SANTA CLARA UNIVERSITY
Computer Engineering Department

COEN 160: Lab assignment 5
Application for a Physical Therapy Clinic

In this assignment, you will develop an application for managing a physical therapy clinic. The clinic hires a fixed number of therapists who are working at any time during business hours. The therapists perform treatments from a predefined list. Each treatment is performed for a single customer, on a date for some time duration, for one room, and by one therapist. The software must be able to schedule appointments by finding the available time slots for a room, as well as available time slots for a therapist. Some customers may have a preference for a particular therapist that must be noted. The system must also record the revenue from each treatment that must be performed.

Your system must have the following classes:

1. *PhysicalTherapyClinic*: This class contains general information about the clinic and is the entry point into the application. It contains methods to store and retrieve the name and location of the clinic, and the name and phone number of a contact person. Other methods provide the following functionality:
   - register a new customer
   - add a new therapist
   - list of customers undergoing treatment at the clinic
   - list of therapists employed at the clinic
   - list of treatments provided by the clinic
   - list of rooms and their bookings
   - available time slots for a given therapist
   - total hours worked by a given therapist
   - appointment schedule for a given customer
   - billing information for each customer (amount paid and amount pending)

2. *Customer*: This class contains information about each customer. It contains methods to store and retrieve information about each customer such as customer id, name, address, contact number, age, gender, symptoms, physician diagnosis, insurance, payment information, preferred therapist, and treatment.

3. *Therapist*: This class contains information about each therapist such as therapist id, name, address, contact number, age, credentials, and specialization.

4. *Appointment*: This class contains information about each appointment. It stores the therapist id, client id, the room, day and time of appointment, and the treatment delivered.

5. *Treatment*: This class stores information about the name and types of treatments provided, detailed information about each treatment, prognosis and duration, and cost. It is the superclass of various other subclasses such as:

- Ultrasound
- Traction
- Massage
- Heat therapy
- Exercise
- Light Therapy
- Hydrotherapy

6. *Billing*: This class stores payment information about each customer such as the amount due, amount paid, date, payment type.

Deliverables

Part 1: Design the classes using UML diagrams and implement the code for each class.

Test each of the following use cases:

- Adding two therapists to the system
- Registering two new customer to the system
- Creating an appointment schedule for each user as follows:
  customer 1 weekly massage by therapist 1 on Tuesdays 6-7 pm in room #1
  customer 2 receives heat therapy and traction twice a week from therapist 2 on Mondays and Fridays 9 am to 10 pm in room #5
- The cost of a massage session is $60
- The cost of heat therapy session is $45
- The cost traction is $50
- Calculate the total amount due for each customer each week
- Show the available slots for both therapists
- Display the room availability

Note: You will complete parts 2 and 3 in a future assignment. You must complete problems 2 and 3 of assignment 4 on graphical user interfaces before starting this part.

Part 2: Develop a Graphical User Interface

Design and implement a graphical user interface with a menu and menu items to implement the function. Create a panel for each of the following :

- Register a new customer : Create a form with fields where the user can enter the personal information of the customer. Clicking on the Add button, adds the details to the system. (The information will be stored in a file or database in Part 3).
- Add a new therapist : Create a form with fields where the user can enter the personal information of a therapist. Clicking on the Add button adds it to the system.
- Add a new booking : Create a form with fields where the user can schedule a new appointment. The form should contain fields to enter the id of the therapist, id of customer, and the desired room and dates. If a room is already reserved or if the therapist is booked for those dates, it should display an error message.

The menu items should allow the user to retrieve the required information and display it in a table:
- Display a list of therapists
- Display a list of customers
- Display the appointment schedule for a given customer
- Display a list of rooms
- Display the total hours worked by a given therapist
- Display the availability of a given therapist
- Display the billing information for a client.

Part 3: Store the information in a file (serialization).

The data entered by the user in the system in Part 2 is not persistent and is lost when the application is closed. To make the data persistent, you can use serialization so that data is stored in a file before the application is closed and the restored from the file when the application is restarted. Add a button called Serialize that stores the contents of all the data structures in a file when it is clicked, and when the application is opened again, read the data from this file into the data structures.