

CS990 DATABASE FUNDAMENTALS
COURSEWORK ASSIGNMENT

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The Task

Requirements

- List **entities** w/ description
- List **attributes** w/ underlined **identifier**
- List **relationships**, for each:
 - Relationship name
 - Names of entities related
 - Degree of relationship
 - Optionality of relationship
- List **assumptions**
- Enhanced Entity Relationship Diagram

Scenario Key Words & Phrases

- ‘An’ *in-patient*
- ‘A’ *hospital*
- ‘A’ *patient record number*
- ‘Details of’ *his/her* (person), *name, address, DoB, allocated GP*
- ‘Patients are assigned to a single’ *ward*
- ‘Each ward identified by’ *ward number, name*
- ‘Some wards may have 0 patients assigned to them’
- ‘Each ward staffed by **at least** one’ *nurse*
- ‘In a ward, a designated nurse is in charge of the ward and other nurses’
- ‘Every patient allocated one’ *consultant*
- ‘Each consultant has recorded’ *specialization*
- ‘And leads team of’ *junior doctors*
- ‘Who may be’ *registrars* ‘or’ *housemen*
- ‘All’ *doctors* (both consultant and junior)
- ‘Have’ *staff numbers, names*
- *Teams* identified by’ *team code, N. doctor members*
- ‘Doctors may treat many patients’
- ‘Each patient may be treated by many doctors, always members of same team as consultant responsible for patient’
- ‘One or more’ *drugs* ‘are prescribed to patient’
- ‘Drugs identified by’ *name, code number*
- ‘Also have’ *date, dosage, prescribing doctor* ‘for each’
- ‘Only doctors prescribe drugs’

1 Preliminaries

1.1 Entities & Attributes

ENTITIES	DESCRIPTION	ATTRIBUTES & IDENTIFIERS
In-Patient	A patient treated in only one ward of a hospital	<u>Patient Record No.</u> Gender (? 'His/her') Name Address DoB Allocated GP Ward
Hospital	An institution in which patients are treated in associated wards, doctors (consultant, junior (reg., house.)) and nurses are employed to treat and survey patients and prescribe drugs etc.	N/A
Ward	A segment of a hospital to which patients are assigned and treated in	<u>Ward No.</u> Name
Nurse	An employee of a hospital who staffs wards and leads other nurses	<u>Staff No.</u> ²
Consultant (Doctor)	A superior (Tier 1) employee of a hospital who consults patients, has a specialization and leads a team of junior doctors	<u>Staff No.</u> Name
Team	A collection of junior doctors lead by a consultant	<u>Team Code</u> N. Doctor Members
Junior Doctor (Doctor)	An inferior (Tier 1) employee of a hospital who is either a <i>registrar</i> or a <i>houseman</i> (with identical attributes) and is part of a team lead by a consultant, many of which may treat a patient if they are in the same consultant's team	<u>Staff No.</u> Name
Drug	An item prescribed to in-patients by only doctors, not nurses, to attempt to provide aid to in-patients	<u>Drug Code</u> Name Date Dosage Prescribing Doctor
Nurse Leader ¹	The leader of a set of nurses and the associated ward if the ward has more than one nurse. Simplifies relationship between nurses and wards	<u>Staff No.</u> ²

Prescription ¹	An item used to assign drugs to patients and simplify the relationship between teams of junior doctors and drugs, and consultants and drugs.	<u>Prescription Code</u>
¹ : New Entity for Relationship		
² : Surrogate Key		

Table 1.1: Entities & Attributes

1.2 Relationships

RELATIONSHIP	ENTITIES	DEGREE	OPTIONALITY
Has	Hospital : Ward	1:N	Obligatory
Has	Ward : In-Patient	1:N	Non-Obligatory
Leads	Nurse Leader : Ward	1:1	Obligatory
Staffs	Nurse : Ward	1:N	Non-Obligatory
Leads	Nurse Leader : Nurse	1:N	Non-Obligatory
Is Assigned To	Consultant : In-Patient	1:N	Non-Obligatory
Treats	Team : In-Patient	1:N	Non-Obligatory
Leads	Consultant : Team	1:1	Obligatory
Contains	Team : Junior Doctor (<i>Reg./House.</i>)	1:N	Obligatory
Is Prescribed	In-Patient : Prescription	1:1	Obligatory
Prescribes	Consultant : Prescription	1:N	Non-Obligatory
Prescribes	Team : Prescription	1:N	Non-Obligatory
Contains	Prescription : Drug	N:M	Obligatory

Table 1.2: Relationships

1.2.1 Commentary

- A hospital must have many wards
- A ward may have many in patients but may also have as little as 0
- A nurse leader heads a ward
- Nurses staff wards but 0 nurses technically may staff a ward as if there is just 1, it is a ‘nurse leader’, not a ‘nurse’
- A nurse leader leads other nurses however, may lead 0 if it’s just them on the ward
- A consultant is assigned to an in-patient meaning every in patient must have a consultant but some consultants may not have an in-patient. Some may have many
- A team (of junior doctors) is assigned to an inpatient meaning every in-patient must have a team (only treated by junior doctors from that team), but perhaps not every team is assigned in-patients, so may have 0
- A consultant leads one team
- Each team must contain a set of junior doctors
- Each in-patient is prescribed a prescription

- A consultant may prescribe many prescriptions if they have many patients, but they may also prescribe 0
- A team may prescribe many prescriptions if they have many patients, but they may also prescribe 0
- Each prescription contains one or more drugs and each drug may appear in many different prescriptions, however some may not appear in any prescriptions

1.3 Assumptions & Explanations

- Consultants and Junior Doctors are both *Doctors* however, have different **attributes** and are therefore listed as separate **entities**
- Registrars and Housemen are both *Junior Doctors* however, have identical *attributes* and are therefore listed as the same **entity**
- All wards may have no patients in a perfectly healthy world. However, for this example it is stated that at least some wards are populated, making the relationship non-obligatory
- There are enough nurses for at least one-per-ward
- If a ward is only staffed by one nurse, they may still be considered the ‘leader’ of the ward however, they lead no other nurses making the Nurse : Nurse relationship non-obligatory
- There may not be enough patients for all the consultants to be assigned to one, making the relationship non-obligatory;
- Therefore, if a consultant isn't assigned a patient, as teams can only treat patients associated with their consultant, some junior doctors may treat no patients, making the relationship non-obligatory
- As patients can be assigned a minimum of one drug by a doctor, this may either be by a consultant or a junior doctor, making each respective relationship with drug non-obligatory
- There are enough junior doctors in the hospital for every consultant to be lead a team

2 Enhanced Entity Relationship Model (EERM)

