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Relational

Educational tool for relational algebra

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Query language

This page explains the query language supported by relational.

Operators

It has 2 class of operators:

- Without parameters
- With parameters

Without parameters

Operators without parameters work on two relations. The syntax for those operators is: `relation operator relation`.

Symbol	Name	Example
*	product	A * B
-	difference	A - B
∪	union	A ∪ B
∩	intersection	A ∩ B
÷	division	A ÷ B
⋈	join	A ⋈ B
⧑	left outer join	A ⧑ B
⧒	right outer join	A ⧒ B
⧓	full outer join	A ⧓ B

With parameters

Operators with parameters work on a single relation, and the result will depend on the passed parameters. The syntax for those is: `operator parameters (relation)`

Symbol	Name	Example	Note
σ	selection	σ id==index or rank>3 (A)	Expression must be written in python
π	projection	π name,age (A)	
ρ	rename	ρ old_name➡new_name,age➡old (A)	

The language is formally defined here.

Complex queries

In any place where a relation is expected, a query can be used instead. For example, since a*b is a relation itself, you can evaluate π f1,f2 (a*b) ∪ R

You can use parenthesis to change priority: a ⋈ (q ∪ d)

Examples

These are some valid queries.

```
σage > 25 and rank == weight(A)
σ (name.upper().startswith('J') and age>21 )(people)
Q ⋈ π a,b(A) ⋈ B
ρ id➡i,name➡n(A) - π a,b(π a,b(A)) ∩ σage > 25 or rank = weight(A)
π a,b(π a,b(A))
ρ id➡i,name➡n(π a,b(A))
A ⋈ B
```

Relational uses automatic casting, so it will try to use an appropriate type for the values.

Dates

When a field contains something like 2007-12-24, this will be considered as a date, and will have a particoular behaviour in selection operations.

Fields

Field	Description
intdate	String representation of the date
day	
month	
weekday	Day of the week (numeric)
year	

Examples

```
Load the file dates.csv and set d as relation's name.
We select every friday:
σ date.weekday==4(d)

We select every date before 2000:
σ date.year<2000 (d)

We rename the field and do the product, we add 2 days to d and see if it is greater than date
σ d+2>date(ρdate➡d(d)*d)
```

Relational maintained by Salvo 'LtWorf' Tomaselli

Released under GPLv3. Contribute.

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