Temporal Databases

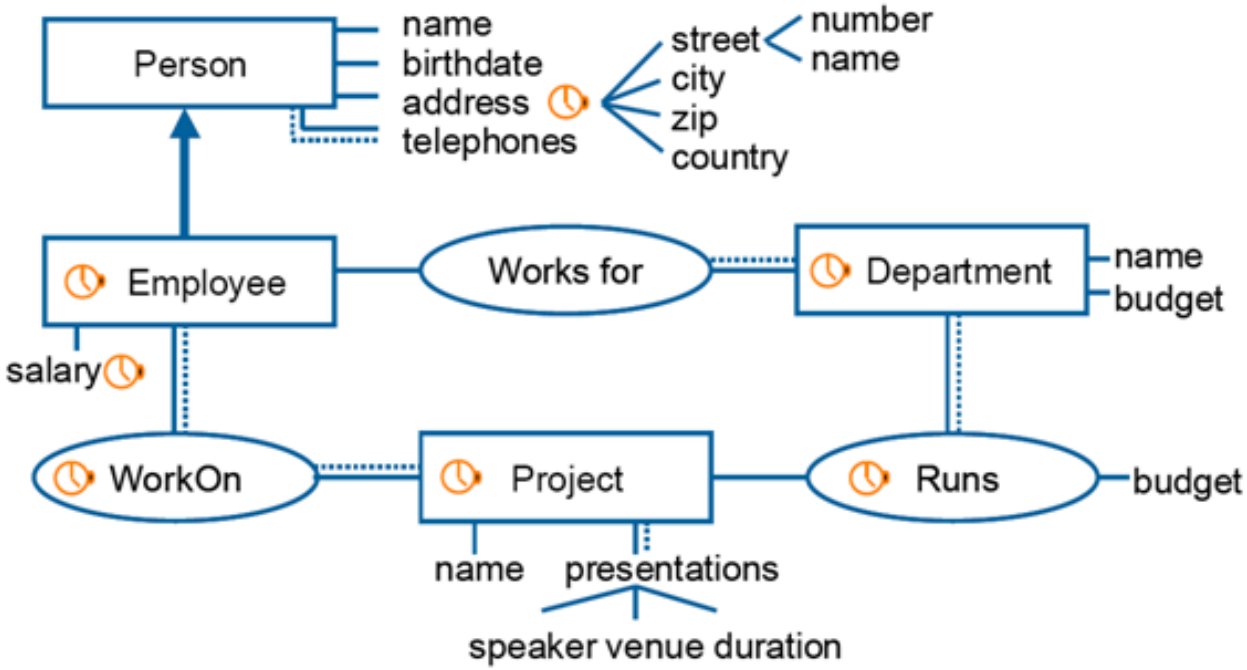
INFO-H-415

Université Libre de Bruxelles

October 7, 2014

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.

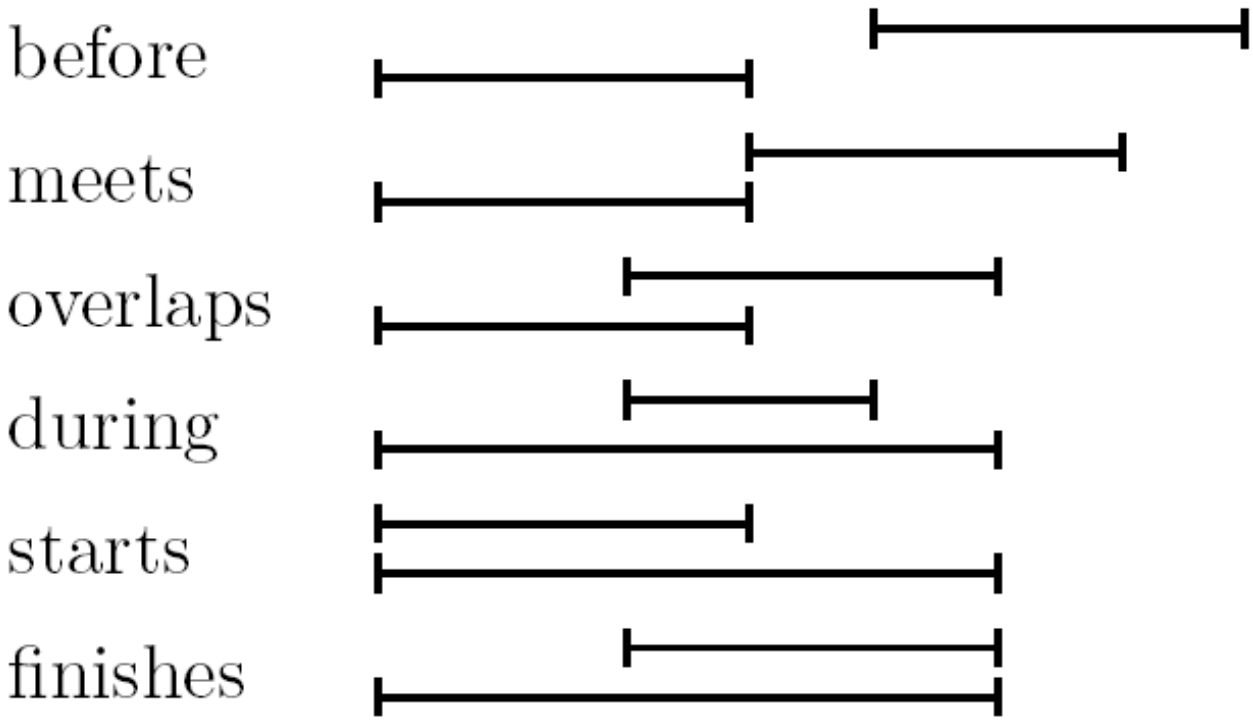


Temporal Relations

- 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`

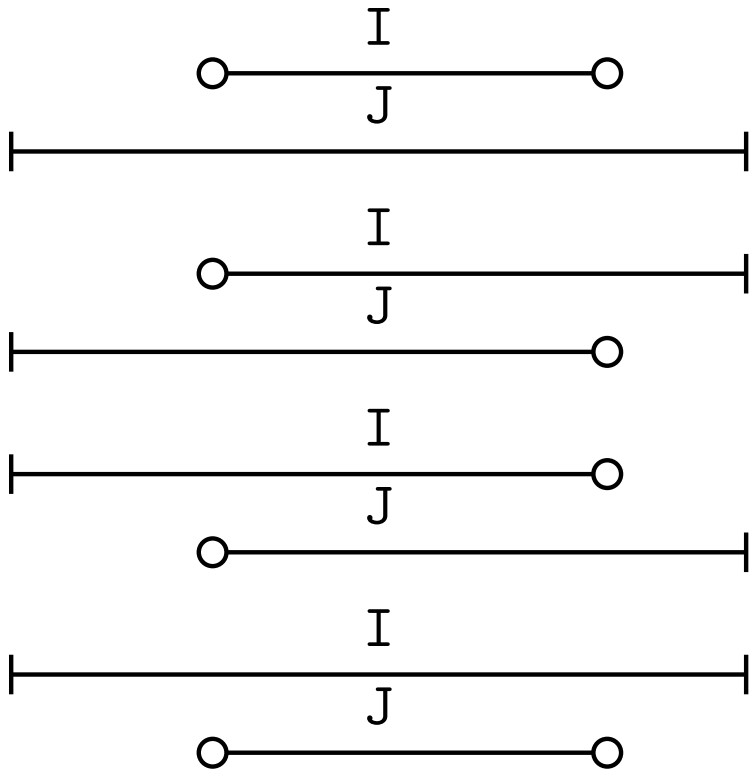
Intervals



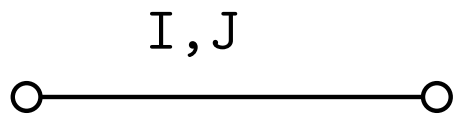
Operations

- Temporal Join
- Coalescing
- Temporal Difference
- Temporal Aggregation

Temporal Join

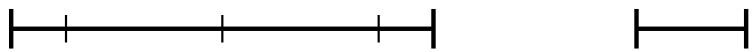


- Result:



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

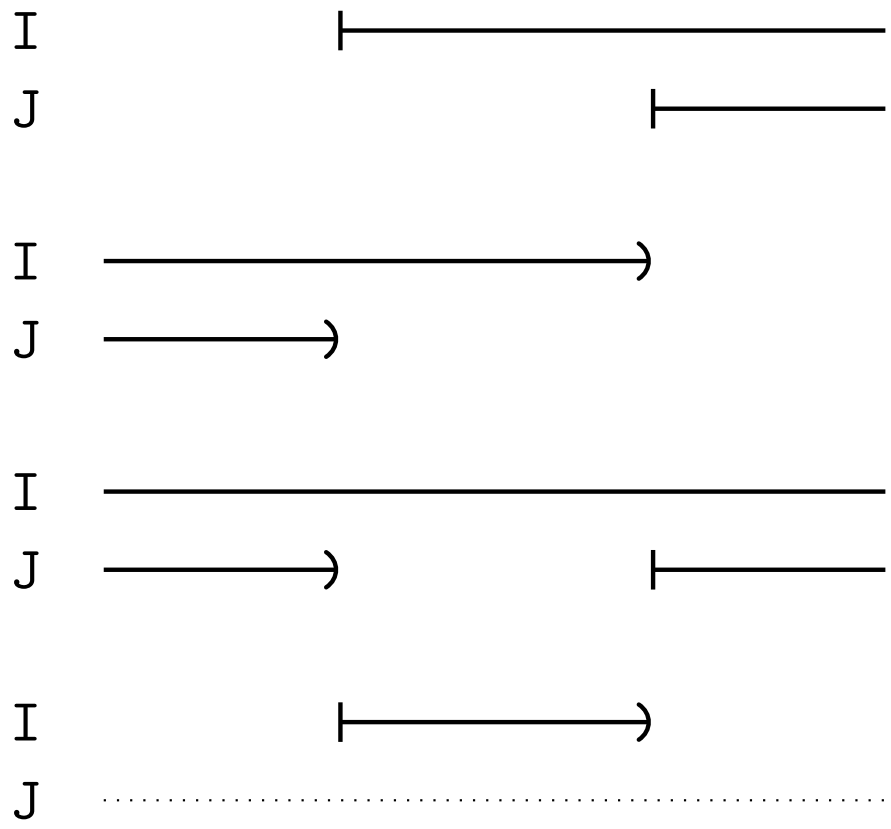
Coalescing



- Result:

- See slides 91 in the lecture notes

Temporal Difference



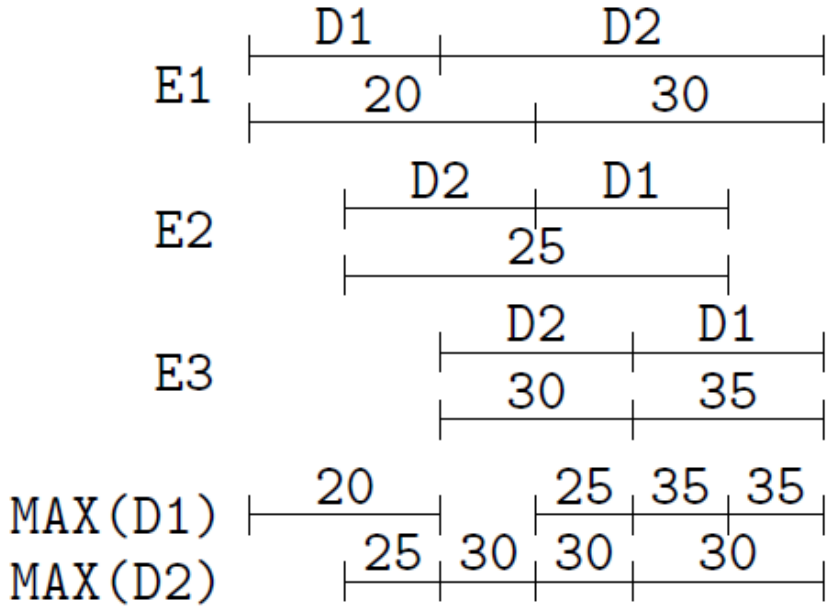
- Result:

- 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