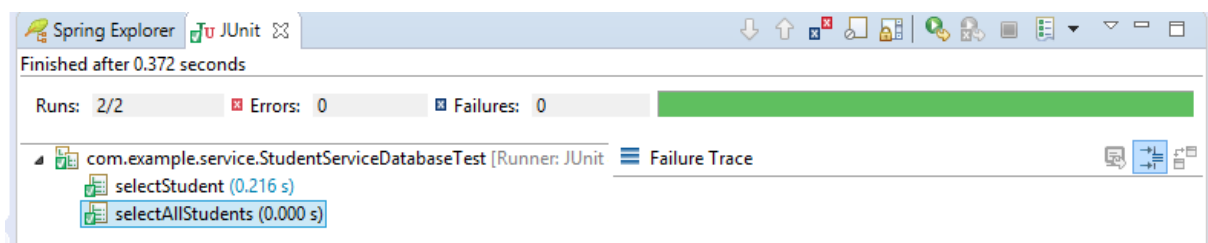


Latihan Unit Testing

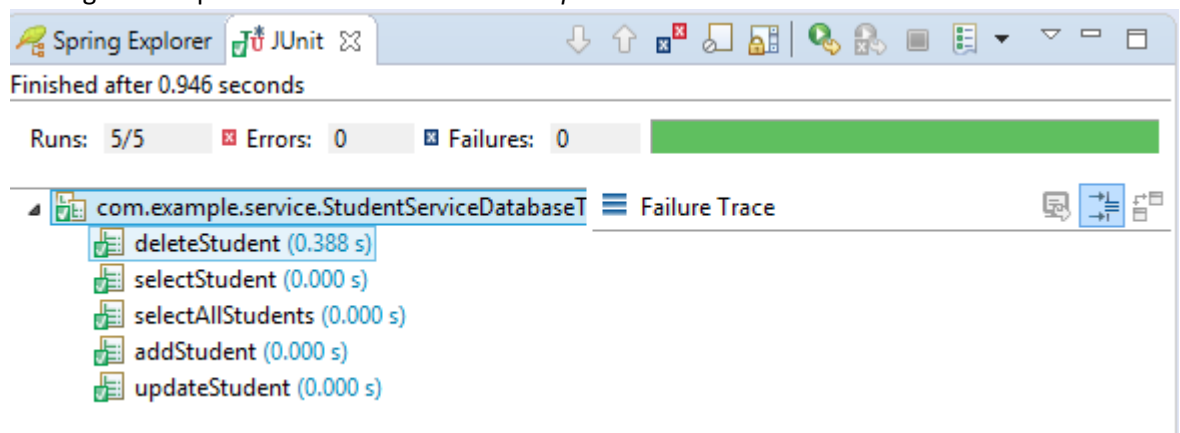
1. Pada *method* **selectAllStudents()** terdapat tiga bagian:
 - Given: Pada bagian ini diinisialisasi *list of object* yang akan dites dan *list of object* yang akan jadi *parameter* pengecekannya. Masing-masing *list of object* menampung *object StudentModel*. Pada `BDDMockito.given()` akan melakukan manipulasi terhadap *function* yang akan dipanggil dengan *return value* sesuai dengan isi dari `willReturn()`.
 - When: Pada bagian ini dilakukan pengetesan dengan *method* yang ingin digunakan yaitu *method* **selectAllStudents()**. Pengetesan dilakukan apakah *method* tersebut akan berjalan dengan memasukannya pada *list of object* yang baru.
 - Then: Pada bagian ini dilakukan pengecekan terhadap *list of object* baru apakah nilainya tidak *null*, apakah kosong, apakah *size*-nya sama, atau apakah kontennya sama.

Hasil testing:



2. Pada *method* **addStudent()** terdapat tiga bagian:
 - Given: Inisialisasi objek yang akan dites dan objek yang akan jadi parameter pengecekannya. `BDDMockito.given()` akan melakukan manipulasi terhadap *function* yang akan dipanggil dengan *return value* sesuai dengan isi dari `willReturn()`.
 - When: Pengetesan dengan *method* yang ingin digunakan yaitu *method* **addStudent()**. Pengetesan dilakukan apakah *method* tersebut akan berjalan dengan memasukannya pada objek baru.
 - Then: Pengecekan apakah objek yang dites (objek baru) sama dengan objek yang dijadikan sebagai *parameter* pengecekan.

3. Testing terhadap *method* **delete student** dan **update student**



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Latihan Load Testing

- Load Testing sebelum dioptimasi
 - `selectStudent()` dengan kondisi berhasil ditemukan:

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename Log/Display Only: ☐ Errors ☒ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(m...)	Status	Bytes	Sent Bytes	Latency	Connect Time(...)
1	21:39:40.280	Thread Group 1...	HTTP Request	26	✓	2043	141	23	2
2	21:39:40.376	Thread Group 1...	HTTP Request	7	✓	2043	141	7	1
3	21:39:40.479	Thread Group 1...	HTTP Request	8	✓	2043	141	7	1
4	21:39:40.589	Thread Group 1...	HTTP Request	16	✓	2043	141	16	1
5	21:39:40.682	Thread Group 1...	HTTP Request	5	✓	2043	141	5	0
6	21:39:40.776	Thread Group 1...	HTTP Request	5	✓	2043	141	5	1
7	21:39:40.885	Thread Group 1...	HTTP Request	9	✓	2043	141	9	1
8	21:39:40.979	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
9	21:39:41.082	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
10	21:39:41.179	Thread Group 1...	HTTP Request	5	✓	2043	141	5	0
11	21:39:41.284	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
12	21:39:41.374	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
13	21:39:41.474	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
14	21:39:41.574	Thread Group 1...	HTTP Request	7	✓	2043	141	7	1
15	21:39:41.674	Thread Group 1...	HTTP Request	10	✓	2043	141	10	1
16	21:39:41.774	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
17	21:39:41.874	Thread Group 1...	HTTP Request	8	✓	2043	141	8	1
18	21:39:41.974	Thread Group 1...	HTTP Request	6	✓	2043	141	6	1
19	21:39:42.074	Thread Group 1...	HTTP Request	12	✓	2043	141	12	1
20	21:39:42.174	Thread Group 1...	HTTP Request	5	✓	2043	141	5	1
21	21:39:42.283	Thread Group 1...	HTTP Request	11	✓	2043	141	11	1
22	21:39:42.414	Thread Group 1...	HTTP Request	9	✓	2043	141	9	1
23	21:39:42.474	Thread Group 1...	HTTP Request	5	✓	2043	141	5	0
24	21:39:42.574	Thread Group 1...	HTTP Request	5	✓	2043	141	5	1
25	21:39:42.674	Thread Group 1...	HTTP Request	5	✓	2043	141	5	1
26	21:39:42.775	Thread Group 1...	HTTP Request	11	✓	2043	141	11	1

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 7 Average 7 Deviation 3

- `selectStudent()` dengan kondisi gagal ditemukan:

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename Log/Display Only: ☐ Errors ☒ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(m...)	Status	Bytes	Sent Bytes	Latency	Connect Time(...)
1	21:41:05.622	Thread Group 1...	HTTP Request	15	✓	343	142	15	2
2	21:41:05.723	Thread Group 1...	HTTP Request	3	✓	343	142	3	0
3	21:41:05.816	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
4	21:41:05.926	Thread Group 1...	HTTP Request	8	✓	343	142	8	2
5	21:41:06.020	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
6	21:41:06.129	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
7	21:41:06.224	Thread Group 1...	HTTP Request	7	✓	343	142	7	2
8	21:41:06.330	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
9	21:41:06.424	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
10	21:41:06.517	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
11	21:41:06.628	Thread Group 1...	HTTP Request	4	✓	343	142	4	0
12	21:41:06.715	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
13	21:41:06.816	Thread Group 1...	HTTP Request	7	✓	343	142	7	1
14	21:41:06.916	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
15	21:41:07.016	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
16	21:41:07.116	Thread Group 1...	HTTP Request	7	✓	343	142	7	2
17	21:41:07.241	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
18	21:41:07.332	Thread Group 1...	HTTP Request	3	✓	343	142	3	0
19	21:41:07.438	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
20	21:41:07.532	Thread Group 1...	HTTP Request	5	✓	343	142	5	1
21	21:41:07.642	Thread Group 1...	HTTP Request	9	✓	343	142	9	2
22	21:41:07.730	Thread Group 1...	HTTP Request	3	✓	343	142	3	0
23	21:41:07.830	Thread Group 1...	HTTP Request	3	✓	343	142	3	0
24	21:41:07.930	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
25	21:41:08.030	Thread Group 1...	HTTP Request	4	✓	343	142	4	0
26	21:41:08.130	Thread Group 1...	HTTP Request	5	✓	343	142	4	2

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 3 Average 4 Deviation 1

- selectAllStudents() :

View Results in Table

Name: View Results in Table

Comments:

- Write results to file / Read from file -

Filename Log/Display Only: ☐ Errors ☒ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Ti...
1	21:35:43.469	Thread Group 1...	HTTP Request	85		3031	133	85	2
2	21:35:43.569	Thread Group 1...	HTTP Request	13		3031	133	13	0
3	21:35:43.670	Thread Group 1...	HTTP Request	8		3031	133	8	0
4	21:35:43.774	Thread Group 1...	HTTP Request	8		3031	133	8	1
5	21:35:43.870	Thread Group 1...	HTTP Request	8		3031	133	8	1
6	21:35:43.975	Thread Group 1...	HTTP Request	16		3031	133	16	1
7	21:35:44.083	Thread Group 1...	HTTP Request	9		3031	133	9	1
8	21:35:44.174	Thread Group 1...	HTTP Request	14		3031	133	14	1
9	21:35:44.274	Thread Group 1...	HTTP Request	16		3031	133	15	2
10	21:35:44.376	Thread Group 1...	HTTP Request	7		3031	133	7	1
11	21:35:44.486	Thread Group 1...	HTTP Request	14		3031	133	14	1
12	21:35:44.584	Thread Group 1...	HTTP Request	15		3031	133	15	1
13	21:35:44.686	Thread Group 1...	HTTP Request	8		3031	133	8	1
14	21:35:44.786	Thread Group 1...	HTTP Request	9		3031	133	9	1
15	21:35:44.885	Thread Group 1...	HTTP Request	18		3031	133	18	2
16	21:35:44.985	Thread Group 1...	HTTP Request	8		3031	133	8	1
17	21:35:45.085	Thread Group 1...	HTTP Request	12		3031	133	12	1
18	21:35:45.174	Thread Group 1...	HTTP Request	8		3031	133	8	1
19	21:35:45.301	Thread Group 1...	HTTP Request	7		3031	133	7	0
20	21:35:45.374	Thread Group 1...	HTTP Request	16		3031	133	16	1
21	21:35:45.474	Thread Group 1...	HTTP Request	8		3031	133	8	1
22	21:35:45.588	Thread Group 1...	HTTP Request	8		3031	133	8	1
23	21:35:45.697	Thread Group 1...	HTTP Request	8		3031	133	7	1
24	21:35:45.775	Thread Group 1...	HTTP Request	8		3031	133	8	1
25	21:35:45.875	Thread Group 1...	HTTP Request	9		3031	133	9	1
26	21:35:45.996	Thread Group 1...	HTTP Request	8		3031	133	8	1

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 7 Average 11 Deviation 8

2. Load Testing setelah dioptimasi

Optimasi yang dilakukan adalah indexing yaitu dengan hanya melakukan select atribut yang digunakan saja (select npm, name, gpa), bukan select all (*).

Note: Pada Load Tesing sebelumnya, query yang digunakan adalah select all.

Berikut hasil setelah melakukan optimasi

- selectStudent() dengan kondisi berhasil ditemukan:

View Results in Table

Name: View Results in Table

Comments:

- Write results to file / Read from file -

Filename Log/Display Only: ☐ Errors ☒ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time...
1	21:16:49.401	Thread Group 1...	HTTP Request	26		2043	141	26	2
2	21:16:49.499	Thread Group 1...	HTTP Request	9		2043	141	9	1
3	21:16:49.614	Thread Group 1...	HTTP Request	8		2043	141	8	1
4	21:16:49.692	Thread Group 1...	HTTP Request	9		2043	141	9	1
5	21:16:49.802	Thread Group 1...	HTTP Request	10		2043	141	10	1
6	21:16:49.897	Thread Group 1...	HTTP Request	11		2043	141	11	1
7	21:16:49.990	Thread Group 1...	HTTP Request	26		2043	141	25	2
8	21:16:50.099	Thread Group 1...	HTTP Request	8		2043	141	8	1
9	21:16:50.203	Thread Group 1...	HTTP Request	16		2043	141	15	2
10	21:16:50.312	Thread Group 1...	HTTP Request	18		2043	141	18	1
11	21:16:50.406	Thread Group 1...	HTTP Request	9		2043	141	9	1
12	21:16:50.522	Thread Group 1...	HTTP Request	8		2043	141	7	0
13	21:16:50.607	Thread Group 1...	HTTP Request	8		2043	141	8	1
14	21:16:50.690	Thread Group 1...	HTTP Request	20		2043	141	20	2
15	21:16:50.815	Thread Group 1...	HTTP Request	8		2043	141	8	0
16	21:16:50.909	Thread Group 1...	HTTP Request	6		2043	141	6	0
17	21:16:51.019	Thread Group 1...	HTTP Request	10		2043	141	10	1
18	21:16:51.106	Thread Group 1...	HTTP Request	7		2043	141	7	1
19	21:16:51.215	Thread Group 1...	HTTP Request	8		2043	141	8	1
20	21:16:51.309	Thread Group 1...	HTTP Request	9		2043	141	9	1
21	21:16:51.419	Thread Group 1...	HTTP Request	8		2043	141	8	1
22	21:16:51.508	Thread Group 1...	HTTP Request	8		2043	141	8	1
23	21:16:51.608	Thread Group 1...	HTTP Request	8		2043	141	8	1
24	21:16:51.708	Thread Group 1...	HTTP Request	8		2043	141	8	1
25	21:16:51.807	Thread Group 1...	HTTP Request	8		2043	141	8	1
26	21:16:51.906	Thread Group 1...	HTTP Request	7		2043	141	7	0

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 7 Average 10 Deviation 4

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1706106904

- selectStudent() dengan kondisi gagal ditemukan:

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename Log/Display Only: ☐ Errors ☐ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(m...	Status	Bytes	Sent Bytes	Latency	Connect Time(...
1	21:19:22.175	Thread Group 1...	HTTP Request	12	✓	343	142	12	2
2	21:19:22.275	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
3	21:19:22.368	Thread Group 1...	HTTP Request	5	✓	343	142	5	1
4	21:19:22.481	Thread Group 1...	HTTP Request	13	✓	343	142	13	2
5	21:19:22.567	Thread Group 1...	HTTP Request	9	✓	343	142	9	2
6	21:19:22.676	Thread Group 1...	HTTP Request	8	✓	343	142	8	2
7	21:19:22.771	Thread Group 1...	HTTP Request	6	✓	343	142	6	1
8	21:19:22.879	Thread Group 1...	HTTP Request	9	✓	343	142	9	2
9	21:19:22.973	Thread Group 1...	HTTP Request	5	✓	343	142	5	0
10	21:19:23.066	Thread Group 1...	HTTP Request	5	✓	343	142	4	1
11	21:19:23.164	Thread Group 1...	HTTP Request	5	✓	343	142	5	1
12	21:19:23.264	Thread Group 1...	HTTP Request	10	✓	343	142	10	2
13	21:19:23.363	Thread Group 1...	HTTP Request	5	✓	343	142	5	1
14	21:19:23.464	Thread Group 1...	HTTP Request	10	✓	343	142	10	1
15	21:19:23.564	Thread Group 1...	HTTP Request	74	✓	343	142	74	1
16	21:19:23.664	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
17	21:19:23.763	Thread Group 1...	HTTP Request	10	✓	343	142	10	2
18	21:19:23.863	Thread Group 1...	HTTP Request	4	✓	343	142	4	1
19	21:19:23.963	Thread Group 1...	HTTP Request	6	✓	343	142	6	1
20	21:19:24.064	Thread Group 1...	HTTP Request	8	✓	343	142	8	1
21	21:19:24.163	Thread Group 1...	HTTP Request	5	✓	343	142	5	2
22	21:19:24.263	Thread Group 1...	HTTP Request	5	✓	343	142	4	1
23	21:19:24.363	Thread Group 1...	HTTP Request	5	✓	343	142	5	1
24	21:19:24.464	Thread Group 1...	HTTP Request	9	✓	343	142	9	2
25	21:19:24.564	Thread Group 1...	HTTP Request	9	✓	343	142	9	2
26	21:19:24.664	Thread Group 1...	HTTP Request	9	✓	343	142	9	2

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 5 Average 7 Deviation 7

- selectAllStudents() :

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename Log/Display Only: ☐ Errors ☐ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Tim...
1	21:20:26.913	Thread Group 1...	HTTP Request	26	✓	3031	133	26	6
2	21:20:27.018	Thread Group 1...	HTTP Request	12	✓	3031	133	12	1
3	21:20:27.111	Thread Group 1...	HTTP Request	11	✓	3031	133	11	1
4	21:20:27.222	Thread Group 1...	HTTP Request	17	✓	3031	133	16	1
5	21:20:27.315	Thread Group 1...	HTTP Request	10	✓	3031	133	10	1
6	21:20:27.421	Thread Group 1...	HTTP Request	13	✓	3031	133	13	2
7	21:20:27.516	Thread Group 1...	HTTP Request	16	✓	3031	133	16	1
8	21:20:27.609	Thread Group 1...	HTTP Request	10	✓	3031	133	10	0
9	21:20:27.707	Thread Group 1...	HTTP Request	8	✓	3031	133	8	1
10	21:20:27.811	Thread Group 1...	HTTP Request	7	✓	3031	133	7	1
11	21:20:27.921	Thread Group 1...	HTTP Request	15	✓	3031	133	15	1
12	21:20:28.009	Thread Group 1...	HTTP Request	8	✓	3031	133	8	1
13	21:20:28.109	Thread Group 1...	HTTP Request	8	✓	3031	133	8	1
14	21:20:28.209	Thread Group 1...	HTTP Request	8	✓	3031	133	8	1
15	21:20:28.309	Thread Group 1...	HTTP Request	18	✓	3031	133	18	2
16	21:20:28.425	Thread Group 1...	HTTP Request	32	✓	3031	133	32	5
17	21:20:28.509	Thread Group 1...	HTTP Request	10	✓	3031	133	10	1
18	21:20:28.610	Thread Group 1...	HTTP Request	10	✓	3031	133	10	0
19	21:20:28.709	Thread Group 1...	HTTP Request	10	✓	3031	133	10	1
20	21:20:28.809	Thread Group 1...	HTTP Request	13	✓	3031	133	13	1
21	21:20:28.910	Thread Group 1...	HTTP Request	19	✓	3031	133	18	1
22	21:20:29.008	Thread Group 1...	HTTP Request	7	✓	3031	133	7	0
23	21:20:29.108	Thread Group 1...	HTTP Request	7	✓	3031	133	7	0
24	21:20:29.208	Thread Group 1...	HTTP Request	17	✓	3031	133	17	2
25	21:20:29.309	Thread Group 1...	HTTP Request	17	✓	3031	133	17	2
26	21:20:29.408	Thread Group 1...	HTTP Request	10	✓	3031	133	10	1

☐ Scroll automatically? ☐ Child samples? No of Samples 100 Latest Sample 6 Average 11 Deviation 5

3. Ide Optimasi

Jadi ide optimasi yang saya gunakan di atas akan berjalan dengan baik jika ada relasi antar tabel, misalnya jika kita melakukan *select join* dan yang kita *select all* (keseluruhan kolom) dari masing-masing tabel yang di-*join*, padahal yang kita butuh hanya beberapa kolom dari masing-masing tabel, jadi sebaiknya jangan melakukan *select all*, cukup select kolom yang hanya digunakan.