

Nama : Rinjani Samosir

NPM : 1606954994

## APAP Tutorial 6

### Ringkasan Tutorial

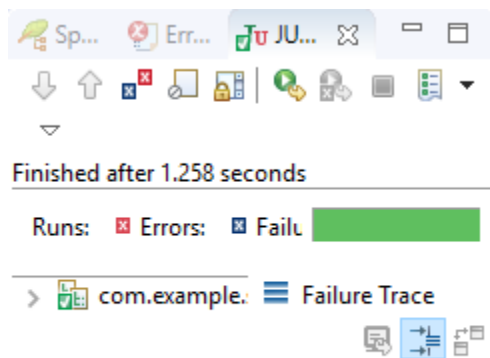
Pada tutorial ini dilakukan unit testing dan load testing. Unit testing digunakan untuk melakukan testing berdasarkan fungsi dan method. Load testing dilakukan untuk mengetahui performa dan respon dari suatu aplikasi. Dalam melakukan testing ini, Spring boot memiliki 2 *dependencies* utama yaitu JUnit dan Mockito. JUnit fokus pada pengecekan class dan method sedangkan Mockito menciptakan *dummy*. Testing yang dilakukan dengan menambahkan class pada `/src/tes`. Class ini akan berisi method `selectStudent`, `addStudent`, `updateStudent` dan `deleteStudent` yang mengaplikasikan JUnit dan Mockito.

### Latihan Unit Testing

1. Tambahkan code berikut pada `StudentServiceDatabaseTest` dan jelaskan apa yang terjadi pada method tersebut berikut dengan hasil testing -nya ! (Screenshot hanya opsional dan tidak akan mempengaruhi nilai) .

**Jawab :**

Pertama kali dibuat sebuah object `StudentModel` yang diisi dengan data mahasiswa. Data pada `studentModel` tersebut dimasukkan kedalam list `studentModel`. Selain itu dibuat juga list `studentModel` dengan nama `checks`. List `check` akan berisi data pada `studentModel`. Pada `StudentMapper` dipanggil `selectAllSudents` untuk mengembalikan nilai `studentModels`. `SelectAllStudent` akan dipanggil dan hasilnya dimasukkan kedalam `test`. Hasil dari `test` ini kemudian dilakukan pengecekan objek baru apakah `null` atau sama, apakah kosong, apakah `sizenya 1` dan apakah datanya sama dengan yang sudah dibuat.



Testing tersebut sukses dilakukan.

2. Lakukan testing terhadap method delete student dan update student ! (cukup lampirkan screenshot akhir dari testing).

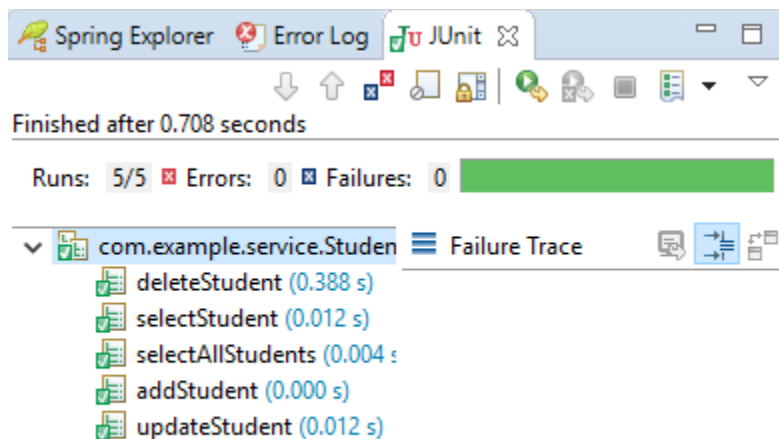
**Jawab :**

### Update Student

Pertama kali dibuat object StudentModel dengan nama studentModel yang diisi dengan data mahasiswa. Lalu dibuat juga object StudentModel dengan nama check. Kemudian dilakukan pemanggilan studentService yaitu updateStudent yang akan mengembalikan nilai true. Variabel test dibuat untuk melakukan update studentModel. Hasilnya akan dikirimkan ke StudentMapper. Hasil tersebut juga dilakukan pengecekan jika sama.

### Delete Student

Pertama kali studentService akan menerima npm yang akan dihapus dan akan mengembalikan nilai true. Lalu dibuat variabel test untuk menyimpan data npm dari studentService. Kemudian npm tersebut akan dikirimkan ke studentMapper untuk dilakukan penghapusan. Dilakukan juga pengecekan jika sama.



Testing tersebut sukses dilakukan.

## **Load Testing**

1. Load Testing dilakukan dengan jumlah thread 5, Ramp-up Period 10 second. Jumlah thread 100 sudah dicoba tetapi tidak dapat berjalan karena terjadi outofMemoryError.

```
2018-03-24 17:55:28.066 INFO 3624 --- [io-8080-exec-49] c.e.service.StudentServiceDatabase : select all students
2018-03-24 17:55:28.070 INFO 3624 --- [io-8080-exec-51] c.e.service.StudentServiceDatabase : select all students
2018-03-24 17:55:28.086 INFO 3624 --- [io-8080-exec-50] c.e.service.StudentServiceDatabase : select all students
Exception in thread "http-nio-8080-ClientPoller-1" java.lang.OutOfMemoryError: Java heap space
```

Error ini terjadi karena keterbatasan memori laptop. Sudah dilakukan pengujian dengan jumlah thread 100 tetapi hanya bisa menjalankan jumlah thread 10.

Filename			Browse...	Log/Display Only: <input type="checkbox"/> Errors <input type="checkbox"/> Successes				
Sample #	Start Time	Thread Name	Label	Sample Time...	Status	Bytes	Sent Bytes	Latency
1	19:02:44.030	Thread Grou...	HTTP Request	2174	✓	3176256	133	19
2	19:02:45.035	Thread Grou...	HTTP Request	2856	✓	3176256	133	26
3	19:02:46.033	Thread Grou...	HTTP Request	2903	✓	3176256	133	26
4	19:02:47.032	Thread Grou...	HTTP Request	3488	✓	3176256	133	31
5	19:02:48.033	Thread Grou...	HTTP Request	3820	✓	3176256	133	29
6	19:02:49.033	Thread Grou...	HTTP Request	3738	✓	3176256	133	36
7	19:02:50.033	Thread Grou...	HTTP Request	4144	✓	3176256	133	37
8	19:02:51.033	Thread Grou...	HTTP Request	3837	✓	3176256	133	36
9	19:02:52.033	Thread Grou...	HTTP Request	3609	✓	3176256	133	30
10	19:02:53.033	Thread Grou...	HTTP Request	2715	✓	3176256	133	26

## LATIHAN LOAD TESTING

1. JMeter fitur soal latihan Load Testing
  - `jmeter_selectStudentBerhasil`

### HTTP Request

Name: HTTP Request

Comments:

Basic

Advanced

Web Server

Protocol [http]:
 Server Name or IP: localhost
 Port Number: 8080

HTTP Request

Method: GET
 Path: student/view/1506737823
 Content encoding:

☐ Redirect Automatically
 ☒ Follow Redirects
 ☒ Use KeepAlive
 ☐ Use multipart/form-data for POST
 ☐ Browser-compatible headers

Parameters

Body Data

Files Upload

Send Parameters With the Request:

Name:	Value	Encode?	Include Equals?

Sample #	Start Time	Thread Name	Label	Sample Time...	Status	Bytes	Sent Bytes	Latency
76	18:57:07.780	Thread Grou...	HTTP Request	24	✓	1595	141	2
77	18:57:07.880	Thread Grou...	HTTP Request	37	✓	1595	141	3
78	18:57:07.978	Thread Grou...	HTTP Request	15	✓	1595	141	1
79	18:57:08.078	Thread Grou...	HTTP Request	18	✓	1595	141	1
80	18:57:08.179	Thread Grou...	HTTP Request	16	✓	1595	141	1
81	18:57:08.278	Thread Grou...	HTTP Request	9	✓	1595	141	1
82	18:57:08.378	Thread Grou...	HTTP Request	12	✓	1595	141	1
83	18:57:08.477	Thread Grou...	HTTP Request	11	✓	1595	141	1
84	18:57:08.579	Thread Grou...	HTTP Request	25	✓	1595	141	2
85	18:57:08.679	Thread Grou...	HTTP Request	27	✓	1595	141	2
86	18:57:08.779	Thread Grou...	HTTP Request	24	✓	1595	141	2
87	18:57:08.895	Thread Grou...	HTTP Request	42	✓	1595	141	4
88	18:57:08.994	Thread Grou...	HTTP Request	13	✓	1595	141	1
89	18:57:09.096	Thread Grou...	HTTP Request	25	✓	1595	141	2
90	18:57:09.195	Thread Grou...	HTTP Request	23	✓	1595	141	2
91	18:57:09.295	Thread Grou...	HTTP Request	22	✓	1595	141	2
92	18:57:09.395	Thread Grou...	HTTP Request	25	✓	1595	141	2
93	18:57:09.493	Thread Grou...	HTTP Request	14	✓	1595	141	1
94	18:57:09.594	Thread Grou...	HTTP Request	23	✓	1595	141	2
95	18:57:09.695	Thread Grou...	HTTP Request	25	✓	1595	141	2
96	18:57:09.798	Thread Grou...	HTTP Request	33	✓	1595	141	3
97	18:57:09.898	Thread Grou...	HTTP Request	27	✓	1595	141	2
98	18:57:09.998	Thread Grou...	HTTP Request	15	✓	1595	141	1
99	18:57:10.097	Thread Grou...	HTTP Request	20	✓	1595	141	1
100	18:57:10.198	Thread Grou...	HTTP Request	19	✓	1595	141	1

- `jmeter_selectStudentGagal`

← → ↺ 🏠 📄 localhost:8080/student/view/11111111

[Home](#) [View Student](#) [Add Student](#)

# Student not found

NPM = 11111111

### HTTP Request

Name: HTTP Request

Comments:

Basic Advanced

Web Server

Protocol [http]: Server Name or IP: localhost Port Number: 8080

HTTP Request

Method: GET Path: studentView/11111111 Content encoding:

☐ Redirect Automatically
☒ Follow Redirects
☒ Use KeepAlive
☐ Use multipart/form-data for POST
☐ Browser-compatible headers

Parameters Body Data Files Upload

Send Parameters With the Request:

Name:	Value	Encode?	Include Equals?

Filename					Browse...	Log/Display Only: <input type="checkbox"/> Errors <input type="checkbox"/> Successes			
Sample #	Start Time	Thread Name	Label	Sample Time...	Status	Bytes	Sent Bytes	Latency	
76	19:00:56.806	Thread Grou...	HTTP Request	14	✓	1550	139	1	
77	19:00:56.907	Thread Grou...	HTTP Request	12	✓	1550	139	1	
78	19:00:57.007	Thread Grou...	HTTP Request	19	✓	1550	139	1	
79	19:00:57.104	Thread Grou...	HTTP Request	18	✓	1550	139	1	
80	19:00:57.208	Thread Grou...	HTTP Request	21	✓	1550	139	2	
81	19:00:57.307	Thread Grou...	HTTP Request	22	✓	1550	139	2	
82	19:00:57.408	Thread Grou...	HTTP Request	66	✓	1550	139	6	
83	19:00:57.508	Thread Grou...	HTTP Request	14	✓	1550	139	1	
84	19:00:57.608	Thread Grou...	HTTP Request	7	✓	1550	139	1	
85	19:00:57.708	Thread Grou...	HTTP Request	7	✓	1550	139	1	
86	19:00:57.802	Thread Grou...	HTTP Request	8	✓	1550	139	1	
87	19:00:57.907	Thread Grou...	HTTP Request	8	✓	1550	139	1	
88	19:00:58.003	Thread Grou...	HTTP Request	7	✓	1550	139	1	
89	19:00:58.108	Thread Grou...	HTTP Request	18	✓	1550	139	1	
90	19:00:58.203	Thread Grou...	HTTP Request	21	✓	1550	139	2	
91	19:00:58.302	Thread Grou...	HTTP Request	14	✓	1550	139	1	
92	19:00:58.408	Thread Grou...	HTTP Request	10	✓	1550	139	1	
93	19:00:58.504	Thread Grou...	HTTP Request	11	✓	1550	139	1	
94	19:00:58.603	Thread Grou...	HTTP Request	12	✓	1550	139	1	
95	19:00:58.708	Thread Grou...	HTTP Request	11	✓	1550	139	1	
96	19:00:58.805	Thread Grou...	HTTP Request	8	✓	1550	139	1	
97	19:00:58.908	Thread Grou...	HTTP Request	9	✓	1550	139	1	
98	19:00:59.007	Thread Grou...	HTTP Request	7	✓	1550	139	1	
99	19:00:59.108	Thread Grou...	HTTP Request	9	✓	1550	139	1	
100	19:00:59.208	Thread Grou...	HTTP Request	8	✓	1550	139	1	

- **jmeter\_selectAllStudents**

### Thread Group

Name: Thread Group

Comments:

Action to be taken after a Sampler error

☒ Continue
☐ Start Next Thread Loop
☐ Stop Thread
☐ Stop Test
☐ Stop Test Now

Thread Properties

Number of Threads (users): 10

Ramp-Up Period (in seconds): 10

Loop Count: ☐ Forever 1

☐ Delay Thread creation until needed

☐ Scheduler

Scheduler Configuration

Duration (seconds)

Startup delay (seconds)

Filename					Browse...	Log/Display Only: <input type="checkbox"/> Errors <input type="checkbox"/> Successes			
Sample #	Start Time	Thread Name	Label	Sample Time...	Status	Bytes	Sent Bytes	Latency	
1	19:02:44.030	Thread Grou...	HTTP Request	2174		3176256	133	15	
2	19:02:45.035	Thread Grou...	HTTP Request	2856		3176256	133	26	
3	19:02:46.033	Thread Grou...	HTTP Request	2903		3176256	133	26	
4	19:02:47.032	Thread Grou...	HTTP Request	3488		3176256	133	31	
5	19:02:48.033	Thread Grou...	HTTP Request	3820		3176256	133	26	
6	19:02:49.033	Thread Grou...	HTTP Request	3738		3176256	133	36	
7	19:02:50.033	Thread Grou...	HTTP Request	4144		3176256	133	37	
8	19:02:51.033	Thread Grou...	HTTP Request	3837		3176256	133	36	
9	19:02:52.033	Thread Grou...	HTTP Request	3609		3176256	133	30	
10	19:02:53.033	Thread Grou...	HTTP Request	2715		3176256	133	26	