

Temporal Databases

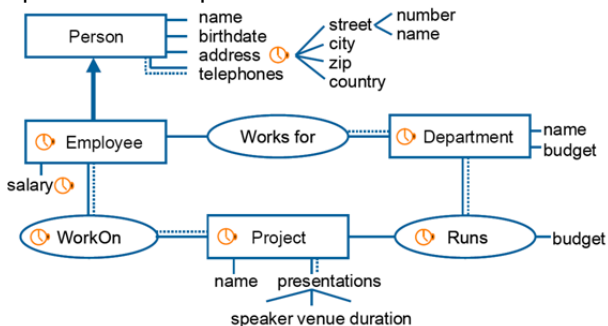
INFO-H-415

Université Libre de Bruxelles

October 15, 2013

MADS Model

- ▶ Extends the Entity-Relationship Model (ERM).
 - ▶ Refer to a general database course for ERM (e.g. INFO-H-303)
- ▶ Spatial and temporal notations.



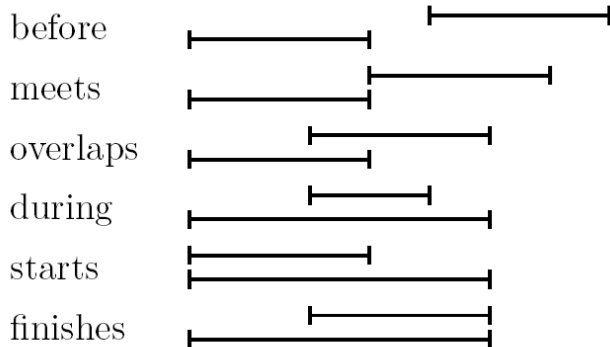
Temporal Relations

- ▶ A relation has a validity interval



- ▶ Attributes FromDate and ToDate
 - ▶ Use a dummy value far in the past for $-\infty$
 - ▶ Use a dummy value far in the future for $+\infty$
- ▶ Candidate keys are:
 - ▶ PK
 - ▶ PK, FromDate
 - ▶ PK, ToDate
 - ▶ PK, FromDate, ToDate

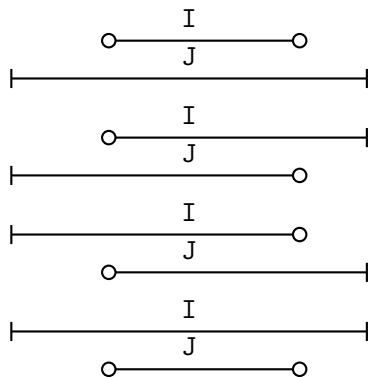
Intervals



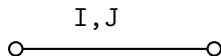
Operations

- ▶ Temporal Join
- ▶ Coalescing
- ▶ Temporal Difference
- ▶ Temporal Aggregation

Temporal Join



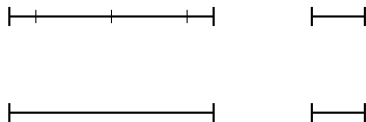
► Result:



- See slides 16 in the lecture notes
- Sequenced version on 111

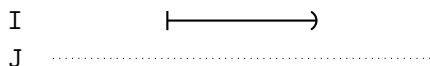
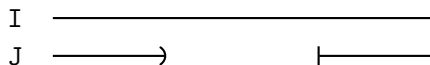
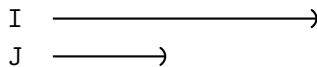
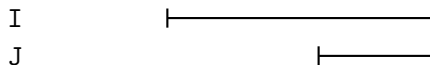
Coalescing

- ▶ Result:



- ▶ See slides 91 in the lecture notes

Temporal Difference



► Result:

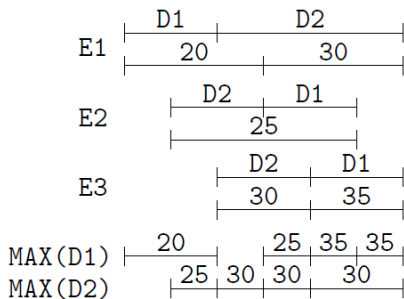


► See slides 99 in the lecture notes

Temporal Aggregation

- ▶ Find the temporal points of change and build the corresponding interval
- ▶ Compute the aggregation over each interval
- ▶ Coalesce the result
- ▶ See slides 104 in the lecture notes

Temporal Aggregation



Dataset

- ▶ Available on
<http://cs.ulb.ac.be/public/teaching/infoh415/tp>
- ▶ Setup
 - ▶ Create a database 'infoh415-<your-netid>-temporal' and select it as the context database
 - ▶ Run `createtable.sql`
 - ▶ Run `dbload.sql`

Exercises

- ▶ **First** session:
 - ▶ Translate the MADS model into a relational schema (20 min.)
 - ▶ Queries 1–9
 - ▶ (5): sequenced join (slide 94 of the course notes)
 - ▶ (6): sequenced difference (slide 99)
 - ▶ (9): coalescing (slide 91)
- ▶ **Second** session:
 - ▶ End of the queries
- ▶ **Third** session:
 - ▶ Temporal constraints