Exercise 01

\* Employee.java

public class Employee {

private int empID;

private String empName;

private String empDesignation;

// Getter and Setter for 'empID'

public int getEmpID() {

return empID;

}

public void setEmpID(int empID) {

this.empID = empID;

}

// Getter and Setter for 'empName'

public String getEmpName() {

return empName;

}

public void setEmpName(String empName) {

this.empName = empName;

}

// Getter and Setter for 'empDesignation'

public String getEmpDesignation() {

return empDesignation;

}

public void setEmpDesignation(String empDesignation) {

this.empDesignation = empDesignation;

}

}

\* TestEmployee.java

public class TestEmployee {

public static void main(String[] args) {

Employee emp1 = new Employee();

emp1.setEmpID(101);

emp1.setEmpName("Mr. Bogdan");

emp1.setEmpDesignation("Software Engineer");

Employee emp2 = new Employee();

emp2.setEmpID(102);

emp2.setEmpName("Ms. Bird");

emp2.setEmpDesignation("Project Manager");

// Printing employee details using getters

System.out.println("Employee 1 details:");

System.out.println("ID: " + emp1.getEmpID());

System.out.println("Name: " + emp1.getEmpName());

System.out.println("Designation: " + emp1.getEmpDesignation());

System.out.println("\nEmployee 2 details:");

System.out.println("ID: " + emp2.getEmpID());

System.out.println("Name: " + emp2.getEmpName());

System.out.println("Designation: " + emp2.getEmpDesignation());

}

}

\* Output

Employee 1 details:

ID: 101

Name: Mr. Bogdan

Designation: Software Engineer

Employee 2 details:

ID: 102

Name: Ms. Bird

Designation: Project Manager

Exercise 02

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\* For object b, we are using the methods defined in SuperB class. The value of x is set to 2, then increased by 1, and finally tripled using the triple() method from the SuperB class.

\* For object c, we are using the methods from SuperB class (since SubC inherits from SuperB), but the triple() method is overridden in SubC class to add 3 instead of multiplying by 3. The value of x is set to 2, then increased by 1, and finally tripled using the overridden triple() method from the SubC class.

Exercise 03

\* Person.java

public class Person {

private String name;

private int id;

// Getter and Setter for 'name'

public String getName() {

return name;

}

public void setName(String name) {

this.name = name;

}

// Getter and Setter for 'id'

public int getID() {

return id;

}

public void setID(int id) {

this.id = id;

}

}

\* Student.java

public class Student extends Person {

private String course;

// Getter and Setter for 'course'

public String getCourse() {

return course;

}

public void setCourse(String course) {

this.course = course;

}

}

\* Lecturer.java

public class Lecturer extends Person {

private String programme;

// Getter and Setter for 'programme'

public String getProg() {

return programme;

}

public void setProg(String programme) {

this.programme = programme;

}

}

\* TestPerson.java

public class TestPerson {

public static void main(String[] args) {

// Creating a Student object

Student student = new Student();

student.setName("John");

student.setID(101);

student.setCourse("Computer Science");

// Creating a Lecturer object

Lecturer lecturer = new Lecturer();

lecturer.setName("Professor Smith");

lecturer.setID(201);

lecturer.setProg("Data Science");

// Displaying student and lecturer details

System.out.println("Student Details:");

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

System.out.println("ID: " + student.getID());

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

System.out.println("\nLecturer Details:");

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

System.out.println("ID: " + lecturer.getID());

System.out.println("Programme: " + lecturer.getProg());

}

}

\* Output

Student Details:

Name: John

ID: 101

Course: Computer Science

Lecturer Details:

Name: Professor Smith

ID: 201

Programme: Data Science

Exercise 04

true

true

true

\* m instanceof Animal: m is an instance of Mammal, which is a subclass of Animal. Since Mammal is a subclass of Animal, the result is true.

\* d instanceof Mammal: d is an instance of Dog, which is a subclass of Mammal. Since Dog is a subclass of Mammal, the result is true.

\* d instanceof Animal: d is an instance of Dog, which is a subclass of Mammal, and Mammal is a subclass of Animal. Since Dog is indirectly a subclass of Animal, the result is also true.

\* In summary, all three instanceof checks return true because each object belongs to its own class and its superclass, following the inheritance hierarchy.