

**LAPORAN TUGAS BESAR  
MANAGEMENT BASIS DATA  
TUNING**



**Dosen Pengampu :**

Ahmad Luky Ramdani, S.Kom, M.Kom.

disusun oleh :

Fatin Delfiandita

(14117087)

Kelas- RA

**PROGRAM STUDI TEKNIK INFORMATIKA  
INSTITUT TEKNOLOGI SUMATERA  
2019**

## DAFTAR ISI

DAFTAR ISI.....	1
BAB I.....	2
STUDI LITERATUR.....	2
1.1    Tuning : Indexing.....	2
1.2    Tuning : Setting Configuration DBMS.....	2
BAB II .....	3
DESKRIPSI PERCOBAAN.....	3
2.1    Tunning : Indexing.....	3
2.2    Tunning : Setting Configuration DBMS.....	16
BAB III .....	17
HASIL DAN PEMBAHASAN .....	17
3.1 Hasil.....	17
3.2 Pembahasan.....	18
Daftar Pustaka.....	19

# **BAB I**

## **STUDI LITERATUR**

### **1.1 Tuning : Indexing**

Index adalah sebuah objek dalam sistem database yang dapat mempercepat proses pencarian (query) data. Index adalah *daftar isi* yang dapat dipakai oleh query tanpa perlu membaca isi tabel secara langsung. Tujuan adanya index dalam database antara lain adalah untuk mempercepat pencarian data berdasarkan kolom tertentu. Tanpa adanya sebuah index pada database, kinerja database sangat menurun dengan sangat signifikan. Hal ini dikarenakan resource CPU banyak digunakan untuk pencarian data atau pengaksesan query SQL dengan metode table-scan. Index membuat pencarian data akan lebih cepat dan tidak banyak menghabiskan resource CPU.

Index diperlukan pada saat ada kondisi tabel dengan besar, kolom sering digunakan sebagai kondisi dalam query, kebanyakan query menampilkan data lebih dari 2-10% dari seluruh data dan tabel jarang di perbarui. Ada beberapa perbedaan clustered index dan non clustered index pada sql server yaitu dalam clustered index hanya terdiri dalam satu tabel atau hanya dapat diterapkan satu kali pada satu tabel, sedangkan pada non clustered index boleh lebih dari satu(banyak).

### **1.2 Tuning : Setting Configuration DBMS**

Untuk melakukan performance tuning pada PostgreSQL dengan skala bisnis dengan konfigurasi manajemen database digunakan database administrator yang akan menganalisis parameter konfigurasi database PostgreSQL dan merekomendasikan konfigurasi optimal sesuai dengan workload Anda.

## BAB II

### DESKRIPSI PERCOBAAN

#### 2.1 Tuning : Indexing

Dengan menggunakan database yang sudah ditentukan dan untuk melakukan tuning index, maka diperlukan data waktu sebelum di tuning dan sesudah dituning untuk dapat membandingkan keduanya, akan dijelaskan pada deskripsi di bawah ini :

```
MariaDB [mbd]> CREATE INDEX ind_student ON student(ID, TOT_CRED) USING BTREE;
Query OK, 0 rows affected (0.47 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [mbd]> CREATE INDEX ind_TAKES ON takes(ID) USING BTREE;
Query OK, 0 rows affected (0.23 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [mbd]> CREATE INDEX ind_takes ON takes(ID,course_id) USING BTREE;
ERROR 1061 (42000): Duplicate key name 'ind_takes'
MariaDB [mbd]> CREATE INDEX ind_takes2 ON takes(ID,course_id) USING BTREE;
Query OK, 0 rows affected (0.63 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [mbd]> CREATE INDEX ind_course ON section(course_id) USING BTREE;
Query OK, 0 rows affected (0.61 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

2.1.2 Data 1 (advisor = 100, student = 100, section = 200,takes = 200)

1. Dengan menggunakan query 1 (SELECT \* FROM student)

Waktu eksekusi sebelum dituning :

79128	Kiki	GO	2
81639	Ahmad	GF	22
82155	Ande	MT	4
84337	Ahmad	DK	116
84701	Kiki	GF	28
85750	Yohan	GT	95
87494	Adri	GO	32
87531	Adri	GT	74
87719	Johan	GT	20
88778	Adri	DK	96
88987	Ahmad	MT	92
89069	Yohan	KL	51
90950	Josu	DE	103
90998	Yohan	RR	39
91655	Ande	GF	89
92405	rahmat	DK	129
95660	Budi	GF	75
96137	Johan	GF	0
9804	Josu	DE	29
99254	Yohan	SS	50
99845	Yohan	GO	84

100 rows in set (0.16 sec)

Waktu eksekusi sesudah dituning :

82547	Johan	RR	24
83300	Budi	WM	72
85396	Ahmad	KL	124
8569	rahmat	RQ	110
85864	rahmat	KL	3
86744	Yohan	KL	43
87116	Budi	BN	64
87229	rahmat	DK	69
88008	rahmat	SS	99
88346	Ahmad	GT	101
88485	Budi	BN	90
89688	yuyun	RQ	25
91218	Kiki	WM	80
94376	yuyun	WM	128
95856	Adri	SS	7
97601	Ande	KL	47
98034	Johan	SS	44
99066	Budi	FR	9
99359	Yohan	DK	127
99400	yuyun	RQ	12

+-----+-----+-----+-----+

100 rows in set (0.00 sec)

2. Dengan menggunakan query 2 (SELECT \* FROM student WHERE tot\_cred > 30)

Waktu eksekusi sebelum menggunakan tuning :

69219	Kiki	DK	64
70421	rahmat	GO	93
71736	rahmat	DE	90
73742	Ande	GT	55
74813	Yohan	DK	113
75883	Kiki	GO	122
77805	Johan	IF	122
78639	Johan	DK	118
84337	Ahmad	DK	116
85750	Yohan	GT	95
87494	Adri	GO	32
87531	Adri	GT	74
88778	Adri	DK	96
88987	Ahmad	MT	92
89069	Yohan	KL	51
90950	Josu	DE	103
90998	Yohan	RR	39
91655	Ande	GF	89
92405	rahmat	DK	129
95660	Budi	GF	75
99254	Yohan	SS	50
99845	Yohan	GO	84

+-----+-----+-----+-----+

71 rows in set (0.01 sec)

Sesudah menggunakan tuning :

66916	yuyun	GT	72
67575	Kiki	DK	59
68769	rahmat	KL	55
74113	Johan	RQ	51
75920	yuyun	DK	53
76902	Josu	SS	47
80976	Adri	SS	74
81939	rahmat	BN	31
82315	yuyun	WW	124
83300	Budi	WW	72
85396	Ahmad	KL	124
8569	rahmat	RQ	110
86744	Yohan	KL	43
87116	Budi	BN	64
87229	rahmat	DK	69
88008	rahmat	SS	99
88346	Ahmad	GT	101
88485	Budi	BN	90
91218	Kiki	WW	80
94376	yuyun	WW	128
97601	Ande	KL	47
98034	Johan	SS	44
99359	Yohan	DK	127

81 rows in set (0.00 sec)

3. Dengan menggunakan query 3 (SELECT `name`, department FROM student WHERE tot\_cred > 30)

Sebelum menggunakan tuning :

Ande	GT
Yohan	DK
Kiki	GO
Johan	IF
Johan	DK
Ahmad	DK
Yohan	GT
Adri	GO
Adri	GT
Adri	DK
Ahmad	MT
Yohan	KL
Josu	DE
Yohan	RR
Ande	GF
rahmat	DK
Budi	GF
Yohan	SS
Yohan	GO

71 rows in set (0.00 sec)

Sesudah menggunakan tuning :

```

+-----+
| Josu | GO |
| rahmat | DF |
| Budi | GO |
| Kiki | GF |
| rahmat | HH |
| yuyun | DF |
| Yohan | GO |
| Adri | GO |
| Johan | HH |
| Yohan | MT |
| Adri | GO |
| Ande | BN |
| Kiki | KL |
| Kiki | DF |
| Ande | GT |
| Josu | DF |
| Yohan | MT |
| yuyun | HH |
| Johan | BN |
| Budi | GF |
| yuyun | DF |
| Adri | DE |
| Ahmad | GO |
| Johan | GO |
| Josu | HH |
+-----+
158 rows in set (0.00 sec)

```

4. Dengan menggunakan query 4 (SELECT \* FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course\_id = section.course\_id)

Sebelum menggunakan tuning :

```

+-----+
| 91655 | 609 | 1 | Spring | 2010 | A | 91655 | Ande | GF | 89 | 609 | 1 | Spring | 2010 | H | 841 | G |
| 92485 | 856 | 2 | Spring | 2009 | C | 92485 | rahmat | DK | 129 | 856 | 1 | Fall | 2008 | J | 157 | F |
| 92485 | 856 | 2 | Spring | 2009 | C | 92485 | rahmat | DK | 129 | 856 | 2 | Spring | 2009 | C | 460 | H |
| 95660 | 838 | 1 | Spring | 2001 | A- | 95660 | Budi | GF | 75 | 838 | 1 | Spring | 2001 | H | 501 | M |
| 9804 | 473 | 1 | Spring | 2006 | B+ | 9804 | Josu | DE | 29 | 473 | 1 | Spring | 2006 | J | 157 | O |
| 9804 | 473 | 1 | Spring | 2006 | B+ | 9804 | Josu | DE | 29 | 473 | 2 | Fall | 2003 | J | 157 | M |
| 9804 | 473 | 1 | Spring | 2006 | B+ | 9804 | Josu | DE | 29 | 473 | 3 | Spring | 2002 | H | 865 | J |
| 9804 | 473 | 1 | Spring | 2006 | B+ | 9804 | Josu | DE | 29 | 473 | 4 | Spring | 2006 | J | 945 | D |
+-----+
370 rows in set (0.00 sec)

```

Sesudah menggunakan tuning :

```

+-----+
| 11 | 2007 | E | 2 | 769 | Spring | D | 2003 | B | 95856 | Adri | SS | 7 | 785 | 2 | Sp |
| 95856 | 785 | I | 2 | 17 | Spring | F | 2003 | B | 95856 | Adri | SS | 7 | 785 | 3 | Sp |
| 95856 | 785 | E | 2 | 769 | Spring | M | 2003 | A- | 97601 | Ande | KL | 47 | 785 | 1 | Fa |
| 97601 | 785 | E | 2 | 769 | Spring | D | 2003 | A- | 97601 | Ande | KL | 47 | 785 | 2 | Sp |
| 97601 | 785 | I | 2 | 17 | Spring | F | 2003 | A- | 97601 | Ande | KL | 47 | 785 | 3 | Sp |
| 97601 | 785 | E | 2 | 769 | Spring | M | 2006 | C- | 99066 | Budi | FR | 9 | 460 | 1 | Sp |
| 99066 | 460 | B | 2 | 508 | Spring | H | 2006 | C- | 99066 | Budi | FR | 9 | 460 | 2 | Sp |
| 99066 | 460 | G | 2 | 198 | Spring | N | 2006 | C- | 99066 | Budi | FR | 9 | 460 | 3 | Sp |
| 99066 | 460 | D | 2 | 145 | Spring | H | 2010 | C- | 99359 | Yohan | DK | 127 | 333 | 1 | Sp |
| 99359 | 333 | I | 1 | 94 | Spring | I | 2006 | B- | 99359 | Yohan | DK | 127 | 378 | 1 | Fa |
| 99359 | 378 | G | 2 | 198 | Fall | G | 2006 | B- | 99359 | Yohan | DK | 127 | 378 | 2 | Fa |
| 99359 | 378 | I | 2 | 94 | Fall | F | 2009 | A | 99400 | yuyun | RQ | 12 | 184 | 1 | Fa |
| 99400 | 184 | G | 1 | 198 | Fall | B |
+-----+
393 rows in set (0.00 sec)

```

5. Dengan menggunakan query 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).

Sesudah menggunakan tuning :

```

Command Prompt - mysql -u root
+-----+-----+-----+-----+-----+-----+-----+-----+
| Kiki | WW | 1 | Fall | 198 | G | 835 | SS |
| Kiki | WW | 1 | Fall | 94 | I | 835 | SS |
| Kiki | WW | 2 | Spring | 588 | B | 933 | GT |
| Kiki | WW | 2 | Spring | 234 | C | 933 | GT |
| yuyun | WW | 1 | Fall | 234 | C | 160 | FR |
| yuyun | WW | 1 | Spring | 198 | G | 549 | FR |
| Adri | SS | 1 | Spring | 198 | G | 512 | SS |
| Adri | SS | 1 | Spring | 94 | I | 686 | BN |
| Adri | SS | 1 | Fall | 769 | E | 720 | FR |
| Adri | SS | 1 | Fall | 629 | C | 720 | FR |
| Adri | SS | 1 | Spring | 17 | I | 778 | SS |
| Adri | SS | 1 | Spring | 234 | C | 778 | SS |
| Adri | SS | 1 | Spring | 234 | C | 778 | SS |
| Adri | SS | 2 | Spring | 769 | E | 785 | FR |
| Adri | SS | 2 | Spring | 17 | I | 785 | FR |
| Adri | SS | 2 | Spring | 769 | E | 785 | FR |
| Ande | KL | 2 | Spring | 769 | E | 785 | FR |
| Ande | KL | 2 | Spring | 17 | I | 785 | FR |
| Ande | KL | 2 | Spring | 769 | E | 785 | FR |
| Budi | FR | 2 | Spring | 588 | B | 460 | BN |
| Budi | FR | 2 | Spring | 198 | G | 460 | BN |
| Budi | FR | 2 | Spring | 145 | D | 460 | BN |
| Yohan | DK | 1 | Spring | 94 | I | 333 | KL |
| Yohan | DK | 2 | Fall | 198 | G | 378 | WW |
| Yohan | DK | 2 | Fall | 94 | I | 378 | WW |
| yuyun | RQ | 1 | Fall | 198 | G | 104 | WW |
+-----+-----+-----+-----+-----+-----+-----+-----+
393 rows in set (0.01 sec)

```

2.1.3 Data 2 (advisor = 200, student = 200, section = 400,takes = 400)

1. Dengan menggunakan query 1 (SELECT \* FROM student)

Waktu sebelum dituning :

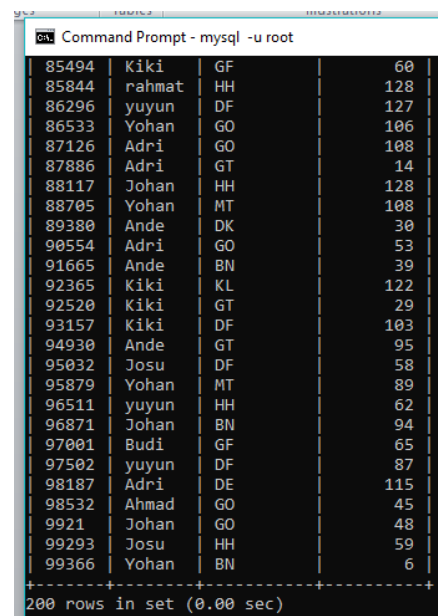
```

Command Prompt - mysql -u root
+-----+-----+-----+-----+
| 85494 | Kiki | GF | 60 |
| 85844 | rahmat | HH | 128 |
| 86296 | yuyun | DF | 127 |
| 86533 | Yohan | GO | 106 |
| 87126 | Adri | GO | 108 |
| 87886 | Adri | GT | 14 |
| 88117 | Johan | HH | 128 |
| 88705 | Yohan | MT | 108 |
| 89380 | Ande | DK | 30 |
| 90554 | Adri | GO | 53 |
| 91665 | Ande | BN | 39 |
| 92365 | Kiki | KL | 122 |
| 92520 | Kiki | GT | 29 |
| 93157 | Kiki | DF | 103 |
| 94930 | Ande | GT | 95 |
| 95032 | Josu | DF | 58 |
| 95879 | Yohan | MT | 89 |
| 96511 | yuyun | HH | 62 |
| 96871 | Johan | BN | 94 |
| 97001 | Budi | GF | 65 |
| 97502 | yuyun | DF | 87 |
| 98187 | Adri | DE | 115 |
| 98532 | Ahmad | GO | 45 |
| 9921 | Johan | GO | 48 |
| 99293 | Josu | HH | 59 |
| 99366 | Yohan | BN | 6 |
+-----+-----+-----+-----+
200 rows in set (0.00 sec)

```



Waktu sesudah dituning :



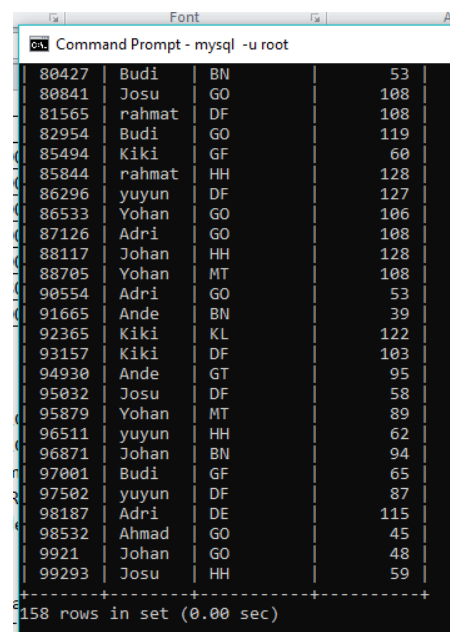
Command Prompt - mysql -u root

85494	Kiki	GF	60
85844	rahmat	HH	128
86296	yuyun	DF	127
86533	Yohan	GO	106
87126	Adri	GO	108
87886	Adri	GT	14
88117	Johan	HH	128
88705	Yohan	MT	108
89380	Ande	DK	30
90554	Adri	GO	53
91665	Ande	BN	39
92365	Kiki	KL	122
92520	Kiki	GT	29
93157	Kiki	DF	103
94930	Ande	GT	95
95032	Josu	DF	58
95879	Yohan	MT	89
96511	yuyun	HH	62
96871	Johan	BN	94
97001	Budi	GF	65
97502	yuyun	DF	87
98187	Adri	DE	115
98532	Ahmad	GO	45
9921	Johan	GO	48
99293	Josu	HH	59
99366	Yohan	BN	6

200 rows in set (0.00 sec)

2. Dengan menggunakan query 2 (SELECT \* FROM student WHERE tot\_cred > 30)

Waktu sebelum dituning :

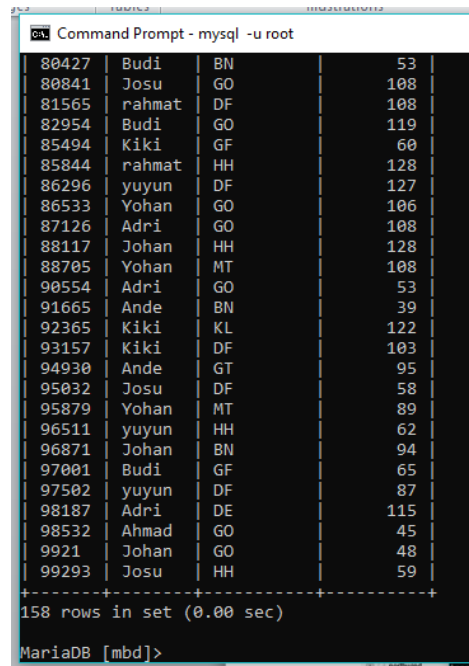


Command Prompt - mysql -u root

80427	Budi	BN	53
80841	Josu	GO	108
81565	rahmat	DF	108
82954	Budi	GO	119
85494	Kiki	GF	60
85844	rahmat	HH	128
86296	yuyun	DF	127
86533	Yohan	GO	106
87126	Adri	GO	108
88117	Johan	HH	128
88705	Yohan	MT	108
90554	Adri	GO	53
91665	Ande	BN	39
92365	Kiki	KL	122
93157	Kiki	DF	103
94930	Ande	GT	95
95032	Josu	DF	58
95879	Yohan	MT	89
96511	yuyun	HH	62
96871	Johan	BN	94
97001	Budi	GF	65
97502	yuyun	DF	87
98187	Adri	DE	115
98532	Ahmad	GO	45
9921	Johan	GO	48
99293	Josu	HH	59

158 rows in set (0.00 sec)

Waktu sesudah dituning :



```

Command Prompt - mysql -u root

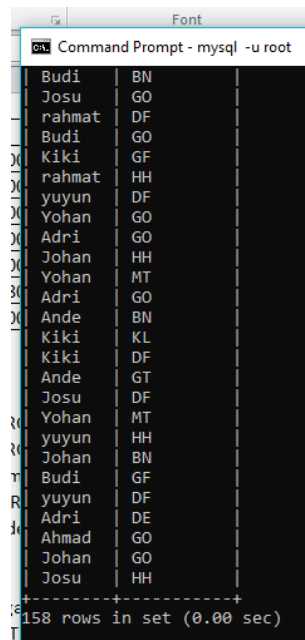
+-----+-----+-----+-----+
| 80427 | Budi  | BN   | 53  |
| 80841 | Josu  | GO   | 108 |
| 81565 | rahmat | DF   | 108 |
| 82954 | Budi  | GO   | 119 |
| 85494 | Kiki  | GF   | 60  |
| 85844 | rahmat | HH   | 128 |
| 86296 | yuyun | DF   | 127 |
| 86533 | Yohan | GO   | 106 |
| 87126 | Adri  | GO   | 108 |
| 88117 | Johan | HH   | 128 |
| 88705 | Yohan | MT   | 108 |
| 90554 | Adri  | GO   | 53  |
| 91665 | Ande  | BN   | 39  |
| 92365 | Kiki  | KL   | 122 |
| 93157 | Kiki  | DF   | 103 |
| 94930 | Ande  | GT   | 95  |
| 95032 | Josu  | DF   | 58  |
| 95879 | Yohan | MT   | 89  |
| 96511 | yuyun | HH   | 62  |
| 96871 | Johan | BN   | 94  |
| 97001 | Budi  | GF   | 65  |
| 97502 | yuyun | DF   | 87  |
| 98187 | Adri  | DE   | 115 |
| 98532 | Ahmad | GO   | 45  |
| 9921  | Johan | GO   | 48  |
| 99293 | Josu  | HH   | 59  |
+-----+-----+-----+-----+
158 rows in set (0.00 sec)

MariaDB [mbd]>

```

3. Dengan menggunakan query 3 (SELECT `name`, department FROM student WHERE tot\_cred > 30)

Sebelum menggunakan tuning :



```

Font
Command Prompt - mysql -u root

+-----+-----+-----+
| Budi  | BN   |      |
| Josu  | GO   |      |
| rahmat | DF   |      |
| Budi  | GO   |      |
| Kiki  | GF   |      |
| rahmat | HH   |      |
| yuyun | DF   |      |
| Yohan | GO   |      |
| Adri  | GO   |      |
| Johan | HH   |      |
| Yohan | MT   |      |
| Adri  | GO   |      |
| Ande  | BN   |      |
| Kiki  | KL   |      |
| Kiki  | DF   |      |
| Ande  | GT   |      |
| Josu  | DF   |      |
| Yohan | MT   |      |
| yuyun | HH   |      |
| Johan | BN   |      |
| Budi  | GF   |      |
| yuyun | DF   |      |
| Adri  | DE   |      |
| Ahmad | GO   |      |
| Johan | GO   |      |
| Josu  | HH   |      |
+-----+-----+-----+
158 rows in set (0.00 sec)

```

Sesudah menggunakan tuning :

Command Prompt - mysql -u root

Budi	BN
Josu	GO
rahmat	DF
Budi	GO
Kiki	GF
rahmat	HH
yuyun	DF
Yohan	GO
Adri	GO
Johan	HH
Yohan	MT
Adri	GO
Ande	BN
Kiki	KL
Kiki	DF
Ande	GT
Josu	DF
Yohan	MT
yuyun	HH
Johan	BN
Budi	GF
yuyun	DF
Adri	DE
Ahmad	GO
Johan	GO
Josu	HH

158 rows in set (0.00 sec)

4. Dengan menggunakan query 4 (SELECT \* FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course\_id = section.course\_id)

Sebelum menggunakan tuning :

99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	2	Fall	2005	G	40
99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	3	Spring	2005	J	10
99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	4	Spring	2004	J	10
99366	831	1	Fall	2010	B+	99366	Yohan	BN	6	831	1	Fall	2010	D	70
99366	831	1	Fall	2010	B+	99366	Yohan	BN	6	831	2	Spring	2010	G	39
99366	904	1	Spring	2008	C+	99366	Yohan	BN	6	904	1	Spring	2008	G	39
99366	904	1	Spring	2008	C+	99366	Yohan	BN	6	904	2	Fall	2010	D	58

1245 rows in set (0.01 sec)

Sesudah menggunakan tuning :

99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	1	Fall	2008	J	10
99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	2	Fall	2005	G	40
99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	3	Spring	2005	J	10
99366	446	3	Spring	2005	A	99366	Yohan	BN	6	446	4	Spring	2004	J	10
99366	831	1	Fall	2010	B+	99366	Yohan	BN	6	831	1	Fall	2010	D	70
99366	831	1	Fall	2010	B+	99366	Yohan	BN	6	831	2	Spring	2010	G	39
99366	904	1	Spring	2008	C+	99366	Yohan	BN	6	904	1	Spring	2008	G	39
99366	904	1	Spring	2008	C+	99366	Yohan	BN	6	904	2	Fall	2010	D	58

1245 rows in set (0.00 sec)

5. Dengan menggunakan query 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)

Sebelum menggunakan tuning :

Johan	GO	3	Spring	394	G	749	DE
Josu	HH	1	Spring	406	G	504	DK
Josu	HH	1	Spring	662	G	504	DK
Josu	HH	1	Spring	349	A	504	DK
Josu	HH	1	Spring	349	A	504	DK
Yohan	BN	1	Spring	185	J	269	DF
Yohan	BN	1	Spring	752	A	269	DF
Yohan	BN	1	Spring	104	J	269	DF
Yohan	BN	1	Spring	752	A	269	DF
Yohan	BN	3	Spring	185	J	446	GO
Yohan	BN	3	Spring	406	G	446	GO
Yohan	BN	3	Spring	104	J	446	GO
Yohan	BN	3	Spring	104	J	446	GO
Yohan	BN	1	Fall	700	D	831	GT
Yohan	BN	1	Fall	394	G	831	GT
Yohan	BN	1	Spring	394	G	904	DK
Yohan	BN	1	Spring	58	D	904	DK

1245 rows in set (0.01 sec)

Sesudah menggunakan tuning :

Josu	HH	1	Spring	406	G	504	DK
Josu	HH	1	Spring	662	G	504	DK
Josu	HH	1	Spring	349	A	504	DK
Josu	HH	1	Spring	349	A	504	DK
Yohan	BN	1	Spring	185	J	269	DF
Yohan	BN	1	Spring	752	A	269	DF
Yohan	BN	1	Spring	104	J	269	DF
Yohan	BN	1	Spring	752	A	269	DF
Yohan	BN	3	Spring	185	J	446	GO
Yohan	BN	3	Spring	406	G	446	GO
Yohan	BN	3	Spring	104	J	446	GO
Yohan	BN	3	Spring	104	J	446	GO
Yohan	BN	1	Fall	700	D	831	GT
Yohan	BN	1	Fall	394	G	831	GT
Yohan	BN	1	Spring	394	G	904	DK
Yohan	BN	1	Spring	58	D	904	DK

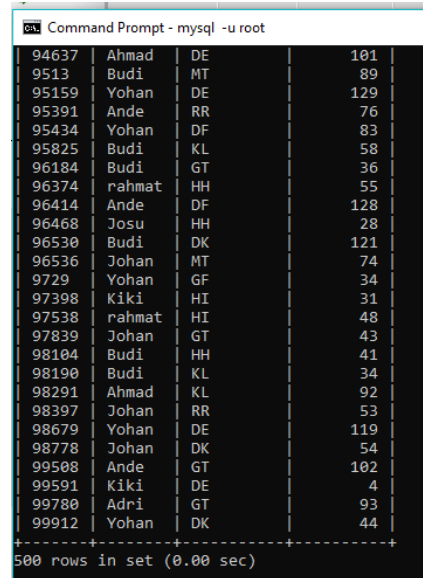
1245 rows in set (0.00 sec)

MariaDB [mhd1]

#### 2.1.4 Data 3 (advisor = 500, student = 500, section = 1000,takes = 1000)

1. Dengan menggunakan query 1 (SELECT \* FROM student)

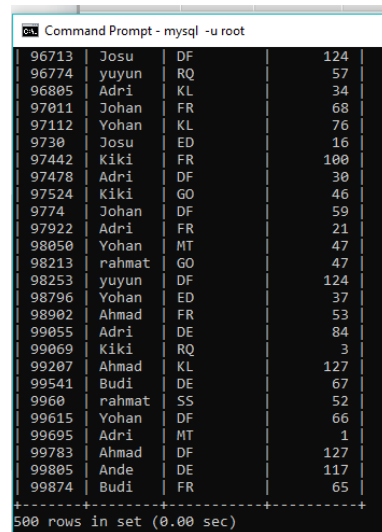
Waktu sebelum dituning :



94637	Ahmad	DE	101
9513	Budi	MT	89
95159	Yohan	DE	129
95391	Ande	RR	76
95434	Yohan	DF	83
95825	Budi	KL	58
96184	Budi	GT	36
96374	rahmat	HH	55
96414	Ande	DF	128
96468	Josu	HH	28
96530	Budi	DK	121
96536	Johan	MT	74
9729	Yohan	GF	34
97398	Kiki	HI	31
97538	rahmat	HI	48
97839	Johan	GT	43
98104	Budi	HH	41
98190	Budi	KL	34
98291	Ahmad	KL	92
98397	Johan	RR	53
98679	Yohan	DE	119
98778	Johan	DK	54
99508	Ande	GT	102
99591	Kiki	DE	4
99780	Adri	GT	93
99912	Yohan	DK	44

500 rows in set (0.00 sec)

Waktu sesudah dituning :

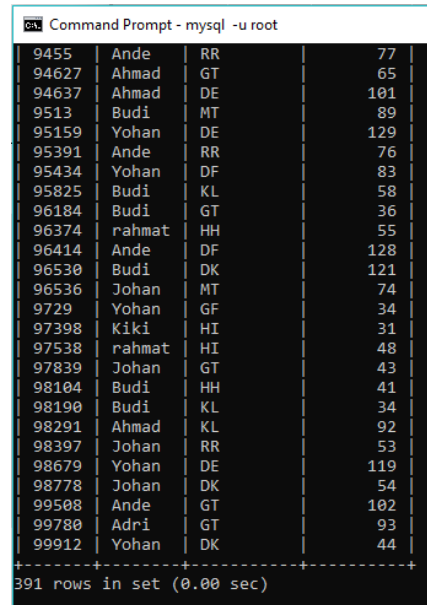


96713	Josu	DF	124
96774	yuyun	RQ	57
96805	Adri	KL	34
97011	Johan	FR	68
97112	Yohan	KL	76
9730	Josu	ED	16
97442	Kiki	FR	100
97478	Adri	DF	30
97524	Kiki	GO	46
9774	Johan	DF	59
97922	Adri	FR	21
98050	Yohan	MT	47
98213	rahmat	GO	47
98253	yuyun	DF	124
98796	Yohan	ED	37
98902	Ahmad	FR	53
99055	Adri	DE	84
99069	Kiki	RQ	3
99207	Ahmad	KL	127
99541	Budi	DE	67
9960	rahmat	SS	52
99615	Yohan	DF	66
99695	Adri	MT	1
99783	Ahmad	DF	127
99805	Ande	DE	117
99874	Budi	FR	65

500 rows in set (0.00 sec)

2. Dengan menggunakan query 2 (SELECT \* FROM student WHERE tot\_cred > 30)

Waktu sebelum dituning :

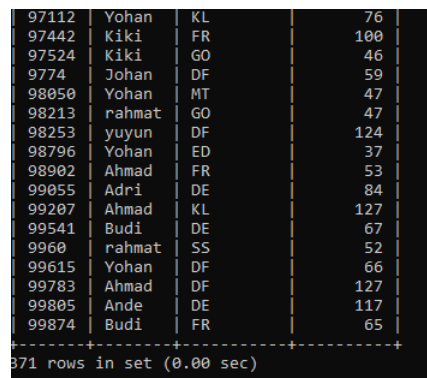


```
mysql -u root
```

9455	Ande	RR	77
94627	Ahmad	GT	65
94637	Ahmad	DE	101
9513	Budi	MT	89
95159	Yohan	DE	129
95391	Ande	RR	76
95434	Yohan	DF	83
95825	Budi	KL	58
96184	Budi	GT	36
96374	rahmat	HH	55
96414	Ande	DF	128
96530	Budi	DK	121
96536	Johan	MT	74
9729	Yohan	GF	34
97398	Kiki	HI	31
97538	rahmat	HI	48
97839	Johan	GT	43
98104	Budi	HH	41
98190	Budi	KL	34
98291	Ahmad	KL	92
98397	Johan	RR	53
98679	Yohan	DE	119
98778	Johan	DK	54
99508	Ande	GT	102
99780	Adri	GT	93
99912	Yohan	DK	44

391 rows in set (0.00 sec)

Waktu sesudah dituning :



```
mysql -u root
```

97112	Yohan	KL	76
97442	Kiki	FR	100
97524	Kiki	GO	46
9774	Johan	DF	59
98050	Yohan	MT	47
98213	rahmat	GO	47
98253	yuyun	DF	124
98796	Yohan	ED	37
98902	Ahmad	FR	53
99055	Adri	DE	84
99207	Ahmad	KL	127
99541	Budi	DE	67
9960	rahmat	SS	52
99615	Yohan	DF	66
99783	Ahmad	DF	127
99805	Ande	DE	117
99874	Budi	FR	65

371 rows in set (0.00 sec)

3. Dengan menggunakan query 3 (SELECT `name`, department FROM student WHERE tot\_cred > 30)

Sebelum menggunakan tuning :

```
Command Prompt - mysql -u root
+-----+
| name | department |
+-----+
| Ande | RR         |
| Ahmad | GT         |
| Ahmad | DE         |
| Budi | MT         |
| Yohan | DE         |
| Ande | RR         |
| Yohan | DF         |
| Budi | KL         |
| Budi | GT         |
| rahmat | HH        |
| Ande | DF         |
| Budi | DK         |
| Johan | MT         |
| Yohan | GF         |
| Kiki | HI         |
| rahmat | HI        |
| Johan | GT         |
| Budi | HH         |
| Budi | KL         |
| Ahmad | KL        |
| Johan | RR         |
| Yohan | DE         |
| Johan | DK         |
| Ande | GT         |
| Adri | GT         |
| Yohan | DK         |
+-----+
391 rows in set (0.00 sec)
```

Sesudah menggunakan tuning :

```
+-----+
| name | department |
+-----+
| yuyun | RQ         |
| Adri | KL         |
| Johan | FR         |
| Yohan | KL         |
| Kiki | FR         |
| Kiki | GO         |
| Johan | DF         |
| Yohan | MT         |
| rahmat | GO        |
| yuyun | DF         |
| Yohan | ED         |
| Ahmad | FR         |
| Adri | DE         |
| Ahmad | KL         |
| Budi | DE         |
| rahmat | SS        |
| Yohan | DF         |
| Ahmad | DF         |
| Ande | DE         |
| Budi | FR         |
+-----+
371 rows in set (0.00 sec)
```

- Sebelum menggunakan tuning :

[illegible]



5. Dengan menggunakan query 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)

Sebelum menggunakan tuning :

```

Command Prompt - mysql -u root
+----+-----+-----+-----+-----+-----+-----+-----+
| Kiki | RR   | 4     | Fall | 663 | F   | 849 | RR   |
| Adri | GT   | 5     | Spring | 928 | C   | 849 | RR   |
| Adri | GT   | 5     | Spring | 355 | J   | 849 | RR   |
| Adri | GT   | 5     | Spring | 717 | E   | 849 | RR   |
| Adri | GT   | 5     | Spring | 54  | B   | 849 | RR   |
| Adri | GT   | 5     | Spring | 663 | F   | 849 | RR   |
| Adri | DE   | 5     | Spring | 928 | C   | 849 | RR   |
| Adri | DE   | 5     | Spring | 355 | J   | 849 | RR   |
| Adri | DE   | 5     | Spring | 717 | E   | 849 | RR   |
| Adri | DE   | 5     | Spring | 54  | B   | 849 | RR   |
| Adri | DE   | 5     | Spring | 663 | F   | 849 | RR   |
| Adri | KL   | 1     | Fall | 717 | E   | 970 | RR   |
| Adri | KL   | 1     | Fall | 928 | C   | 970 | RR   |
| Adri | KL   | 1     | Fall | 54  | B   | 970 | RR   |
| Adri | KL   | 1     | Fall | 355 | J   | 970 | RR   |
| Adri | KL   | 1     | Fall | 54  | B   | 970 | RR   |
| Ahmad | GT   | 2     | Spring | 717 | E   | 970 | RR   |
| Ahmad | GT   | 2     | Spring | 928 | C   | 970 | RR   |
| Ahmad | GT   | 2     | Spring | 54  | B   | 970 | RR   |
| Ahmad | GT   | 2     | Spring | 355 | J   | 970 | RR   |
| Ahmad | GT   | 2     | Spring | 54  | B   | 970 | RR   |
| rahmat | DF   | 5     | Fall | 717 | E   | 970 | RR   |
| rahmat | DF   | 5     | Fall | 928 | C   | 970 | RR   |
| rahmat | DF   | 5     | Fall | 54  | B   | 970 | RR   |
| rahmat | DF   | 5     | Fall | 355 | J   | 970 | RR   |
| rahmat | DF   | 5     | Fall | 54  | B   | 970 | RR   |
+----+-----+-----+-----+-----+-----+-----+-----+
5999 rows in set (0.03 sec)

```

Sesudah menggunakan tuning :

```

+----+-----+-----+-----+-----+-----+-----+-----+
| Johan | SS   | 2     | Fall | 966 | A   | 843 | SS   |
| Johan | SS   | 2     | Fall | 834 | H   | 843 | SS   |
| Ande  | RQ   | 4     | Fall | 220 | B   | 843 | SS   |
| Ande  | RQ   | 4     | Fall | 911 | C   | 843 | SS   |
| Ande  | RQ   | 4     | Fall | 966 | A   | 843 | SS   |
| Ande  | RQ   | 4     | Fall | 834 | H   | 843 | SS   |
| Josu  | MT   | 1     | Spring | 711 | B   | 966 | SS   |
| Josu  | MT   | 1     | Spring | 220 | B   | 966 | SS   |
| Josu  | MT   | 1     | Spring | 711 | B   | 966 | SS   |
| Josu  | MT   | 1     | Spring | 966 | A   | 966 | SS   |
| rahmat | SS   | 1     | Spring | 911 | C   | 987 | SS   |
| rahmat | SS   | 1     | Spring | 542 | J   | 987 | SS   |
| rahmat | SS   | 1     | Spring | 948 | B   | 987 | SS   |
| Adri  | KL   | 1     | Spring | 911 | C   | 987 | SS   |
| Adri  | KL   | 1     | Spring | 542 | J   | 987 | SS   |
| Adri  | KL   | 1     | Spring | 948 | B   | 987 | SS   |
| Josu  | MT   | 3     | Fall | 911 | C   | 987 | SS   |
| Josu  | MT   | 3     | Fall | 542 | J   | 987 | SS   |
| Josu  | MT   | 3     | Fall | 948 | B   | 987 | SS   |
| Kiki  | MT   | 3     | Fall | 911 | C   | 987 | SS   |
| Kiki  | MT   | 3     | Fall | 542 | J   | 987 | SS   |
| Kiki  | MT   | 3     | Fall | 948 | B   | 987 | SS   |
| rahmat | FR   | 3     | Fall | 911 | C   | 987 | SS   |
| rahmat | FR   | 3     | Fall | 542 | J   | 987 | SS   |
| rahmat | FR   | 3     | Fall | 948 | B   | 987 | SS   |
+----+-----+-----+-----+-----+-----+-----+-----+
194 rows in set (0.01 sec)

```

## 2.2 Tuning : Setting Configuration DBMS

Untuk membatasi penguraian pembahasan pada , kami dari tim pengembang aplikasi membuat beberapa rumusan masalah dalam bentuk pertanyaan yaitu:

## BAB III

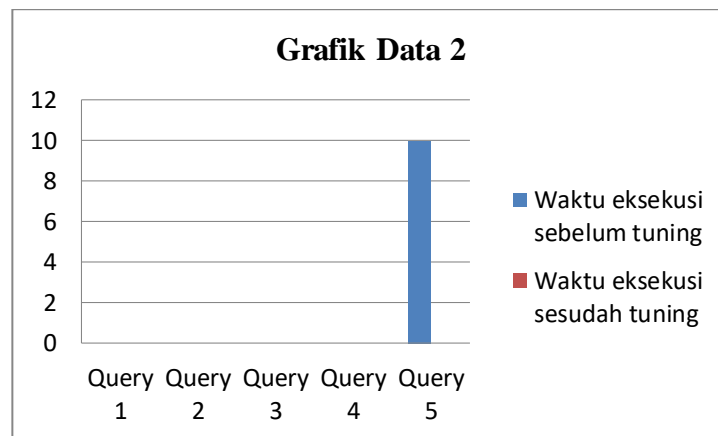
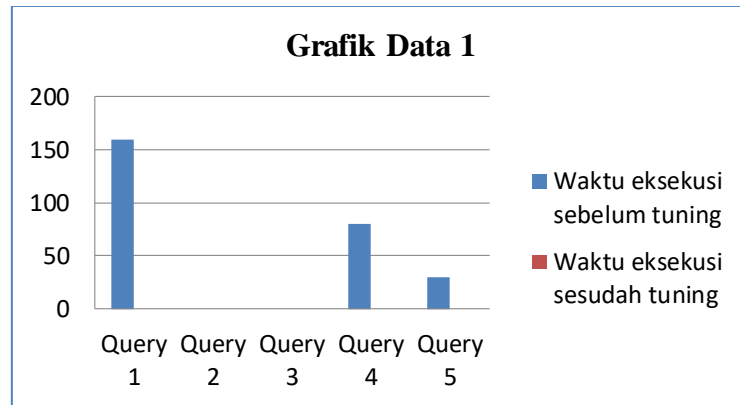
### HASIL DAN PEMBAHASAN

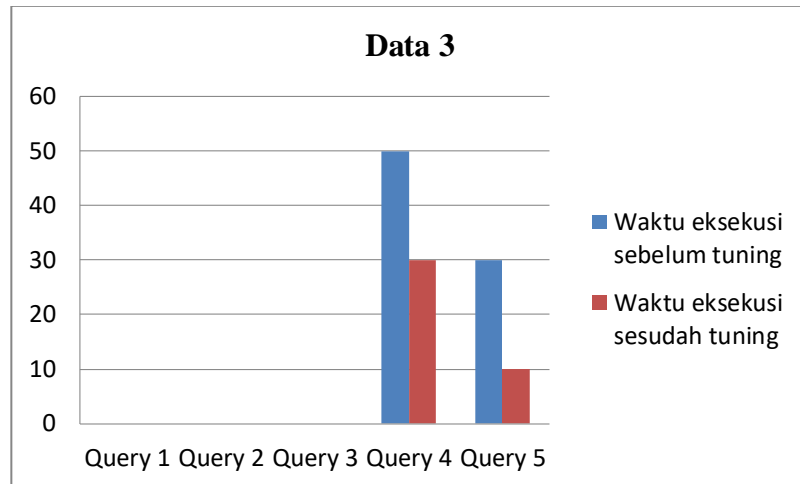
#### 3.1 Hasil

**Tabel hasil :**

Data ke-	Waktu eksekusi sebelum tuning (ms)					Waktu eksekusi sesudah tuning (ms)				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1	160	0	0	80	30	0	0	0	0	0
2	0	0	0	0	10	0	0	0	0	0
3	0	0	0	50	30	0	0	0	30	10

**Grafik hasil :**





Keterangan :

Data 1	advisor = 100, student = 100, section = 200,takes = 200
Data 2	advisor = 200, student = 200, section = 400,takes = 400
Data 3	advisor = 500, student = 500, section = 1000,takes = 1000

### 3.2 Pembahasan

Berdasarkan data pada tabel hasil dan grafik hasil diatas, dapat dilihat bahwa pada Data 1 dengan advisor = 100, student = 100, section = 200, takes = 200 menghasilkan waktu eksekusi yang ragam berdasarkan kelima query yang telah ditentukan. Data yang dieksekusi menggunakan query 1, 4 dan 5 menggunakan waktu eksekusi program yang lebih lama dibanding dengan menggunakan query 2 dan 3, hal ini dapat terjadi tergantung oleh cara mengecek setiap query yang berbeda-beda. Untuk itu, maka diperlukan tuning agar dapat mempercepat waktu eksekusi data, dalam hal ini saya menggunakan teknik B-Tree untuk tuning index yang sangat berguna pada saat memilih row yang sesuai dengan kriteria tertentu. Index jenis B-Tree dapat dibuat dengan perintah CREATE INDEX. Setelah menggunakan teknik di atas, maka didapatkan waktu eksekusi sesudah dituning menjadi jauh lebih kecil, bahkan mencapai 0 ms.

Dari pembahasan di atas, dapat disimpulkan bahwa tuning dapat digunakan untuk meningkatkan kecepatan dalam eksekusi data sehingga pada akhirnya data dapat dihasilkan secara lebih cepat dan sesuai dengan kebutuhan pengguna.

## **Daftar Pustaka**

Cecilia, C., Mihai, G. (2011). Increasing Database Performance using Indexes, Database Systems Journal.

