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Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Final Examination, Spring 2025
Course Code: SE216; Course Title: Object Oriented Programming
Sections: A-J & Teachers: RJM, MAAA, NAN, PC, KMH

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) **Solve** the following scenario using appropriate UML diagrams, illustrating the association relationships. Alex is a Learner. Alex has a fullName, studentID of type String, int. Learner has a studentNumber of type int and performs an action showDetails() of type void. Alex must have a ReportCard, and without this, Alex cannot graduate. ReportCard has a recordID of type int. **2** **CLO-3** ***Level-3***

b) You are organizing a tech fest with participants from two different departments: SWE and CSE., Your task is to manage and manipulate the list of participants using ArrayLists in Java. **Customize** a class called **TechFest** that performs the following: **7**

1. Create two ArrayLists: One for **SWE** participants and one for **CSE** participants. Add the following participants to each list:
   - SWE participants: Alice, Bob, Charlie
   - CSE participants: David, Eva, Frank
2. Combine both lists into a single **FinalList.**
3. Replace the first occurrence of the participant "Alice" in the FinalList with "Grace".
4. Display the first and last participants in the FinalList.
5. Find the last occurrence of the participant "David" in the FinalList and display the index. If "David" is not found, display the message: "David is not in the list."
6. Remove all CSE participants from the FinalList.
7. Display the size of the FinalList.
8. Clear the FinalList.
9. Check if the FinalList is empty and display the message: "The list is empty!" if it is empty, otherwise display: "The list is not empty!"

c) **8**

Code	Output

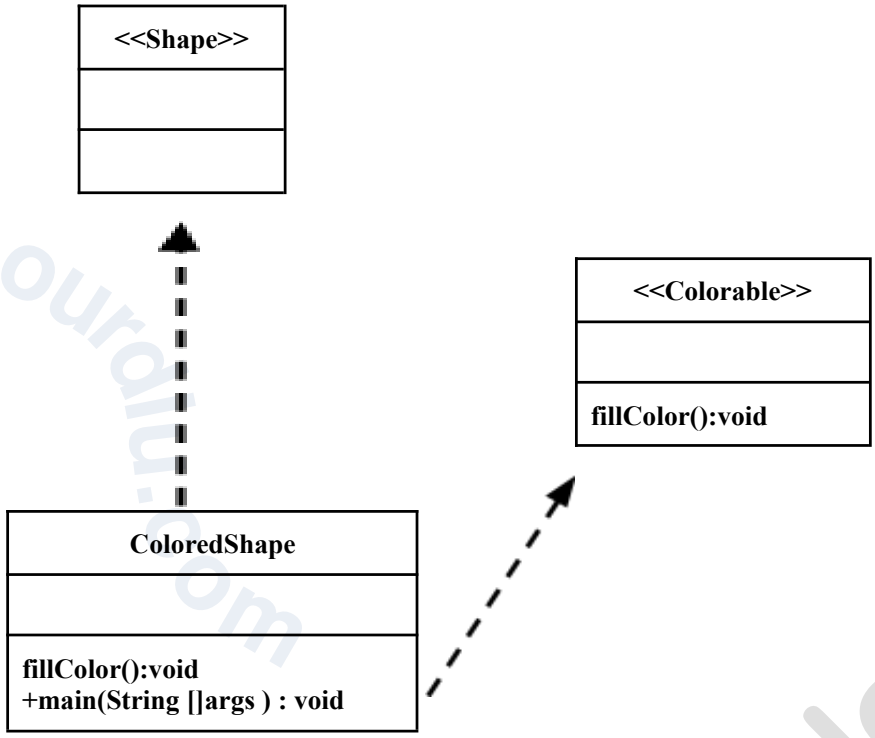
Class1:
public class StudentTest{
public static void main(String [] args){
Student s1 = new Student();
System.out.println(s1.getName());
 	
Student s2 = new Student("Elizabeth");
System.out.println(s2.getName());
 	
Student s3 = new Student("Teylor");
System.out.println(s3.getName());
System.out.println(Student.numberOfStudents); }}
	No Name
	Elizabeth
	Teylor
	3

Class2:
public class StudentSetNameTest {
public static void main(String[] args) {
Student s = new Student();
System.out.println(s.getName());
s.setName("Anabia");
System.out.println(s.getName()); }}
	No Name
	Anabia

You are given the following two Java programs that use a Student class.
Construct the **Student** class so that both programs produce the expected outputs shown in the right column.

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	c)	 **Translate** the above class diagram into a proper JAVA code. **Expected Output:** Fill the shape with color.	**3**	
2.	**a)**	**Create** an abstract class **Instrument** with two abstract methods: **play()** and **adjust()**. The class also has one concrete method: **compose()**. Then, create subclasses **Guitar, Keyboard**, and **Violin** that implement the necessary methods from th**e Instrument** class. Finally, in a **TesterClass** Create instance(object) of every class and invoke(call) every method on each object. The output should display the corresponding messages for each method call, as follows: **Guitar Class:** In the playing method of Guitar Adjusting the strings of Guitar Composing music for Guitar **Keyboard Class:** In the playing method of Keyboard Adjusting the keys of Keyboard Composing music for Keyboard **Violin Class:** In the playing method of Violin Adjusting the strings of Violin Composing music for Violin	**12**	CLO-4 *Level-6*
	b)	**Develop** a Java program that asks the user to input two integers and divides the first number by the second. You must use nested try-catch blocks to handle the following cases: 1. If the user enters a non-integer input, catch the InputMismatchException and display: ● "Invalid input! Please enter integers only." ● If the input is correct, print "Input is correct." 2. If the user enters zero as the divisor, throw and handle a custom exception named DivideByZeroException that displays: ● "Custom Exception: Division by zero is not allowed." ● If both integers are valid and the divisor is non-zero, print the result of the division. 3. Finally, the program should always print: "Program terminated." regardless of any exception. All exceptions must be handled using **a single pair of nested try-catch blocks** — one outer try for input mismatch and one inner try for division and custom exception.	**8**	

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