Day - 4
Scenario - 1
Servlet has to accept input from the client

In the previous session we had seen how the client was connecting to our Server via the URL but what if we wanted to pass input to the server from the client?
There are two ways through which we can pass input to the server-
- Query String
- HTML form

Let us see how Query String works

Through Query String we can pass input to the server and we pass the input after the URL by entering a **'?'** after the URL suggesting that **Query String** starts from here.
==Query String is nothing but the ability to pass data to the servlet in the form of key & value pairs.==
For Example-
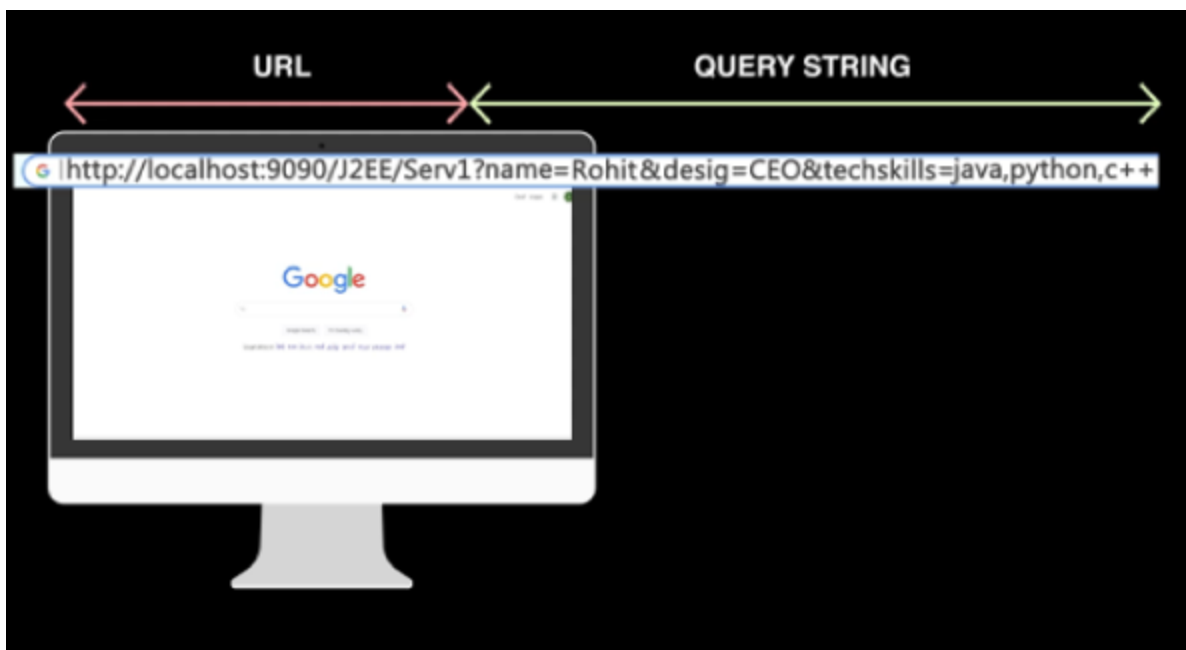
So the data we enter after **'?'** will be considered as Query String and if we want to pass multiple key and value pairs then we have to separate them with **'&'.**

So how does Query String reach the Servlet?
We know that whenever we pass something to the servlet via the browser, it will sent in the **RequestFormat** and the data in the Query String will be present in the body of the RequestFormat
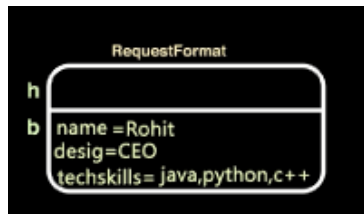
Now the RequestFormat will reach the **Deployment Descriptor(web.xml)**. The web.xml will now map to the Servlet based on the url-pattern mentioned in the URL.

We know that before the service method (doGet()) is called, two objects will be created i.e., **Request object and Response object** and the service method will access to both these objects.

The RequestFormat will be placed inside the request object and with the help of the following methods we can access the data inside the body of the RequestFormat

- getParameterNames( )
- getParameterValues( )
- getParameter( )
- getParameterMap( )

Let us try to implement these methods in our code

```java
package com.tap.servlets;

import java.io.IOException;
import java.io.PrintWriter;

import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;


public class FirstServlet extends HttpServlet {

    @Override
    protected void doGet(HttpServletRequest req, HttpServletResponse resp)
                throws ServletException, IOException {

        String name = req.getParameter("name");
        String desig = req.getParameter("desig");
        String ts = req.getParameter("techskills");

        System.out.println("name = "+name);
        System.out.println("designation = "+desig);
        System.out.println("tech skills = "+ts);
    }
}
```

And if we start the server and execute the code -

Output:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe
Aug 05, 2021 12:34:54 PM org.apache.catalina.core.Standar
INFO: Starting service [Catalina]
Aug 05, 2021 12:34:54 PM org.apache.catalina.core.Standar
INFO: Starting Servlet engine: [Apache Tomcat/8.5.69]
Aug 05, 2021 12:34:55 PM org.apache.coyote.AbstractProtoc
INFO: Starting ProtocolHandler ["http-nio-9090"]
Aug 05, 2021 12:34:55 PM org.apache.catalina.startup.Cata
INFO: Server startup in 1431 ms
init() method called
name = Rohit
designation = CEO
tech skills = java,python,c
```

Let us explore the other methods-

```java
protected void doGet(HttpServletRequest req, HttpServletResponse resp)
            throws ServletException, IOException {
        Enumeration<String> pN = req.getParameterNames();
        while(pN.hasMoreElements()) {
            System.out.println(pN.nextElement());
        }
}
```

And we will restart the server and deploy it in the browser

Output:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (
INFO: Initialization processed in 1751 ms
Aug 05, 2021 1:01:45 PM org.apache.catalina.core.Standard
INFO: Starting service [Catalina]
Aug 05, 2021 1:01:46 PM org.apache.catalina.core.Standard
INFO: Starting Servlet engine: [Apache Tomcat/8.5.69]
Aug 05, 2021 1:01:46 PM org.apache.coyote.AbstractProtoco
INFO: Starting ProtocolHandler ["http-nio-9090"]
Aug 05, 2021 1:01:46 PM org.apache.catalina.startup.Catal
INFO: Server startup in 797 ms
name
desig
techskills
```

What if the client will send multiple values for a single parameter?

We can use **getParameterValue( )** whenever a single parameter has multiple values and those values will be saved in a String array

```java
protected void doGet(HttpServletRequest req, HttpServletResponse resp)
            throws ServletException, IOException {

        String name = req.getParameter("name");
        String desig = req.getParameter("desig");
        String[] pV = req.getParameterValues("techskills");

        System.out.println("name = "+name);
        System.out.println("designation = "+desig);

        for(String i : pV) {
            System.out.println(i);
        }

    }
```

Output:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe
INFO: Starting service [Catalina]
Aug 05, 2021 1:18:30 PM org.apache.catalina.core.Standard
INFO: Starting Servlet engine: [Apache Tomcat/8.5.69]
Aug 05, 2021 1:18:30 PM org.apache.coyote.AbstractProtoco
INFO: Starting ProtocolHandler ["http-nio-9090"]
Aug 05, 2021 1:18:30 PM org.apache.catalina.startup.Catal
INFO: Server startup in 849 ms
name = Rohit
designation = CEO
java
python
c
```

Now let us see how we can take input from the HTML forms-
Whenever a user requests for "http://localhost:9090/J2EE/", then automatically **index.html** should be sent as response and a html form should be displayed like this-

Enter your details

name:
designation:

Techskills:

☐ Java
☐ Python
☐ C++
☐ C#
☐ Javascript

Submit Query

So let us now create the HTML form.
1. Open index.html file and type in the following code-

```html
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Home Page</title>
</head>
<body>
        <h3>Enter your details</h3>
        <form action="">
                <label>name:</label>
                <input type="text" name="name"><br/>

                <label>designation:</label>
                <input type="text" name="desig"><br/>

                <p>Techskills:</p>
                <input type = "checkbox" name="techskills" value="java">
                <label>Java</label><br/>
                <input type = "checkbox" name="techskills" value="python">
                <label>Python</label><br/>
                <input type = "checkbox" name="techskills" value="C++">
                <label>C++</label><br/>
                <input type = "checkbox" name="techskills" value="C#">
```

```
            <label>C#</label><br/>
            <input type = "checkbox" name="techskills" value="Javascript">
            <label>Javascript</label><br/><br/>

            <input type="submit">

        </form>
    </body>
    </html>
```

Now when the user requests for **index.html** and after entering all the details in the form and clicks on the Submit button, then automatically the details must be sent to **FirstServlet.java** servlet.
So how do we achieve that?
That is where the "action" field in the html file comes into picture.
We have to mention the URL to which the request must be sent when someone clicks on the Submit button.
We can mention the URL in two ways-
- Absolute Path
- Relative Path
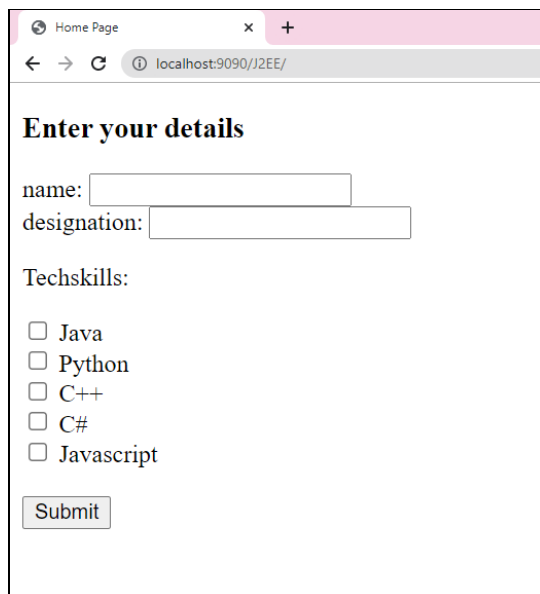
We will how to give Absolute path-

```
<form action="http://localhost:9090/J2EE/Serv1">
```

After deploying the server and executing the code in the browser

And enter the following details and click on submit button-

We can see that automatically a Query String will be generated and output will be displayed on the console

Let us now see how to pass Relative Path in the action field:

```
<form action="Serv1">
```

Output:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-14.0.2\bin\
Aug 05, 2021 2:07:18 PM org.apache.catalina.core.St
INFO: Starting service [Catalina]
Aug 05, 2021 2:07:18 PM org.apache.catalina.core.St
INFO: Starting Servlet engine: [Apache Tomcat/8.5.6
Aug 05, 2021 2:07:19 PM org.apache.coyote.AbstractP
INFO: Starting ProtocolHandler ["http-nio-9090"]
Aug 05, 2021 2:07:19 PM org.apache.catalina.startup
INFO: Server startup in 938 ms
name = Rakshit
designation = CMO
python
C#
```