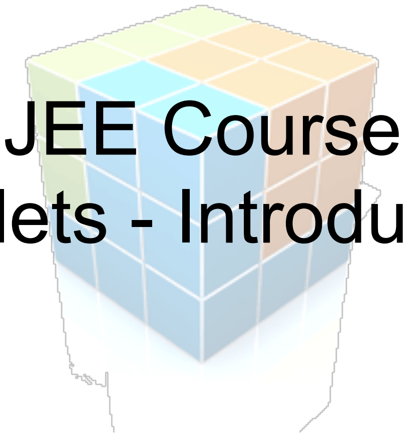

JEE Course
Servlets - Introduction

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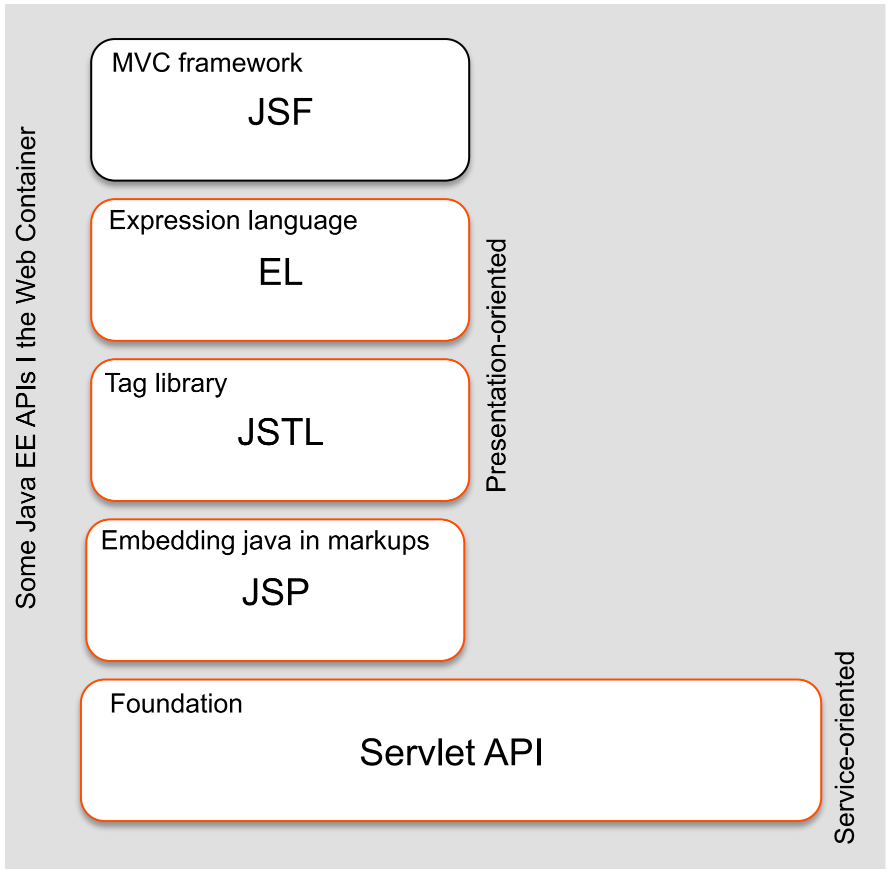
Content

The web tier of the JEE ecosystem (1 de 2)

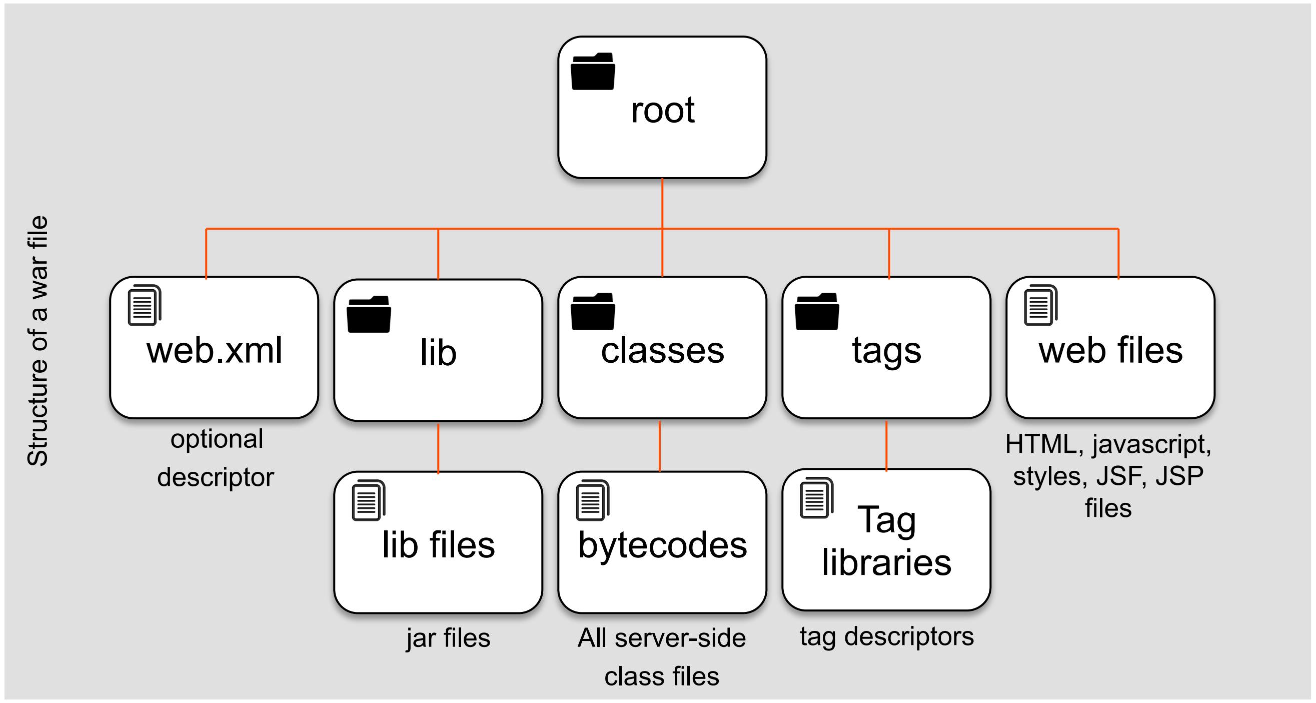
- **Servlet API**
  - Critical API used by several JEE APIs. Allows the execution of Java objects with server-side capabilities.
- **Java Server Pages API (JSP)**
  - A language entirely based on the Servlet API. Allows embedding Java code and custom tags into markup languages.
- **Java Server Pages Standard Tag Library (JSTL)**
  - Set of tags that helps to reduce the quantity of Java code in the presentation layer
- **Java Server Faces (JSF)**
  - Simplifies the creation of Web applications by providing a standard set of tools (or an API) for building user interfaces



Web modules (1 of 2)

- A web module is the smallest deployable and functional unit of web resources. It contains web components and static web content files such as:
  - HTML pages, style files and JavaScript files.
  - Configuration descriptors
  - Custom tags;
  - Java classes
- A web module can be deployed as an unpacked file structure or can be packaged in a file known as a Web Archive (WAR)
- A WAR file has a predefined structure and can be deployed in any JEE-compatible server

Web modules (2 of 2)



Servlets – Introduction (1 of 3)

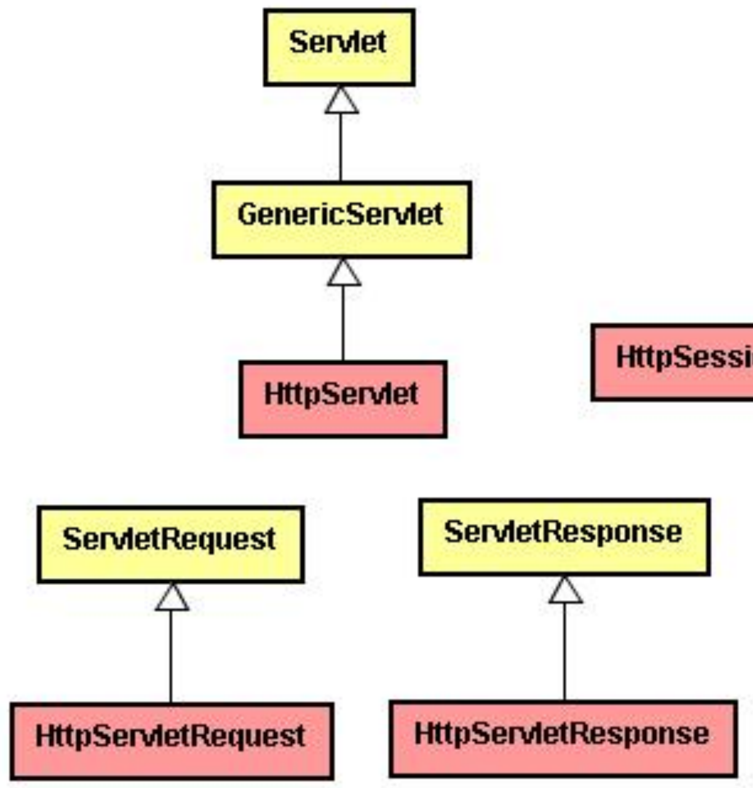
What is a Servlet according to Oracle ?

"A servlet is a Java programming language class used to extend the capabilities of servers that host applications accessed by means of a request-response programming model."

Servlets – Introduction (2 of 3)

- A servlet is a Java object that conforms to the Servlet API and inherits some functionalities of an HTTP server.
- These objects are accessible through URL mappings
- A servlet is platform and server-independent:
  - Servlets can be executed on any server compatible with the JEE specification

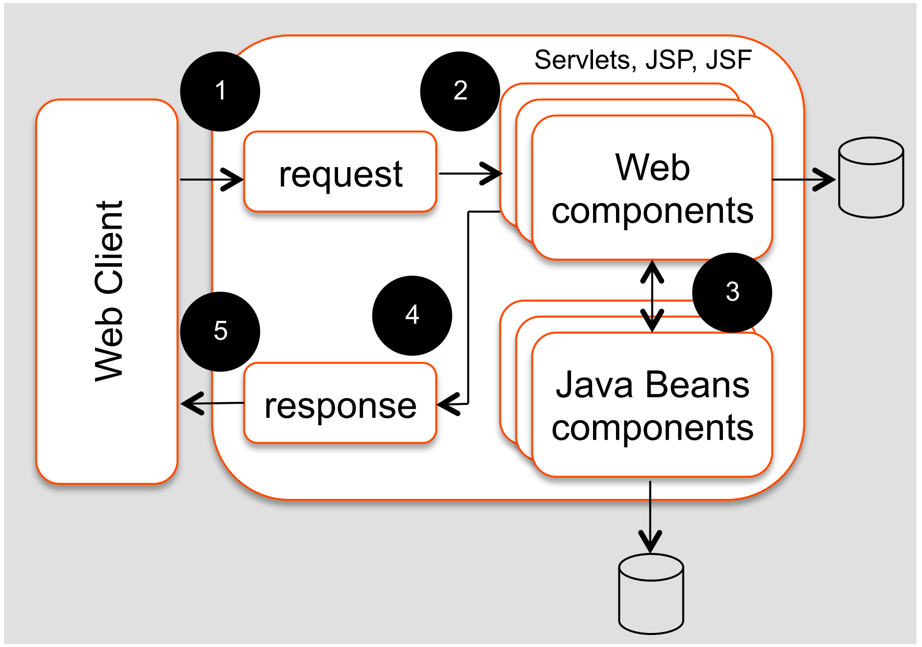
Servlets – Introduction (3 of 3)



Basic Servlet API Hierarchy

Request-Response paradigm

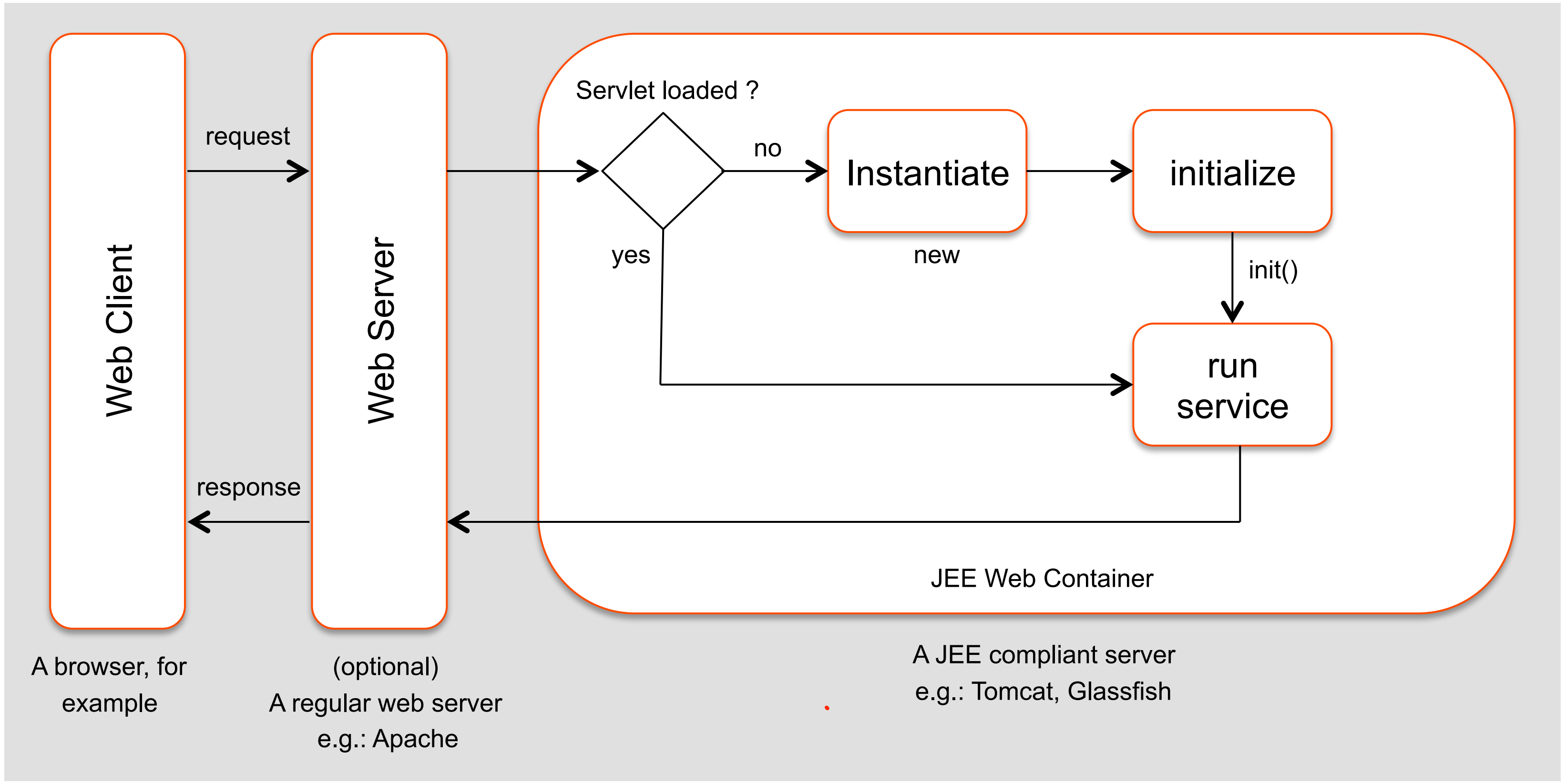
- During the request, a typical servlet:
  - Receives HTTP requests
  - Extracts information such as parameters, attributes and cookies
  - Fires business logic (method calls, web service execution, EJB invocation, etc.)
- As a response, a servlet can:
  - Generate content (ex.: JSON, XML, HTML or binary)
  - Forwards the request to a proper component (JSF or JSP page to render the content)



Servlet lifecycle (1 of 5)

- Servlets are naturally **multithreaded**
- A servlet instance can receive various requests at the same time
- The **container** controls the lifecycle of a servlet
- When the client invokes a servlet, the following steps are performed by the container
  - It **verifies** if an instance of the servlet exists
  - If not, it **creates** an instance of the servlet and executes the initialization methods
  - The container **invokes** the service method

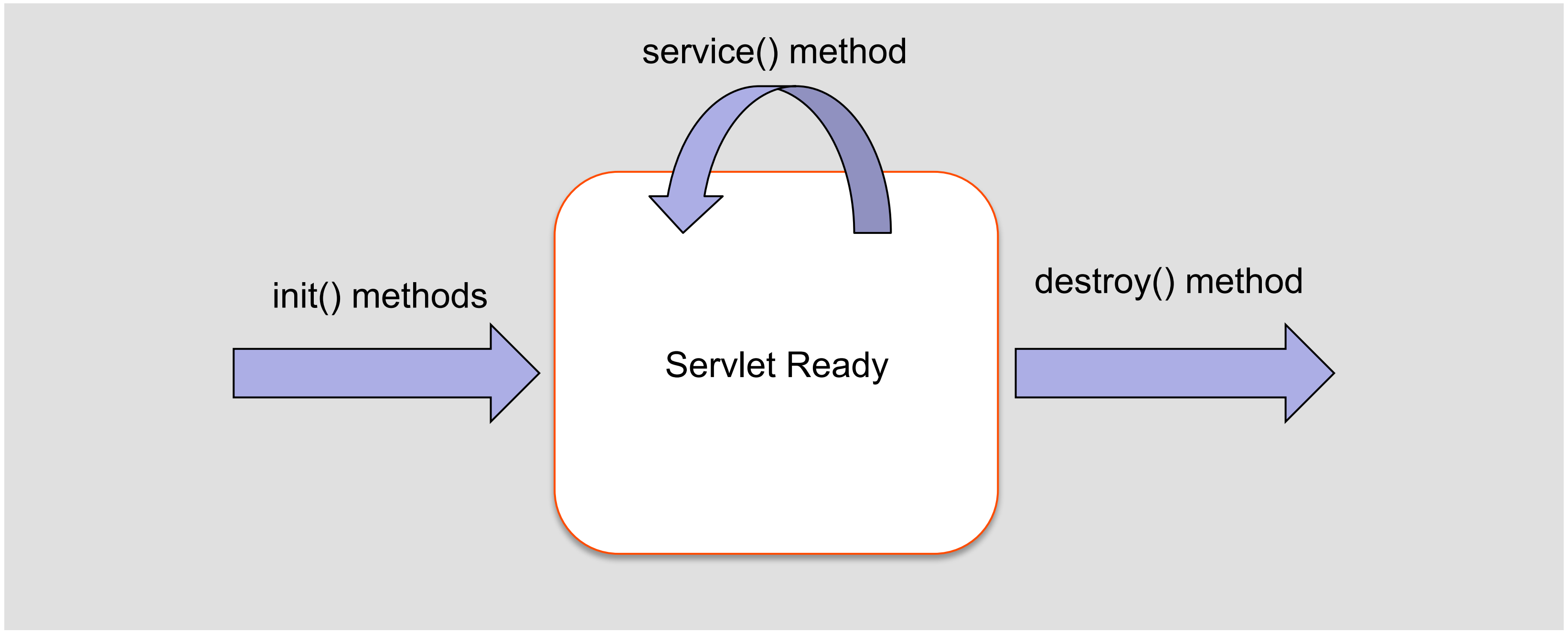
Servlet lifecycle (2 of 5)



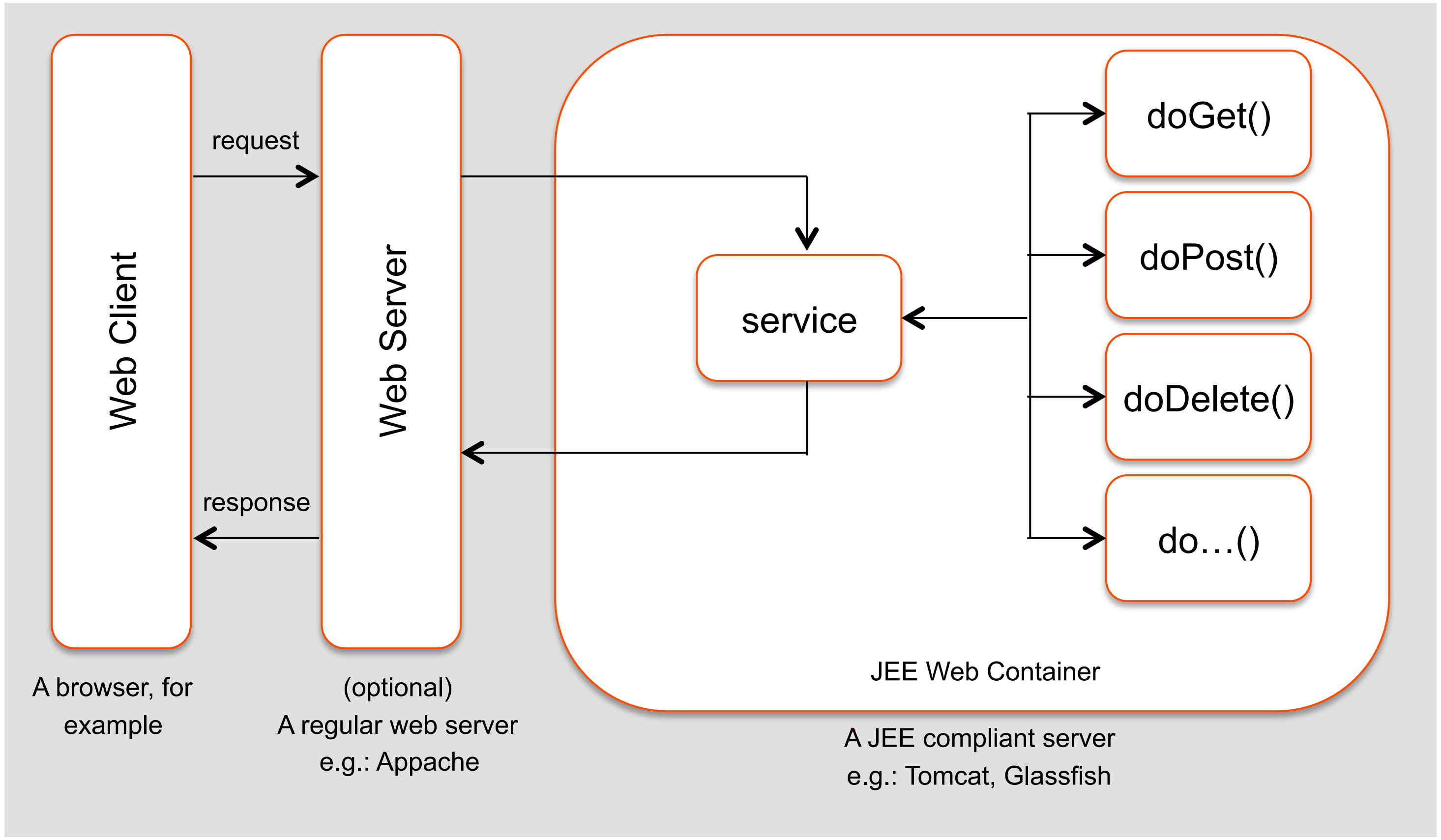
Servlet lifecycle (3 of 5)

- As state before, the container controls the servlet life cycle.
- The following methods are defined in the *GenericServlet* interface.
  - *init*: executed when the servlet is loaded.
  - *destroy*: executed when the servlet is finalized.
    - Some reasons: Container shutdown, new deployment
  - *service*: execute when the servlet is invoked.
- The *HttpServlet* class overrides the service method to invoke the corresponding HTTP methods (get, post, delete, trace, etc.)

Servlet lifecycle (4 of 5)



Servlet lifecycle (5 of 5)



Example: /module01/example03.html

Generating responses (1 of 4)

- Textual responses can be written using a *PrintWriter* object:

```
PrintWriter out = response.getWriter ()
```

- print() and println() methods will write contents using the response stream

```
out.print (”JEE Course");
out.println (”Hello ESIGELEC");
```

- The content is sent to the client after flushing the output stream

Example: /module01/example04.html

Further reading

The Java EE 7 **Tutorial**: Eric Jendrock et al.

http://docs.oracle.com/javaee/7/tutorial

Java Servlet 3.1 **documentation**:

http://docs.oracle.com/javaee/7/api/javax/servlet/package-summary.html

Java Servlet 3.1 Specification

https://jcp.org/aboutJava/communityprocess/final/jsr340/