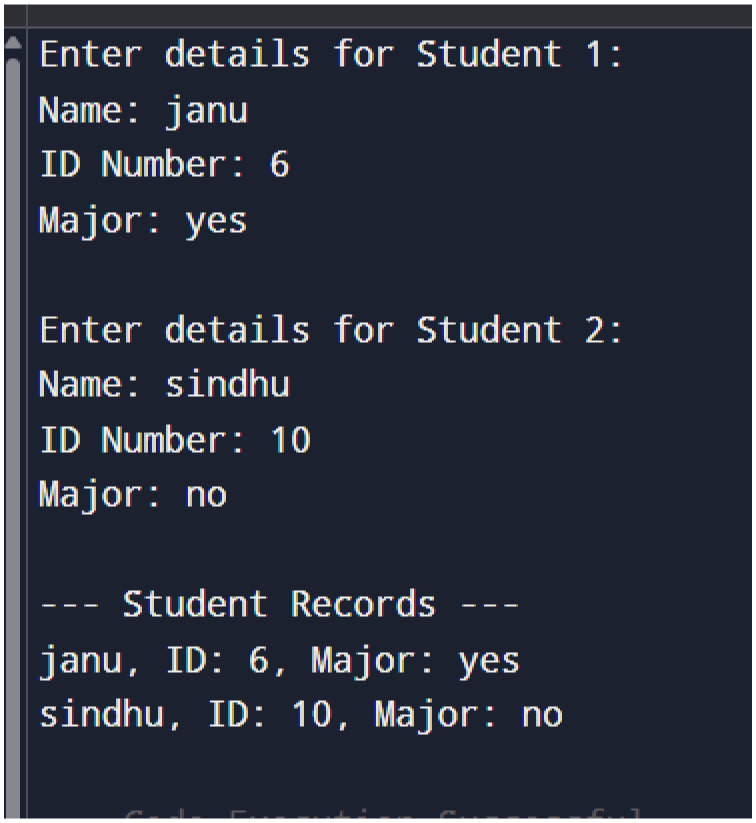
|  |  |  |  |  |
|---|---|---|---|---|
|  | Enter details for Student 2:<br>Name: ram<br>ID Number: 2<br>Major: no<br><br>Enter details for Student 3:<br>Name: raju<br>ID Number: 3<br>Major: yes |  |  |  |
| TC2 | Enter details for Student 1:<br>Name: janu<br>ID Number: 6<br>Major: yes<br><br>Enter details for Student 2:<br>Name: sindhu<br>ID Number: 10<br>Major: no | --- Student Records ---<br>janu, ID: 6, Major: yes<br>sindhu, ID: 10, Major: no | --- Student Records ---<br>janu, ID: 6, Major: yes<br>sindhu, ID: 10, Major: no | pass |
| TC3 | Enter details for Student 1:<br>Name: anu<br>ID Number: 19<br>Major: no | --- Student Records ---<br>anu, ID: 19, Major: no | --- Student Records ---<br>anu, ID: 19, Major: no | pass |

**TC1 :**



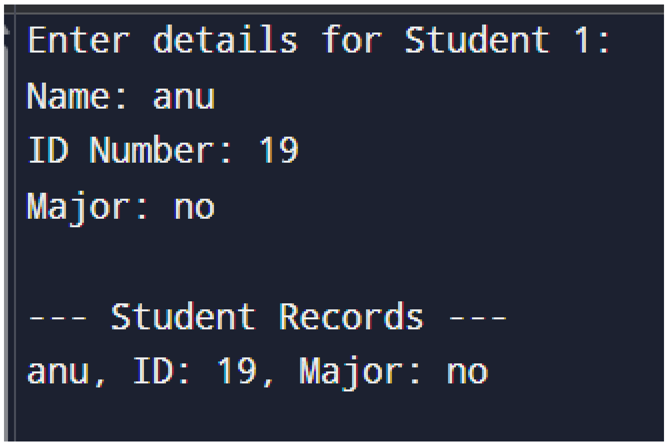
```
Enter details for Student 1:
Name: john
ID Number: 1
Major: yes

Enter details for Student 2:
Name: ram
ID Number: 2
Major: no

Enter details for Student 3:
Name: raju
ID Number: 3
Major: yes

--- Student Records ---
john, ID: 1, Major: yes
ram, ID: 2, Major: no
raju, ID: 3, Major: yes
```

**TC2 :**



```
Enter details for Student 1:
Name: janu
ID Number: 6
Major: yes

Enter details for Student 2:
Name: sindhu
ID Number: 10
Major: no

--- Student Records ---
janu, ID: 6, Major: yes
sindhu, ID: 10, Major: no
```

**TC3 :**



```
Enter details for Student 1:
Name: anu
ID Number: 19
Major: no

--- Student Records ---
anu, ID: 19, Major: no
```

**Observation:**The Student program demonstrates how to use constructors and arrays of objects in Java. It takes user input to create multiple Student objects and prints their details using a method. It also shows how to use this keyword to assign values properly and emphasizes object-oriented programming concepts like encapsulation and data grouping.

## SECTION 3 :

**Problem Statement 1 :** (Bank Account) Create a different method for BankAccount class with checking the balance, deposit the amount and withdraw and also when the user enters the negative value for deposit or withdrawal it will show invalid operations.

**Pseudo code :**

```
Start
Create bank account with balance
Define deposit(), withdraw(), getbalance()
In main():
loop:
show menu
get user choice
if 1 → show balance
if 2 → get deposit amount → deposit()
if 3 → get withdrawal amount → withdraw()
if 4 → exit
else → invalid option
End
```

**Algorithm: steps**

1. Start
2. Create account with ₹2000
3. Repeat:
    - Show menu
    - Get user input
    - Perform action (check, deposit, withdraw, exit)
4. End when user selects Exit

**Code** :

```
import java.util.Scanner;

public class BankAccount {
    private double balance;

    public BankAccount(double initialBalance) {
        if (initialBalance >= 0)
            this.balance = initialBalance;
        else
            this.balance = 0;
    }
```

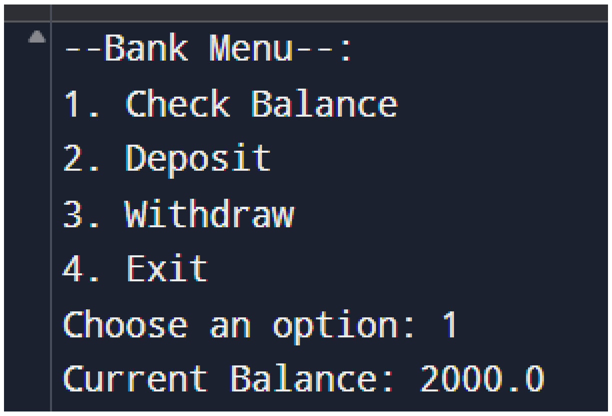
```
public double getBalance() {
    return balance;
}

public void deposit(double amount) {
    if (amount > 0) {
        balance += amount;
        System.out.println("Deposited: " + amount);
    } else {
        System.out.println("Invalid deposit amount. Must be positive.");
    }
}

public void withdraw(double amount) {
    if (amount <= 0) {
        System.out.println("Invalid withdrawal amount.");
    } else if (amount > balance) {
        System.out.println("Insufficient balance.");
    } else {
        balance -= amount;
        System.out.println("Withdrew: " + amount);
    }
}

public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);

    BankAccount account = new BankAccount(2000);

    while (true) {
        System.out.println("--Bank Menu--:");
        System.out.println("1. Check Balance");
        System.out.println("2. Deposit");
        System.out.println("3. Withdraw");
        System.out.println("4. Exit");

        System.out.print("Choose an option: ");
        int choice = scanner.nextInt();

        switch (choice) {
            case 1:
                System.out.println("Current Balance: " + account.getBalance());
                break;
                case 2:
                    System.out.print("Enter deposit amount: ");
                    double depositAmount = scanner.nextDouble();
                    account.deposit(depositAmount);
                    break;

                case 3:
                    System.out.print("Enter withdrawal amount: ");
                    double withdrawAmount = scanner.nextDouble();
                    account.withdraw(withdrawAmount);
                    break;

                case 4:
                    System.out.println("Thank you! Exiting.");
                    return;

                default:
                    System.out.println("Invalid option. Please try again.");
            }
        }
    }
}
```

**Test Cases:**

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | --Bank Menu--:<br>1. Check Balance<br>2. Deposit<br>3. Withdraw<br>4. Exit<br>Choose an option: 1 | Current Balance: 2000.0 | Current Balance: 2000.0 | pass |
| TC2 | --Bank Menu--:<br>1. Check Balance<br>2. Deposit<br>3. Withdraw<br>4. Exit | Invalid option. Please try again. | Invalid option. Please try again. | pass |

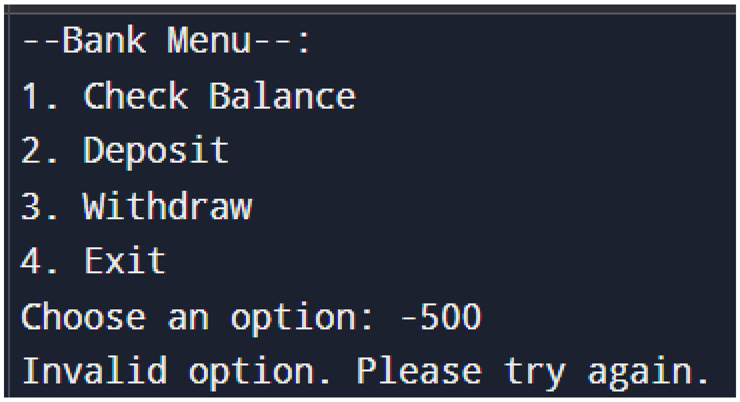
| | | | | |
|---|---|---|---|---|
| | Choose an option:<br>-500 | | | |
| TC3 | --Bank Menu--:<br>1. Check Balance<br>2. Deposit<br>3. Withdraw<br>4. Exit<br>Choose an option: 2 | --Bank Menu--:<br>1. Check Balance<br>2. Deposit<br>3. Withdraw<br>4. Exit<br>Choose an option: 2<br>Enter deposit amount:<br>2000<br>Deposited: 2000.0 | --Bank Menu--:<br>1. Check Balance<br>2. Deposit<br>3. Withdraw<br>4. Exit<br>Choose an option: 2<br>Enter deposit amount: 2000<br>Deposited: 2000.0 | pass |

**TC1 :**



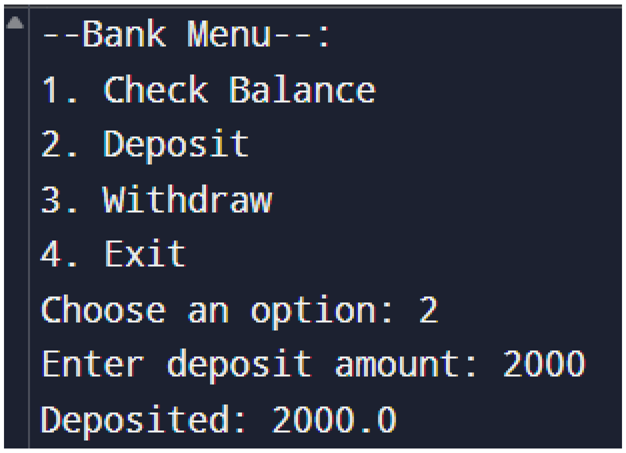
```
--Bank Menu--:
1. Check Balance
2. Deposit
3. Withdraw
4. Exit
Choose an option: 1
Current Balance: 2000.0
```

**TC2 :**



```
--Bank Menu--:
1. Check Balance
2. Deposit
3. Withdraw
4. Exit
Choose an option: -500
Invalid option. Please try again.
```

**TC3 :**



```
--Bank Menu--:
1. Check Balance
2. Deposit
3. Withdraw
4. Exit
Choose an option: 2
Enter deposit amount: 2000
Deposited: 2000.0
```

**Observation:**The Bank Account program demonstrates basic object-oriented programming concepts like encapsulation, method calling, and user input handling. It ensures valid transactions by checking for negative deposits and excessive withdrawals, making the program safe, interactive, and user-friendly.

**Problem Statement 2 :** (Product Inventory) Create a product Use getters and setters Validate constraints (like no negative price or quantity) Calculate total value.

**Pseudo code :**

- Start
- Ask user for product name, price, and quantity
- Create product object with these values
- Inside product class:
- store name, price, quantity
- setprice(): allow only positive price
- setquantity(): allow zero or more
- gettotalvalue(): return price × quantity
- Print product name, price, quantity, and total value
- End

**Algorithm: steps**

1. Start
2. Prompt user to enter product name, price, and quantity
3. Create a Product object with given input
4. In Product class:
    - Use constructor to initialize fields using setters
    - Validate price and quantity

5. Display:
    - Name
    - Price
    - Quantity
    - Total value (price × quantity)
6. End

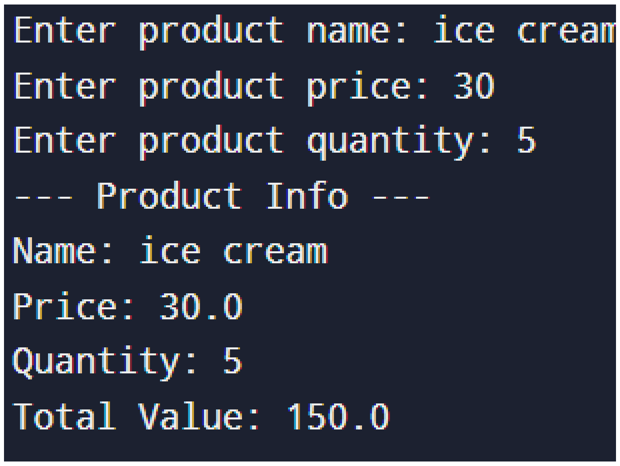
**Code** :
```
import java.util.Scanner;

public class Product {
    private String name;
    private double price;
    private int quantity;

    public Product(String name, double price, int quantity) {
        this.name = name;
        setPrice(price);
        setQuantity(quantity);
    }

    public String getName() {
        return name;
    }

    public double getPrice() {
        return price;
    }

    public int getQuantity() {
        return quantity;
    }

    public void setPrice(double price) {
        if (price > 0) {
            this.price = price;
        } else {
            System.out.println("Invalid price! Must be positive.");
        }
    }

    public void setQuantity(int quantity) {
        if (quantity >= 0) {
            this.quantity = quantity;
        } else {
            System.out.println("Invalid quantity! Must be zero or more.");
        }
    }
    public double getTotalValue() {
        return price * quantity;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter product name: ");
        String name = scanner.nextLine();

        System.out.print("Enter product price: ");
        double price = scanner.nextDouble();

        System.out.print("Enter product quantity: ");
        int quantity = scanner.nextInt();

        Product product = new Product(name, price, quantity);

        System.out.println("--- Product Info ---");
        System.out.println("Name: " + product.getName());
        System.out.println("Price: " + product.getPrice());
        System.out.println("Quantity: " + product.getQuantity());
        System.out.println("Total Value: " + product.getTotalValue());
    }
}
```

**Test Cases:**

| Test cases | Input | Expected Output | Actual Output | Status |
|---|---|---|---|---|
| TC1 | Enter product name: ice cream<br>Enter product price: 30<br>Enter product quantity: 5 | --- Product Info ---<br>Name: ice cream<br>Price: 30.0<br>Quantity: 5<br>Total Value: 150.0 | --- Product Info ---<br>Name: ice cream<br>Price: 30.0<br>Quantity: 5<br>Total Value: 150.0 | pass |

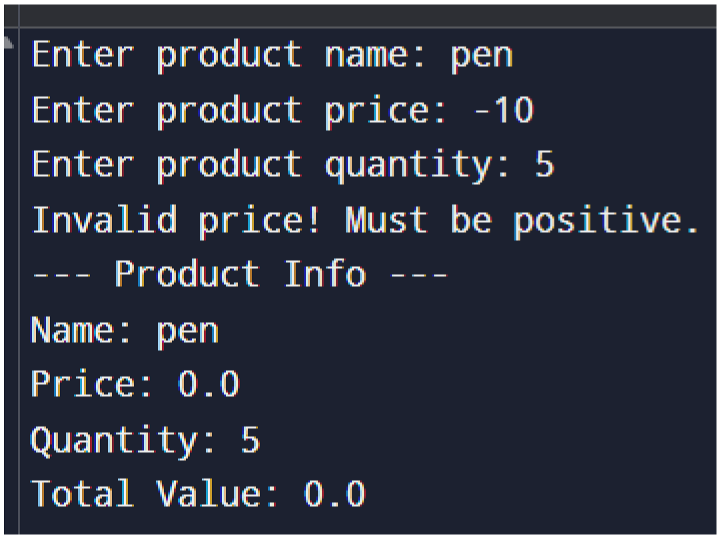
|  |  |  |  |  |
|---|---|---|---|---|
| TC2 | Enter product name: pen<br>Enter product price: -10<br>Enter product quantity: 5<br>Invalid price! Must be positive. | --- Product Info ---<br>Name: pen<br>Price: 0.0<br>Quantity: 5<br>Total Value: 0.0 | --- Product Info ---<br>Name: pen<br>Price: 0.0<br>Quantity: 5<br>Total Value: 0.0 | pass |
| TC3 | Enter product name: rose<br>Enter product price: 5.5<br>Enter product quantity: 10 | --- Product Info ---<br>Name: rose<br>Price: 5.5<br>Quantity: 10<br>Total Value: 55.0 | --- Product Info ---<br>Name: rose<br>Price: 5.5<br>Quantity: 10<br>Total Value: 55.0 | pass |

**TC1 :**



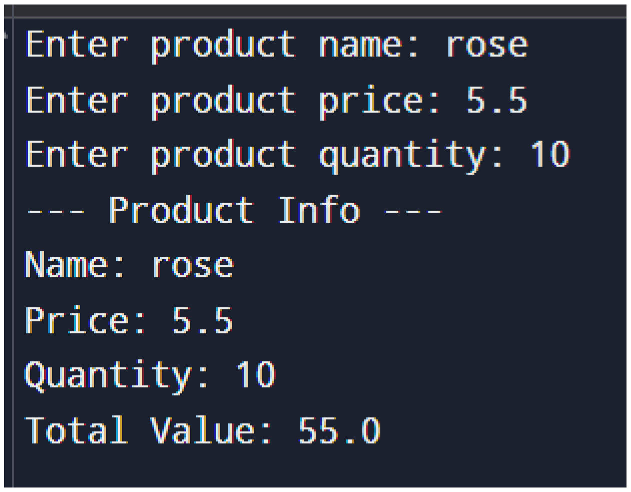
```
Enter product name: ice cream
Enter product price: 30
Enter product quantity: 5
--- Product Info ---
Name: ice cream
Price: 30.0
Quantity: 5
Total Value: 150.0
```

**TC2 :**



```
Enter product name: pen
Enter product price: -10
Enter product quantity: 5
Invalid price! Must be positive.
--- Product Info ---
Name: pen
Price: 0.0
Quantity: 5
Total Value: 0.0
```

**TC3 :**



```
Enter product name: rose
Enter product price: 5.5
Enter product quantity: 10
--- Product Info ---
Name: rose
Price: 5.5
Quantity: 10
Total Value: 55.0
```

## Observation:

The Product program demonstrates encapsulation by using private fields with getters and setters. It validates user input to ensure the price is positive and quantity is non-negative, ensuring data integrity. The program also calculates the total value (price × quantity) and displays all product details interactively using user input.