>>
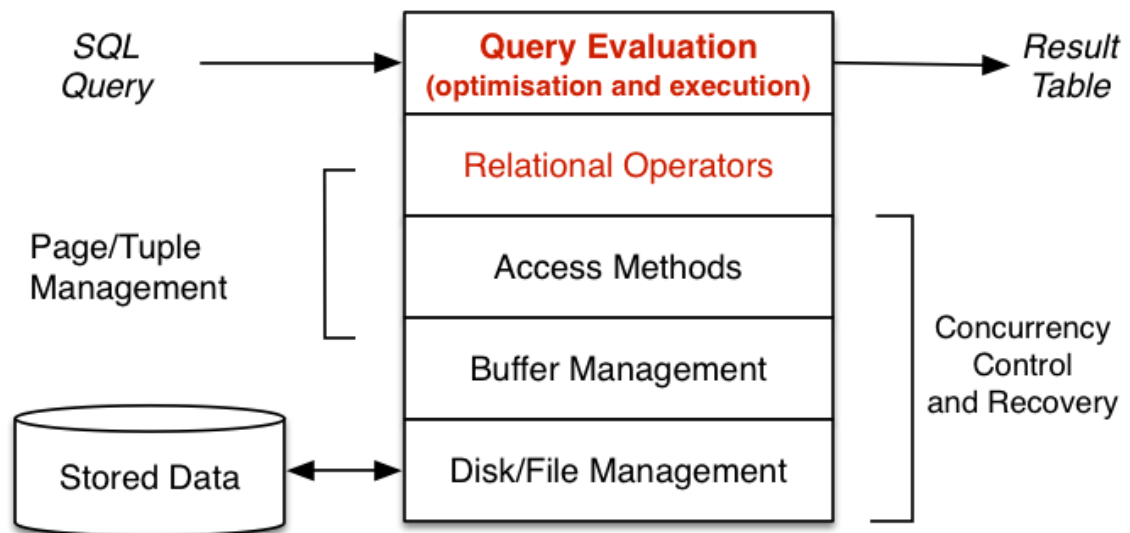
Query Processing

- Query Processing
- Terminology Variations

COMP9315 21T1 ◇ Query Processing ◇ [0/6]

∧   >>

❖ Query Processing

COMP9315 21T1 ◇ Query Processing ◇ [1/6]

<<   ∧   >>

❖ Query Processing (cont)

A query in SQL:

- states *what* kind of answers are required (declarative)
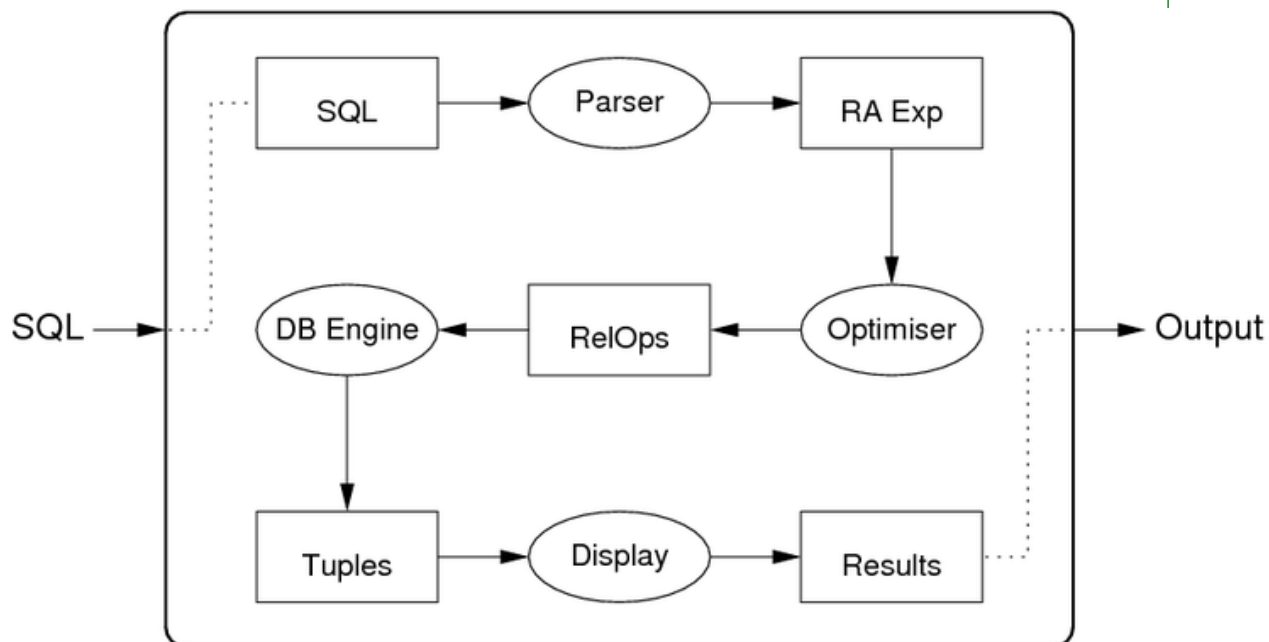- does not say *how* they should be computed (procedural)

A query evaluator/processor :

- takes declarative description of query (in SQL)
- parses query to internal representation (relational algebra)
- determines plan for answering query (expressed as DBMS ops)
- executes method via DBMS engine (to produce result tuples)

Some DBMSs can save query plans for later re-use.

❖ Query Processing (cont)

Internals of the query evaluation "black-box":

COMP9315 21T1 ◇ Query Processing ◇ [3/6]

<< ∧ >>

❖ Query Processing (cont)

DBMSs provide several "flavours" of each RA operation.

For example:

- several "versions" of selection (σ) are available
- each version is effective for a particular kind of selection, e.g

```
select * from R where id = 100   -- hashing
select * from S                  -- Btree index
where age > 18 and age < 35
select * from T                  -- MALH file
where a = 1 and b = 'a' and c = 1.4
```

Similarly, π and $\bowtie$ have versions to match specific query types.

COMP9315 21T1 ◇ Query Processing ◇ [4/6]

<< ∧ >>

❖ Query Processing (cont)

We call these specialised version of RA operations RelOps.

One major task of the query processor:

- given a RA expression to be evaluated
- find a combination of RelOps to do this efficiently

Requires the query translator/optimiser to consider

- information about relations (e.g. sizes, primary keys, ...)
- information about operations (e.g. selection reduces size)

RelOps are realised at execution time

- as a collection of inter-communicating nodes
- communicating either via pipelines or temporary relations

COMP9315 21T1 ◇ Query Processing ◇ [5/6]

<<   ∧

❖ Terminology Variations

Relational algebra expression of SQL query

- intermediate query representation
- logical query plan

Execution plan as collection of RelOps

- query evaluation plan
- query execution plan
- physical query plan

Representation of RA operators and expressions

- *σ = Select = Sel,   π = Project = Proj*
- *R ⋈ S = R Join S = Join(R,S),   ∧ = &,   ∨ = |*

COMP9315 21T1 ◇ Query Processing ◇ [6/6]

Produced: 5 Apr 2021