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 carryout, 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)

	Student
PK	ID
	Name (FirstN, LastN)
	Date of Birth
	Uni Code
	Departament
	Age (derived)

b)

	Office of the Registrar
PK	Uni code
	Partners Of Uni
	Activities to be Agreed

	Dormitory
PK	corps
	Student ID
	Manager Name

	Department
PK	deptname
	Dean
	Specialization

	University
PK	Uni Code
	Name
	Location

	Course
PK	Course ID
	Title
	Department
	Credits

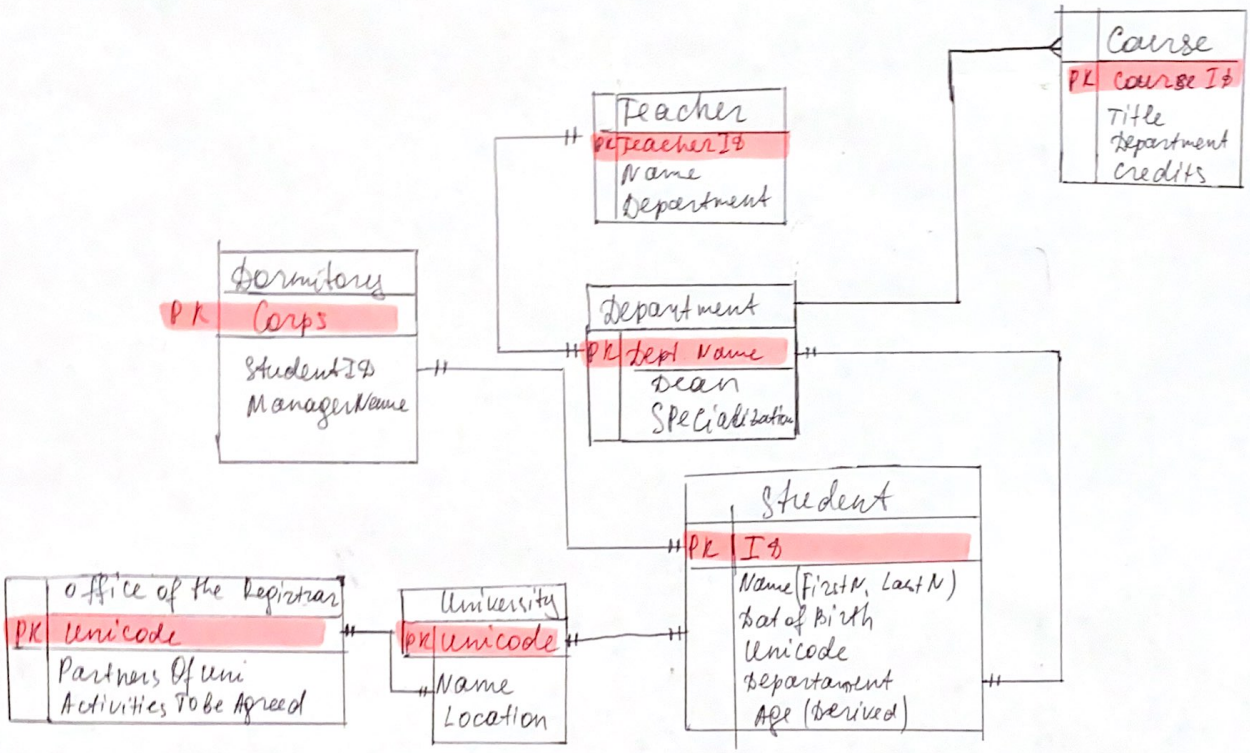
	Teacher
PK	Teacher ID
	Name
	Department

№ 3.

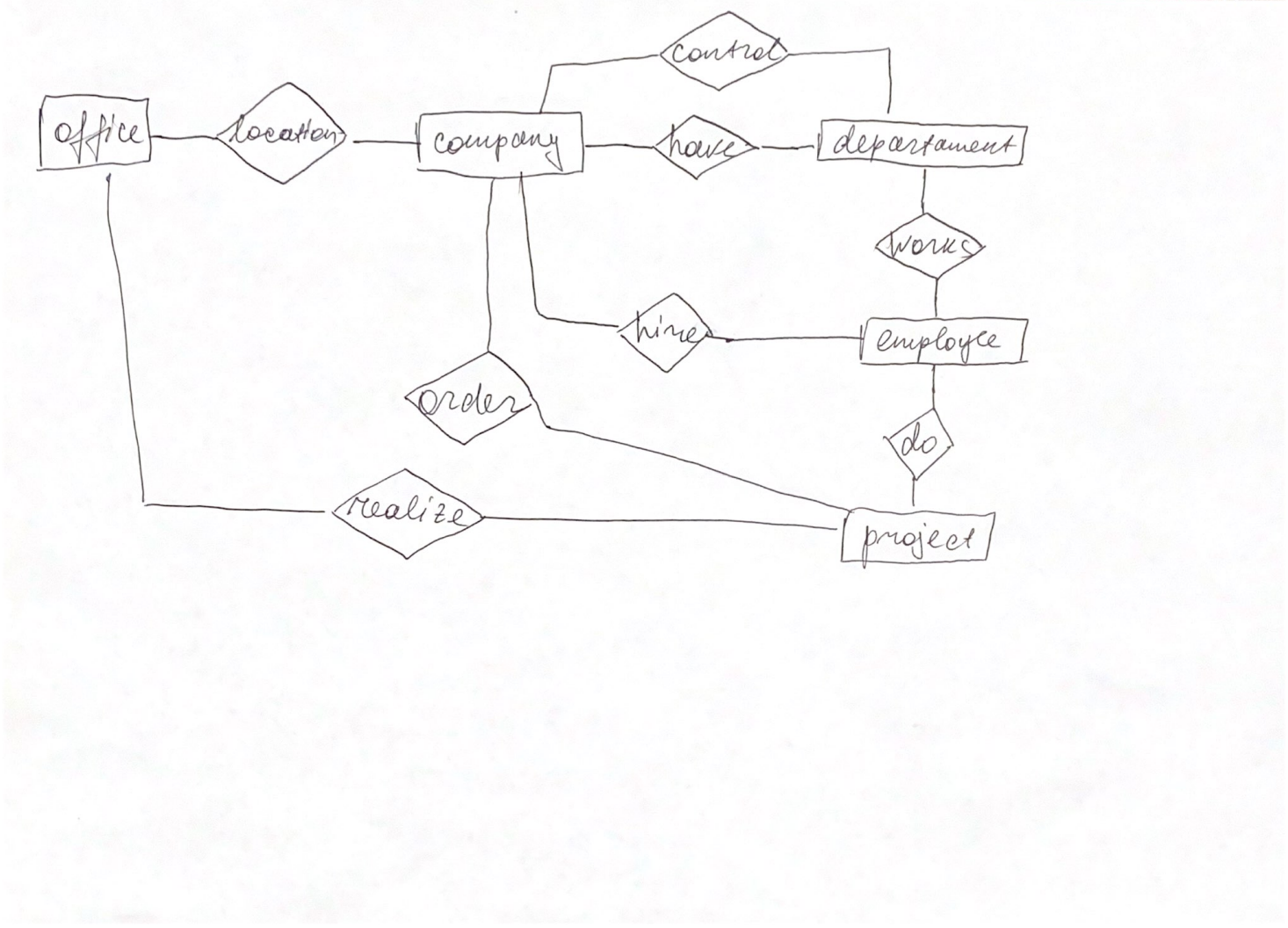
One-to-one: Person — Passport

One-to many: Doctor — Patient

Many-to-many: student — Subject


Course
PK Course ID
Title
Department
Credits
Teacher
PK TeacherID
Name
Department
Dormitory
PK Corps
StudentID
ManagerName
Department
PK Dept Name
Dean
Specialization
Student
PK ID
Name (First N, Last N)
Dat of Birth
Unicode
Department
Age (Derived)
Office of the Registrar
PK Unicode
Partners Of Uni
Activities To Be Agreed
University
PK Unicode
Name
Location

Ver. 4


control
office
location
company
have
departament
works
hire
employee
order
do
realize
project