Optimizing SQL

AKA SQL Glitter Bombs

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- If you would like to take part in a SQL user group listserv, place a check next to your name.
- Quick poll (SIS/Database/SQL Client)

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Indexes

- Indexes are used to quickly locate data without having to search every row in a database table every time a database table is accessed. Indexes can be created using one or more columns of a database table, providing the basis for both rapid random lookups and efficient access of ordered records.
  -http://en.wikipedia.org/wiki/Database_index

```
select index_owner, index_name, table_owner, table_name,
       column_name
from all_ind_columns
where table_owner = 'PROD_SATURN’
  and table_name = 'SSBSECT'
;
```

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Select Statements

- List out desired columns in your select statement instead of selecting all columns.

- Instead of:

```
select *
from prod_saturn.ssbsect
;
```

- Use:

```
select ssbsect_term_code, ssbsect_crn, ssbsect_subj_code,
ssbsect_crse_numb
from prod_saturn.ssbsect
;
```

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Limit Returned Rows

- If you are simply exploring values, limit the number of rows returned. Your DBA will thank you.

- Use:

```
select *
from prod_saturn.ssbsect
where rownum < 100
;
```

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Having clause

- The `having` clause filters after all rows have been selected. Only use `having` when filtering transformation such as `group by`.

- Use:

```
select ssbsect_term_code, ssbsect_subj_code,
count(ssbsect_crn)
from prod_saturn.ssbsect
group by ssbsect_term_code, ssbsect_subj_code
having count(ssbsect_crn) > 100
```

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Minimize subquery blocks

- Subqueries process the outer query before processing the inner query. Use sparingly.

- Instead of:

```
SELECT name
FROM employee
WHERE salary = (SELECT MAX(salary) FROM employee_details)
AND age = (SELECT MAX(age) FROM employee_details)
AND dept = 'Psychology';
```

- Use:

```
SELECT name
FROM employee
WHERE (salary, age ) = (SELECT MAX (salary), MAX (age)
FROM employee_details)
AND dept = 'Psychology';
```

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EXISTS and IN

- Usually IN has the slowest performance.
- IN is efficient when most of the filter criteria is in the sub-query.
- EXISTS is efficient when most of the filter criteria is in the main query.

- Instead of:

```
select szrcbm1_pidm, szrcbm1_first_name
from prod_txcnmgr.szrcbm1
where szrcbm1_pidm in(select szrcbm8_pidm from
prod_txcnmgr.szrcbm8);
```

- Use:

```
select szrcbm1_pidm, szrcbm1_first_name
from prod_txcnmgr.szrcbm1
where exists (select *
              from prod_txcnmgr.szrcbm8
              where szrcbm1_pidm = szrcbm8_pidm);
```

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UNION and UNION ALL

- Instead of:

```
select program, courses
from txir.cat_programs
join dw_prog conc
  on bnr_conc = conc.dap_block_value
 and conc.dap_block_type = 'CONC'
union
select *
from txir.cat_programs
join dw_prog cert
  on bnr_cert = cert.dap_block_value
 and cert.dap_block_type = 'SPEC’
```

- Use:

```
select program, courses
from txir.cat_programs
join dw_prog conc
  on bnr_conc = conc.dap_block_value
 and conc.dap_block_type = 'CONC'
union all
select *
from txir.cat_programs
join dw_prog cert
  on bnr_cert = cert.dap_block_value
 and cert.dap_block_type = 'SPEC’
```

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Avoid NOT

- When possible, use logic operators as opposed to NOT
- Instead of:

```
select first_name, last_name
from person
where age != 18
```

- Use:

```
select first_name, last_name
from person
where age < 18
```

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Substrings instead of LIKE

- LIKE requires the processor to look through the entire string. Use substrings instead.
- Instead of:

```
select first_name, last_name
from person
where last_name like ‘Smi%’
```

- Use:

```
select first_name, last_name
from person
where substr(last_name,1,3) =‘Smi’
```

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Use views efficiently

- Check your select statement to see if variables truly need to be pulled from a view.
- If all variables in the select exist in a single table, use the table instead of the view.

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Check for unintentional Cartesian products

- Cartesian products or cross-joins return all rows in all tables listed in the query. They are usually a result of no relationship being defined between tables.

```
select ID, classification
from person, student
```

ID	classification
A1	FR
A1	SO
A1	JR
A1	SR
A2	FR
A2	SO
A2	JR
A2	SR

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Avoid transformed columns in the WHERE clause

- Instead of:

```
where
to_number(substring(ssbsect_term_code,instr(ssbsect_term_c
ode,2)) =
to_number(substring(szrcbm4_term_code,instr(ssbsect_term_c
ode,2))
```

- Use:

```
where ssbsect_term_code = szrcbm4_term_code
```

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Use binary logic instead of BETWEEN

- Instead of:

```
where age between(18 and 24)
```

- Use:

```
where age >=18 AND <=24
```

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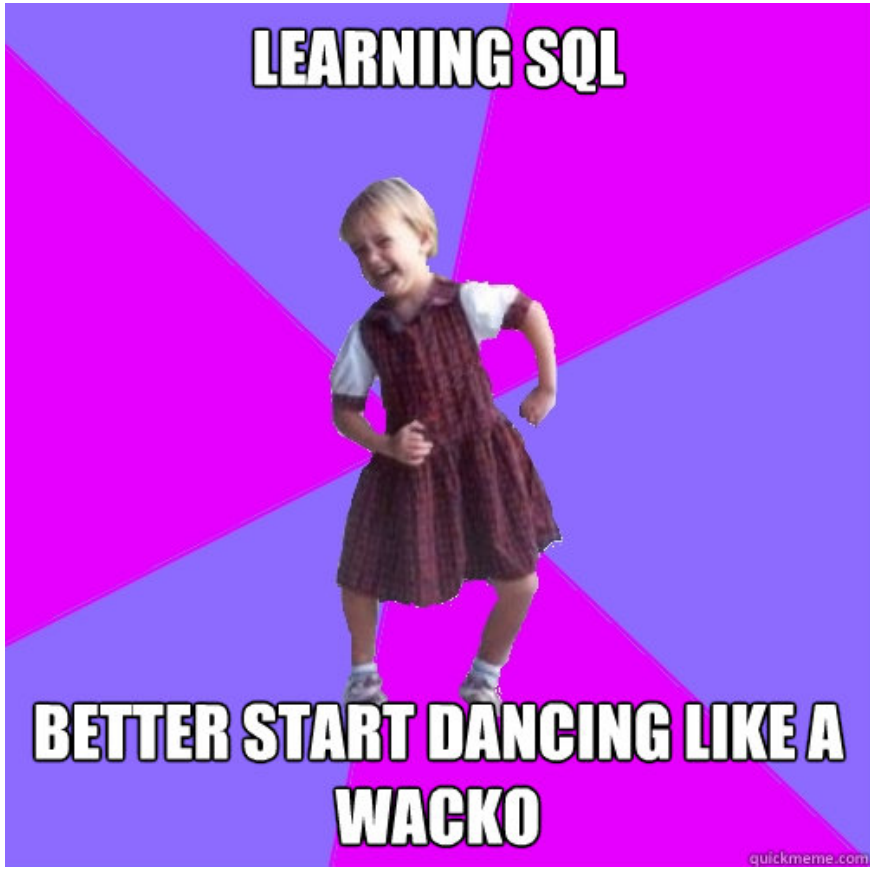
Questions or tips?



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Contact

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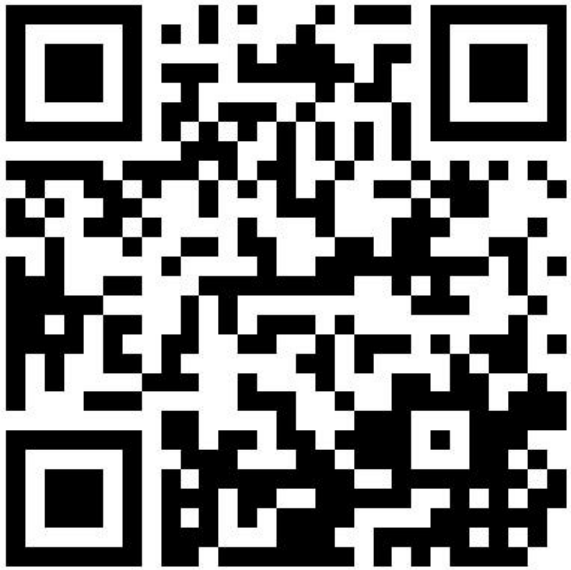

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SQL OPTIMIZATION CHEAT SHEET

Define Select Statements

Instead of:

```
SELECT *
FROM schema.table;
```

Use:

```
SELECT col1, col2, col3
FROM schema.table;
```

Avoid IN

Instead of:

```
SELECT name
FROM student
WHERE classification in('FR', 'SO');
```

Use:

```
SELECT name
FROM student
WHERE (classification = 'FR'
   OR  classification = 'SO');
```

Avoid NOT

When filtering on a column with few options,
list out the desired variables instead using NOT.

Instead of:

```
SELECT name
FROM student
WHERE level != 'UG';
```

Use:

```
SELECT name
FROM student
WHERE level = 'GR' OR level = 'DR'
```

Avoid BETWEEN

Instead of:

```
SELECT name
FROM person
WHERE age BETWEEN(18 AND 24);
```

Use:

```
SELECT name
FROM person
WHERE age >=18 AND age <=24;
```

SUBSTR instead of LIKE

Instead of:

```
SELECT first_name, last_name
FROM person
WHERE last_name like 'Smi%';
```

Use:

```
SELECT first_name, last_name
FROM person
WHERE substr(last_name,1,3) ='Smi';
```

Limit Returned Rows

When exploring data, limit the rows returned.

```
SELECT *
FROM schema.table
WHERE rownum <= 100;
```

Use UNION ALL

UNION will analyze data for duplicates.
UNION ALL simply appends the additional rows.

```
SELECT name
FROM student
UNION ALL
SELECT name
FROM employee;
```

Use JOIN to avoid Cartesian Products

Instead of:

```
SELECT first_name, last_name, major
FROM person, student
WHERE person.id = student.id;
```

Use:

```
SELECT first_name, last_name, major
FROM person
JOIN student
  ON person.id = student.id;
```

Minimize Subquery Blocks

Use sparingly and pull all variables in a single subquery, if possible.

Instead of:

```
SELECT name
FROM person
WHERE sch = (SELECT SUM(sch) FROM student)
AND gpa = (SELECT MAX(gpa) FROM student);
```

Use:

```
SELECT name
FROM person
WHERE (sch,gpa) = (SELECT SUM(sch),MAX(gpa)
FROM student);
```

Use Indexes

Filtering on indexes first leads to quicker results. Find indexes with:

```
SELECT index_owner, index_name, table_owner,
       table_name, column_name
FROM all_ind_columns
WHERE table_owner = <insert schema name>
  AND table_name = <insert table name>;
```

Use VIEWS efficiently

If all variables in the select exist in a single table,
use the table instead of the view.

To see the SQL behind a view:

```
SELECT text
FROM all_views
WHERE view_name = '<view_name>';
```


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