Advanced Object Oriented Programming and Design
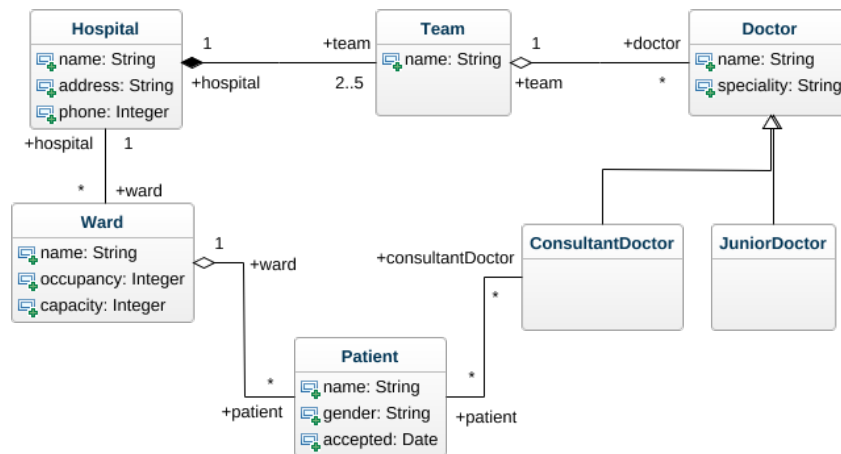
Theoretical Homework 2

Abraham Murciano and Daniel Klein

November 1, 2020

Question A

Below is a UML class diagram which describes the relationships between different entities for a hospital, according to the specifications given in the question paper.

Question B

The relationship between Hospital and Team is a composition, because there is ownership, meaning a team can belong to at most one hospital, and there is also existence dependance, meaning if a hospital is deleted, so are its teams.

Question C

The relationship between Team and Doctor is an aggregation, since there is ownership, meaning a doctor can belong to at most one team at any given time, however there is no existence dependance, since a team can be deleted without its doctors.

Question D

The relationship between Doctor and ConsultantDoctor is one of inheritance, since a consultant doctor is a type of doctor.

Question E

The relationship between Doctor and JuniorDoctor is one of inheritance, since a junior doctor is a type of doctor.

Question F

There is no direct relation between Team and ConsultantDoctor. However, since ConsultantDoctor extends the class Doctor, it inherits the aggregation relation described in question C.

Question G

The relationship between Hospital and Ward is a bidirectional association, since we are told that a ward also has a pointer to its hospital. A hospital may have many wards, but obviously a ward can be part of only one hospital.

Question H

The relationship between Ward and Patient is an aggregation, since there is ownership, because a patient cannot be in two wards simultaneously. However there is no existence dependance.

Question I

There is no direct relation between Team and Patient.

Question J

There is no direct relation between Doctor and Patient, since only the sub-type
ConsultantDoctor can treat patients.

Question K

The relationship between ConsultantDoctor and Patient is a many to many
bidirectional association. This is because a consultant doctor can treat many
patients and a patient can be treated by any number of consultant doctors.