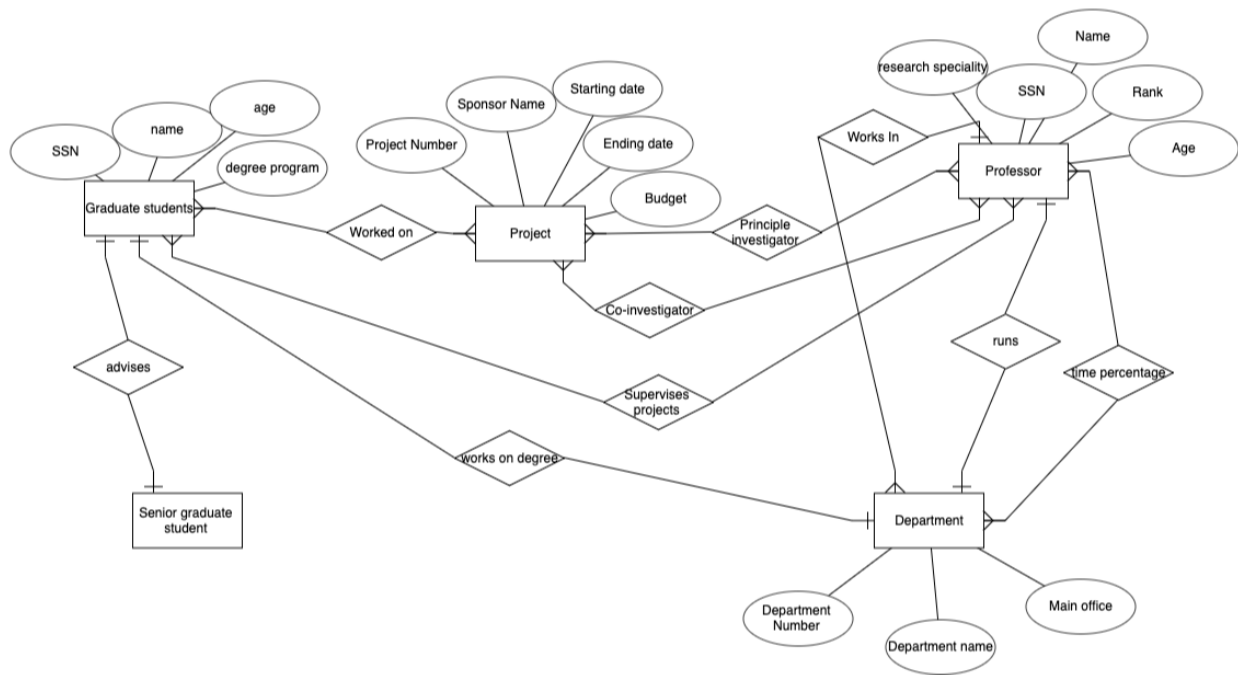


1.4 Part 1 University



Key Constraints:

1. One to one:
 - a. Senior graduate student advises graduate student
 - b. Graduate student works on getting their degree in a specific department
 - c. Professor can run only one department
2. One to many:
 - a. Professor is the principle investigator of a project
 - b. Professor can work in multiple departments
3. Many to many:
 - a. Professor can work on many projects and many projects can be worked on by professors
 - b. Professor can manage many projects and many projects can be managed by professors
 - c. Graduate students can work on more than one project so they can have more than one supervisor
 - d. For every department a professor works in there is a time percentage associated

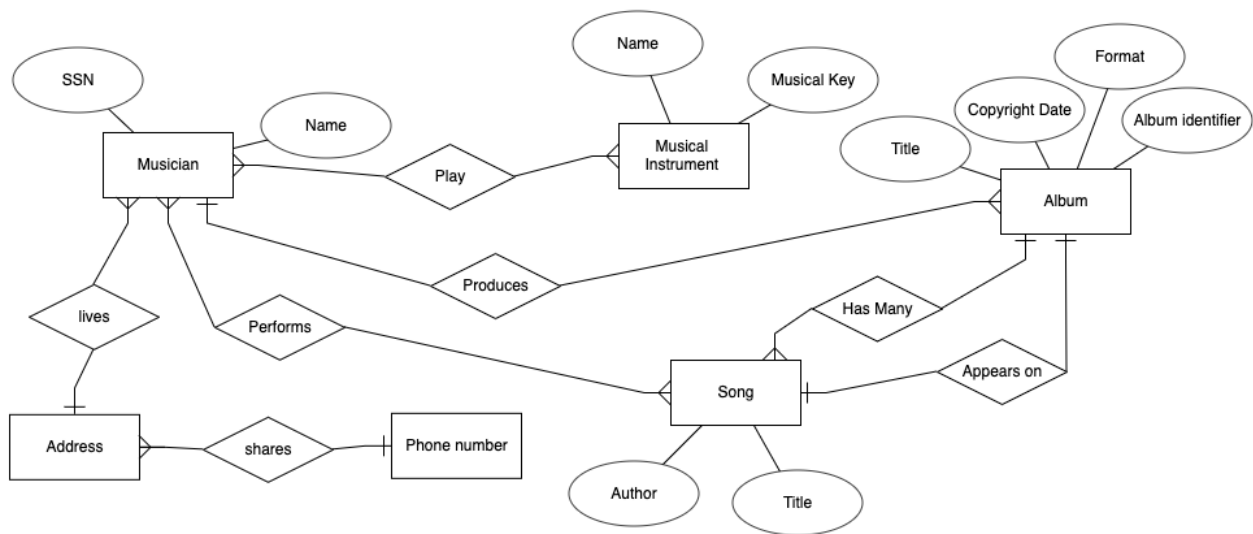
Participation Constraints:

1. Mandatory:
 - a. Every department has a graduate student working on a degree, with multiple professors working in the department and one professor running it. Each department also has a time constraint associated with the professor working for said department
 - b. Each project must be worked on by one or more graduate students/professors and managed by one and only professor

2. Optional:

- a. Not every professor will manage a project they can be occupied with other jobs such as teaching, research
- b. Not every professor will manage a department
- c. Not every graduate student will be an advisor
- d. Every graduate student who works on multiple projects has a supervisor unique to one project.

1.5 Part 2-Notown



I could not express the constraint of poorly paid musicians because poorly paid musicians would fall under the same entity as musicians.

Key constraints:

1. One-to-one
 - a. A song cannot appear on an album more than once
2. One-to-many
 - a. A musician may produce multiple albums but each album is produced by one musician
 - b. An album can have many songs
3. Many to many
 - a. A musician can perform multiple songs
 - b. A musician can play multiple instruments

Participation Constraints:

1. Mandatory:
 - a. An album has to have songs and songs have to appear on the album.
 - b. The album has to be produced by a musician
 - c. Each musician must have an address

2. Optional:

- a. There can be more than one address with the same phone number. This is because a phone number can be an entity
- b. Not all musicians produce an album