UNIVERSITY OF WESTMINSTER

5COSC020W DATABASE SYSTEMS

2022-2023 Tutorial 02

Conceptual Database Design – Enhanced Entity-Relationship Modelling

Tutorial 02 Exercise 01

ITDream is a start-up company that provides IT solutions to business organisations. It employs a team of highly trained members of staff who have a wide range of technical skills. For every IT solution that needs to be designed and developed, a project is created. Hence, the staff at ITDream work on a variety of different IT projects for which they utilise the skills they have at their disposal to create high-quality products. In order to monitor how projects are undertaken and to optimise the utilisation of skills in these projects, ITDream is seeking to design a database that keeps a record of all the IT solutions being designed and developed, all the projects that are undertaken, all the staff involved in these projects and all the skills that are used on specific projects. ITDream strongly insists on the fact that they need to be able to use the system to determine which skills are being used by which member of the team on which project.

Question 1.1.

Produce an **Entity Relationship Diagram (ERD)** to model the data architecture of ITDream using UML notations.

- To do this, identify the main **entities**, the main **relationships** between these entities and the **multiplicities (participation and cardinality)** for each relationship.
- Create your conceptual ERD using draw.io, export your ERD as a PNG and insert it below.

Question 1.2.

Customer Relationship Managers (CR Managers) are particular types of staff that plays a specific role at ITDream. They are responsible for locating clients and convincing them to use the services of ITDream. Specific data needs to be stored about them. Also, which CR Managers has located which client needs to be recorded.

Produce an **Enhanced Entity Relationship Diagram (EERD)** to improve the model of the data architecture of ITDream.

- To do this, consider whether it is appropriate to introduce the enhanced concepts of **specialization / generalisation** into the previously produced ERD.
- Create your conceptual EERD using draw.io, export your ERD as a PNG and insert it below.

Tutorial 02 Exercise 02

CoolUni is a University located in North London. It offers a certain number of undergraduate courses which consist of and share a certain number of modules between them. Some modules may also be taught on a stand-alone basis and not be part of a specific course. Students are registered on a course and take a certain number of modules. These modules are delivered by Full-time Lecturers and Visiting Lecturers. Some of these academic members of staff can manage a course but not more than one. They can also be responsible for one or more modules (i.e. be the Module Leader for one or more modules) or just teach on them. Some members of staff offer mentoring to their colleagues especially at an early stage of their employment with the University. For each module, lecturers recommend a textbook, and it is essential that a record is kept of which textbook is being recommended by which lecturer for which module.

Question 2.1.

Produce an **Entity Relationship Diagram (ERD)** to model the data architecture of CoolUni using UML notations.

- To do this, identify the main **entities**, the main **relationships** between these entities and the **multiplicities (participation and cardinality)** for each relationship.

- Create your conceptual ERD using draw.io, export your ERD as a PNG and insert it below.

Question 2.2.

Produce an **Enhanced Entity Relationship Diagram (EERD)** to improve the model of the data architecture of CoolUni.

- To do this, consider whether it is appropriate to introduce the enhanced concepts of **specialization / generalisation** into the previously produced ERD.

- Create your conceptual EERD using draw.io, export your ERD as a PNG and insert it below.

Tutorial 02 Exercise 03

HOSPIMAX is a large London hospital that provides care in a range of medical specialities. The hospital is organised in a number of departments, with every department specialised in a particular medical area (e.g. rheumatology, dermatology, immunology, infectious diseases, etc.). When arriving at the hospital, patients are given a room, which they share with other patients, located in a specific ward in the particular hospital department that will provide their care. There are different kinds of people working in this hospital and all have them have well-defined roles: doctors are responsible for patients (up to 25), managers look after a department, technicians oversee wards (up to two), to make sure that the equipment in the ward is maintained adequately, and nurses are assigned entire rooms in the ward to ensure that the patients staying in these rooms are well looked after. These roles are the only ones available at HOSPIMAX and a role cannot be shared by more than one staff.

Directly produce an **Enhanced Entity Relationship Diagram (EERD)** to model the data architecture of HOSPIMAX using UML notations.

- To do this, identify the main **entities**, the main **relationships** between these entities and the **multiplicities (participation and cardinality)** for each relationship.

- Then consider whether it is appropriate to introduce the enhanced concepts of **specialization / generalisation** into the previously produced ERD.

- Create your conceptual EERD using draw.io, export your ERD as a PNG and insert it below.