Relational Query Languages: Relational Algebra

Davood Rafiei Copyright 2019-2022

Relational query languages

- 1) Relational Algebra
- 2) Relational Calculus
- 3) SQL

Tables:

```
teach(sin, cid)
courses(cid, title)
emp(sin, name, phone, age, salary)
```

E.g. Find names and phones of employees who make more than 50k.

3) SQL

- 2) Relational Calculus
- 1) Relational Algebra

Relational calculus: declarative

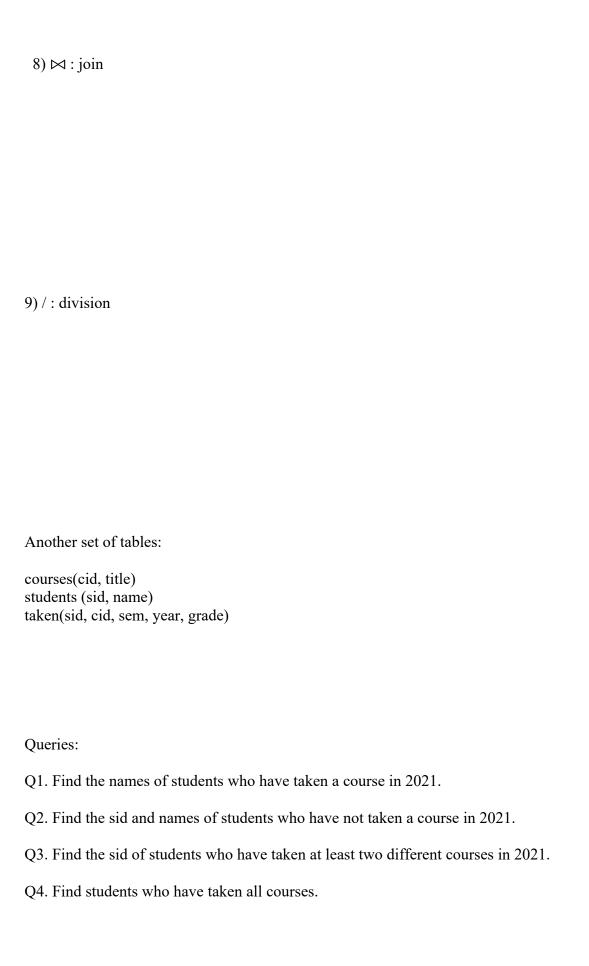
SQL: based on rel. calculus and declarative (sometimes with procedural components)

Relational Algebra:

- a procedural or operational query language
- It is an algebra: much similar to elementary algebra and linear algebra

- domain:
- operators: basic:
derived:
- Some features
Operations: 1) σ : select some rows
2) π : project some columns
3) × : cartesian product

4) ρ : rename result columns (and table)
5) ∪ : Set union
6) - : Set difference
7) \cap : set intersection is a derived operator (how?)



courses(cid, title) students (sid, name) taken(sid, cid, sem, year, grade)