Practice Worksheet: OOP Concepts, Exception Handling, and GUI Design in C++ and Qt

# Section 1: Basic Concepts of Object-Oriented Programming (OOP) in C++

1. What are the four main principles of Object-Oriented Programming? Briefly explain each.

2. Explain the difference between a class and an object with your own example.

3. Write a C++ program that defines a class `Book` with attributes title, author, and price. Include a constructor and a method to display the details.

4. How does inheritance promote code reusability? Illustrate with a simple example using a base class `Vehicle` and a derived class `Car`.

5. What is polymorphism? Differentiate between compile-time and run-time polymorphism.

# Section 2: Exception Handling in C++

6. What is the importance of exception handling in programming?

7. What is the role of `try`, `catch`, and `throw` in C++ exception handling?

8. Write a C++ program to input marks of a student. Throw an exception if the marks are not between 0 and 100.

9. What does `e.what()` return when catching exceptions using the standard library? Give an example.

# Section 3: GUI Design with Qt Design Studio / Canva

10. What is Qt and how is it used in GUI application development?

11. Design a GUI layout for a Student Registration Form using Qt Design Studio or Canva. Include the following fields:

- Name  
 - Email  
 - Age  
 - Gender (Radio Buttons)  
 - Submit Button

13. (Practical Task) Create a basic Qt project that includes a form to input and display student data using appropriate widgets.