Class diagram

![Class diagram for the Hospital System initial structural model](image)

**Class descriptions**

**Class** Ward  
A hospital ward

**Attributes**

- **name**  
The unique name of the ward
- **type**  
Whether the ward is for male or female (M or F) patients
- **capacity**  
The maximum number of patients that can be on the ward at any one time
- **/numberOfFreeBeds**  
The number of free beds on the ward

**Class** Patient  
A patient in the hospital

**Attributes**

- **name**  
The name of the patient
- **/sex**  
The sex (M or F) of the patient
- **dateOfBirth**  
The date of birth of the patient
- **/age**  
The age of the patient in years
**Class** Team

**Attributes**
- code: The unique code of the team

**Class** Doctor

**Abstract:** generalises JuniorDoctor and ConsultantDoctor

**Attributes**
- name: The name of the doctor

**Class** JuniorDoctor

**Specialises** Doctor

**Attributes**
- grade: The grade (1, 2 or 3) of the junior doctor

**Class** ConsultantDoctor

**Specialises** Doctor

**Attributes**
- None

**Invariants**

1. The sex attribute of any Patient object has the same value as the type attribute of the linked Ward object.
2. For each Patient object, the value of its age attribute is equal to the difference (in years) between the current date and the value of its dateOfBirth attribute.
3. For each Ward object, the value of its numberOfFreeBeds attribute is equal to the value of its capacity attribute minus the number of Patient objects to which it is linked.
4. Each Team object is linked to at least one JuniorDoctor object for which the grade attribute has a value of 1.
5. The ConsultantDoctor object linked to a Team object via isHeadedBy is linked to the same Team object via contains.
6. The ConsultantDoctor object linked to any Patient object via isResponsibleFor is linked via isHeadedBy to the Team object to which that Patient object is linked.
7. If aPatient is any Patient object, then any Doctor object linked to aPatient is also linked to the Team object which is linked to aPatient.