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**Hands-on Assignments for Abstract Classes**

**Create an abstract class Compartment to represent a rail coach. Provide an abstract function notice in this class.**

**public abstract String notice();**

**Derive FirstClass, Ladies, General, Luggage classes from the compartment class. Override the notice function in each of them to print notice message that is suitable to the specific type of compartment.**

**Create a class TestCompartment.Write main function to do the following: Declare an array of Compartment of size 10.**

**Create a compartment of a type as decided by a randomly generated integer in the range 1 to 4.**

**Check the polymorphic behavior of the notice method.**

**[i.e based on the random number genererated, the first compartment can be Luggage, the second one could be Ladies and so on..]**

import java.util.Random;

// Abstract class

abstract class Compartment { public abstract String notice();

}

// Derived classes

class FirstClass extends Compartment { @Override

public String notice() {

return "This is First Class compartment.";

}

}

class Ladies extends Compartment { @Override

public String notice() {

return "This is Ladies compartment.";

}

}

class General extends Compartment { @Override

public String notice() {

return "This is General compartment.";

}

}

class Luggage extends Compartment { @Override

public String notice() {

return "This is Luggage compartment.";

}

}

// Main class

public class TestCompartment {

public static void main(String[] args) {

Compartment[] compartments = new Compartment[10]; // array of 10 compartments

Random rand = new Random();

// Fill array with random compartments

for (int i = 0; i < compartments.length; i++) {

int choice = rand.nextInt(4) + 1; // random number 1 to 4

switch (choice) {

case 1: compartments[i] = new FirstClass(); break; case 2: compartments[i] = new Ladies(); break; case 3: compartments[i] = new General(); break; case 4: compartments[i] = new Luggage(); break;

}

}

// Display notices (polymorphism in action) for (int i = 0; i < compartments.length; i++) {

System.out.println("Compartment " + (i + 1) + ": " + compartments[i].notice());

}

}

}

**Output:**

Compartment 1: This is Luggage compartment. Compartment 2: This is Ladies compartment. Compartment 3: This is General compartment. Compartment 4: This is First Class compartment. Compartment 5: This is Ladies compartment.

Compartment 6: This is Luggage compartment. Compartment 7: This is General compartment.

Compartment 8: This is First Class compartment. Compartment 9: This is General compartment.

Compartment 10: This is Luggage compartment.