ITR08 Lecture 11

Table Operations (again)

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Reading

Roman, Steven (1999) "Access Database Design and Programming" (chapter 5), O'Reilly, 2nd edition

ITR8 class (2001) "sofix database" http://wotan.liu.edu/home/krichel/itr8/db/sofix.mdb

Questions

Which composer has the longest overall contribution to the music is the sofix database?

Which violinist has been playing tracks that are between 5 and 15 minutes long?

Which works were recorded between 1975 and 1980? (easy)

Query

A base table is a table in the database.

A query is a request to the base tables, the result of which is a new derived table that contains the information sought.

Queries can be expressed through a relational algebra that consists of proceducal statements.

Example Query

Find the titles of all works that have a track which is at least 300 seconds long. To do this:

- *Join* the TRACKS and WORKS table, by the work_number key attribute of works.
- From that joined table, *select* the rows where the tracktime is at least 300.
- *Project* the selected rows onto the title attribute.

Rename an attribute

item_number	label_name	number
1	arte nova classics	74321 59214 2
2	deutsche grammophon	410 020-2
3	deutsche grammophon	415 062-2

item_number	name	number
1	arte nova classics	74321 59214 2
2	deutsche grammophon	410 020-2
3	deutsche grammophon	415 062-2

Compute the union between two tables with the same attributes

Table1:

A_1	A_2
a	b
c	d
e	f

Table2:

A_1	A_2
g	h
i	j

Result:

A_1	A_2
a	b
c	d
e	f
g	h
i	j

In MS Access, done through copy and paste in the tables view.

Compute the intersection between two tables with the same attributes

Table1:

A_1	A_2
a	b
c	d
e	f

Table3:

A_1	A_2
c	d
i	j
e	f

Result:

A_1	A_2
c	d
e	f

In MS Access, perform left outer join, select where elements of the right table is not null.

Compute the difference between two tables with the same attributes

Table5:

A_1	A_2
a	b
c	d
e	f
g	h

Table3:

A_1	A_2
c	d
i	j
e	f

Result:

A_1	A_2
a	b
g	h

In MS Access, perform left outer join, select where elements of the right table is null.

Form the Cartesian product between tables with different attributes with the same attributes

Table1:

A_1	A_2
a	b
c	d
e	f

Table4:

B_1	B_2	B_3
g	h	l
j	k	l

Result:

A_1	A_2	B_1	B_2	B_3
a	b	g	h	l
a	b	j	k	l
c	d	g	h	l
c	d	j	k	l
e	f	g	h	l
e	f	j	k	l

Form the projection of a table onto a subset of its columns

item_number	label_name	number
1	arte nova classics	74321 59214 2
2	deutsche grammophon	410 020-2
3	deutsche grammophon	415 062-2

trow everything away exept the 1st and 3rd columns

item_number	label_name
1	74321 59214 2
2	410 020-2
3	415 062-2

Form a selection of a rows in a table according to a criterium

Selection criterea may comprise

- Constants values from the attribute domain
- Attribute names
- Algebraic expressions like $=$, $>$ etc
- Logical expressions like AND, OR, NOT

Example

tracktime $>$ 500

label $=$ deutsche gramophone

Example tables

Table A

A_1	A_2
1	4
4	5
6	3

Table B

B_1	B_2	B_3
2	3	4
6	7	3
1	1	4

Note that in the join constructs it does not matter how many rows each table has, the fact that both tables here have three rows is just a coincidence.

Inner Join

In an inner join, rows are combined if there are equal attribute values in certain selected columns from each table.

We join table A on colunm A_2 with table B on colunm B_3, if we select from table A and B, where the values of A_2 are the same as the values of B_3.

The result is

A_1	A_2	B_1	B_2	B_3
1	4	2	3	4
1	4	1	1	4
6	3	6	7	3

Left Outer Join

In a left outer join, we have the same rows as in the inner join, but add the rows in the first table that were not involved in the inner join, with NULL values for the second table columns.

A_1	A_2	B_1	B_2	B_3
1	4	1	1	4
1	4	2	3	4
4	5			
6	3	6	7	3

Right Outer Join

In a right outer join, we have the same rows as in the inner join, but add the rows in the second table that were not involved in the inner join, with NULL values for the first table columns.

A_1	A_2	B_1	B_2	B_3
1	4	2	3	4
6	3	6	7	3
1	4	1	1	4

Homework: Joining muliple columns

A_1	A_2	A_3	A_4
a	b	c	d
e	f	g	d
i	j	k	l
m	b	o	l

B_1	B_2	B_3	B_4
a	b	c	d
c	j	l	f
f	b	d	g
x	y	z	h
s	j	l	j

Compute inner join, left and right outer join between A_2,A_4 and B_2,B_4. Verify your answers using MS Access.