**COEN 244 (Winter 2020) - Assignment 4**

**Deadline: March 16 by 11:59PM**

**Type: Group Assignment**

**Weight: This assignment is worth 5% of your final grade**

**Graduate Attribute: Design (Introductory Level)**

**IMPORTANT:**

* Add the name and student ID of both partners of a group in each file.
* For each class that you create you need to separate the specification of the class from its implementation by using header files. You need to have a driver program that tests all the classes. Make sure that you submit with your answer both the .h and .cpp files for each class.
* Compress the files using zip or other tools.
* Submit the zip file on Moodle. Assignments sent by email won’t be corrected.
* No late submission policy.

**Hospital Management System**

We would like to build a software system for the management of a hospital. The hospital serves two types of patients referred to as outpatients and inpatients. All patients have a unique id and a name.

An outpatient will have an appointment for the present day with one of the doctors. Hospital charges a fixed fee for each visit of an outpatient. More specifically, an outpatient has an appointment date (class Date), an appointment time (Time), a hospital charge (double), and the doctor who provided treatment (class Doctor)

An inpatient is a patient who is admitted to the hospital and assigned a bed. If there are no available beds, an inpatient cannot be admitted. Hospital charges inpatients a daily rate for the duration of their stay in the hospital. An inpatient has an admission date (Date), a discharge date (Date), the doctor who provided treatment (Doctor), the bed number (int), and a daily charge (double).

The system also keeps track of track of the beds of the hospital. A bed has a unique id and a flag indicating if the bed is available or not.

In addition, the system keeps track of the doctors. A doctor is identified with a medical license number (string), name (string), and a specialty (e.g., orthopedist, pediatrician, etc.) (string). A doctor has also a list of patients he or she has treated.

Finally, you need to create a class Hospital that keeps track of inpatients, doctors, and beds. Assume that the bed capacity is 500. The maximum number of doctors is 100. Note that the maximum number of inpatients is the same as the bed capacity (i.e., 500).

Questions:

1. Create classes Time and Date to be used as types for some data members
2. Create class Person that will serve as a base class for the other classes. Person must be abstract
3. Create class Doctor as a derived class of Person
4. Create classes InPatient and OutPatient as derived classes of Person
5. Create class Bed
6. Create class Hospital
7. Test the system by creating an object of Hospital, objects of InPatient, OuPatient, Bed and Doctor and by testing the various functionalities of the system including:

* Add Doctor, InPatient and Bed objects to Hospital object
* Assign a Doctor to InPatient and OutPatient
* Assign a Bed to an InPatient
* List all InPatients of a Hospital
* List all Doctors of the hospital
* Etc.

Important Assumptions:

* The objects should be created using dynamic memory allocation. When a function is implemented, all the relevant data structures should be updated.
* Print function of a class prints all the data members of that class including inherited members.
* In pointer arrays, when an object that a pointer is pointing to is removed, then the nullpointer should be stored at that location. In pointer arrays addresses of objects may not be sequentially stored.