

UNIT TESTING

1. Unit testing selectAllStudents()

- Given

Membuat list studentModel untuk menyimpan data student dengan asumsi data tersebut sudah tersedia dan dapat digunakan. Begitu juga dengan list checks yang nantinya akan digunakan untuk pembandingan. Sedangkan BDDMockito digunakan untuk mengamsumsikan return dari model menggunakan studentMapper telah dilakukan dan hasilnya adalah berhasil / true.

- When

List test digunakan untuk menampung list hasil balikan dari service yang berisi list student.

- Then

`assertThat(test, notNullValue());` // Digunakan bahwa list test yang mana menampung list hasil dari balikan service tidak null

`assertThat(test.isEmpty(), equalTo(false));` // cek bahwa test tidak kosong

`assertThat(test.size(), equalTo(1));` // cek bahwa test tersebut hanya ada 1 data

`assertThat(test, equalTo(checks));` // cek test datanya sama dengan checks (list yang kita gunakan untuk pembandingan)

2. Unit testing addStudent()

- Given

Membuat instance studentModel membuat data student dan check yang nantinya akan digunakan untuk pembandingan. Sedangkan BDDMockito digunakan untuk mengamsumsikan return dari model menggunakan studentMapper telah dilakukan dan hasilnya adalah berhasil / true.

- When

Berisi Boolean yang digunakan untuk menampung hasil dari service apakah berhasil atau tidak.

- Then

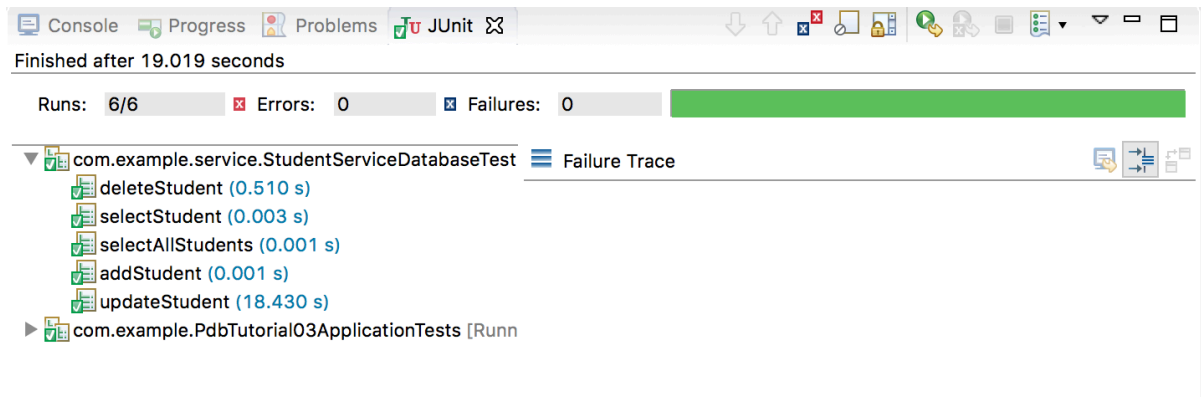
`BDDMockito.then(studentMapper).should().addStudent(check);`

Jadi mapper akan melakukan addstudent dengan data dari instance check

`assertThat(test, equalTo(true));` // akan melakukan pengecekan apakah Boolean yang digunakan untuk menyimpan flag menambahkan studentmodel apakah berhasil atau tidak

3. testing terhadap method delete student dan update student.

Hasil:



LOAD TESTING

Melakukan select student dengan NPM 1506737823.

NPM = 1506737823

Name = Kermie

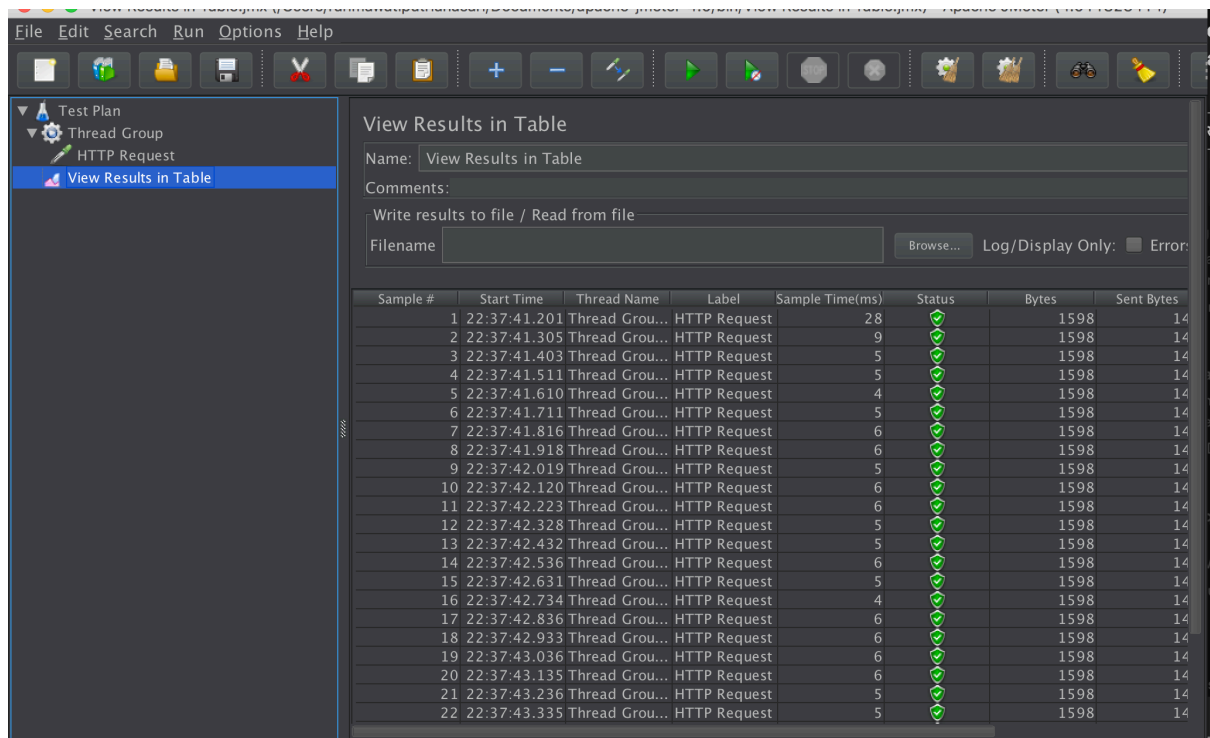
GPA = 3.32

konfigurasi apache JMeter



Sebelum Optimisasi

1. jmeter_selectStudentBerhasil



View Results in Table

Name: View Results in Table

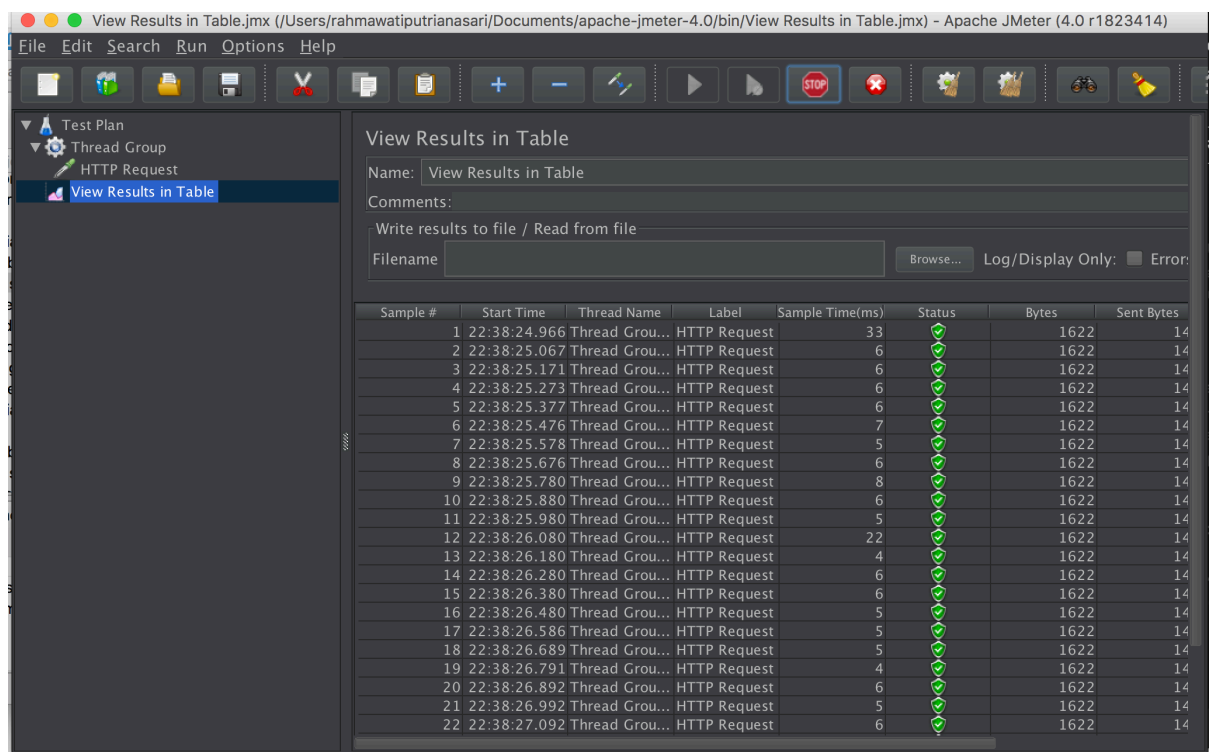
Comments:

Write results to file / Read from file

Filename Browse... Log/Display Only: ☐ Error:

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes
1	22:37:41.201	Thread Grou...	HTTP Request	28	Success	1598	14
2	22:37:41.305	Thread Grou...	HTTP Request	9	Success	1598	14
3	22:37:41.403	Thread Grou...	HTTP Request	5	Success	1598	14
4	22:37:41.511	Thread Grou...	HTTP Request	5	Success	1598	14
5	22:37:41.610	Thread Grou...	HTTP Request	4	Success	1598	14
6	22:37:41.711	Thread Grou...	HTTP Request	5	Success	1598	14
7	22:37:41.816	Thread Grou...	HTTP Request	6	Success	1598	14
8	22:37:41.918	Thread Grou...	HTTP Request	6	Success	1598	14
9	22:37:42.019	Thread Grou...	HTTP Request	5	Success	1598	14
10	22:37:42.120	Thread Grou...	HTTP Request	6	Success	1598	14
11	22:37:42.223	Thread Grou...	HTTP Request	6	Success	1598	14
12	22:37:42.328	Thread Grou...	HTTP Request	5	Success	1598	14
13	22:37:42.432	Thread Grou...	HTTP Request	5	Success	1598	14
14	22:37:42.536	Thread Grou...	HTTP Request	6	Success	1598	14
15	22:37:42.631	Thread Grou...	HTTP Request	5	Success	1598	14
16	22:37:42.734	Thread Grou...	HTTP Request	4	Success	1598	14
17	22:37:42.836	Thread Grou...	HTTP Request	6	Success	1598	14
18	22:37:42.933	Thread Grou...	HTTP Request	6	Success	1598	14
19	22:37:43.036	Thread Grou...	HTTP Request	6	Success	1598	14
20	22:37:43.135	Thread Grou...	HTTP Request	6	Success	1598	14
21	22:37:43.236	Thread Grou...	HTTP Request	5	Success	1598	14
22	22:37:43.335	Thread Grou...	HTTP Request	5	Success	1598	14

2. jmeter_selectStudentGagal



View Results in Table

Name: View Results in Table

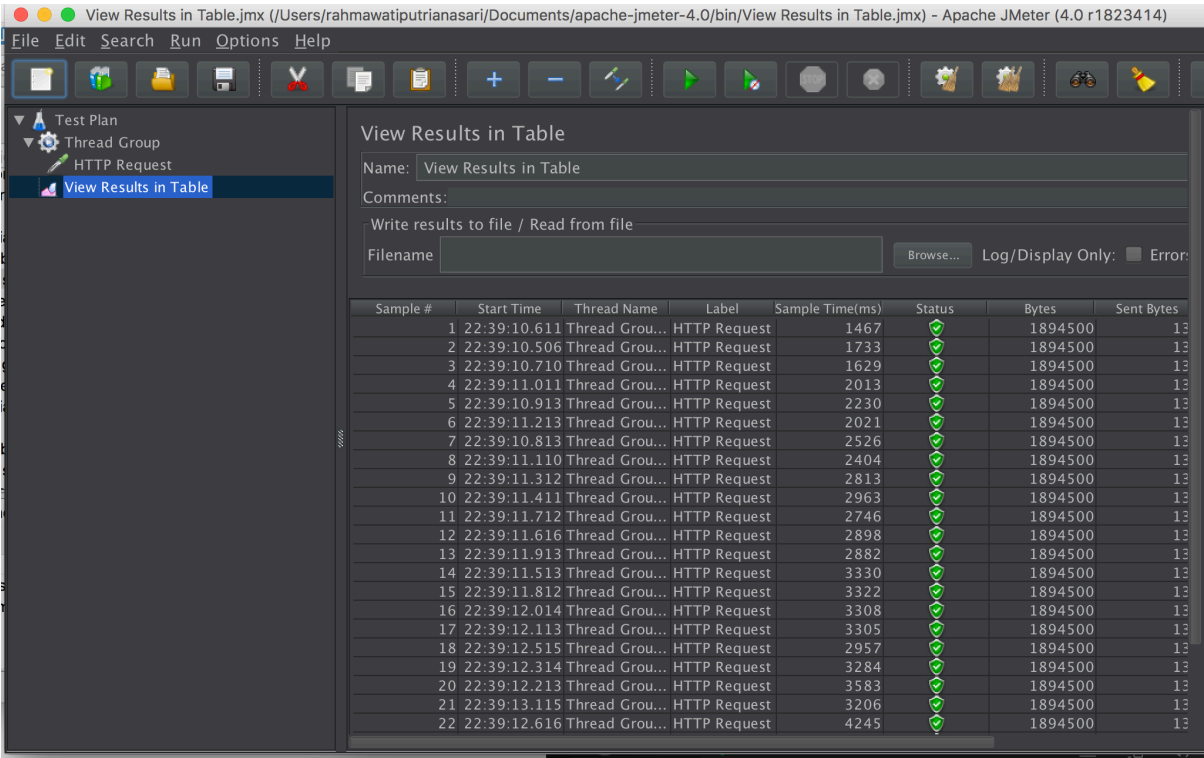
Comments:

Write results to file / Read from file

Filename Browse... Log/Display Only: ☐ Error:

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes
1	22:38:24.966	Thread Grou...	HTTP Request	33	Success	1622	14
2	22:38:25.067	Thread Grou...	HTTP Request	6	Success	1622	14
3	22:38:25.171	Thread Grou...	HTTP Request	6	Success	1622	14
4	22:38:25.273	Thread Grou...	HTTP Request	6	Success	1622	14
5	22:38:25.377	Thread Grou...	HTTP Request	6	Success	1622	14
6	22:38:25.476	Thread Grou...	HTTP Request	7	Success	1622	14
7	22:38:25.578	Thread Grou...	HTTP Request	5	Success	1622	14
8	22:38:25.676	Thread Grou...	HTTP Request	6	Success	1622	14
9	22:38:25.780	Thread Grou...	HTTP Request	8	Success	1622	14
10	22:38:25.880	Thread Grou...	HTTP Request	6	Success	1622	14
11	22:38:25.980	Thread Grou...	HTTP Request	5	Success	1622	14
12	22:38:26.080	Thread Grou...	HTTP Request	22	Success	1622	14
13	22:38:26.180	Thread Grou...	HTTP Request	4	Success	1622	14
14	22:38:26.280	Thread Grou...	HTTP Request	6	Success	1622	14
15	22:38:26.380	Thread Grou...	HTTP Request	6	Success	1622	14
16	22:38:26.480	Thread Grou...	HTTP Request	5	Success	1622	14
17	22:38:26.586	Thread Grou...	HTTP Request	5	Success	1622	14
18	22:38:26.689	Thread Grou...	HTTP Request	5	Success	1622	14
19	22:38:26.791	Thread Grou...	HTTP Request	4	Success	1622	14
20	22:38:26.892	Thread Grou...	HTTP Request	6	Success	1622	14
21	22:38:26.992	Thread Grou...	HTTP Request	5	Success	1622	14
22	22:38:27.092	Thread Grou...	HTTP Request	6	Success	1622	14

3. jmeter_selectAllStudents



Setelah Optimisasi

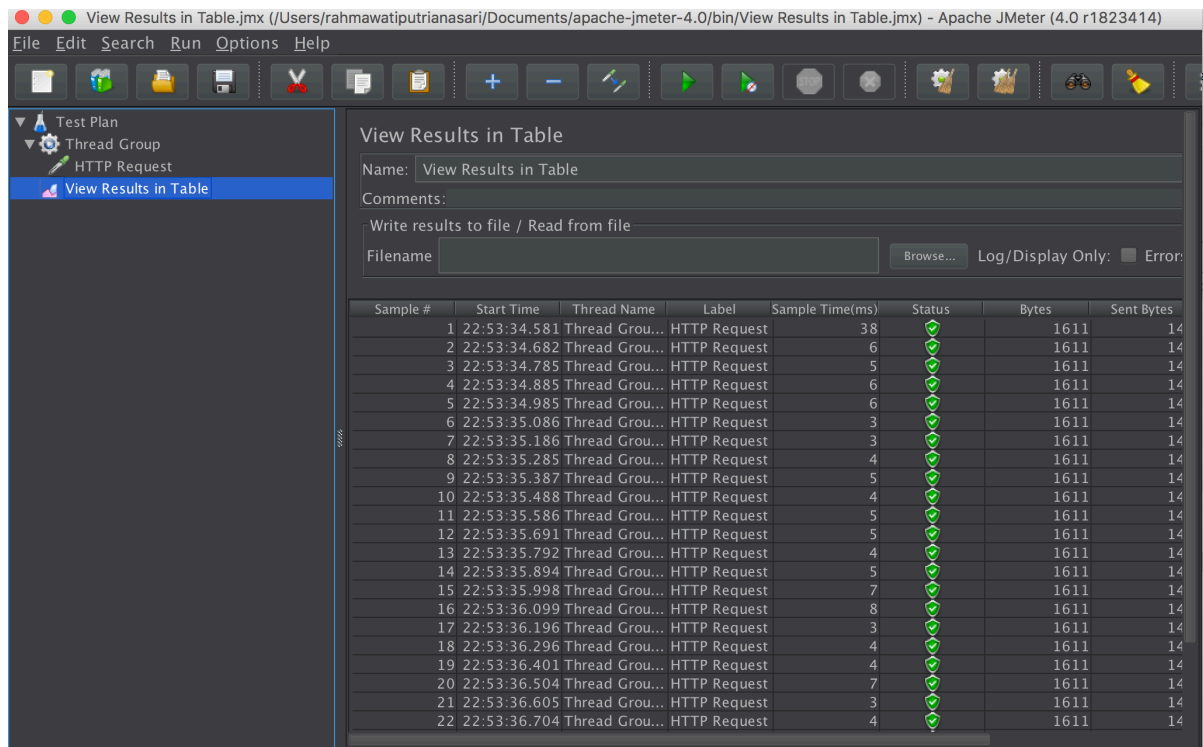
Optimalisasi dengan memaksimalkan database yang semula:

Column Name	#	Data Type	Not Null	Auto Increment	Key	Default	Extra
npm	1	varchar(20)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PRI		
name	2	varchar(45)	<input type="checkbox"/>	<input type="checkbox"/>			
gpa	3	double	<input type="checkbox"/>	<input type="checkbox"/>			

menjadi:

Column Name	#	Data Type	Not Null	Auto Increment	Key	Default	Extra
npm	1	varchar(11)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PRI	"	
name	2	varchar(20)	<input type="checkbox"/>	<input type="checkbox"/>			
gpa	3	double	<input type="checkbox"/>	<input type="checkbox"/>			

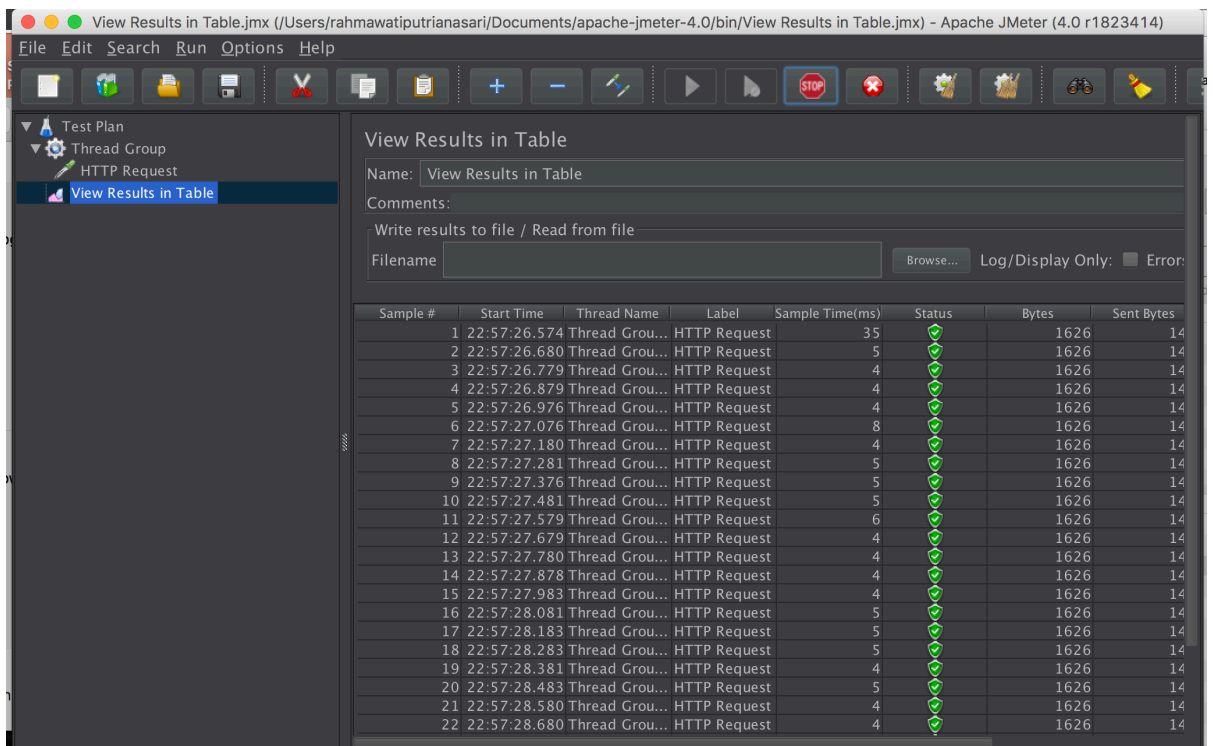
1. jmeter_selectStudentBerhasil



The screenshot shows the Apache JMeter 4.0 interface with the 'View Results in Table' window. The test plan on the left includes a Thread Group with an HTTP Request and the 'View Results in Table' element. The main window displays a table of test results for 22 samples, all of which are successful (Status: green checkmark). The table columns are Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, and Sent Bytes.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes
1	22:53:34.581	Thread Grou...	HTTP Request	38	✓	1611	14
2	22:53:34.682	Thread Grou...	HTTP Request	6	✓	1611	14
3	22:53:34.785	Thread Grou...	HTTP Request	5	✓	1611	14
4	22:53:34.885	Thread Grou...	HTTP Request	6	✓	1611	14
5	22:53:34.985	Thread Grou...	HTTP Request	6	✓	1611	14
6	22:53:35.086	Thread Grou...	HTTP Request	3	✓	1611	14
7	22:53:35.186	Thread Grou...	HTTP Request	3	✓	1611	14
8	22:53:35.285	Thread Grou...	HTTP Request	4	✓	1611	14
9	22:53:35.387	Thread Grou...	HTTP Request	5	✓	1611	14
10	22:53:35.488	Thread Grou...	HTTP Request	4	✓	1611	14
11	22:53:35.586	Thread Grou...	HTTP Request	5	✓	1611	14
12	22:53:35.691	Thread Grou...	HTTP Request	5	✓	1611	14
13	22:53:35.792	Thread Grou...	HTTP Request	4	✓	1611	14
14	22:53:35.894	Thread Grou...	HTTP Request	5	✓	1611	14
15	22:53:35.998	Thread Grou...	HTTP Request	7	✓	1611	14
16	22:53:36.099	Thread Grou...	HTTP Request	8	✓	1611	14
17	22:53:36.196	Thread Grou...	HTTP Request	3	✓	1611	14
18	22:53:36.296	Thread Grou...	HTTP Request	4	✓	1611	14
19	22:53:36.401	Thread Grou...	HTTP Request	4	✓	1611	14
20	22:53:36.504	Thread Grou...	HTTP Request	7	✓	1611	14
21	22:53:36.605	Thread Grou...	HTTP Request	3	✓	1611	14
22	22:53:36.704	Thread Grou...	HTTP Request	4	✓	1611	14

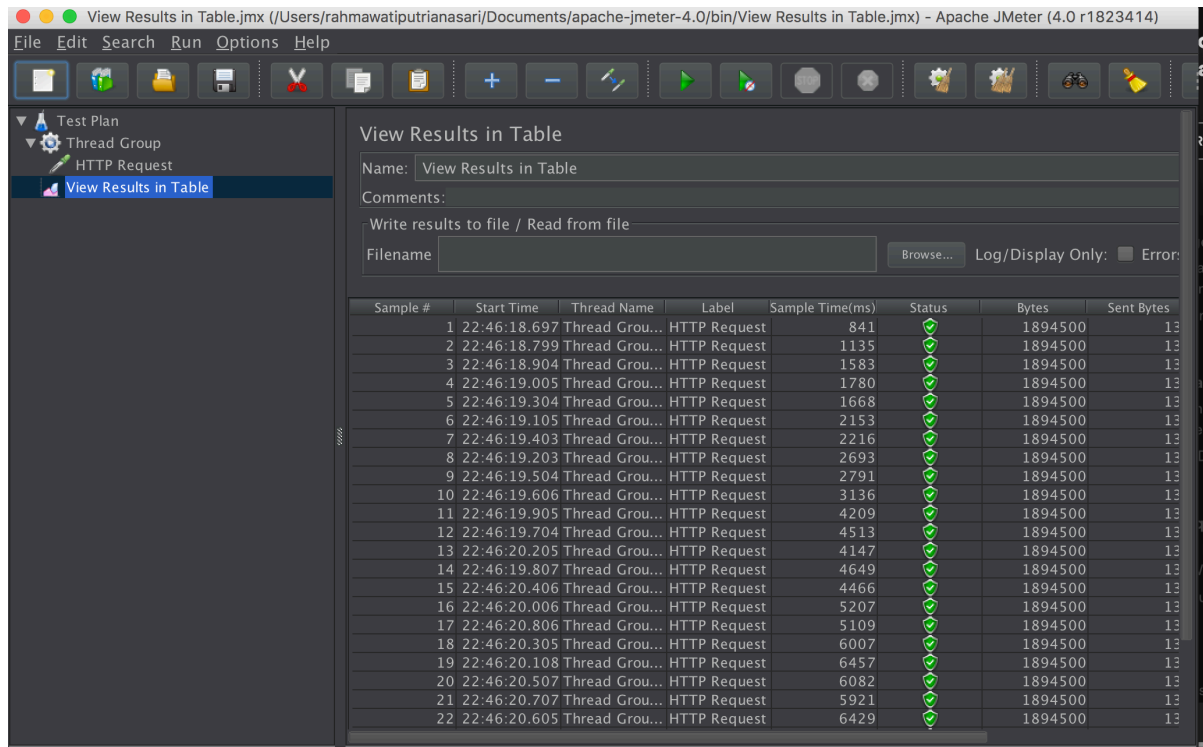
2. jmeter_selectStudentGagal



The screenshot shows the Apache JMeter 4.0 interface with the 'View Results in Table' window. The test plan on the left includes a Thread Group with an HTTP Request and the 'View Results in Table' element. The main window displays a table of test results for 22 samples, all of which are successful (Status: green checkmark). The table columns are Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, and Sent Bytes.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes
1	22:57:26.574	Thread Grou...	HTTP Request	35	✓	1626	14
2	22:57:26.680	Thread Grou...	HTTP Request	5	✓	1626	14
3	22:57:26.779	Thread Grou...	HTTP Request	4	✓	1626	14
4	22:57:26.879	Thread Grou...	HTTP Request	4	✓	1626	14
5	22:57:26.976	Thread Grou...	HTTP Request	4	✓	1626	14
6	22:57:27.076	Thread Grou...	HTTP Request	8	✓	1626	14
7	22:57:27.180	Thread Grou...	HTTP Request	4	✓	1626	14
8	22:57:27.281	Thread Grou...	HTTP Request	5	✓	1626	14
9	22:57:27.376	Thread Grou...	HTTP Request	5	✓	1626	14
10	22:57:27.481	Thread Grou...	HTTP Request	5	✓	1626	14
11	22:57:27.579	Thread Grou...	HTTP Request	6	✓	1626	14
12	22:57:27.679	Thread Grou...	HTTP Request	4	✓	1626	14
13	22:57:27.780	Thread Grou...	HTTP Request	4	✓	1626	14
14	22:57:27.878	Thread Grou...	HTTP Request	4	✓	1626	14
15	22:57:27.983	Thread Grou...	HTTP Request	4	✓	1626	14
16	22:57:28.081	Thread Grou...	HTTP Request	5	✓	1626	14
17	22:57:28.183	Thread Grou...	HTTP Request	5	✓	1626	14
18	22:57:28.283	Thread Grou...	HTTP Request	5	✓	1626	14
19	22:57:28.381	Thread Grou...	HTTP Request	4	✓	1626	14
20	22:57:28.483	Thread Grou...	HTTP Request	5	✓	1626	14
21	22:57:28.580	Thread Grou...	HTTP Request	4	✓	1626	14
22	22:57:28.680	Thread Grou...	HTTP Request	4	✓	1626	14

3. jmeter_selectAllStudents



View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename: Browse... Log/Display Only: ☐ Error: ☐

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes
1	22:46:18.697	Thread Grou...	HTTP Request	841	Success	1894500	13
2	22:46:18.799	Thread Grou...	HTTP Request	1135	Success	1894500	13
3	22:46:18.904	Thread Grou...	HTTP Request	1583	Success	1894500	13
4	22:46:19.005	Thread Grou...	HTTP Request	1780	Success	1894500	13
5	22:46:19.304	Thread Grou...	HTTP Request	1668	Success	1894500	13
6	22:46:19.105	Thread Grou...	HTTP Request	2153	Success	1894500	13
7	22:46:19.403	Thread Grou...	HTTP Request	2216	Success	1894500	13
8	22:46:19.203	Thread Grou...	HTTP Request	2693	Success	1894500	13
9	22:46:19.504	Thread Grou...	HTTP Request	2791	Success	1894500	13
10	22:46:19.606	Thread Grou...	HTTP Request	3136	Success	1894500	13
11	22:46:19.905	Thread Grou...	HTTP Request	4209	Success	1894500	13
12	22:46:19.704	Thread Grou...	HTTP Request	4513	Success	1894500	13
13	22:46:20.205	Thread Grou...	HTTP Request	4147	Success	1894500	13
14	22:46:19.807	Thread Grou...	HTTP Request	4649	Success	1894500	13
15	22:46:20.406	Thread Grou...	HTTP Request	4466	Success	1894500	13
16	22:46:20.006	Thread Grou...	HTTP Request	5207	Success	1894500	13
17	22:46:20.806	Thread Grou...	HTTP Request	5109	Success	1894500	13
18	22:46:20.305	Thread Grou...	HTTP Request	6007	Success	1894500	13
19	22:46:20.108	Thread Grou...	HTTP Request	6457	Success	1894500	13
20	22:46:20.507	Thread Grou...	HTTP Request	6082	Success	1894500	13
21	22:46:20.707	Thread Grou...	HTTP Request	5921	Success	1894500	13
22	22:46:20.605	Thread Grou...	HTTP Request	6429	Success	1894500	13

Rangkuman

Pada tutorial ini belajar tentang testing dalam sebuah aplikasi yaitu Unit Testing dan Load testing. Unit testing berguna untuk test code yang sudah kita buat apakah sudah berjalan dengan semestinya atau tidak dan mendapatkan balikan (return) yang sesuai atau belum serta dapat melakukan mock terhadap instance yang kita mau sehingga seakan-akan program tersebut memberikan response yang benar.

Sedangkan load testing untuk melakukan uji stress dari aplikasi web kita dengan menggunakan user (thread) yang banyak agar aplikasi tidak down saat prosesnya berjalan serta bagaimana caranya untuk mengoptimisasi dari code entah itu dari query, code, database agar time yang didapatkan semakin sedikit atau semakin cepat loadnya.

Dalam tutorial ini, cara untuk mengoptimisasi adalah dengan mengubah panjang atribut yaitu NPM(20) dan Nama(45) menjadi NPM(11) dan Nama(20). Dengan begitu terjadi selisih antara sebelum dan sesudah dioptimalisasi karena semakin cepat loadnya dan lebih ringan.