**Servlets Introduction**

Web Browser:

* It’s a “Desktop Application” which helps us to interact with web applications
* Browser is the One & Only application which understands content/data present in HTML and display accordingly

Web Resources:

* Resources present inside a web application are called as web resources
* There are two types of web resources

1. Static web Resources:

* These resources “are present at web application” before making the request
* Content of these resources “**does not change**”.
* In other words, resources which generates “static response” is called as Static web Resources
* Few Examples:

1. Any Songs Downloads
2. Any Books (PDF, MS-WORD, etc.) Download
3. Any Software Download
4. Any Video/Movie files.
5. Dynamic Web Resources:

* These resources “**does not** present at web application” before making the request & they get generated at the time of request.
* Content of these resources “May Change” for every request (Dynamic Response)
* In other words, resources which generates “dynamic response” is called as Dynamic Web Resources
* Few Examples:

1. Any NetBanking Web Application Transaction Statement Download (PDF file)
2. Any Post Paid Connection Statement Downloads (PDF file)
3. Google Search Page (HTML Page)
4. Gmail Inbox Page (HTML Page)
5. Facebook Home Page (HTML Page)
6. Gmail “Download All Attachments” (ZIP file)

Note:

Both Static & Dynamic Web Response can be “HTML” or “Non-HTML” in nature.

**Web Path:**

* It’s a Path in Webserver in which Web Applications are present
* Web Path varies from Webserver to Webserver, we have to read the manual to get this information.
* In case of Tomcat web path is “<Tomcat Location>/webapps”
* Hence in Tomcat, WAR file should be kept webapps.

**Starting the WebServer**

**Note:**

* When we start webserver it should not throw any exception in the console
* At the time of starting the server, webserver extracts the contents of WAR file to a folder by same name inside “webapps” folder.

Web Application :

* Web Application is an application which is accessed over the network with the help of web browser
* Web application is a collection of web resources
* If a web application consists of “ONLY static resources then it is called as “Static Web Application”
* If a web application consists of “one/more dynamic resources” then it is called as “Dynamic Web Application”

Example: Gmail, Facebook, Twiter, Flipkart, etc.,

* J2EE helps us to develop “Dynamic Web Applications”

Web Server:

* Like any other application (Adobe Reader, Media Player, etc.,) , Webserver is also an application which runs on Operating System
* Webserver as the name implies “Serves requests to a Web Applications”
* In other words, it helps both web browser & web application to interact with each other
* Hence every web application (Static/Dynamic) is directly under the control of webserver
* Few Examples:

1. Apache Tomcat
2. Apache JBOSS
3. IBM WebSphere
4. Oracle WebLogic
5. Oracle GlassFish & many more…

Different ways to interact with Web Applications

1. By Typing an URL in Browser
2. By Clicking on the Hyperlink
3. By Submitting the HTML Form

WEB URL

* Web URL, uniquely indentifies a particular web resource inside a web application
* Hence every web resource (Static/Dynamic) must need to have its unique address in the form of “web URL”

Note: In case of Static web Resources, URL Consists of Resource file Name

Servlets:

* J2EE helps us to develop Dynamic web applications Hence Servlets & JSP acts like a Dynamic web Resources
* Servlets is an API of J2EE, it accepts web request from web server & generates “Dynamic Response” i.e response is getting generated at the time of Request.
* This Dynamic Response, may be a “HTML response” or “Non-HTML Response”
* For Example:

1. Any NetBanking Web Application, Transaction Statement Download (PDF file) is a Non-HTML Response.
2. Google Search Page (HTML Page) is a HTML Response
3. Gmail “Download All Attachements” (ZIP File) is non-HTML Response

* In the world of Java, Servlets are the “One and Only API “ that accepts web request and generate “Dynamic Response”
* Since Servlets are like Dynamic Resource & hence Servlets must have its unique address in the form of “Web URL”
* i.e Even though Servlets are Java Programs, we should not run them like normal Java Programs instead we should access via using corresponding Web URL with the help of Web Browser.

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ASSIGNMENT:

Assume That there is a table by name “Library” With the following structure

“Library”

1. student\_nm varchar(50)
2. book\_nm varchar(50)

NOTE: None of the above colums are Primary key

* Write a Java Program prints student name & corresponding number of books in the Console.

**Steps to Create MY First Servlet:**

1. Created the “Dynamic Web Project” by name “studentsApp” by selecting web module 3.0 or 3.1 to develop dynamic web Application

Note:

* In eclipse we should be in “Java EE” perspective to create Dynamic Web Project
* Dynamic Web Project has following 4 folders

1. Src (.java files will be present)
2. Build (.class files will be present)
3. WebContent (other than .java files will be present

* Create the “Index.html” file under “webContent” folder.
* Created the first servlet under “src” folder by extending “HttpServlet”
* Fixed the compilation error by copying the “servlet.jar” file to “WebContent/WEB-INF/lib” folder
* Override a metod by name “doGet()”
* Javax.servlet.\* is the package which represents servlet API
* In case of Dynamic Web Project, every JAR file SHOULD BE KEPT under “WebContent/WEB-INF/lib” folder
* Any Class which extends “javax.servlet.http.HttpServlet” is called as Servlet.
* Configure the URL for the servlet in “WebContent/WEB-INF/web.xml”

Note: Every Servlet MUST have a unique URL & that URL MUST be present in web.xml.

* Generate the WAR File from Dynamic Web Project (Build Process)

Note: To generate WAR file, right click on war file project, select “Export” & click on WAR file.

In the pop-up chose the destination to keep the WAR file.

WAR file “represents Dynamic Web Application” & helps to transfer dynamic web application from one location to another location

It’s a Collection of .class files + Other necessary resources + Dependent JAR files (one/more).

1. Copied the WAR file to Web Server “Web Path” Location (Deployment Process)

Web Path:

* It’s a Path/Directory Location in Webserver in which Web Application are present.
* Web Path varies from Webserver to Webserver. We have to refer the manual to get this information
* In case of Apache Tomcat web path is “<Tomcat Location>webapps”
* Hence in Tomcat, WAR file SHOULD be kept under “webapps” folder.

1. Started the Webserver

Note:

* When we start the webserver it should not throw any exception in the console
* At the time of starting the server, webserver extracts the contents of war file to the folder by same name inside webapps” folder.

1. Accessed the developed dynamic web application resources using Web Browser by using corresponding web URL’s
2. Accessed the HTML Page (Static Web Resources)

<http://localhost:8080/appName/xyz.html>

NOTE:

* In case of Static Resource web URL consists of “Resource File Nsme”
* HTML generates “Static Response” or in other words it helps us to generate “Static Page

1. Accessed the Servlet by typing the configured URL present in web.xml (Dynamic Resource)

http://localhost:8080/appName/servlet\_public \_url

NOTE:

- In case of Dynamic Resource web URL consists of “configured URL” present in web.xml

- Servlet generates “Dynamic Response” or in other words it helps us to generate “Dynamic Page”.

Dynamic Web Resource = Dynamic Response = Dynamic Page

Static Web Resource = Static Response = Static Page.

We know that web application is a collection of web resources. Web URL uniquely identify these web resources inside a web application. Structure of web url is **: protocol://domain:port/path?query-string#fragment\_id**

**Protocol:**

* When one application wants to communicate with other (or in case browser & server) , there needs to be a common language which both application understands & that language should have set of rules and instructions
* This common language is known as “Protocol” where protocol is “Set of Rules”
* Web Browser & Web Server application communicate using

1. Hyper Text Transfer Protocol (HTTP)
2. Hyper Text Transfer Protocol Secure (HTTPS)

* As the name implies most of the time HTTP Response contain HTML
* In Url it’s an optional informtion & default protoco is HTTP

**Domain:**

* IT uniquely identifies a computer in a network in which web application is present
* Domain consists of Computer Name / IP address of the computer in which web application is present
* In URL it is a Mandatory Information

**Port:**

* Port number in Web URL uniquely identifies web server application
* Default port number for http IS 80 & https is 443
* In URL this is an optional information
* When it’s not used default port number is used depending on the protocol present in Web URL
* In Tomcat Webserver, default port number for HTTP is changed from 80 to 8080 and default port number for HTTPS is changed from 443 to 8443

**Path:**

* We know that web application is a collection of web resources (Static / Dynamic) & also Web Server can consist of one/more applications
* Path is the full path of the web resource at web application side
* It consists of Web Application Name + (File Name in case of Static Resource OR configred URL in case of Dynamic Resource)
* Web Application Name “ uniquely identifies One web Application inside webserver.
* “File Name” uniquely identifies Static web resource inside that web application
* “Configured URL” uniquely identifies Dynamic web resource
* In URL, it’s an optional Information.