

Ellen Yim

Lab 1

1.4) University

Professors - entity; SSN, name, age, rank, research specialist - attributes

Projects -entity; project number, sponsor name, starting date, ending date, budget - attributes

Graduate students - entity; SSN, name, age, degree program - attributes

Department - entity; department number, department name, main office - attributes

Each project is managed by one professor. **(mandatory Many-to-one relationship) each project needs a single professor to manage it but many professors can work on multiple projects**

Each project is worked on by one or more professors. **(mandatory many-to-many relationship) each project needs more than 1 professor, but professors can work on multiple projects.**

Each project is worked on by one or more graduate students (**many-to- many relationship**) .
Each project needs a graduate student but a graduate student can work on multiple projects.

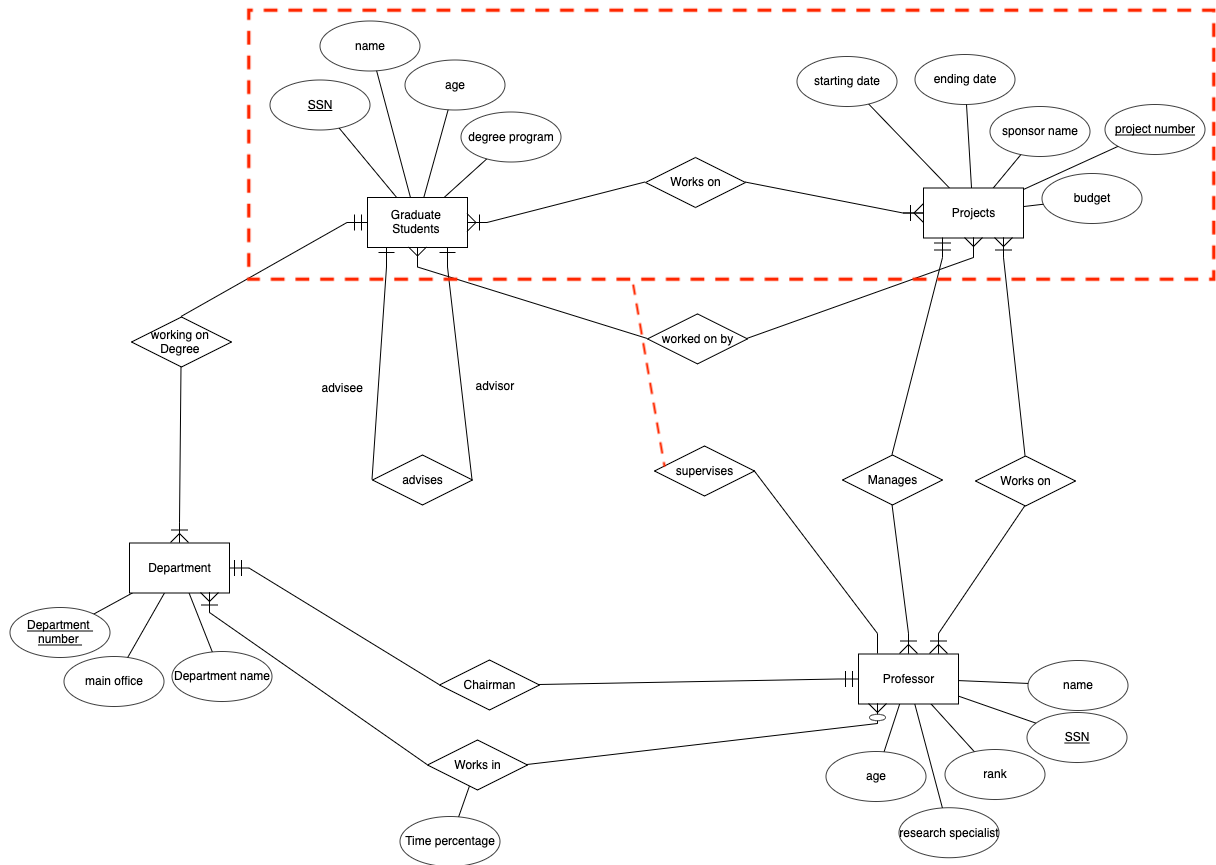
When graduate students work on a project, a professor must supervise their work on the project. **Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one. (mandatory many-to-many relationship)**

Departments have a professor (known as the chairman) who runs the department. **(mandatory one-to-one relationship)**

Professors work in one or more departments and for each department that they work in, a time percentage is associated with their job. **(mandatory many-to-many relationship) with time percentage as an association because one professor can work in one or more departments.**

Graduate students have one major department in which they are working on their degree. **(mandatory many-to-one) such as a department has many graduate students**

Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take. **(one-to-one relationship)**



1.5 Notown)

Each musician that records at Notown has an SSN, a name, an address and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone. **(Entity: Musician, attributes: SSN (primary key), name (primary key), address, phone number)**

Each instrument that is used in songs recorded at Notown has a name (e.g., guitar, synthesizer, flute) and a musical key. **(Entity: instrument, attributes: name (primary key) and musical key)**

Each album that is recorded on the Notown label has a title, a copyright date, a format (e.g., CD or MC), and an album identifier. **(Entity: album, attributes: title, copyright date, format, album identifier (primary key))**

Each song recorded at Notown has a title and an author. **(Entity: song, attributes: title, author)**
This is a weak entity set as title and author are not primary keys and they depend on another attribute of an entity, like album identifier of entity album or musician's name.

Each musician may play several instruments, and a given instrument may be played by several musicians. **(Optional many to many relationship) instruments must be played by many musicians but a musician is optional to play several instruments.**

Each album has a number of songs on it, but no song may appear on more than one album.
(Mandatory many-to-many relationship) An album can have multiple songs on it but one song can only appear no more than once on an album.

Each song is performed by one or more musicians, and a musician may perform a number of songs. **(mandatory many-to-many relationship) A musician can play many instruments and an instrument can be played by many musicians.**

Each album has exactly one musician who acts as its producer. A musician may produce several albums, of course. **(optional many-to-many relationship) An album has one musician who produces it. A musician may produce several albums.**

Assumptions

A musician does not have to be a producer.

Not all phones are associated with an address.

The same phone number can be used for multiple addresses.

A musician must play at least one instrument.

Not every instrument must be played.

A musician must perform at least one song.

All musicians must have an address.

A song can be released on its own and not on an album.

A musician can perform at least one song.

All addresses must have one phone number associated with it.

