

Introduction to Databases, ITU, Fall 2004

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Exercises on November 5

The exercises refer to the examples belonging to the lecture on “database efficiency”, which can be found on the course home page.

1. In Oracle, perform the preliminaries to enable autotrace, and get the sample data.
2. Run these example statements:

```
SELECT count(*) FROM projects WHERE last2='Gearloose' and last3='Rabbit';
INSERT INTO projects values ('Rasmus','Pagh',11,'Toger','Norgaard',10,'Lars','Bengtsson',10);
CREATE INDEX groupmembers23 on projects (last2,last3,first2,first3);
INSERT INTO projects values ('Rasmus','Pagh',13,'Toger','Norgaard',11,'Lars','Bengtsson',11);
SELECT count(*) FROM projects WHERE last2='Gearloose' and last3='Rabbit';
SELECT count(*) FROM projects WHERE last2='Gearloose';
SELECT count(*) FROM projects WHERE last3='Rabbit';
```

For each query notice the kind of scan used, as shown in the execution plan. Try to compare and explain the changes in the number of “db block gets” for similar operations. (This is the number of times the DBMS accesses a block of data, either part of an index or part of a relation. Not all of these give rise to physical gets, as some data is stored, “cached”, in main memory.)

3. Run these example statements:

```
SELECT count(*) FROM projects WHERE last1='Gearloose' and last2='Rabbit';
SELECT max(grade2) FROM projects WHERE last1='Gearloose' and last2='Rabbit';
```

Notice and explain any changes in the number of db block gets and physical reads.

4. Compare the speed of updates to the database with and without an index, as follows:
 - `commit` all previous changes.
 - Delete all projects with `grade1 < 6`. Note the time in seconds and the number of db gets / physical reads.
 - `rollback` to the previous state.
 - Create an index on `grade2`.
 - Again delete all projects with `grade1 < 6`. Again note the time in seconds and the number of db gets / physical reads.

To be handed in no later than November 12, 1 PM:

- Problem 3 from the exam, January 2004, available on the course home page under “useful links”, or directly at: <http://www.itu.dk/people/pagh/IDB04/exam.pdf>, **and**
- Problem 6 from the trial exam, December 2003, available on the course home page under “useful links”, or directly at: <http://www.itu.dk/people/pagh/IDB04/trialexam.pdf>