Keys
- SuperKey
  - a set of attributes whose values together uniquely identify a tuple in a relation
- Candidate Key
  - a superkey for which no proper subset is a superkey…a key that is minimal.
  - Can be more than one for a relation
- Primary Key
  - a candidate key chosen to be the main key for the relation.
  - One for each relation
- Keys can be composite

Example:
- **SK** = \{lecturer, roomno, appraiser\}, \{lecturer, roomno\}, \{lecturer, appraiser\}, \{roomno, appraiser\}, \{lecturer\} and \{roomno\}
- **CK** = \{lecturer\} and \{roomno\}
- **PK** = \{lecturer\}

Foreign Key
- a (set of) attribute(s) in a relation that exactly matches a (primary) key in another relation
- the names of the attributes don’t have to be the same but must be of the same domain
- a foreign key in a relation A matching a primary key in a relation B represents a many:one relationship between A and B

**Student**: studno, name, tutor, year

**Staff**: lecturer, roomno, appraiser

Relationship -v- Relation
- “an association between several entities represented by a Relationship Type of which there will be many Relationship Instances”

**Relationship**
- STUDENT (studno, name)
- STAFF (lecturer, roomno)
- SCHOOL (hons, faculty)

**Relation**
- STUDENT (studno, name, hons)
- STUDENT (studno, name, hons)
- STAFF (lecturer, roomno)
- STAFF (lecturer, roomno)

**Joins**
- e.g., get studno, name and tutor’s roomno for each student
Get hotels and their regions

```sql
SELECT * FROM HOTEL, RESORT, REGION
WHERE hotel.resort=resort.resort and resort.region=region.region
```

Sub and Super-Types (Classes)
Sub and Super-Types (Classes)

- STAFF
  - technical
  - admin

Referential Integrity

- Student(studno, name, tutor, year)
- Staff(lecturer, roomno, appraiser)

- CASCADE
  - delete all matching foreign key tuples
  - e.g. STUDENT

- RESTRICT
  - can’t delete primary key tuple STAFF whilst a foreign key tuple STUDENT matches

- NULLIFY
  - foreign key STUDENT.tutor set to null if the foreign key ids allowed to take on null

Lab Extensions

- Completed work must be handed in by 9:30 on the day of the subsequent lab!