Data Integration: Metadata

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Schematic discrepancies

The information in the schema of one database may correspond to the information in the instance of another database.

Postulates

1. the same constant may be a relation name, a column name and an attribute value
2. schema elements should be first-class objects
3. queries may define more than one relation, each with varying number of columns.

Correspondences

- attribute value $\Longleftrightarrow$ relation name
- attribute value $\Longleftrightarrow$ column name
- column name $\Longleftrightarrow$ relation name

FISQL [WR05]

A successor of SchemaSQL [LSS01].

Features

- metavariables, ranging over relation and column names
- dynamically varying relation schemas (`INTO`, `ON`)

Database schemas

DA: `Exams(Sid,Exam,Grade)`

DB: `Theory(Sid,Grade)`, `AI(Sid,Grade)`, `Systems(Sid,Grade)`

DC: `Students(Sid,Theory,AI,Systems)`

Attribute values $\Longleftrightarrow$ relation names

DA2DB

```
select E.Sid as "Sid", E.Grade as "Grade"
into  E. Exam
from DA.Exams as E
```

DB2DA

```
select T.Sid as "Sid", R as "Exam", T.Grade as "Grade"
into "Exams"
from DB :R as T
```

Attribute values $\Longleftrightarrow$ column names

DA2DC

```
select E.Sid as "Sid", E.Grade on E.Exam
into "Students"
from DA.Exams as E
```

DC2DA

```
select C.Sid as "Sid", A as "Exam", C.A as "Grade"
into "Exams"
from DC: R as C, R:A
where R="Students" and A <> "Sid"
```

FISQL queries

Semantics

- a generalization of SQL semantics
- metavariables range over relation and column names
- output: special treatment for dynamic schemas

FIRA

- extension of relational algebra
- operators map federated databases to federated databases
- new operators: partition, transpose,....

FISQL can be translated to FIRA and vice versa.


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