

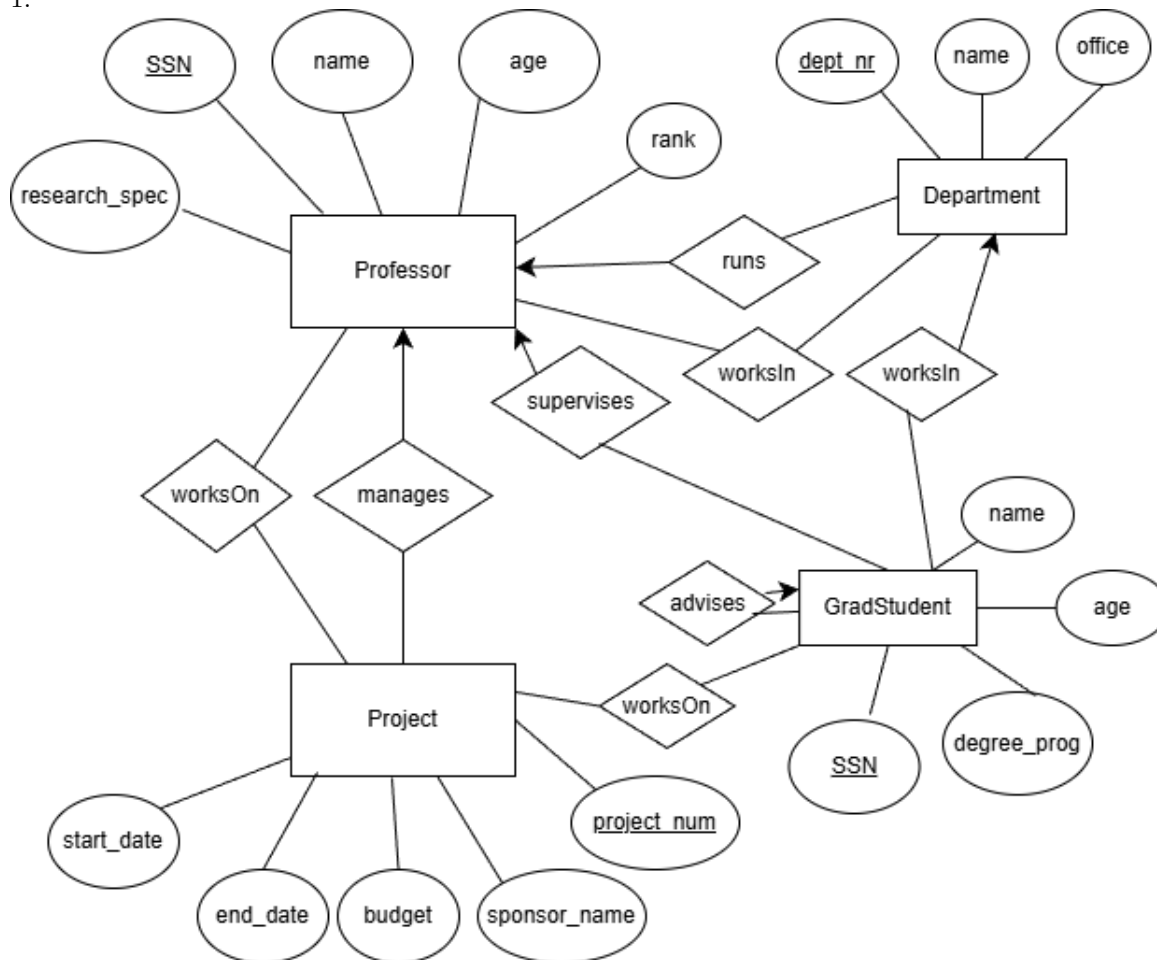
Problem 1

1. name is not a candidate key because Smith has 2 instances.
age also has 2 instances, so it cannot be a candidate key.
All others are candidate keys for this legal instance.

2. The set of attributes I would choose for a candidate key are sid and login, since they must be unique as no 2 students can have the same Student ID or email address. GPA is also technically an attribute for a candidate key in this instance as it has no duplicates, but that would be a bad choice in real life as multiple students can have the same GPA.

Problem 2

1.



2.

Professor(ssn, name, age, rank, research_spec)
Department(dept_nr, name, office, chair_ssn)
Project(project_num, sponsor_name, budget, start_date, end_date, manager_ssn)
GradStudent(ssn, name, age, degree_prog, dept_nr)
ProfWorksOnProject(prof_ssn, project_num)
GradStudentWorksInDept(grad_student_ssn, dept_nr)
ProfessorWorksInDept(prof_ssn, dept_nr)