**BYAGARI PAVAN PBL ID: J\_251890123**

PACKAGES

1. **Create a package called test package.**

**Define a class called foundation inside the test package. Inside the class, you need to define 4 integer variables: var1 with private access modifier**

**var2 with default access modifier var3 with protected access modifier var4 with public access modifier**

**Import this class and packages in another class.**

**Try to access all 4 variables of the foundation class and see what variables are accessible and what are not accessible.**

**Foundation.java (in testpackage)**

package testpackage;

public class Foundation {

private int var1 = 10; // private access

int var2 = 20; // default access (package-private) protected int var3 = 30; // protected access

public int var4 = 40; // public access

}

**TestAccess.java (in mainpackage)**

package mainpackage;

import testpackage.Foundation;

// Subclass to check protected access

class SubFoundation extends Foundation { void showProtected() {

// Protected variable accessible through inheritance

System.out.println("Protected var3 (via inheritance): " + var3);

}

}

public class TestAccess {

public static void main(String[] args) { Foundation f = new Foundation();

System.out.println("Public var4: " + f.var4); SubFoundation sf = new SubFoundation(); sf.showProtected();

}

}

**Output**

Public var4: 40

Protected var3 (via inheritance): 30

1. **Create a class called compartment which represents the ship compartments with attributes like height, width and breadth.**

**Take care it should not conflict with the compartment class you have created in Abstract class exercise 2.**

**To avoid conflict create this class in a new package called com.wipro.automobile.ship**

**Compartment.java (in com.wipro.automobile.ship)**

package com.wipro.automobile.ship;

public class Compartment { private double height; private double width;

private double breadth;

// Constructor

public Compartment(double height, double width, double breadth) { this.height = height;

this.width = width;

this.breadth = breadth;

}

// Getters

public double getHeight() { return height;

}

public double getWidth() { return width;

}

public double getBreadth() { return breadth;

}

// Method to calculate volume public double getVolume() {

return height \* width \* breadth;

}

@Override

public String toString() {

return "Compartment [height=" + height + ", width=" + width + ", breadth=" + breadth

+

", volume=" + getVolume() + "]";

}

}

**Example Usage (in another file)**

Suppose you create a test file ShipTest.java outside that package: import com.wipro.automobile.ship.Compartment;

public class ShipTest {

public static void main(String[] args) {

Compartment c = new Compartment(10.5, 8.0, 6.0); System.out.println(c); // uses toString()

System.out.println("Volume of compartment: " + c.getVolume());

}

}

**Output**

Compartment [height=10.5, width=8.0, breadth=6.0, volume=504.0] Volume of compartment: 504.0

1. **Create a package called com.automobile. Define an abstract class called Vehicle.**

**Vehicle class has the following abstract methods:**

**public String getModelName()**

**public String getRegistrationNumber() public String getOwnerName()**

**Create twowheeler subpackage under automobile package**

**Hero class extends automobile.vehicle class with the following methods public int getSpeed()**

* **returns the current speed of the vehicle. public void radio()**
* **provides facility to control the radio device**

**Honda class extends com.automobile.vehicle class with the following methods public int getSpeed()**

* **Returns the current speed of the vehicle. public void cdplayer()**
* **provides facility to control the cd player device which is available in the car. Create a test class to test the methods available in all these child class.**

**Vehicle.java (Abstract Class in com.automobile)**

package com.automobile;

public abstract class Vehicle {

public abstract String getModelName();

public abstract String getRegistrationNumber(); public abstract String getOwnerName();

}

o **Hero.java (TwoWheeler subclass)**

package com.automobile.twowheeler;

import com.automobile.Vehicle;

public class Hero extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Hero(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName;

}

@Override

public String getRegistrationNumber() { return registrationNumber;

}

@Override

public String getOwnerName() { return ownerName;

}

public int getSpeed() { return speed;

}

public void radio() {

System.out.println("Radio is ON in Hero bike.");

}

}

o **Honda.java (TwoWheeler subclass)**

package com.automobile.twowheeler;

import com.automobile.Vehicle;

public class Honda extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Honda(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName;

}

@Override

public String getRegistrationNumber() { return registrationNumber;

}

@Override

public String getOwnerName() { return ownerName;

}

public int getSpeed() { return speed;

}

public void cdplayer() {

System.out.println("CD Player is playing music in Honda bike.");

}

}

o **TestVehicle.java (Test class in default package)**

import com.automobile.twowheeler.Hero; import com.automobile.twowheeler.Honda;

public class TestVehicle {

public static void main(String[] args) {

Hero heroBike = new Hero("Hero Splendor", "TN-01-1234", "Madhan", 85); Honda hondaBike = new Honda("Honda Shine", "TN-02-5678", "Arun", 95);

System.out.println("----- Hero Bike Details ");

System.out.println("Model: " + heroBike.getModelName());

System.out.println("Registration Number: " + heroBike.getRegistrationNumber()); System.out.println("Owner: " + heroBike.getOwnerName());

System.out.println("Speed: " + heroBike.getSpeed() + " km/h"); heroBike.radio();

System.out.println("\n----- Honda Bike Details ");

System.out.println("Model: " + hondaBike.getModelName());

System.out.println("Registration Number: " + hondaBike.getRegistrationNumber()); System.out.println("Owner: " + hondaBike.getOwnerName());

System.out.println("Speed: " + hondaBike.getSpeed() + " km/h"); hondaBike.cdplayer();

}

}

**Output**

----- Hero Bike Details ----- Model: Hero Splendor

Registration Number: TN-01-1234 Owner: Madhan

Speed: 85 km/h

Radio is ON in Hero bike.

----- Honda Bike Details ----- Model: Honda Shine

Registration Number: TN-02-5678 Owner: Arun

Speed: 95 km/h

CD Player is playing music in Honda bike.

1. **Add the following ideas to the previous hands on:**

**Create FourWheeler subpackage under automobile package Logan class extends com.automobile.Vehicle class**

**public int speed()**

**Logic Building Hour Plan-M1**

**Returns the current speed of the vehicle. OOPS/Inheritance [2.5d]**

**public int gps()**

**provides facility to control the gps device Eclipse Overview**

**Ford class extends com.automobile.Vehicle class Abstraction/Packages/Exception**

**public int speed() Handling [2.5d]**

**Returns the current speed of the vehicle. Wrapper Classes [1d]**

**public int tempControl()**

**provides facility to control the air conditioning device which is available in the car I/O Streams [1d]**

**Create objects of the relevant classes and test the various functionalities of the class.**

**Vehicle.java (no change)**

package com.automobile;

public abstract class Vehicle {

public abstract String getModelName();

public abstract String getRegistrationNumber(); public abstract String getOwnerName();

}

o **Hero.java (already done)**

package com.automobile.twowheeler;

import com.automobile.Vehicle;

public class Hero extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Hero(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName; } @Override

public String getRegistrationNumber() { return registrationNumber; } @Override

public String getOwnerName() { return ownerName; }

public int getSpeed() { return speed; }

public void radio() {

System.out.println("Radio is ON in Hero bike.");

}

}

o **Honda.java (already done)**

package com.automobile.twowheeler;

import com.automobile.Vehicle;

public class Honda extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Honda(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName; } @Override

public String getRegistrationNumber() { return registrationNumber; } @Override

public String getOwnerName() { return ownerName; }

public int getSpeed() { return speed; }

public void cdplayer() {

System.out.println("CD Player is playing music in Honda bike.");

}

}

o **Logan.java (FourWheeler subclass)**

package com.automobile.fourwheeler;

import com.automobile.Vehicle;

public class Logan extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Logan(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName; } @Override

public String getRegistrationNumber() { return registrationNumber; } @Override

public String getOwnerName() { return ownerName; }

public int speed() { return speed; }

public void gps() {

System.out.println("GPS is ON in Logan car.");

}

}

o **Ford.java (FourWheeler subclass)**

package com.automobile.fourwheeler;

import com.automobile.Vehicle;

public class Ford extends Vehicle { private String modelName;

private String registrationNumber; private String ownerName;

private int speed;

public Ford(String modelName, String registrationNumber, String ownerName, int speed) {

this.modelName = modelName;

this.registrationNumber = registrationNumber; this.ownerName = ownerName;

this.speed = speed;

}

@Override

public String getModelName() { return modelName; } @Override

public String getRegistrationNumber() { return registrationNumber; } @Override

public String getOwnerName() { return ownerName; }

public int speed() { return speed; }

public void tempControl() {

System.out.println("Air conditioning is ON in Ford car.");

}

}

o **TestVehicle.java (Test all classes)** import com.automobile.twowheeler.Hero; import com.automobile.twowheeler.Honda; import com.automobile.fourwheeler.Logan; import com.automobile.fourwheeler.Ford;

public class TestVehicle {

public static void main(String[] args) {

Hero heroBike = new Hero("Hero Splendor", "TN-01-1234", "Madhan", 85); Honda hondaBike = new Honda("Honda Shine", "TN-02-5678", "Arun", 95); Logan loganCar = new Logan("Logan Sedan", "KA-05-9876", "Priya", 120); Ford fordCar = new Ford("Ford Ecosport", "DL-08-4567", "Rahul", 140);

System.out.println("----- Hero Bike ");

System.out.println("Model: " + heroBike.getModelName());

System.out.println("Reg No: " + heroBike.getRegistrationNumber());

System.out.println("Owner: " + heroBike.getOwnerName()); System.out.println("Speed: " + heroBike.getSpeed() + " km/h"); heroBike.radio();

System.out.println("\n----- Honda Bike ");

System.out.println("Model: " + hondaBike.getModelName());

System.out.println("Reg No: " + hondaBike.getRegistrationNumber()); System.out.println("Owner: " + hondaBike.getOwnerName());

System.out.println("Speed: " + hondaBike.getSpeed() + " km/h"); hondaBike.cdplayer();

System.out.println("\n----- Logan Car ");

System.out.println("Model: " + loganCar.getModelName());

System.out.println("Reg No: " + loganCar.getRegistrationNumber()); System.out.println("Owner: " + loganCar.getOwnerName());

System.out.println("Speed: " + loganCar.speed() + " km/h"); loganCar.gps();

System.out.println("\n----- Ford Car ");

System.out.println("Model: " + fordCar.getModelName());

System.out.println("Reg No: " + fordCar.getRegistrationNumber()); System.out.println("Owner: " + fordCar.getOwnerName());

System.out.println("Speed: " + fordCar.speed() + " km/h"); fordCar.tempControl();

}

}

**Sample Output**

----- Hero Bike -----

Model: Hero Splendor Reg No: TN-01-1234

Owner: Madhan Speed: 85 km/h

Radio is ON in Hero bike.

----- Honda Bike ----- Model: Honda Shine Reg No: TN-02-5678

Owner: Arun Speed: 95 km/h

CD Player is playing music in Honda bike.

----- Logan Car ----- Model: Logan Sedan Reg No: KA-05-9876

Owner: Priya

Speed: 120 km/h

GPS is ON in Logan car.

----- Ford Car -----

Model: Ford Ecosport Reg No: DL-08-4567

Owner: Rahul Speed: 140 km/h

Air conditioning is ON in Ford car.