**CAT-1 LAB (11 April 2023) L11 + L12**

**ITA5004 Lab**

**1.** You are working for a travel company that needs a program to manage tour packages. Create a Java program that uses inheritance and abstract classes to create a hierarchy of tour packages.

- The travel company needs a program to manage different types of tour packages, such as adventure tours, cultural tours, or luxury tours.
- Create an abstract class "TourPackage" that defines the common properties and methods of all tour packages. For example, it could have fields for location, duration, price, and a method for displaying package details.
- Create concrete subclasses for specific types of tour packages. For example, you could create a subclass, "AdventureTourPackage" that includes activities such as hiking or rafting, or a subclass "CulturalTourPackage" that includes visits to museums or historical sites.
- The program should allow users to add new tour packages, and update existing tour packages.
- The program should allow users to search for tour packages based on location or price. For example, the user should be able to search for all tour packages that include a visit to Paris or that cost less than $1000.

The program should prevent users from adding invalid tour packages or entering invalid data. The program should include error handling and display meaningful error messages to the user.

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**2.** You are working for a school that needs a program to manage student enrolment. Create a Java program that uses interfaces to define the enrolment system.

- Create an interface "Student" that defines the properties and methods of all students. For example, it could have methods for adding a new student, deleting a student, and searching for a student by name.
- Create an interface "Course" that defines the properties and methods of all courses. For example, it could have methods for adding a new course, deleting a course, and searching for a course by name.
- Create an interface "Instructor" that defines the properties and methods of all instructors. For example, it could have methods for adding a new instructor, deleting an instructor, and searching for an instructor by name.
- Create concrete classes that implement the interfaces. For example, you could create a class "StudentImpl" that implements the "Student" interface.
- The program should allow users to add new students, register for courses, and assign instructors to courses. The program should allow users to search for students, courses, and instructors by name or ID.

The program should prevent users from adding invalid data or entering duplicate data.
The program should include error handling and display meaningful error messages to the user.