Module 2: Data Modeling

Lab: Identify Components in Entity Relationship Modeling

Exercise 1: Identify Entities

Task 1: Create a List of Suitable Entities

1. Examine the text of the brief.
2. On examination, extract the real nouns (those that refer to actors or actions in the application).
3. Use these real nouns to develop an initial list of suitable entities.
4. Preserve this list for later in the lab.

Task 2: Add Suitable Attributes

1. Take each entity from the initial list in turn.
2. For each entity, identify suitable attributes for it. Use the text in the brief you have been given to identify those pieces of information that are to be recorded for the various entities.
3. For each attribute, develop a suitable domain for its declaration.
4. Add these attributes to the entities in the list you developed in the previous task.
5. From the list of attributes, identify the candidate keys and primary keys. These will be those attributes that (either individually or in combination) uniquely identify instances of that entity.
6. Compare your list with **initial_entities.docx** in the **D:\Labfiles\Lab02\Solution** folder.

Exercise 2: Identify Relationships

Task 1: Create a List of Named Relationships

1. Take each entity in the model in turn.
2. Identify the relationships this has with other entities.
3. List and name these relationships.

Task 2: Draw an ERD Modeling the Entities and Relationships

1. Using the list of entities and relationships, draw an ERD showing each entity and the relationships between them.
2. Remember to name each relationship.
3. Do not forget about optionality and degree for each relationship.
4. Model these relationships by sharing keys. (Hint: use Primary Keys in one as Foreign Keys in another.)

5. Compare your model with the **initial_ER.docx** file in the **D:\Labfiles\Lab02\Solution** folder.
6. What problems do you see for modeling relationships with the model in its current form? (Hint: think about the degree of some of the relationships.)

Task 3: Resolve Any m:n Relationships

1. Identify any m:n relationships between entities in your model.
2. Resolve these relationships by creating an intersection entity, containing the Primary Keys of each entity involved in the original m:n relationship.
3. Compare your model with the **updated_diagram.xps** file in the **D:\Labfiles\Lab02\Solution** folder.

Exercise 3: Finalize Your Model

Task 1: Develop a List of Constraints and Assumptions

1. In the data brief, constraints can be identified by the verbs “must”, or “may”.
2. Assumptions are usually implicitly, rather than explicitly, stated and can be identified by examination of the text.
3. List the constraints and assumptions.

Task 2: Finalize the ERD

1. Update your model to include the constraints and assumptions that you identified in the previous task.
2. Compare your model with the **final_ER.docx** in the **D:\Labfiles\Lab02\Solution** folder.

Lab Review

Question: How do you identify entities?

Answer Entities can be identified as nouns in the data brief.

Entities represent real-world objects about which information is required to be stored. An entity can represent a physical object, such as a person, place, or a thing; or it could represent a virtual object, such as an event.

Question: What is a relationship?

Answer Relationships exist between entities in a data model. They represent how one entity is related to another at the level of their respective attributes.

In a conceptual model, a relationship can exist between two entities. It is a named, meaningful link between entities. It represents how the attributes in one entity are related to those in the other, and can be thought of as a verb phrase that links the two entities to form a sentence. For example:

- STUDENT attends COURSE PRESENTATION.
- COMPANY sponsors STUDENT.
- COURSE PRESENTATION is one presentation of COURSE TYPE.