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**AN2**

1. Code

public class Car {

String brand;

String model;

int year;

String color;

boolean isRunning;

public Car(String brand, String model, int year, String color) {

this.brand = brand;

this.model = model;

this.year = year;

this.color = color;

this.isRunning = false;

}

public void startEngine() {

if (!isRunning) {

isRunning = true;

System.out.println(brand + " " + model + " engine started.");

} else {

System.out.println(brand + " " + model + " engine is already running.");

}

}

public void stopEngine() {

if (isRunning) {

isRunning = false;

System.out.println(brand + " " + model + " engine stopped.");

} else {

System.out.println(brand + " " + model + " engine is already off.");

}

}

public void displayInfo() {

System.out.println("Car Info: " + year + " " + brand + " " + model + ", Color: " + color + ", Running: " + isRunning);

}

public int getAge(int currentYear) {

return currentYear - year;

}

public static void main(String[] args) {

Car car1 = new Car("Toyota", "Camry", 2018, "Red");

Car car2 = new Car("Honda", "Civic", 2020, "Blue");

Car car3 = new Car("Tesla", "Model 3", 2022, "White");

car1.startEngine();

car1.displayInfo();

System.out.println("Car Age: " + car1.getAge(2025) + " years\n");

car2.displayInfo();

car2.startEngine();

car2.stopEngine();

System.out.println("Car Age: " + car2.getAge(2025) + " years\n");

car3.startEngine();

car3.displayInfo();

System.out.println("Car Age: " + car3.getAge(2025) + " years\n");

}

}

1. Code

public class Student {

private String studentId;

private String name;

private double grade;

private String course;

public Student() {

}

public Student(String studentId, String name, double grade, String course) {

this.studentId = studentId;

this.name = name;

this.grade = grade;

this.course = course;

}

public String getStudentId() {

return studentId;

}

public void setStudentId(String studentId) {

this.studentId = studentId;

}

public String getName() {

return name;

}

public void setName(String name) {

this.name = name;

}

public double getGrade() {

return grade;

}

public void setGrade(double grade) {

this.grade = grade;

}

public String getCourse() {

return course;

}

public void setCourse(String course) {

this.course = course;

}

public String calculateLetterGrade() {

if (grade >= 90) return "A";

else if (grade >= 80) return "B";

else if (grade >= 70) return "C";

else if (grade >= 60) return "D";

else return "F";

}

public void displayStudent() {

System.out.println("ID: " + studentId + ", Name: " + name + ", Grade: " + grade + " (" + calculateLetterGrade() + "), Course: " + course);

}

public static void main(String[] args) {

Student s1 = new Student();

s1.setStudentId("S101");

s1.setName("Alice");

s1.setGrade(85.5);

s1.setCourse("Computer Science");

Student s2 = new Student("S102", "Bob", 72.0, "Mathematics");

System.out.println("Student 1 Info:");

s1.displayStudent();

System.out.println("ID: " + s1.getStudentId());

System.out.println("Name: " + s1.getName());

System.out.println("Course: " + s1.getCourse());

System.out.println("Grade: " + s1.getGrade());

System.out.println("Letter Grade: " + s1.calculateLetterGrade());

System.out.println();

System.out.println("Student 2 Info:");

s2.displayStudent();

System.out.println("ID: " + s2.getStudentId());

System.out.println("Name: " + s2.getName());

System.out.println("Course: " + s2.getCourse());

System.out.println("Grade: " + s2.getGrade());

System.out.println("Letter Grade: " + s2.calculateLetterGrade());

}

}

1. Code

public class BankAccount {

static String bankName;

static int totalAccounts = 0;

static double interestRate;

String accountNumber;

String accountHolder;

double balance;

public BankAccount(String accountNumber, String accountHolder, double balance) {

this.accountNumber = accountNumber;

this.accountHolder = accountHolder;

this.balance = balance;

totalAccounts++;

}

public static void setBankName(String name) {

bankName = name;

}

public static void setInterestRate(double rate) {

interestRate = rate;

}

public static int getTotalAccounts() {

return totalAccounts;

}

public static void displayBankInfo() {

System.out.println("Bank: " + bankName + ", Total Accounts: " + totalAccounts + ", Interest Rate: " + interestRate + "%");

}

public void deposit(double amount) {

balance += amount;

System.out.println(accountHolder + " deposited " + amount + ". New balance: " + balance);

}

public void withdraw(double amount) {

if (amount <= balance) {

balance -= amount;

System.out.println(accountHolder + " withdrew " + amount + ". New balance: " + balance);

} else {

System.out.println("Insufficient balance for " + accountHolder);

}

}

public void calculateInterest() {

double interest = balance \* interestRate / 100;

System.out.println(accountHolder + " will earn interest: " + interest);

}

public void displayAccountInfo() {

System.out.println("Account Number: " + accountNumber + ", Holder: " + accountHolder + ", Balance: " + balance);

}

public static void main(String[] args) {

BankAccount.setBankName("Global Bank");

BankAccount.setInterestRate(5.0);

BankAccount acc1 = new BankAccount("A101", "Alice", 1000);

BankAccount acc2 = new BankAccount("A102", "Bob", 2000);

acc1.displayAccountInfo();

acc2.displayAccountInfo();

acc1.deposit(500);

acc2.withdraw(300);

acc1.calculateInterest();

acc2.calculateInterest();

BankAccount.displayBankInfo();

System.out.println("Total Accounts (via static): " + BankAccount.getTotalAccounts());

System.out.println("Total Accounts (via object): " + acc1.getTotalAccounts());

}

}

1. Code

class Vehicle {

protected String make;

protected String model;

protected int year;

protected double fuelLevel;

public Vehicle(String make, String model, int year, double fuelLevel) {

this.make = make;

this.model = model;

this.year = year;

this.fuelLevel = fuelLevel;

}

public void startVehicle() {

System.out.println(make + " " + model + " started.");

}

public void stopVehicle() {

System.out.println(make + " " + model + " stopped.");

}

public void refuel(double amount) {

fuelLevel += amount;

System.out.println(make + " " + model + " refueled. Current fuel: " + fuelLevel);

}

public void displayVehicleInfo() {

System.out.println(year + " " + make + " " + model + " | Fuel: " + fuelLevel);

}

}

class Car extends Vehicle {

public Car(String make, String model, int year, double fuelLevel) {

super(make, model, year, fuelLevel);

}

}

class Truck extends Vehicle {

public Truck(String make, String model, int year, double fuelLevel) {

super(make, model, year, fuelLevel);

}

}

class Motorcycle extends Vehicle {

public Motorcycle(String make, String model, int year, double fuelLevel) {

super(make, model, year, fuelLevel);

}

}

public class VehicleDemo {

public static void main(String[] args) {

Vehicle car = new Car("Toyota", "Camry", 2020, 50);

Vehicle truck = new Truck("Volvo", "FH16", 2018, 80);

Vehicle bike = new Motorcycle("Yamaha", "R15", 2022, 20);

car.startVehicle();

truck.refuel(20);

bike.displayVehicleInfo();

Vehicle[] vehicles = {car, truck, bike};

for (Vehicle v : vehicles) {

v.displayVehicleInfo();

v.stopVehicle();

}

}

}