Task 1.1: Superkey and Candidate Key Analysis

Relation a: Employee

1) 6 different superkeys:

1 {EmpID}, 2 {SSN}, 3 {Email}, 4 {Phone}, 5 {EmpID, Name}, 6 {SSN, Email}

2) Candidate Keys:

EmpID, SSN, Email, Phone.

3) The best candidate key:

The best choice is Emplayee ID, it's an artificial, short and stable identifier.

4) Can two employees have the same phone number?

The table shows that each employee has a unique phone number. However, in real life the situation may be different: one person may have several numbers, and the same number may be used by several employees (for example, a common office phone). Therefore, using a phone as a key is not safe.

Relation B: Course Registration

1) Determine the minimum attributes needed for the primary key:

Primary Key = {StudentID, CourseCode, Section, Semester, Year}

2) Explain why each attribute in your primary key is necessary:

StudentID - to differentiate students.

CourseCode - the course can be different.

Section - the course can have several sections.

Semester - the course can be taken again in another semester.

Year - the semester is repeated every year, a year is needed to differentiate.

Task 1.2:

1) Identify all foreign key relationships:

Student(AdvisorID) → Professor(ProfID)
Student(Major) → Department(DeptCode)
Professor(Department) → Department(DeptCode)
Course(DepartmentCode) → Department(DeptCode)
Department(ChairID) → Professor(ProfID)
Enrollment(StudentID) → Student(StudentID)
Enrollment(CourseID) → Course(CourseID)