Daffodil International University

Faculty of Science & Information Technology

Final Examination, Fall 2022

Course Code: CSE 221/214, Course Title: Object Oriented Programming

Level: 2 Term: 1+2 Batch: 59, 60, OLD-SYL

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

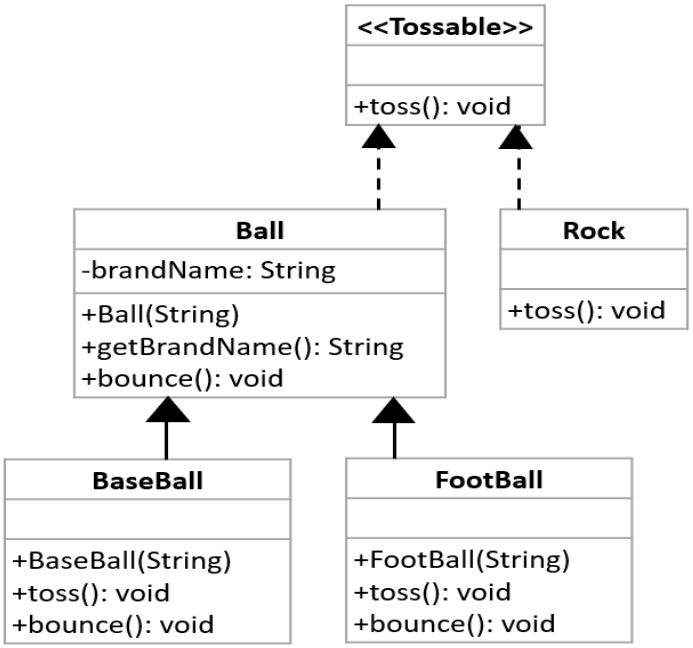
[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	***a)***	**What** is the main difference between checked and unchecked exception?
		Find out the output of the following java program?
		`public class X {`
		`  public static void main(String[] args) {`
		`  try {`
		`  badMethod();`
		`  System.out.print("A");`
		`  } catch (RuntimeException ex) {`
		`  System.out.print("B");`
		`  } catch (Exception ex1) {`
		`  System.out.print("C");`
		`  }`
		`  finally {`
		`  System.out.print("D");`
		`  }`
		`  System.out.print("E");`
		`  }`
		`  public static void badMethod() {`
		`  throw new RuntimeException();`
		`  }`
		`}`
			[2.5]	**CO1**

	b)	**Compare** between Aggregation and composition with proper example.	**[2.5]**	

2.	***a)***	"Multiple Inheritance is not supported through a class in Java, but it can be possible through the interface" – **Explain** your answer with example. Find out the output of the following java program.
		`interface GFG{`
		`  void learnCoding();`
		`  void learnProgramming();`
		`  void contribute();`
		`}`
		`abstract class Student implements GFG {`
		`  public void learnCoding(){`
		`  System.out.println("Let's make coding a habit with GFG");`
		`  }`
		`  public void learnProgramming(){`
		`  System.out.println("Let's Learn Java");`
		`  }`
		`}`
		`class GEEK extends Student {`
		`  public void contribute() {`
		`  System.out.println("Let's help others to Learn java");`
		`  }`
		`  public void learnCoding() {`
		`  System.out.println("Let's make coding a habit with Java");`
		`  }`
		`}`
		`public class NewClass {`
		`  public static void main(String[] args){`
		`  GEEK gfgStudent = new GEEK();`
		`  gfgStudent.learnCoding();`
		`  gfgStudent.learnProgramming();`
		`  gfgStudent.contribute();`
		`  }}`
			[5]	**CO2**

	b)	Is there any Exception exists in the following program? If yes, **explain** that Exceptions that were causing problems and what approach have you taken to solve this problem.
		`public class Test {`
		`  public static void main(String[] args) {`
		`  int a = 20, b = 30, c = 10;`
		`  int x = (a * b) / (a - b + c);`
		`  System.out.println("Result: " + x);`
		`  }}`
			[5]	

3.	***a)***	Let us consider a Company class with properties of name, reg_no and type and the function elements are getter and setter methods for each data field. It has a parameterized constructor to initialize the name, reg_no and type at the time of object creation. Company class also has a display method to show the company details. Company has a large number of employees of two different categories. Employee class has emp_id, emp_name, designation as data fields and getter and setter methods for these data fields. It defines a default constructor. Employee class also has a payment method but has no implementation. SalariedEmployee is one type of Employee with the basic properties of Employee with additional properties of salaryScale. It has a method to set salaryScale and it overrides the payment method from the Employee class which returns the salary of the employee. HourlyEmployee is another category or Employee which inherits the Employee class and has the data member of hours_worked and hourly_payment. It has getter and setter methods for data fields and it implements the payment method for salary payment returning hours_worked*hourly_payment. Now, **develop** a UML diagram for the above-mentioned company's class hierarchy maintaining all mentioned relationships.	**[6]**	**CO3**
	b)	**Assume** that you have to create an interface called 'Machine' to represent any kind of machine. 'Machine' has two methods: start() and stop(). Now create two implementations of the 'Machine': a Car, and a WaterPump. Show that the same piece of code works fine for both machines. Also draw the UML of the above scenario.	**[4]**	
4.	***a)***	The abstract Fruits class has three subclasses named Apple, Banana and Jackfruit. It also has an abstract method maned "display". Now **develop** a java program that demonstrates how to establish this class hierarchy. Declare an instance variables of type String that indicates the color of a fruit. Create objects of each class and display the name of the fruit and its color.	**[6]**	**CO4**
	b)	**Develop** a Java Code to implement the following UML Diagram. You do not need to fill in the method bodies for the **toss** or **bounce** methods.  	**[9]**	