Assignment-2.1 for Generics and Collections (Part 1)

Subject: CSW2 (CSE 3141)
Session: Jan to May 2025
Branch: CSE
Section: All
Course Outcomes: CO1

Learning Levels: Remembering (L1), Understanding (L2), Application (L3), and Analysis (L4).

Q no.	Questions	Learning Levels
Q1.	Write a program to create a **Student** class with the following attributes: **name**, **rollNumber**, and **age**. The **rollNumber** should be designed to accept both integers and strings. Additionally, implement a driver class to create Student objects and invoke relevant methods.	L1, L2
Q2.	Write a program to create a **Book** class with the following member variables: **bookId**, **bookName**, and **price**. Implement the appropriate constructor and methods for this class. Additionally, create a driver class to: i. Instantiate two **Book** objects. ii. Compare the books based on their **price**. iii. Print the details of both books. **Note:** Override the **toString()** and **equals()** methods.	L2, L3
Q3.	Write a program to create a **Car** class with the following member variables: **model**, **color**, and **speed**. Implement the appropriate constructor and methods for this class. Additionally, create a driver class to: i. Instantiate two **Car** objects. ii. Compare the cars based on their **speed**. iii. Print the details of the car with the greater speed. **Note:** Implement the **Comparable** interface and override the **compareTo()** method.	L3, L4
Q4.	Write a program to create a **Student** class with member variables name, **rollNumber**, and **totalMark**. The program should allow the creation of an array of **Student** objects and implement a linear search to find a specific student in the array. Additionally, the **Student** class should implement the **Comparable** interface by overriding the **compareTo()** method to facilitate comparisons between student objects.	L2, L3
Q5.	Write a program to create a **Student** class with member variables **name**, **rollNumber**, and **totalMark**. The program should create an array of **Student** objects and sort them using the **Bubble Sort** algorithm based on their roll numbers.	L3, L4

	Note: Implement the **Comparable** interface and override the **compareTo()** method for comparison.	
Q6.	Write a program to create an **Animal** class with member variables **name**, **color**, and **type** (indicating whether the animal is a **pet** or **wild**). Override the **hashCode()** method to generate a unique identifier for each object. Then, create multiple **Animal** objects and print their hash codes.	L2, L3
Q7.	Write a program to create a **Student** class with member variables **name**, **rollNo**, and **age**. The program should allow the creation of an array of **Student** objects and implement sorting based on **rollNo** and **age** in the driver class. The sorted student arrays should be printed separately. Additionally, the program should utilize the **Comparator** interface by overriding the **compare()** method to enable custom comparisons for sorting.	L3, L4
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