

04/03/2020

Q B E

- \* Find the names of all branches that are not located in Brooklyn

Branch	Branch-name	Branch-city	assets
P.		Brooklyn	

- \* Find the numbers of all loans made jointly to Smith & Jones

borrower	customer-name	loan-number
	"Smith"	P.-X
	"Jones"	-Y

- \* Find the loan numbers of all loans made to Smith, to Jones or to both jointly

borrower	customer-name	loan-number
	"Smith"	P.-X
	"Jones"	P.-Y

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\* Find all customers who live in the same city as Jones.

Customer	customer_name	customer_street	customer_city
	P. -n Jones		-y -y

### Queries on several Relations

\* Find the names of all customers who have a loan from the Penridge branch.

loan	branch-name	loan-number	amount
	Penridge	-x	
borrower	customer-name	loan-number	
	P. -y	-x	

\* Find the names of all customers who have both an account and a loan at the bank.

depositor	customer-name	account-number
	P. -x	
borrower	customer-name	loan-number
	-n	

\* Find the names of all customers who have an account at the bank, but who do not have a loan from the bank.

depositor	customer_name	account_number
P. - n		6

borrower	customer_name	loan_number
n	n	

\* n can be read as there does not exist.

\* Condition box

\* Find all account numbers with a balance b/w

1300 & 1500

account	branch_name	account_number	balance
P.			-2

Conditions
$-n \geq 1300$
$-n \leq 1500$

\* Find all branches that have assets greater than those of at least one branch located in Brooklyn.

branch	branch_name	branch_city	assets
P. - n		Brooklyn	-2

Conditions
$-y > -2$

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\*) Find all branches that have assets that are at least twice as large as the assets of one of the branches located in Brooklyn.

Conditions
$-y \geq 2 * -z$

\*) Allows logical expressions to appear in a SQL box  
Find all account numbers of account with a balance b/w 1300 and 2000, but not exactly 1500.

account	branch_name	acct_number	balance
		P. 1500	-2

Conditions
$-x = (\geq 1300 \text{ and } \leq 2000 \text{ and } \neq 1500)$

\* Find all branches that are located in either Brooklyn or Queens.

branch	branch_name	branch_city	assets
		B.	-n

Conditions
$-n = (\text{Brooklyn} \text{ or } \text{Queens})$

## The Result Relation

\* In all previous queries, we display only one variable

~~for~~

\* If the result of a query includes attributes from several reln schemas, we need a mechanism to display the desired result in a single table.

\* For this purpose, we can declare a temporary 'result' relation that includes all the attributes of the result of the query.

We print the desired result by including the command P. in only the 'result' skeleton table.

\*) Find the customer-name, account-number and balance for all accounts at the Perryridge branch

1) joint depositors & account

2) project customer-name, account-number & balance

To accomplish this,

1) Create a skeleton table, called "result", with attributes customer-name, account-number, & balance - The name of the newly created skeleton table must be different from any of the previously existing db reln schemas

2) write the query

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account	branch-name	account-number	balance
	Perryridge	-y	-3

depositor	customer-name	account-number
	-x	-y

result	customer-name	account-number	balance
P.	-x	-y	-3

### Aggregate operations

\* QBE includes aggregate operators

AVG, MAX, MIN, SUM, COUNT

\* we must postfix these operators with ALL. to  
create a multiset on which the aggregate oper.  
is evaluated.

\* The ALL. operator ensures that duplicates are not  
eliminated.

#) Find the total balance of all the accounts maintained  
at the Perryridge branch

account	branch-name	account-number	balance
	Perryridge		P. SUM. ALL

\*) If we want to eliminate duplicates when an aggregate operator is used.

we must add a new operator UNIQ to specify that we want to ~~eliminate~~ duplicates eliminated.

\*) find the total number of customers who have an account at the bank.

depositor	customer-name	account-number
P-CNT.UNIQ-ALL		

\*) QBE also offers the ability to compute functions on groups of tuples using the 'Gr' operator, which is analogous to SQL's group by construct.

\*) find the avg balance at each branch

account	branch-name	account-no	balance
	P-Gr		P-AVG.ALL,-k

The avg balance is computed on a branch by branch basis.

The ALL. in the P-AVG.ALL. entry ensures that all the balances are considered.

