

Laboratory work 4

1.

- a) What are the main phases in the database design? What is done on each development phase?

The process of moving from an abstract data model to the implementation of the database proceeds in two final design phases.

In the **logical-design phase**, the designer maps the high-level conceptual schema onto the implementation data model of the database system that will be used. The implementation data model is typically the relational data model, and this step typically consists of mapping the conceptual schema defined using the entity-relationship model into a relation schema.

Finally, the designer uses the resulting system-specific database schema in the subsequent **physical-design phase**, in which the physical features of the database.

The physical schema of a database can be changed relatively easily after an application has been built. However, changes to the logical schema are usually harder to carry out, since they may affect a number of queries and updates scattered across application code. It is therefore important to carry out the database design phase with care, before building the rest of the database application.

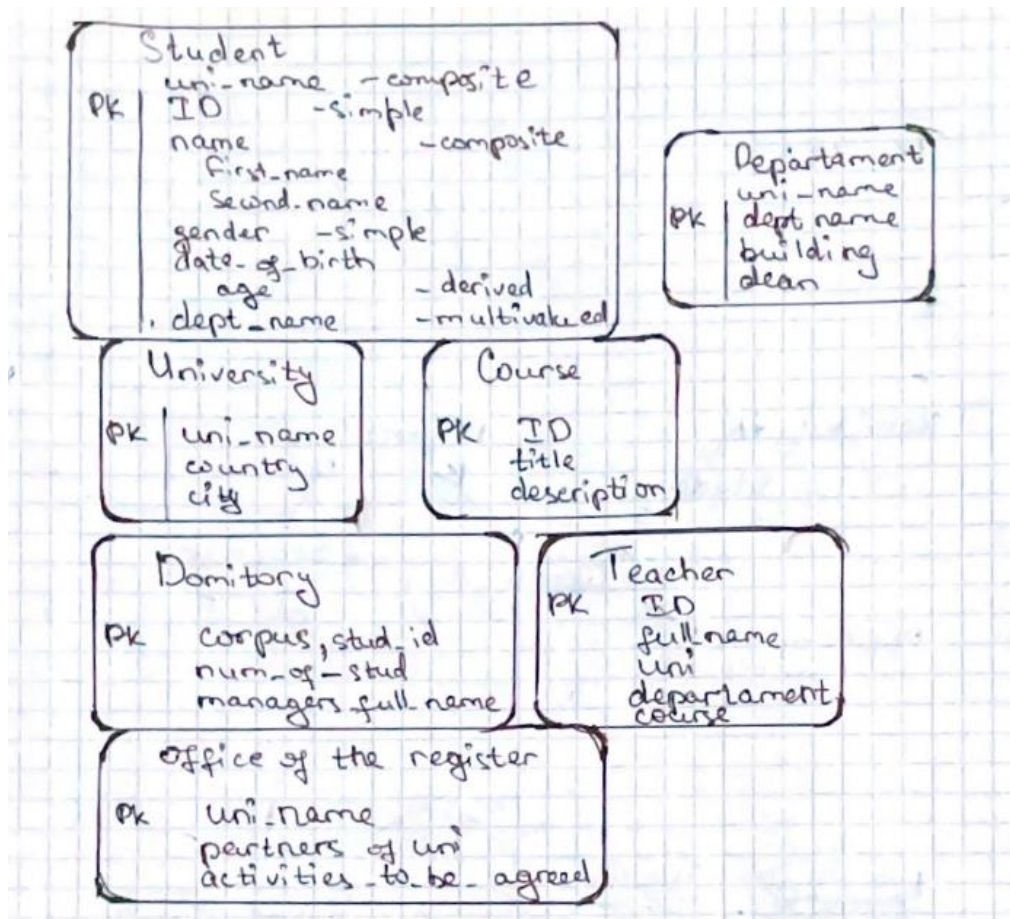
- a) What is the entity-relationship **(ER) data model**?

The entity-relationship (E-R) data model was developed to facilitate database design by allowing specification of an enterprise schema that represents the overall logical structure of a database. The E-R model is very useful in mapping the meanings and interactions of real-world enterprises onto a conceptual schema. Because of this usefulness, many database-design tools draw on concepts from the E-R model. The E-R data model employs three basic concepts: entity sets, relationship sets, and attributes. The E-R model also has an associated diagrammatic representation, the E-R diagram.

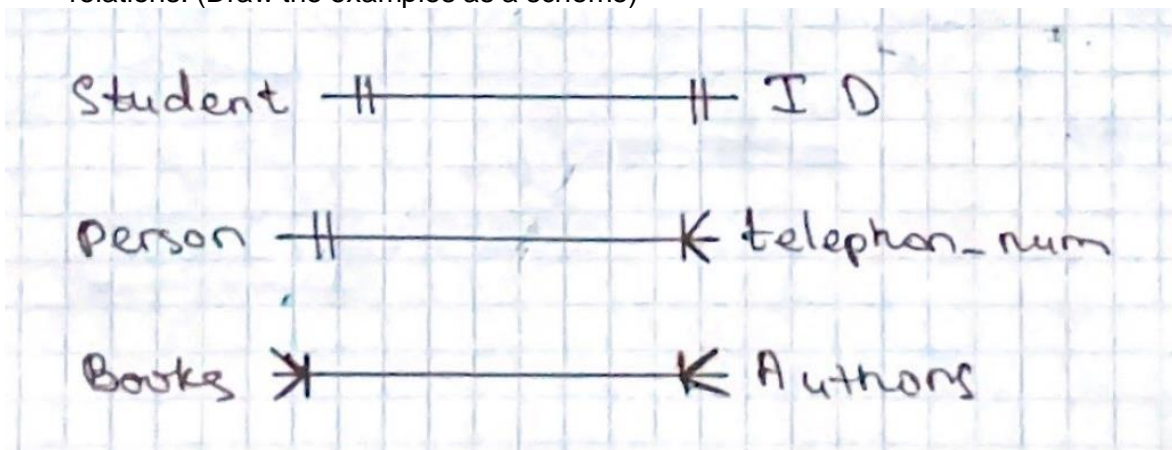
2.

- a) Create entity “**Student**” with at least **5 attributes** (One for each type of attribute: **simple, composite, derived, multivalued**)

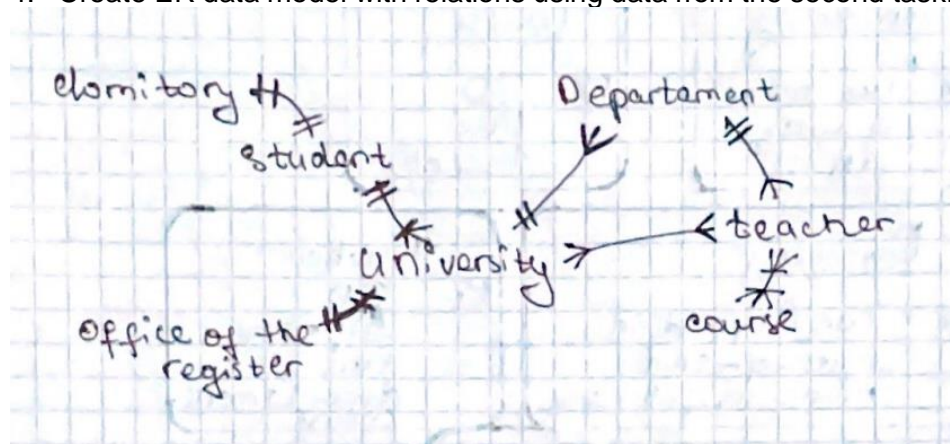
- b) Create entities “**University**”, “**Course**”, “**Dormitory**”, “**Teacher**”, “**Office of the Registrar**” with at least 3 attributes each. (Entity types should be correct on data model)



3. Give examples for **one-to-many**, **one-to-one**, **many-to-many**, **many-to-one** relations. (Draw the examples as a scheme)



4. Create ER data model with relations using data from the second task.



5. Create ER data model for IT company. (At least 5 entities and 8 relations)

