1.

a). **First phase** is finding out all data needs of the future database users.

Second phase if choosing a data model. This phase also includes 3 subphases:

- Applying the concepts of the chosen data model.

- Translating these requirements into a conceptual scheme of the DB.

- This conceptual scheme will indicate all the functional requirements of the company, when it is fully developed, so the third subphase is to describe all the operations/transactions that can be performed on the data.

Third phase is the last one – implementation of our abstract data model(or creating the actual DB). This phase has 2 subphases:

- Logical Design – deciding on the database schema(what relation schemas, attributes will DB have and how they all should look like).

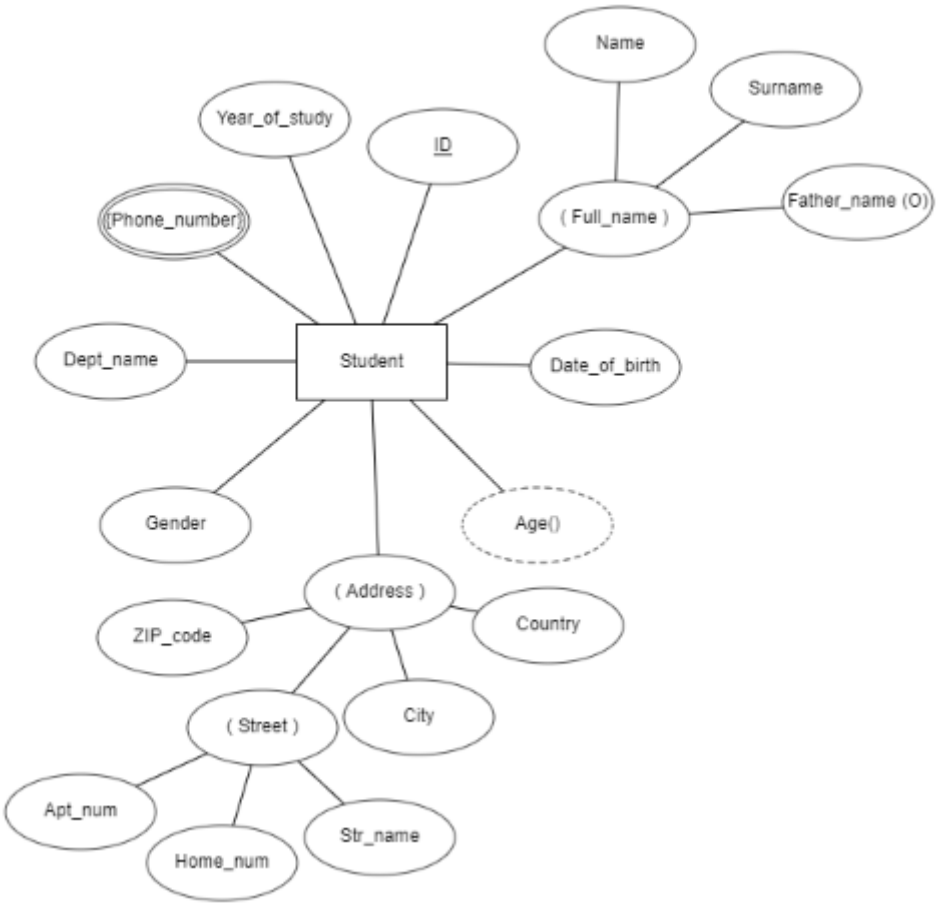
- Physical Design – deciding on the physical layout of the database.

b). **ER Model i**s a graphical representation of entities and their relationships:

- Based on Entity, Attributes & Relationships
  - Entity is a thing about which data are to be collected and stored
    - e.g. EMPLOYEE
  - Attributes are characteristics of the entity
    - e.g. SSN, last name, first name
  - Relationships describe an associations between entities
    - i.e. 1:M, M:N, 1:1
- Complements the relational data model concepts
  - Helps to visualize structure and content of data groups
    - entity is mapped to a relational table
  - Tool for conceptual data modeling (higher level representation)
- Represented in an Entity Relationship Diagram (ERD)
  - Formalizes a way to describe relationships between groups of data

2.

a).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Dept_name
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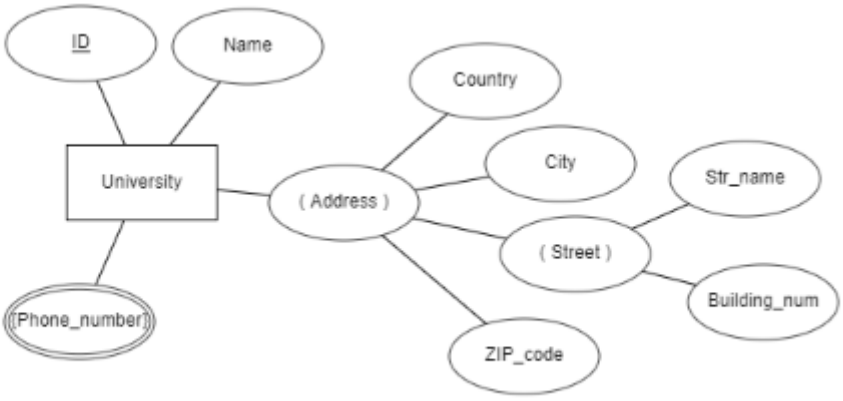
City
Apt_num
Home_num
Str_name

b).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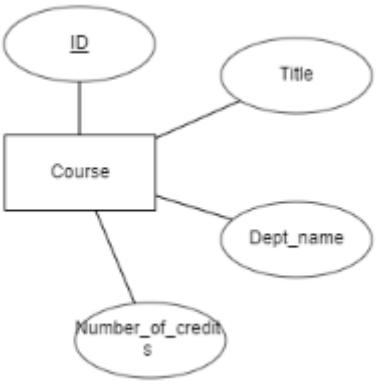
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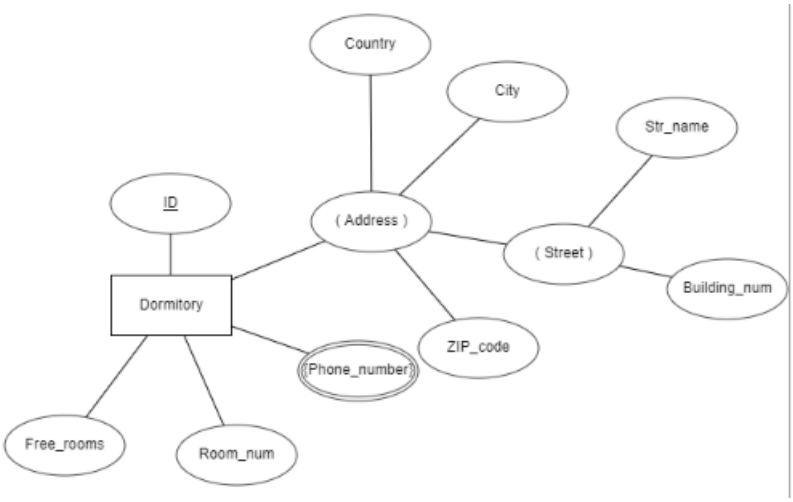
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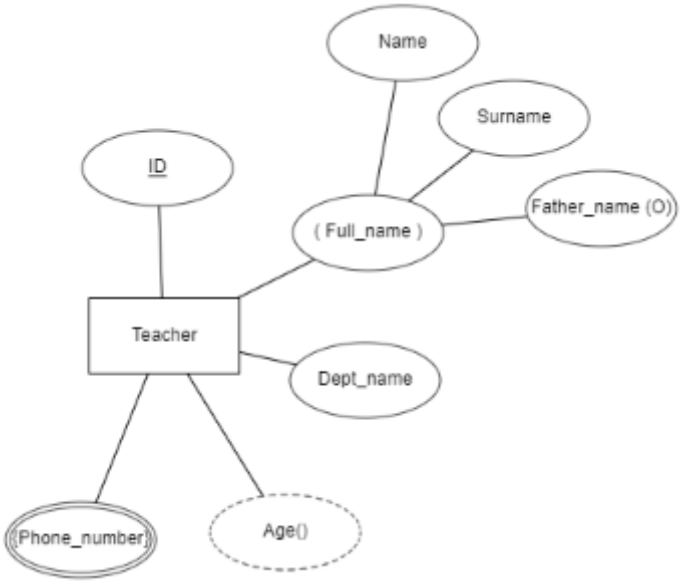
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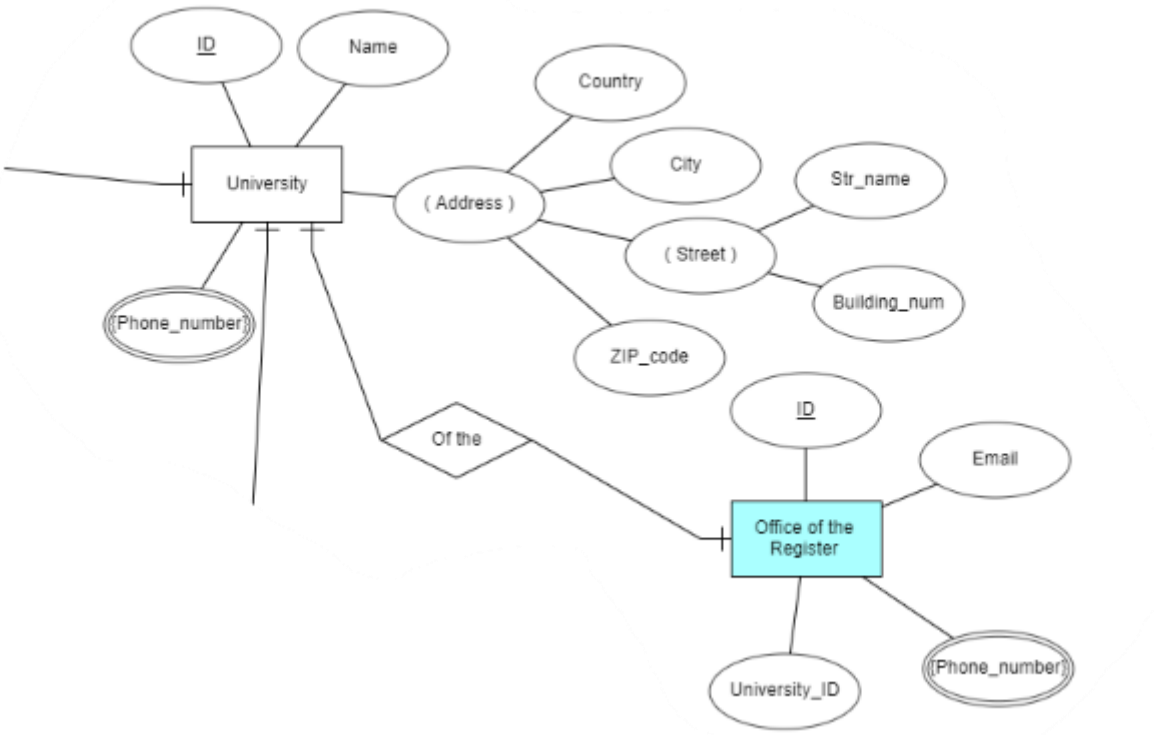
Register
Phone_number
University_ID

3.

1-1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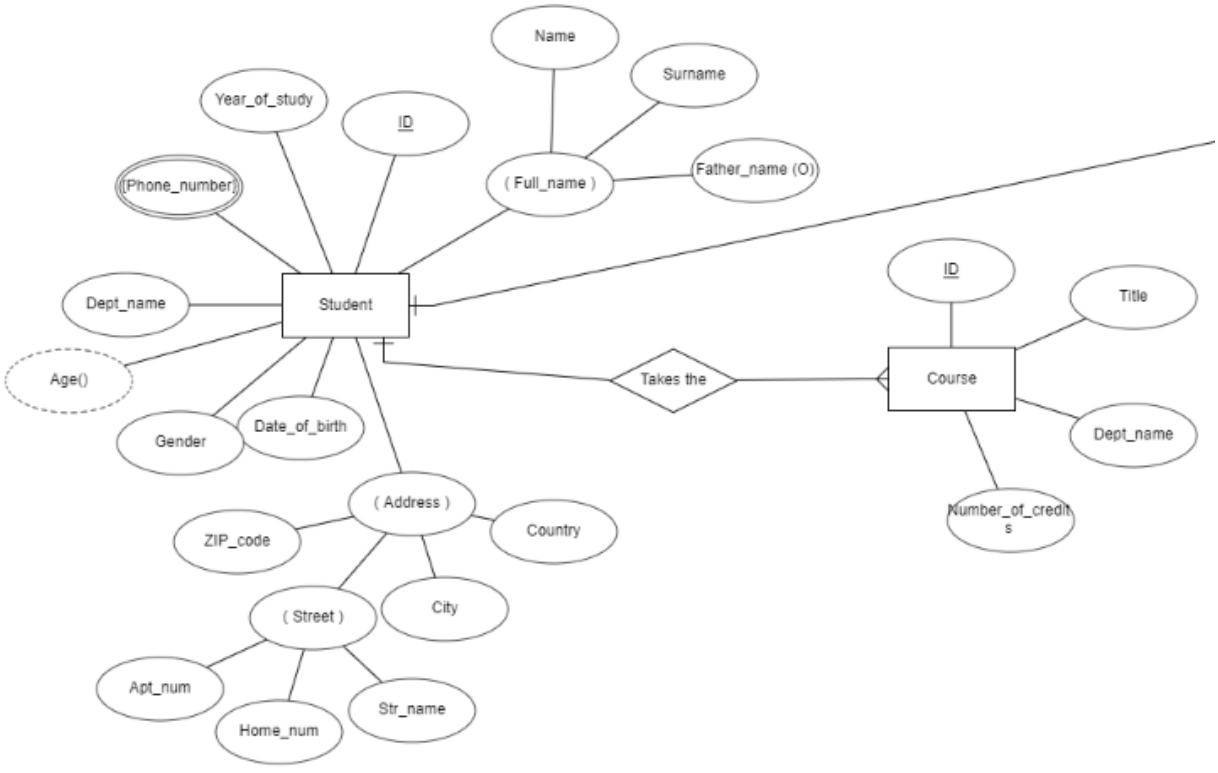
1-M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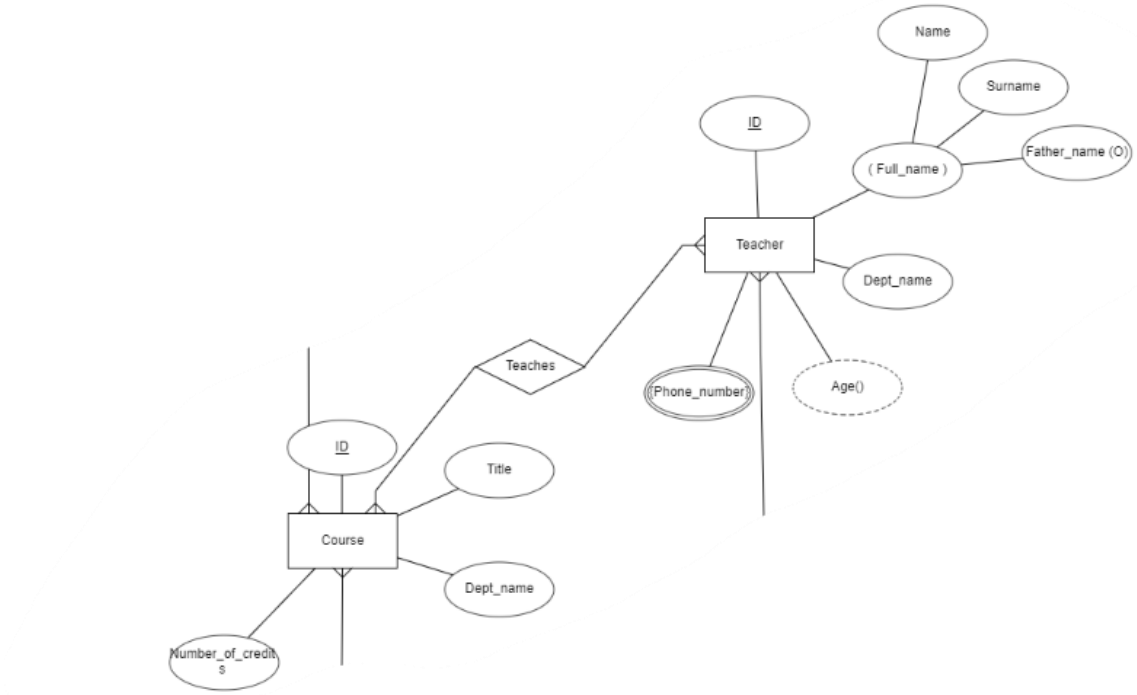
M-M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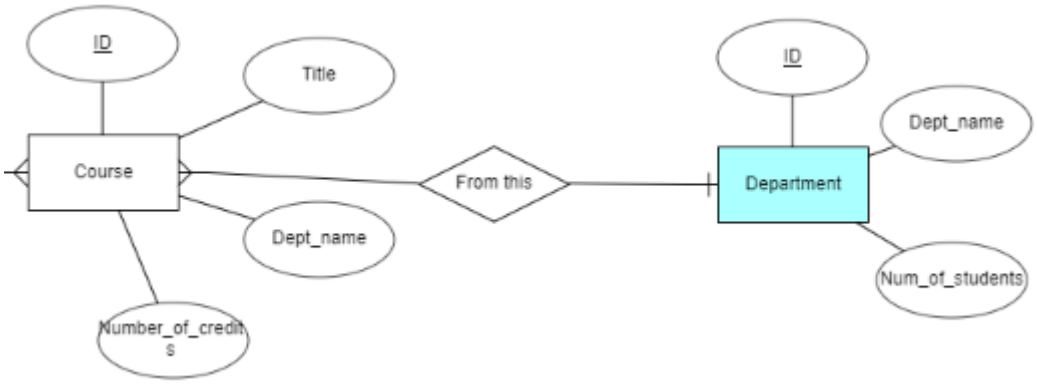
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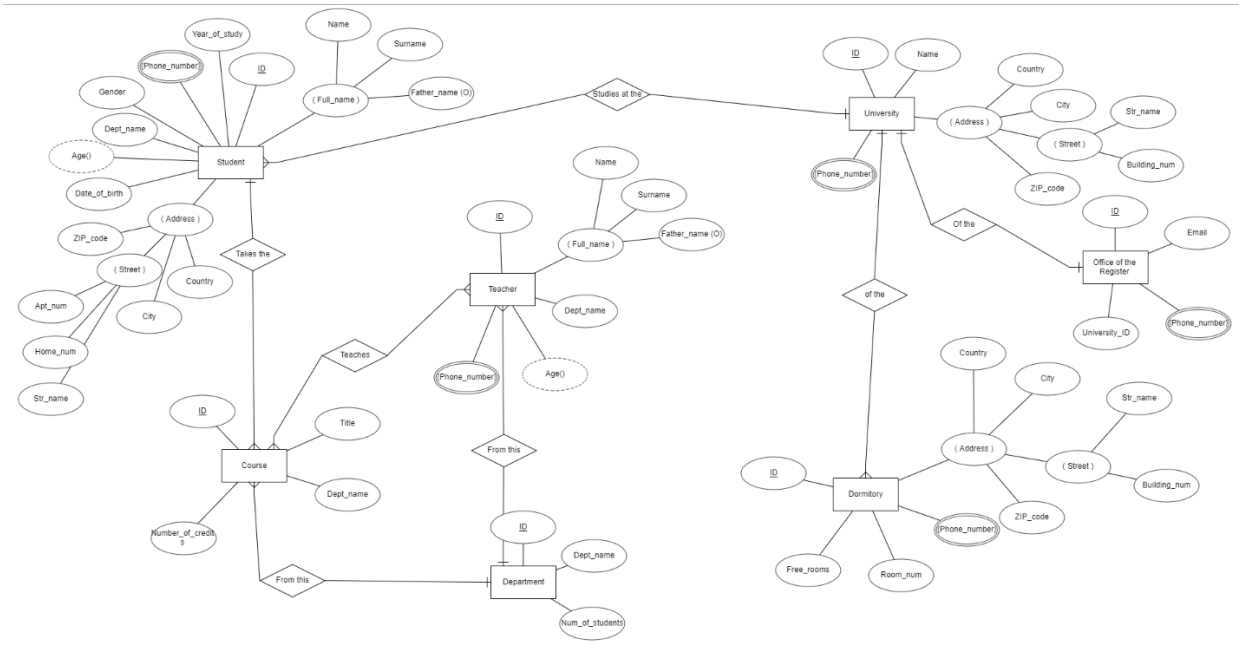
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5.