

TUGAS BESAR MANAJEMEN BASIS DATA TUNNING DATABASE SYSTEM



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BAB I

Studi Literatur

1.1 Tunning : Index

Pengindeksan adalah cara untuk mengoptimalkan kinerja database dengan meminimalkan jumlah akses disk yang diperlukan saat permintaan diproses. Ini adalah teknik struktur data yang digunakan untuk mencari dan mengakses data dalam database dengan cepat.

Indeks dibuat menggunakan beberapa kolom basis data. Kolom pertama adalah kunci pencarian yang berisi salinan kunci utama atau kunci kandidat dari tabel. Nilai-nilai ini disimpan dalam urutan diurutkan sehingga data yang sesuai dapat diakses dengan cepat. Catatan: Data mungkin atau mungkin tidak disimpan dalam urutan diurutkan.

Kolom kedua adalah Referensi Data atau Pointer yang berisi seperangkat pointer yang menyimpan alamat blok disk tempat nilai kunci tertentu dapat ditemukan.

1.2 Tunning : Konfigurasi Database Management Server

Database server adalah program komputer yang menyediakan layanan basis data untuk program komputer lainnya. Database server didefinisikan sebagai client server model. Database management system menyediakan fungsi-fungsi database server dan beberapa DBMS (seperti mysql) sangat eksklusif untuk client server model database access. Database server menyediakan fleksibilitas untuk konfigurasi database service yang kita inginkan

BAB II

Deskripsi Percobaan

2.1 Tuning : Indexing

1. Lakukan Generate Data terlebih dahulu
2. Eksekusi Query **Set Profiling = 1;**
3. Eksekusi query dibawah ini

Query

- 1) `SELECT * FROM student;`
 - 2) `SELECT * FROM student WHERE tot_cred > 30;`
 - 3) `SELECT name, dept_name FROM student WHERE tot_cred > 30;`
 - 4) `SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id;`
 - 5) `SELECT student.`name`,student.dept_name,takes.sec_id AS pengambilan,takes.semester,section.room_number,section.building,course.course_id,course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id;`
4. Setelah selesai melakukan eksekusi query di atas, kemudian lakukan indexing dengan menggunakan query dibawah

Indexing

- 1) `create index student_pk on student(name)`
 - 2) `create index section_pk on section(sec_id);`
5. Ulangi kembali tahap (3)
6. Eksekusi query **Show Profiles;**
7. Catat Waktu eksekusi query sebelum dan sesudah indexing

BAB III

Hasil dan Pembahasan

3.1 Screenshot dari setiap percobaan yang di lakukan

```
Command Prompt - mysql -u root
Query_ID | Duration | Query
+-----+-----+-----+
1 | 0.00034050 | SELECT * FROM student
2 | 0.00031880 | SELECT * FROM student WHERE tot_cred > 30
3 | 0.00027550 | SELECT name, dept_name FROM student WHERE tot_cred > 30
4 | 0.00904110 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
5 | 0.00571500 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id
5 rows in set (0.00 sec)

MariaDB [dbms1]>
```

Gambar 1 Data 1 Sebelum Tunning Indexing

```
Command Prompt - mysql -u root
Query_ID | Duration | Query
+-----+-----+-----+
1 | 0.02744650 | create index student_pk1 on student(name)
2 | 0.02246900 | create index section_pk on section(sec_id)
3 | 0.00038730 | SELECT * FROM student
4 | 0.00044450 | SELECT * FROM student WHERE tot_cred > 30
5 | 0.00028820 | SELECT name, dept_name FROM student WHERE tot_cred > 30
6 | 0.00206600 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
7 | 0.00205480 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id
```

Gambar 2 Data 1 Setelah Tunning Indexing

```

Command Prompt - mysql -u root

|      8 | 0.00032770 | SELECT * FROM student
|
|      9 | 0.00040840 | SELECT * FROM student WHERE tot_cred > 30
|
|     10 | 0.00038520 | SELECT name, dept_name FROM student WHERE tot_cred > 30
|
|     11 | 0.00313990 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
|
|     12 | 0.00225540 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id
+-----+
12 rows in set (0.00 sec)

MariaDB [dbms2]>

```

Gambar 3 Data 2 Sebelum Tunning Indexing

```

Command Prompt - mysql -u root

+-----+
| Query_ID | Duration | Query
+-----+
|
|      1 | 0.02826690 | create index student_pk on student(name)
|
|      2 | 0.02603660 | create index section_pk on section(sec_id)
|
|      3 | 0.00041110 | SELECT * FROM student
|
|      4 | 0.00043750 | SELECT * FROM student WHERE tot_cred > 30
|
|      5 | 0.00039070 | SELECT name, dept_name FROM student WHERE tot_cred > 30
|
|      6 | 0.00310000 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
|
|      7 | 0.00639050 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id
|
|      8 | 0.00011320 | set profiles
+-----+

```

Gambar 4 Data 2 Setelah Tunning Indexing

```

Command Prompt - mysql -u root
| Query_ID | Duration | Query
+-----+-----+-----+
| 1 | 0.00493580 | SELECT * FROM student
+-----+-----+-----+
| 2 | 0.00050490 | SELECT * FROM student WHERE tot_cred > 30
+-----+-----+-----+
| 3 | 0.00040750 | SELECT name, dept_name FROM student WHERE tot_cred > 30
+-----+-----+-----+
| 4 | 0.01637730 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id =
section.course_id
+-----+-----+-----+
| 5 | 0.01125740 | SELECT student.`name`,student.dept_name,takes.sec_id AS pengambilan,takes.semester,section.r
oom_number,section.building,course.course_id,course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN se
ction ON takes.course_id = section.course_id JOIN course ON section.course_id = course.cou
+-----+-----+-----+
5 rows in set (0.00 sec)

MariaDB [dbms3]>

```

Gambar 5 Data 3 Sebelum Tuning Indexing

```

Command Prompt - mysql -u root
| 6 | 0.02376470 | create index student_pk on student(name)
+-----+-----+-----+
| 7 | 0.00044070 | create index section_pk on section(sec_id)
+-----+-----+-----+
| 8 | 0.00050380 | SELECT * FROM student
+-----+-----+-----+
| 9 | 0.00050330 | SELECT * FROM student WHERE tot_cred > 30
+-----+-----+-----+
| 10 | 0.00043410 | SELECT name, dept_name FROM student WHERE tot_cred > 30
+-----+-----+-----+
| 11 | 0.01004160 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id =
section.course_id
+-----+-----+-----+
| 12 | 0.00681450 | SELECT student.`name`,student.dept_name,takes.sec_id AS pengambilan,takes.semester,section.r
oom_number,section.building,course.course_id,course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN se
ction ON takes.course_id = section.course_id JOIN course ON section.course_id = course.cou
+-----+-----+-----+
12 rows in set (0.00 sec)

MariaDB [dbms3]>

```

Gambar 6 Data 3 Setelah Tuning Indexing

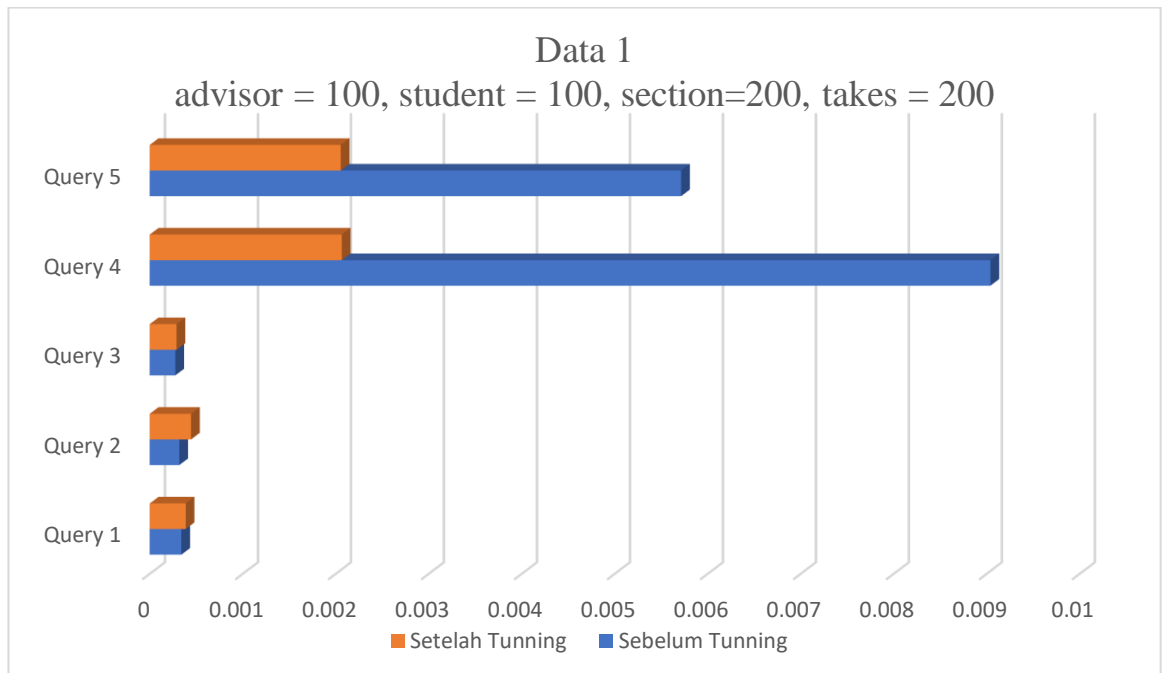
```
Command Prompt - mysql -u root
MariaDB [dbms4]> show profiles;
+-----+-----+-----+
| Query_ID | Duration | Query |
+-----+-----+-----+
| 1 | 0.00064950 | SELECT * FROM student |
| 2 | 0.00055320 | SELECT * FROM student WHERE tot_cred > 30 |
| 3 | 0.00047350 | SELECT name, dept_name FROM student WHERE tot_cred > 30 |
| 4 | 0.04374480 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id |
| 5 | 0.03511280 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.cou |
14 rows in set (0.00 sec)
```

Gambar 7 Data 4 Sebelum Tuning Indexing

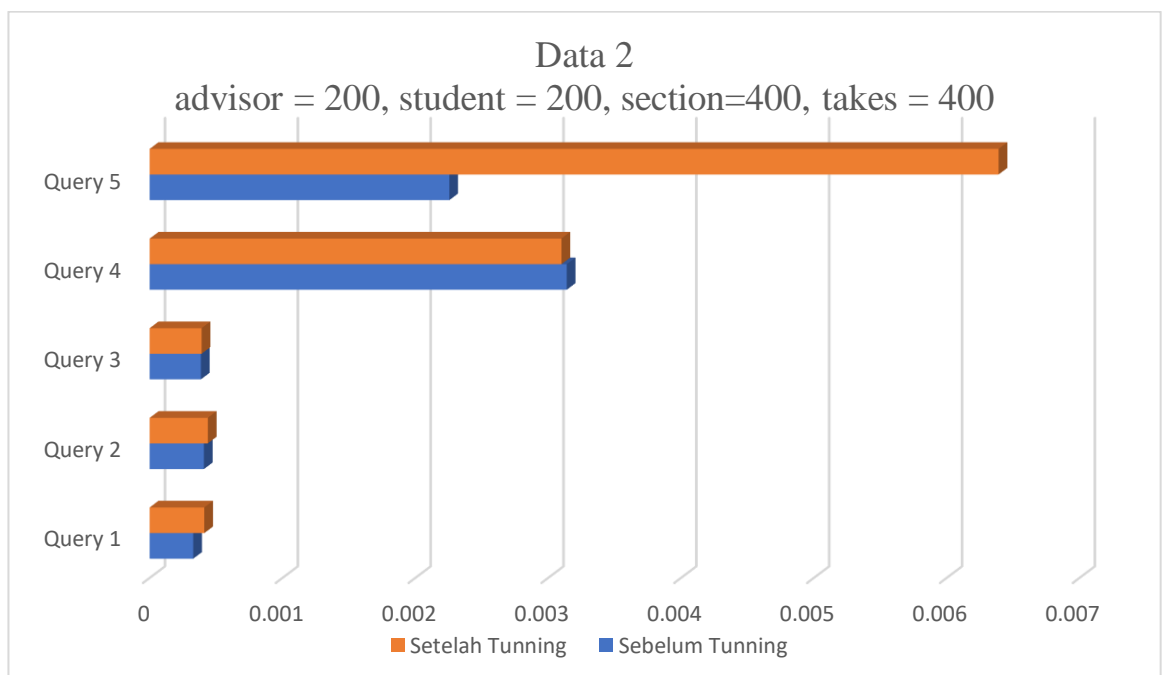
```
Command Prompt - mysql -u root
MariaDB [dbms4]>
8 | 0.03155210 | create index section_pk1 on section(sec_id)
9 | 0.02583500 | create index student_pk1 on student(name)
10 | 0.00066970 | SELECT * FROM student
11 | 0.00065000 | SELECT * FROM student WHERE tot_cred > 30
12 | 0.00047450 | SELECT name, dept_name FROM student WHERE tot_cred > 30
13 | 0.03603940 | SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
14 | 0.02291150 | SELECT student.`name`, student.dept_name, takes.sec_id AS pengambilan, takes.semester, section.room_number, section.building, course.course_id, course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.cou
14 rows in set (0.00 sec)
```

Gambar 8 Data 4 Sebelum tuning Indexing

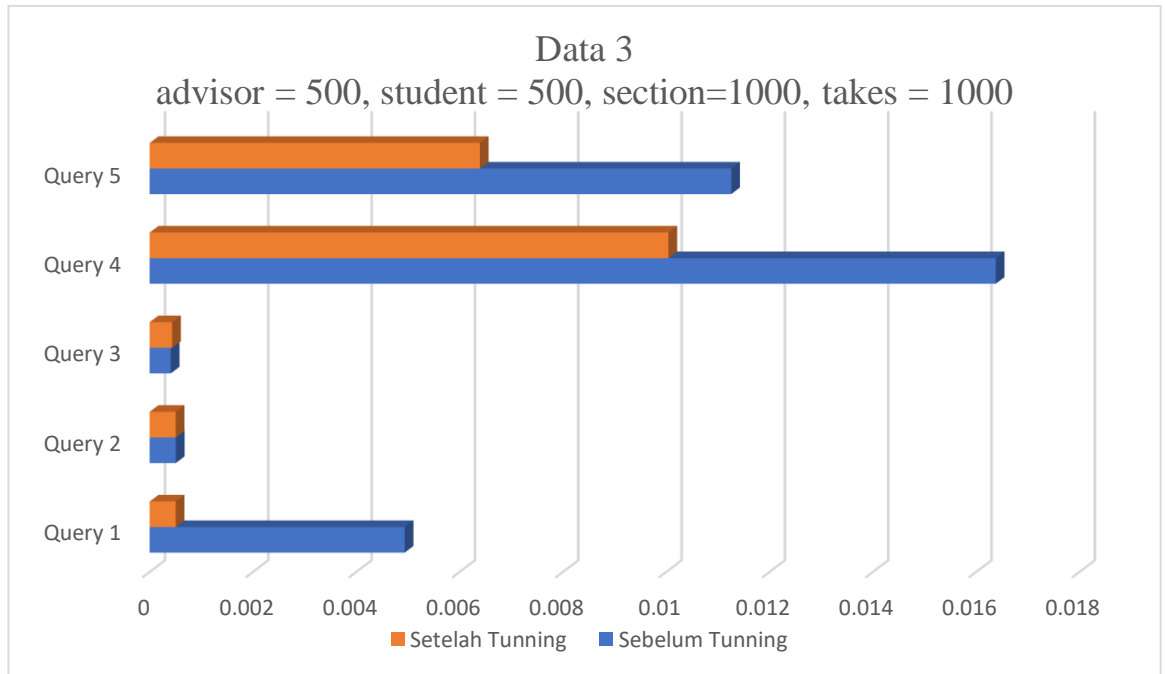
3.2 Grafik Hasil



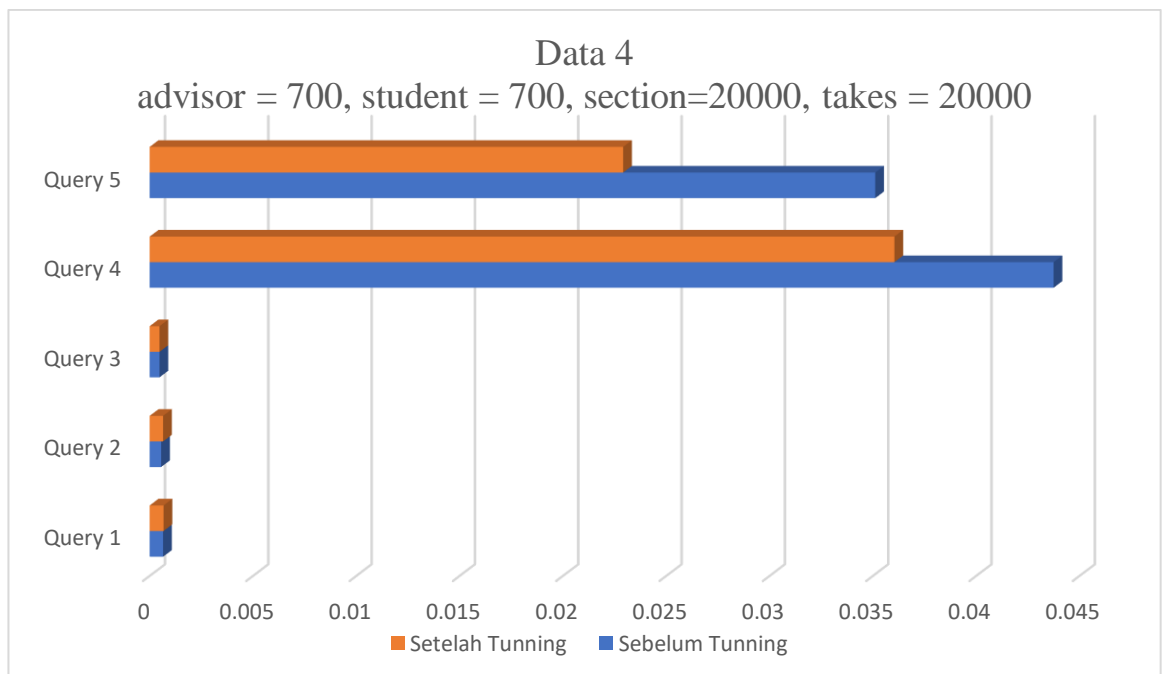
Gambar 9 Grafik Data 1 Perbedaan eksekusi Query sebelum dan sesudah Tuning



Gambar 10 Grafik Data 2 Perbedaan eksekusi Query sebelum dan sesudah Tuning



Gambar 11 Grafik Data 3 Perbedaan eksekusi Query sebelum dan sesudah Tuning



Gambar 12 Grafik Data 4 Perbedaan eksekusi Query sebelum dan sesudah Tuning

3.3 Pembahasan

Dari hasil yang telah diperoleh seperti pada grafik , Didapatkan kesimpulan bahwa tuning dengan indexing menghasilkan eksekusi query lebih cepat pada query 4 dan query 5, selain itu, pada query 1, query 2, dan query 3 didapatkan hasil yang relative sama antara sebelum diindexing dan setelah diindexing.

DAFTAR PUSTAKA

<https://www.geeksforgeeks.org/indexing-in-databases-set-1/>

nurkamilahaprilia07.blogspot.com/2016/11/konfigurasi-database-server-menggunakan.html