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Tutorial 2

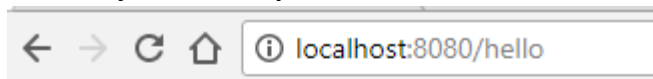
Latihan Project Hello World

Ringkasan dari materi yang dipelajari dalam tutorial ini :

Pada tutorial 2 ini dipelajari mengenai pengerjaan project di Spring boot yang membutuhkan STS (Spring Tools Suites) dan harus sudah terinstall JDK dan JRE di laptop. Pada pengerjaan project dilakukan pemanggilan method oleh view dari controller. Method yang dibuat meliputi method dengan parameter (GET request) dan yang tanpa parameter. Pengerjaan project ini dilakukan dari sisi server karena dijalankan dengan Spring Boot. Hal ini terlihat pada penggunaan thymeleaf. Thymeleaf adalah Java library yang menghasilkan data dari server dalam bentuk XML/HTML.

Latihan Project Hello World

Ketika dijalankan **http://localhost:8080/hello**



Hello, world!

1. Ganti baris tersebut menjadi `@RequestMapping("/hello123")`

Pertanyaan: Apakah compile error?

Jika tidak, stop Spring Boot yang sedang berjalan, run kembali dan buka localhost:8080/hello apa yang terjadi? Kembalikan RequestMapping menjadi /hello

Jawab :

Tidak ada compile error. Seperti terlihat dibawah ini.

```

HelloWordProject - HelloWordProjectApplication [Spring Boot App] C:\Program Files\Java\jre1.8.0_161\bin\javaw.exe (Feb 22, 2018, 1:27:40 PM)
2018-02-22 13:27:46.291 INFO 8544 --- [ restartedMain] o.apache.catalina.core.StandardService : Starting service
2018-02-22 13:27:46.293 INFO 8544 --- [ restartedMain] org.apache.catalina.core.StandardEngine : Starting Servlet
2018-02-22 13:27:46.436 INFO 8544 --- [ost-startStop-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spri
2018-02-22 13:27:46.436 INFO 8544 --- [ost-startStop-1] o.s.web.context.ContextLoader : Root WebApplicati
2018-02-22 13:27:46.831 INFO 8544 --- [ost-startStop-1] o.s.b.w.servlet.ServletRegistrationBean : Mapping servlet:
2018-02-22 13:27:46.842 INFO 8544 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:27:46.842 INFO 8544 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:27:46.843 INFO 8544 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:27:46.843 INFO 8544 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:27:47.320 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerAdapter : Looking for @Cont
2018-02-22 13:27:47.407 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/hello1
2018-02-22 13:27:47.409 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/greeti
2018-02-22 13:27:47.410 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/greeti
2018-02-22 13:27:47.411 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/perkal
2018-02-22 13:27:47.415 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/error]
2018-02-22 13:27:47.416 INFO 8544 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/error]
2018-02-22 13:27:47.467 INFO 8544 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:27:47.468 INFO 8544 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:27:47.532 INFO 8544 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:27:48.188 INFO 8544 --- [ restartedMain] o.s.b.d.a.OptionalLiveReloadServer : LiveReload server
2018-02-22 13:27:48.298 INFO 8544 --- [ restartedMain] o.s.j.e.a.AnnotationMBeanExporter : Registering beans
2018-02-22 13:27:48.485 INFO 8544 --- [ restartedMain] s.b.c.e.t.TomcatEmbeddedServletContainer : Tomcat started on
2018-02-22 13:27:48.492 INFO 8544 --- [ restartedMain] c.e.demo.HelloWordProjectApplication : Started HelloWord

```

Yang terjadi adalah Error karena path request HTTP yang seharusnya adalah /hello

← → ↺ ↻ ⓘ localhost:8080/hello123

Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Thu Feb 22 12:46:41 ICT 2018

There was an unexpected error (type=Not Found, status=404).

No message available

2. Ganti nama method index() dengan nama method hello() .

Pertanyaan: Apakah compile error? Jika tidak, Stop Spring Boot yang sedang berjalan, run kembali dan buka localhost:8080/hello apakah page hello sebelumnya masih muncul?

Jawab :

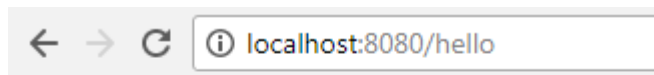
Tidak ada compile error. Seperti yang terlihat dibawah ini.

```

HelloWordProject - HelloWordProjectApplication [Spring Boot App] C:\Program Files\Java\jre1.8.0_161\bin\javaw.exe (Feb 22, 2018, 1:29:53 PM)
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.908 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerAdapter : Looking for @Cont
2018-02-22 13:29:59.982 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/greeti
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/greeti
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/hello1
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/perkal
2018-02-22 13:29:59.989 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/error]
2018-02-22 13:29:59.990 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "{[/error]
2018-02-22 13:30:00.045 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.045 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.100 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.767 INFO 4348 --- [ restartedMain] o.s.b.d.a.OptionalLiveReloadServer : LiveReload server
2018-02-22 13:30:00.856 INFO 4348 --- [ restartedMain] o.s.j.e.a.AnnotationMBeanExporter : Registering beans
2018-02-22 13:30:00.984 INFO 4348 --- [ restartedMain] s.b.c.e.t.TomcatEmbeddedServletContainer : Tomcat started on
2018-02-22 13:30:00.993 INFO 4348 --- [ restartedMain] c.e.demo.HelloWordProjectApplication : Started HelloWord
2018-02-22 13:30:08.172 INFO 4348 --- [nio-8080-exec-2] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spri
2018-02-22 13:30:08.172 INFO 4348 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet : FrameworkServlet
2018-02-22 13:30:08.199 INFO 4348 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet : FrameworkServlet

```

Ketika dirun, hello muncul kembali



Hello, world!

3. Ganti string return type menjadi return "hello123"

Apakah compile error?

Tidak ada compile error. Seperti terlihat dibawah ini.

```
HelloWordProject - HelloWordProjectApplication [Spring Boot App] C:\Program Files\Java\jre1.8.0_161\bin\javaw.exe (Feb 22, 2018, 1:29:53 PM)
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.464 INFO 4348 --- [ost-startStop-1] o.s.b.w.servlet.FilterRegistrationBean : Mapping filter: '
2018-02-22 13:29:59.908 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerAdapter : Looking for @Cont
2018-02-22 13:29:59.982 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/greeti
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/greeti
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/hello1
2018-02-22 13:29:59.983 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/perkal
2018-02-22 13:29:59.989 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/error]
2018-02-22 13:29:59.990 INFO 4348 --- [ restartedMain] s.w.s.m.m.a.RequestMappingHandlerMapping : Mapped "[/error]
2018-02-22 13:30:00.045 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.045 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.100 INFO 4348 --- [ restartedMain] o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [
2018-02-22 13:30:00.767 INFO 4348 --- [ restartedMain] o.s.b.d.a.OptionalLiveReloadServer : LiveReload server
2018-02-22 13:30:00.856 INFO 4348 --- [ restartedMain] o.s.j.e.a.AnnotationMBeanExporter : Registering beans
2018-02-22 13:30:00.984 INFO 4348 --- [ restartedMain] s.b.c.e.t.TomcatEmbeddedServletContainer : Tomcat started on
2018-02-22 13:30:00.993 INFO 4348 --- [ restartedMain] c.e.demo.HelloWordProjectApplication : Started HelloWord
2018-02-22 13:30:08.172 INFO 4348 --- [nio-8080-exec-2] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spri
2018-02-22 13:30:08.172 INFO 4348 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet : FrameworkServlet
2018-02-22 13:30:08.199 INFO 4348 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet : FrameworkServlet
```

Jika tidak, Stop Spring Boot yang sedang berjalan, run kembali dan buka localhost:8080/hello apakah page hello sebelumnya masih muncul?



Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Thu Feb 22 13:34:20 ICT 2018

There was an unexpected error (type=Internal Server Error, status=500).

Error resolving template "hello123", template might not exist or might not be accessible by any of the configured Template Resolvers

Kembalikan return type menjadi "hello" Pertanyaan: Menandakan apakah String yang di-return tersebut?

String yang di-return tersebut akan mengembalikan method yang dibuat untuk dikirimkan ke view (greeting.html).

Request Parameter (Query String)

Pada tutorial sebelumnya Anda telah menggunakan query string untuk mengirimkan data ke server PHP. Spring Boot juga dapat mengolah query string.

Langkah:

1. Silakan buat page baru dengan nama greeting.html pada folder templates dengan isi sebagai berikut.

```
<!DOCTYPE html>
<html xmlns:th="http://www.thymeleaf.org">
<head>
<title>Second Page</title>
</head>
<body>
<p th:text="'Selamat datang ' + ${name} + '!'"> Sapaan untuk user</p>
</body>
</html>
```

2. Selanjutnya pada PageController tambahkan import berikut:

```
package com.example.demo.controller;

import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestParam;

@Controller
public class PageController {

    @RequestMapping("/hello")
    public String index ()
    {
        return "hello123";
    }

    @RequestMapping("/greeting")
    public String greeting (@RequestParam(value = "name") String name, Model model)
    {
        model.addAttribute ("name", name);
        return "greeting";
    }

}
```

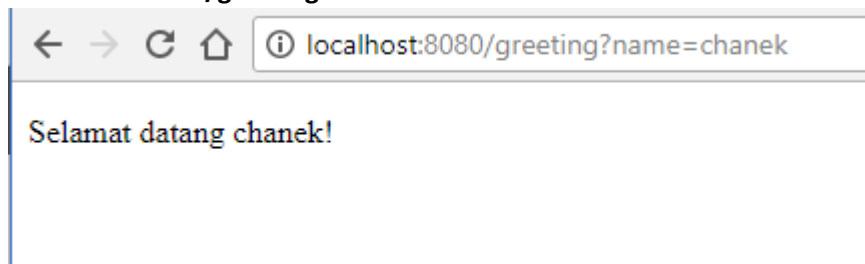
3. Stop Spring Boot yang sedang berjalan dan run kembali (Tidak perlu melakukan ini kalau sudah menginstall dev tools dan live reload).

```
at org.apache.tomcat.util.net.AbstractEndpoint.start(AbstractEndpoint.java:1150) ~[tomcat-embed-core-8.5.27.jar:8.5.27]
at org.apache.coyote.AbstractProtocol.start(AbstractProtocol.java:591) ~[tomcat-embed-core-8.5.27.jar:8.5.27]
at org.apache.catalina.connector.Connector.startInternal(Connector.java:1018) ~[tomcat-embed-core-8.5.27.jar:8.5.27]
... 19 common frames omitted

2018-02-20 21:26:09.485 INFO 5088 --- [ restartedMain] o.apache.catalina.core.StandardService : Stopping the service
2018-02-20 21:26:09.485 INFO 5088 --- [ restartedMain] utoConfigurationReportLoggingInitializer :

Error starting ApplicationContext. To display the auto-configuration report re-run your application with 'spring-boot:info'
2018-02-20 21:26:09.500 ERROR 5088 --- [ restartedMain] o.s.b.d.LoggingFailureAnalysisReporter :
```

4. Buka localhost:8080/greeting?name=chanek



Latihan Request Parameter

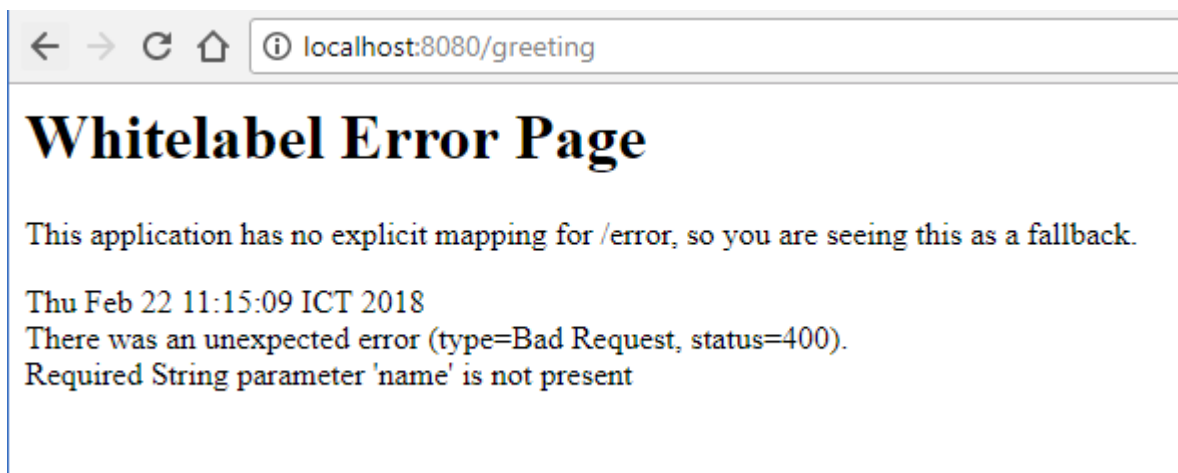
1. Ubah nilai anotasi RequestMapping dari `"/greeting"` menjadi `"/hello/greeting"` Buka `localhost:8080/hello/greeting?name=chanek`. Pertanyaan: apakah hasilnya?



Selamat datang chanek!

Kembalikan request map menjadi `@RequestMapping("/greeting")`

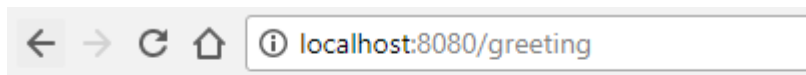
2. Akses `localhost:8080/greeting`
Pertanyaan: Apakah hasilnya?



Error tersebut karena parameter name tidak ada. Padahal message kepada user berisi variabel nama.

Ubah header method greeting menjadi seperti berikut.

Pertanyaan: Apakah hasilnya?

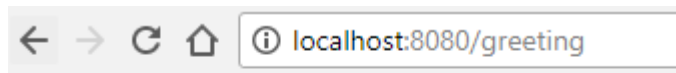


Selamat datang null!

3. Ubah header method greeting menjadi seperti berikut

Stop Spring Boot yang sedang berjalan, run kembali, dan buka localhost:8080/greeting.

Pertanyaan: apakah hasilnya?



Selamat datang dunia!

4. Perhatikan bahwa pada berkas greeting.html, tag paragraf yang kita tambahkan adalah sebagai berikut

Pertanyaan: Mengapa tulisan "Sapaan untuk user" tidak pernah muncul?

```
<p th:text="'Selamat datang ' + ${name}+ '!'> Sapaan untuk user </p>
```

Jawab :

th:text pada gambar diatas merupakan thymeleaf. Thymeleaf adalah java library yang menghasilkan data dari server, berbentuk XML/HTML format. Karena saat ini file dijalankan menggunakan springboot thymeleaf maka yang tampil adalah value dari sisi server. Jika ingin menampilkan sapaan untuk user maka harus dijalankan langsung dari file.

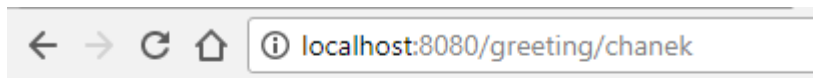
Path Variable

Langkah:

1. PageController tambahkan import berikut:

```
}
~ ~ ~
@RequestMapping("/greeting/{name}")
public String greetingPath (@PathVariable String name, Model model)
{
    model.addAttribute("name",name);
    return "greeting";
}
```

2. Stop Spring Boot yang sedang berjalan, run kembali, dan buka localhost:8080/greeting/chanek apakah hasilnya

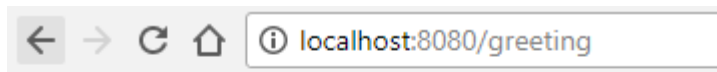


Selamat datang chanek!

Latihan Path Variable:

1. Akses localhost:8080/greeting/

Pertanyaan: Apa hasilnya?



Selamat datang dunia!

Ubah method greetingPath menjadi seperti berikut

Akses localhost:8080/greeting/ Pertanyaan: Apa hasilnya?



Whitelabel Error Page

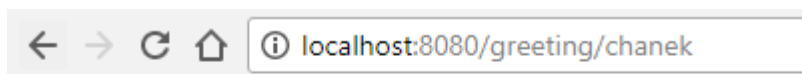
This application has no explicit mapping for /error, so you are seeing this as a fallback.

Thu Feb 22 11:44:56 ICT 2018

There was an unexpected error (type=Internal Server Error, status=500).

Ambiguous handler methods mapped for HTTP path 'http://localhost:8080/greeting': {public java.lang.String com.example.demo.controller.PageController.greeting(java.lang.String,org.springframework.ui.Model), public java.lang.String com.example.demo.controller.PageController.greetingPath(java.util.Optional,org.springframework.ui.Model)}

Akses localhost:8080/greeting/chanek Pertanyaan: Apa hasilnya?



Selamat datang chanek!

Latihan

1. Buatlah satu halaman baru untuk melakukan operasi perkalian.
2. Halaman ini menerima 2 buah parameter dari query string yaitu a dan b.
3. Pada view tampilkan hasil perkalian a dan b.
4. Jika a atau b tidak ada, nilai defaultnya 0.

5. Contoh hasil tampilannya

JAWABAN:

Controller untuk operasi perkalian

PerkalianController.java

```
package com.example.demo.controller;

import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestParam;

@Controller
public class PerkalianController {
    @RequestMapping("/perkalian")
    public String perkalian (@RequestParam(value="a", required=false, defaultValue = "0")
        Integer a, @RequestParam(value="b", required=false, defaultValue = "0") Integer b, Model model)
    {
        model.addAttribute ("a",a);
        model.addAttribute ("b",b);
        model.addAttribute ("c",a * b);
        return "perkalian";
    }
}
```

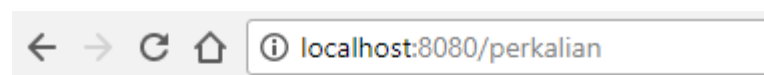
View untuk operasi perkalian

Perkalian.html

```
PageController.java PerkalianController.java perkalian.html greeting.html

<!DOCTYPE html>
<html xmlns:th="http://www.thymeleaf.org">
<head>
<title>Second Page</title>
</head>
<body>
<p th:text="${a} + ' x ' + ${b} + ' = ' + ${c}"> Sapaan untuk user </p>
</body>
</html>
```

<http://localhost:8080/perkalian>



0 x 0 = 0

<http://localhost:8080/perkalian?a=10>

← → ↻ 🏠 ⓘ localhost:8080/perkalian?a=10

$10 \times 0 = 0$

http://localhost:8080/perkalian?a=10&b=10

← → ↻ 🏠 ⓘ localhost:8080/perkalian?a=10&b=10

$10 \times 10 = 100$