

CSCI235 – Database Systems

2019 S4

Implementation Task 1

15 October 2019

Scope

The Implementation of Task 1 is related to the contents of topic on indexing.

This Implementation is due by Saturday, 26 October 2019, 9:00 pm Singapore time. This task is worth 3% of the total assessment for the subject.

Only electronic submission through Moodle at:

<https://moodle.uowplatform.edu.au/>

is accepted. All email submission will be deleted and mark 0 ("zero") will be awarded.

The submission procedure is explained at the end of this specification.

Specification

Step 1

If you have not done it yet, download the TPCHR sample database and load the sample TPCHR using user account CSCI235. This will make the user account CSCI235 the owner of the TPCHR database.

Step 2

In this step we shall use the relational tables included in a sample TPCHR benchmark database owned by the user CSCI235. The conceptual schema of the sample database is included in the file tpchr.pdf.

The objective of this task is to find the smallest number of indexes that improve performance of a given collection of SELECT statements. We do not expect the best possible improvement in performance for each SELECT statement, however, processing of each SELECT statement must benefit from the existence of at least one of the indexes. An important objective is to minimize the total number of indexes created.

Implement SQL script solution.sql that performs the actions listed below.

1. First, the script finds query processing plans for each one of the queries listed below. Use EXPLAIN PLAN statement and a script showplan.sql to display the query processing plans

- i. SELECT O_ORDERSTATUS, O_ORDERDATE, O_TOTALPRICE
FROM ORDERS
ORDER BY O_ORDERDATE;

- ii. SELECT (SELECT COUNT(P_BRAND)
 FROM PART) TOTALBRAND,
 (SELECT COUNT(DISTINCT P_BRAND)
 FROM PART) DISTTOTALBRAND
FROM DUAL;

- iii. SELECT O_CLERK, COUNT(*)
FROM ORDERS
GROUP BY O_CLERK;

- iv. SELECT O_CLERK, O_ORDERDATE
FROM ORDERS
ORDER BY O_CLERK, O_ORDERDATE;

- v. SELECT O_CLERK, O_ORDERDATE
FROM ORDERS
WHERE O_CLERK = 'Clerk#000000446'
AND O_ORDERSTATUS = 'F';

- vi. SELECT COUNT(*)
FROM ORDERS;

- vii. SELECT O_CLERK, O_ORDERDATE, L_RECEIPTDATE
FROM ORDERS JOIN LINEITEM
 ON O_ORDERKEY = L_ORDERKEY
WHERE O_CLERK = 'Clerk#000000446'
AND O_ORDERSTATUS = 'F';

- viii. SELECT O_CLERK, O_ORDERDATE, O_TOTALPRICE
FROM ORDERS
WHERE O_CLERK = 'Clerk#000000446'
UNION
SELECT O_CLERK, O_ORDERDATE, O_TOTALPRICE
FROM ORDERS
WHERE O_TOTALPRICE > 400000;

- ix. SELECT C_NAME, O_TOTALPRICE
FROM CUSTOMER JOIN ORDERS
 ON C_CUSTKEY = O_CUSTKEY
WHERE C_MKTSEGMENT = 'AUTOMOBILE'
AND C_ACCTBAL < 500;

- x. SELECT P_PARTKEY, P_RETAILPRICE
FROM PART
WHERE P_RETAILPRICE < 1000;

2. Next, the script creates the smallest number of indexes such that processing of each one of the queries listed above benefits from the existence of at least one index.
3. Next, script lists the query processing plans for each one of the queries listed in a step. Use EXPLAIN PLAN statement and a script showplan.sql to display the query processing plans.
4. Finally, the script drops all indexes created in a step (2).

The script must be processed with SQL*Plus options ECHO and FEEDBACK set to ON such that all SQL statements processed are included in the report! To achieve that put the following statement at the beginning of your script:

```
SPOOL solution
SET ECHO ON
SET FEEDBACK ON
```

and the following statement at the end of the script:

```
SPOOL OFF
```

The report from processing of the script must have NO syntax errors!

Deliverables

A file solution.lst that contains a report from the processing of a script solution.sql.

Submissions

This assignment is due by 9:00 pm (21:00 hours) Saturday, 26 October 2019, **Singapore time.**

Submit the files **solution.pdf** through Moodle in the following way:

- 1) Access Moodle at **<http://moodle.uowplatform.edu.au/>**
- 2) To login use a Login link located in the right upper corner the Web page or in the middle of the bottom of the Web page
- 3) When successfully logged in, select a site CSCI235 (SP419) Database Systems
- 4) Scroll down to a section Submissions of Implementation Tasks
- 5) Click at Submit your Implementation Task 1 here link.
- 6) Click at a button Add Submission
- 7) Move the **solution.pdf** into an area provided in Moodle. You can drag and drop files here to add them. You can also use a link *Add...*
- 8) Click at a button Save changes,
- 9) Click at check box to confirm authorship of a submission,
- 10) When you are satisfied, remember to click at a button Submit assignment.

A policy regarding late submissions is included in the subject outline.

Only one submission per student is accepted.

Implementation Task 1 is an individual assessed task and it is expected that all its tasks will be solved individually without any cooperation with the other students. Plagiarism is treated seriously. Students involved will likely receive zero. If you have any doubts, questions, etc. please consult your lecturer or tutor during lab classes or over e-mail.

End of specification