

HOMWORK 3

1. Foreign key

We consider the relations *Employee* and *Department*.

Employee(EmpId, LastName, Dept)

Department(DeptId, Description, Location)

For example, the following diagram represents part of the *Employee* and the entire *Department* table.

Employee:

EmpId	LastName	Dept
1	Slate	1
4	Flinstone	2
5	Rubble	2
7	Rockhead	3
11	Gravel	1

Department:

DeptId	Description	Location
1	Administration	Bedrock
2	Quarry	Bedrock
3	Stockpile	Bedrock

- What is the primary key of *Employee*?
- What is the primary key of *Department*?
- Explain why the *Dept* attribute in the *Employee* table is a foreign key referring to *DeptId* in *Department*.
What does it mean for the relation *Employee* to have a foreign key?

2. Relational algebra

- What is the difference between Equi-Join and Natural-Join?
- Here is the relational database schema we consider.

- Student (Id: INT, Name: STRING, Address: STRING, Status: STRING)
 - Professor (Id: INT, Name: STRING, DeptId: DEPTS)
 - Course (DeptId: DEPTS, CrsName: STRING, CrsCode: COURSES)
 - Enrolled (CrsCode: COURSES, StudId: INT, Grade: GRADES, Semester: SEMESTERS)
 - Department(DeptId: DEPTS, Name: STRING)
 - Teaching(ProffId:INTEGER, CrsCode:COURSES, Semester:SEMESTERS)
- NB: For example a Semester is of the form *F2000* for Fall 2000.

- (a) List the names of all the professors teaching in the history department (HIS DeptId).
- (b) List the names of all the professors who taught in Fall 1994 (F1994).
- (c) List all the Ids of the professors who taught at least 2 courses in Fall 1999.
- (d) Find the names of the courses taught in Fall 1995 together with the names of the professors who taught those courses.
- (e) Find the ProffIds of the professors who taught all the courses of the CS department (DeptId CS).

Good work!