

UML Class Diagrams

Practical Work Report

Your Name

UM6P

October 16, 2025

Contents

1	Introduction	2
2	Exercise 1: Library and Laptop Systems	2
2.1	Library Management System	2
2.2	Laptop System	2
3	Exercise 2: Restaurant Management System	4
4	Exercise 3: Academy Course Management System	5
5	Exercise 4: Flight Booking System	6

1 Introduction

This report presents UML class diagrams for four different systems as part of a practical exercise in object-oriented modeling. Each diagram illustrates the structure, relationships, and multiplicities between classes in various domains: library management, laptop components, restaurant operations, academy course management, and flight booking.

2 Exercise 1: Library and Laptop Systems

2.1 Library Management System

The library system models the relationship between libraries, books, members, and loans. Books are specialized into magazines and study books through inheritance.

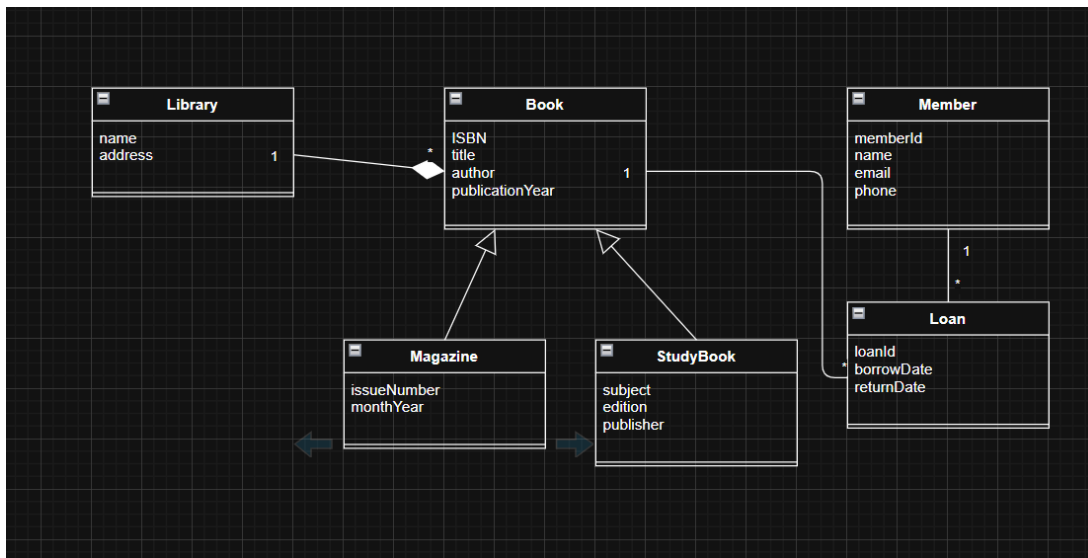


Figure 1: Library System Class Diagram

Key features:

- A library contains multiple books (composition relationship)
- Books are generalized into Magazine and StudyBook subclasses
- Members can borrow multiple books
- Each loan tracks the borrow and return dates

2.2 Laptop System

This diagram represents the composition relationship between a laptop and its components, as well as the optional ownership relationship.

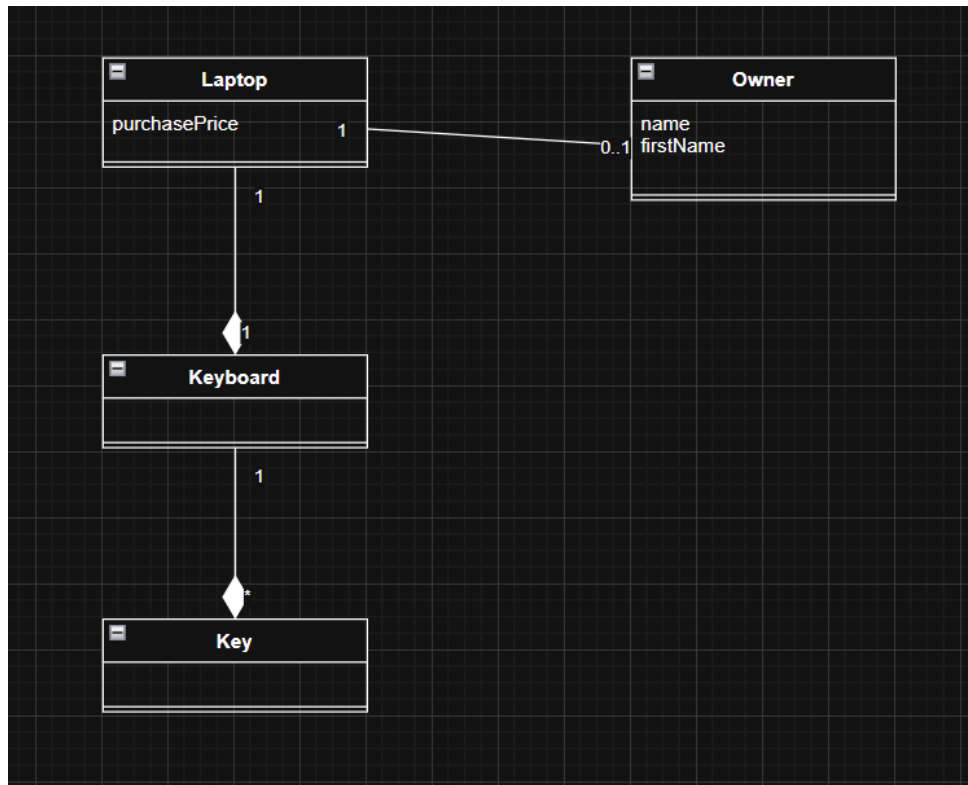


Figure 2: Laptop System Class Diagram

Key features:

- Strong composition: a laptop has exactly one keyboard
- A keyboard is composed of multiple keys
- Optional association: a laptop may have zero or one owner

3 Exercise 2: Restaurant Management System

The restaurant system manages ingredients, dishes, meals, tables, waiters, and customers. It includes an association class (MealDish) to handle the many-to-many relationship between meals and dishes.

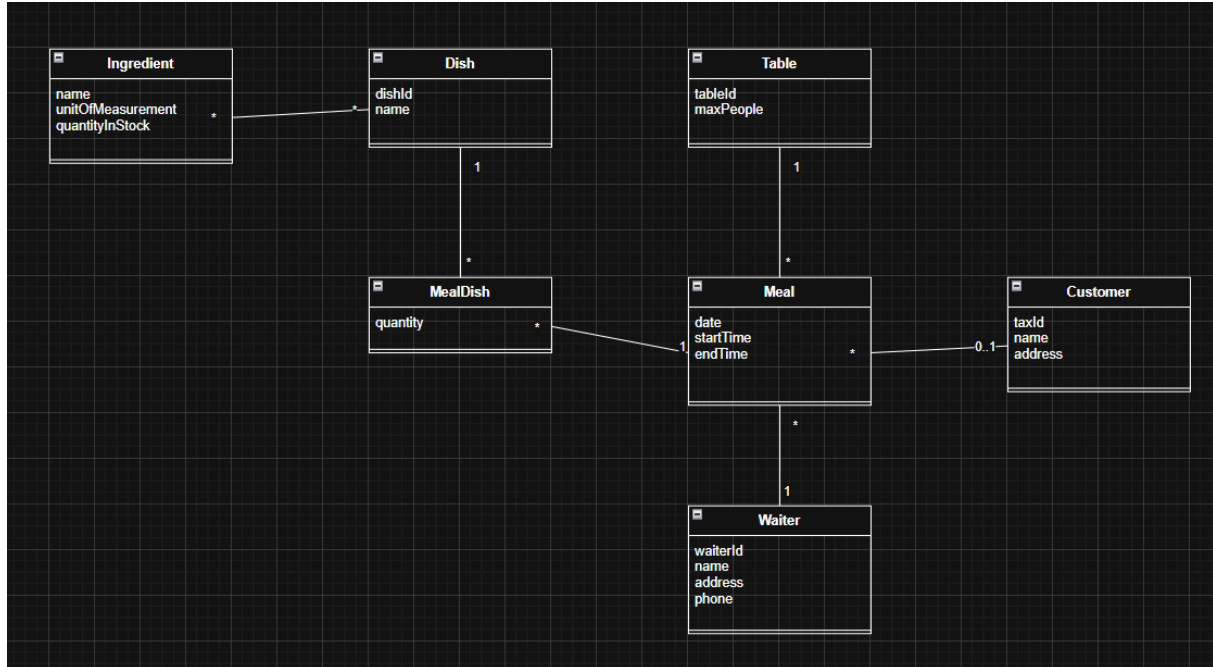


Figure 3: Restaurant System Class Diagram

Key features:

- Many-to-many relationship between Ingredient and Dish
- Each meal is associated with one table and one waiter
- MealDish association class tracks quantity of each dish in a meal
- Optional customer information for billing purposes

4 Exercise 3: Academy Course Management System

This system models the organization of an academy with colleges, departments, teachers, students, and courses. It demonstrates inheritance with an abstract Person class and uses an association class for student enrollment.

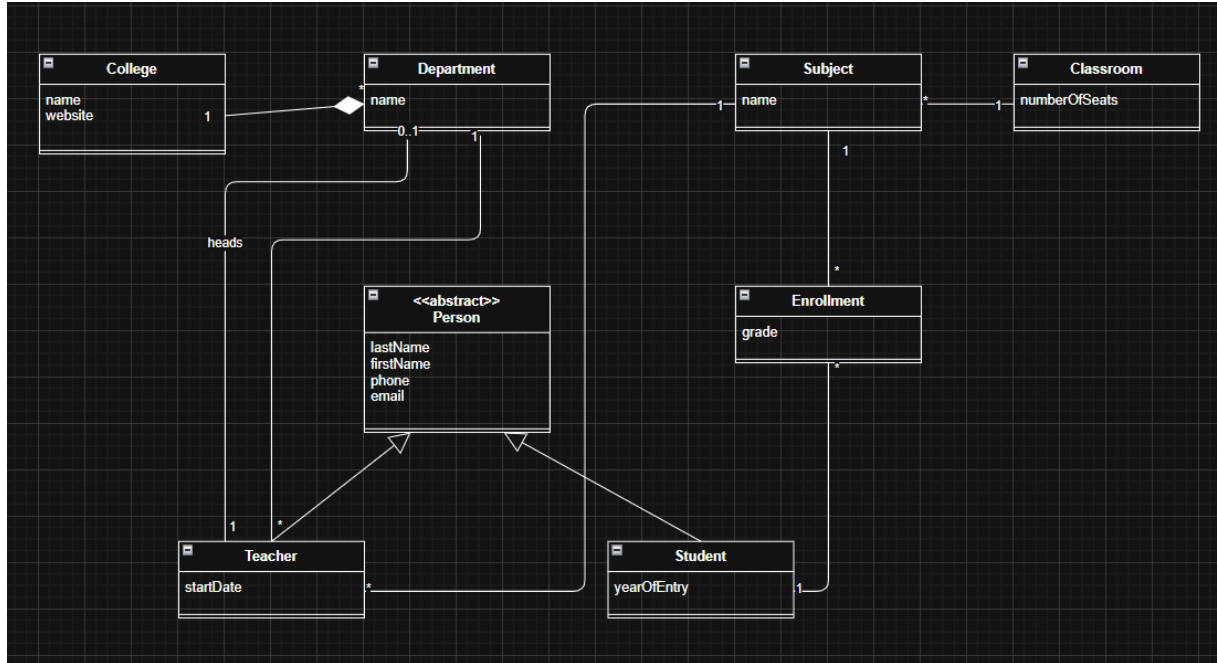


Figure 4: Academy System Class Diagram

Key features:

- Abstract Person class with Teacher and Student subclasses
- Departments belong to colleges and have a designated head teacher
- Teachers teach one subject; subjects are taught by multiple teachers
- Enrollment association class links students to subjects with grades
- Each subject takes place in one classroom

5 Exercise 4: Flight Booking System

The flight booking system manages flight reservations through an agency, including airlines, flights, airports, stopovers, and cities.

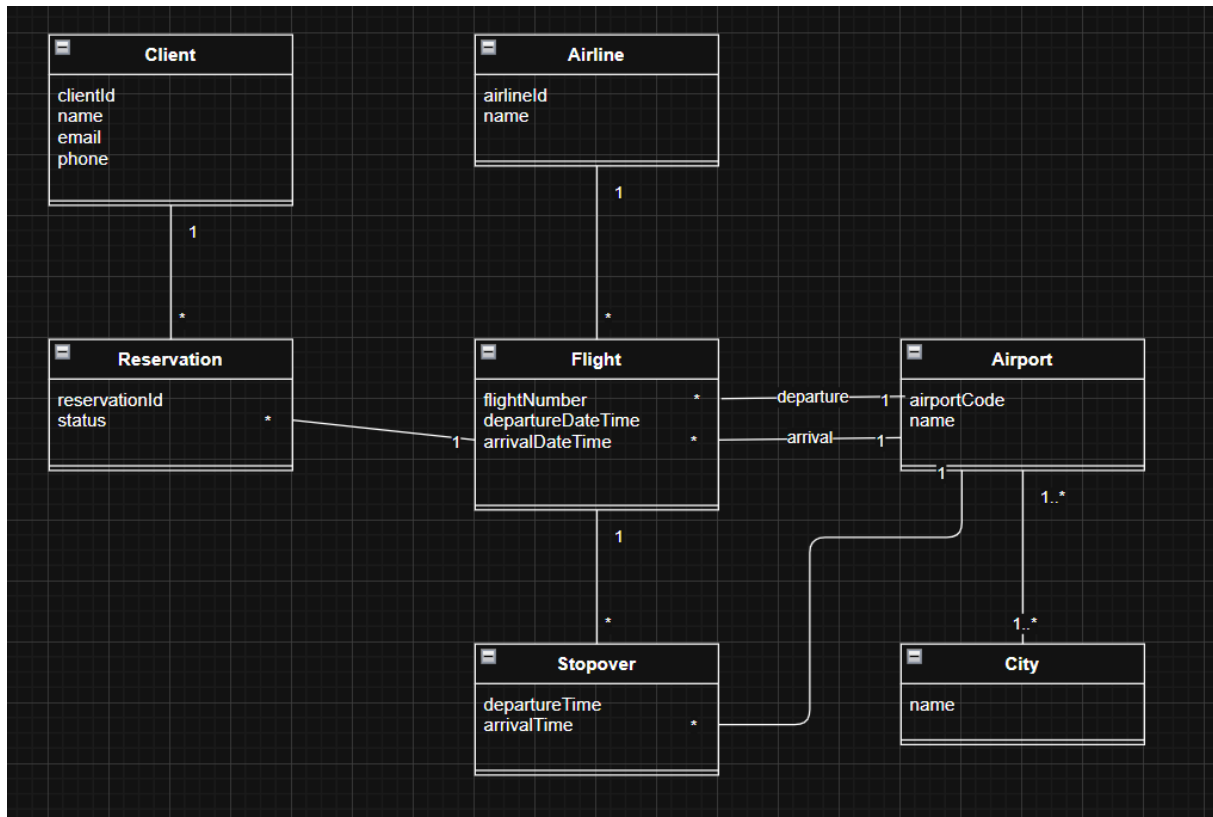


Figure 5: Flight Booking System Class Diagram

Key features:

- Clients book multiple flights through reservations
- Each reservation is for one flight and one passenger
- Flights have departure and arrival airports (role-based associations)
- Flights can include multiple stopovers at different airports
- Airports serve multiple cities (many-to-many relationship)