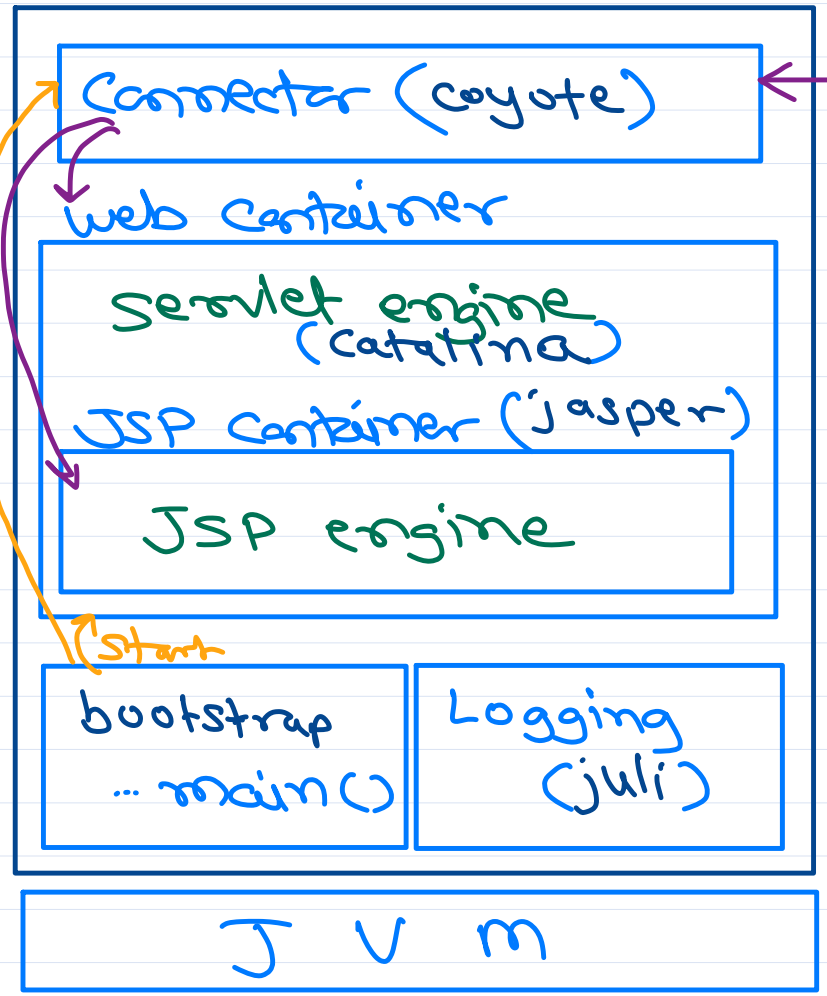
Advanced Java

Trainer: Nilesh Ghule

Tomcat architecture



req

Key parts:

1. Connector (accept reqs)
2. web container (req processing)
3. web applns running in tomcat.

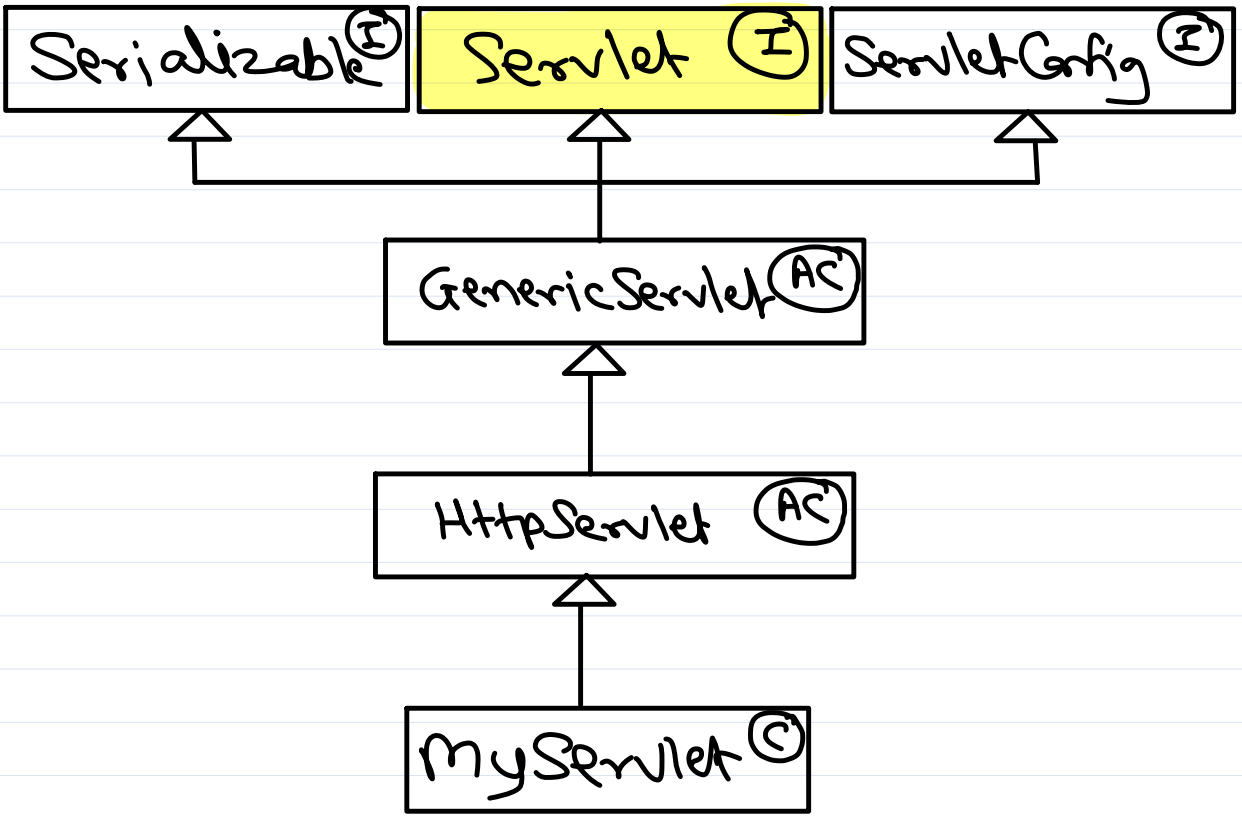
Request Processing

1. accept request
2. url mapping
   - @WebServlet or web.xml
3. Servlet object
   - created on 1st req
   - accessed from pool on next req
4. Response generation
   - doXyz() method
5. HTTP response

Thread model

- tomcat creates a collection of threads during startup - executor thread pool.
- on each req to a connector, a thread from pool is assigned to process that request.
- upon completion, thread returns back to pool.
- max num of threads in pool can be configured in server.xml.

Servlet is a java class that is executed in java web server when req is received from client and produces response that is sent back to the client.



Servlet interface:

① init() → arg: ServletConfig ← info/ metadata of servlet
- when 1st req received for a servlet, obj is created and init() called by web container.
- programmer should override, if any one time initialization is to be done. e.g. JDBC connection, ...
- If failed, must throw ServletException. Now servlet reqs will not be processed further.

③ destroy()
- when appln is undeployed or web server shutdown, destroy is called by web container.
- programmer should override, if any one time de-initialization is to be done. e.g. close connection.

② service() →

Java Servlets

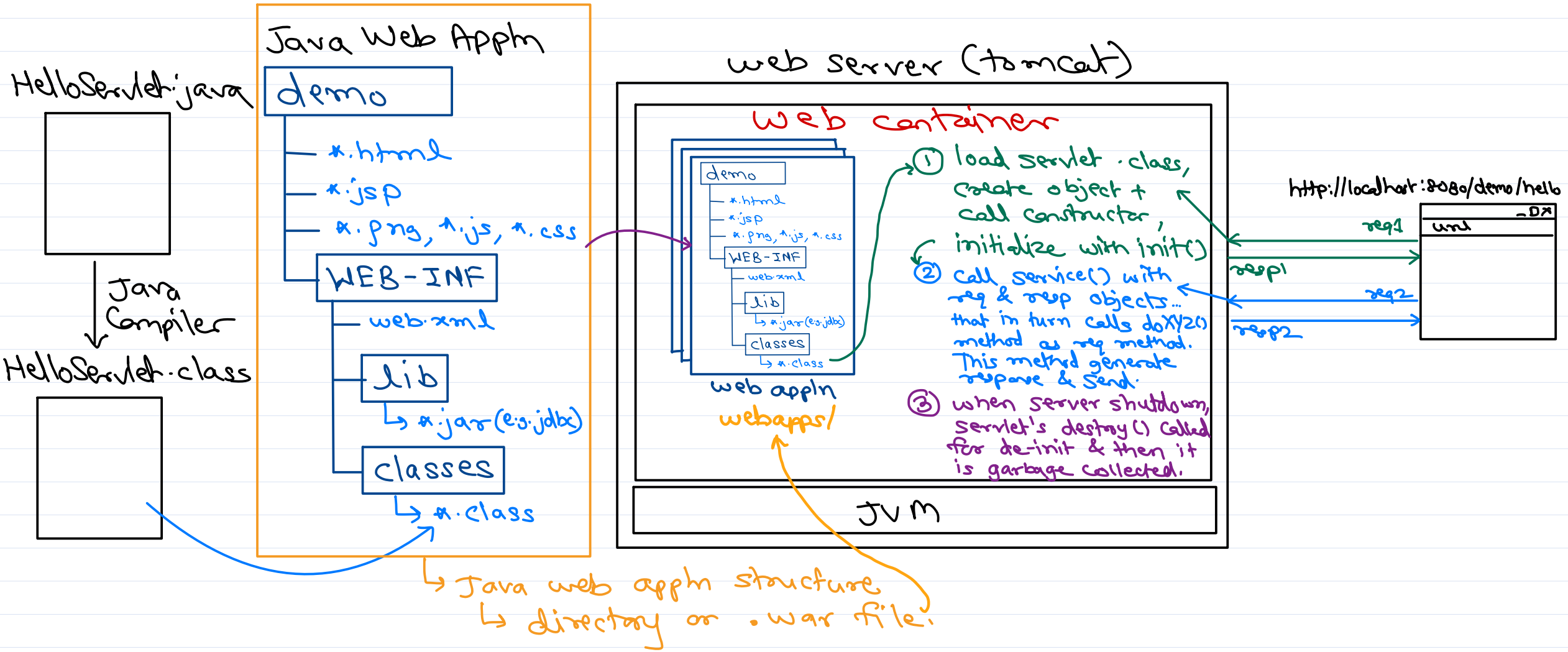
* Servlet interface:
  - @service()
    - called for each req by web container.
    - programmer should override it to process the req and produce the response.

* GenericServlet class
  - provides default impl of init() & destroy().
  - keeps service() abstract.
  * Protocol independent servlet.

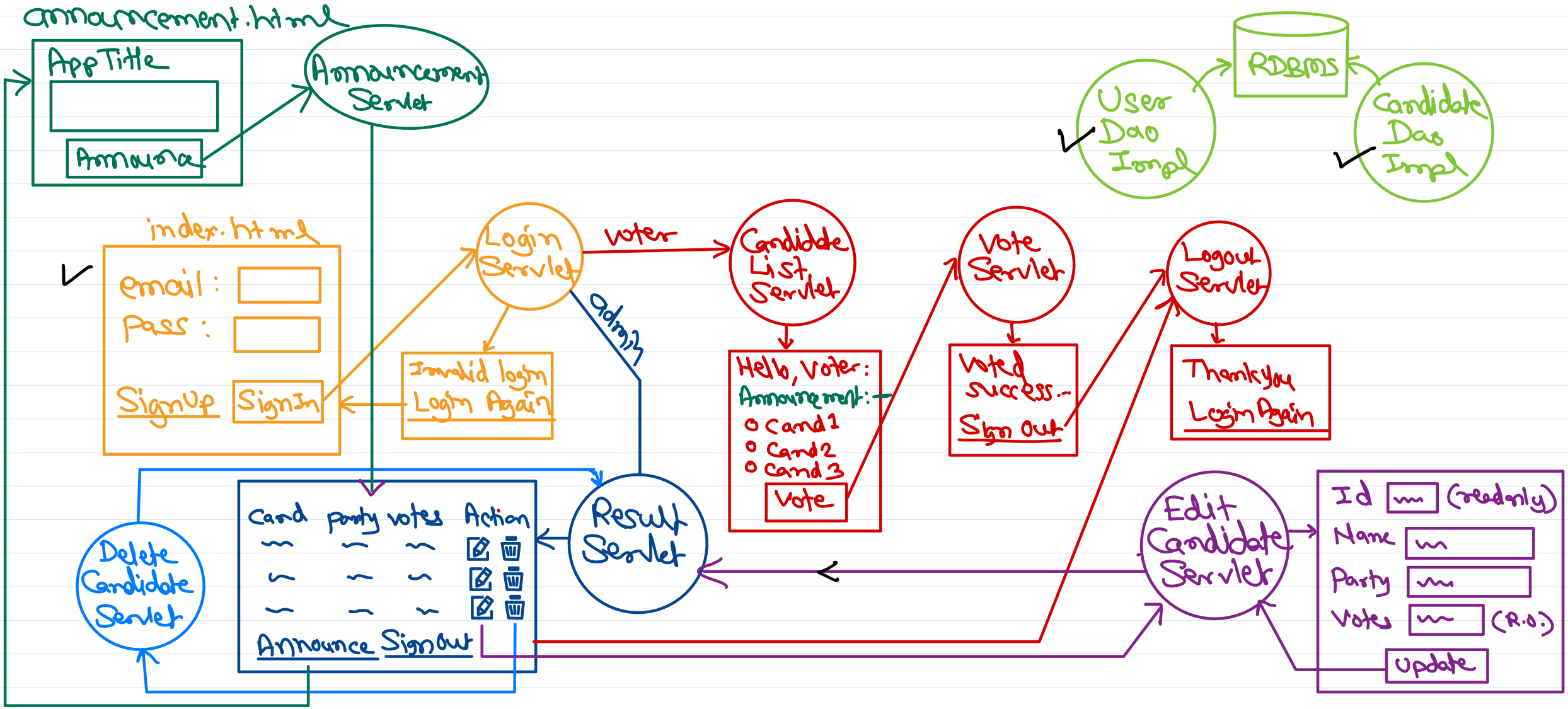
* HttpServlet class
  - class to handle HTTP requests.
  - it overrides service() and internally calls doGet(), doPost(), doHead(), ... methods depend on current req. method.

```
//predefined class
class HttpServlet extends
                    GenericServlet {
@Override
void service(req, resp) ... {
    String m = req.getRequestMethod();
    if(m == "get")
        doGet(req, resp);
    else if(m == "post")
        doPost(req, resp);
    else ...
}
void doGet(req,resp) { throw ... };
void doPost(req,resp) { throw ... };
...
```

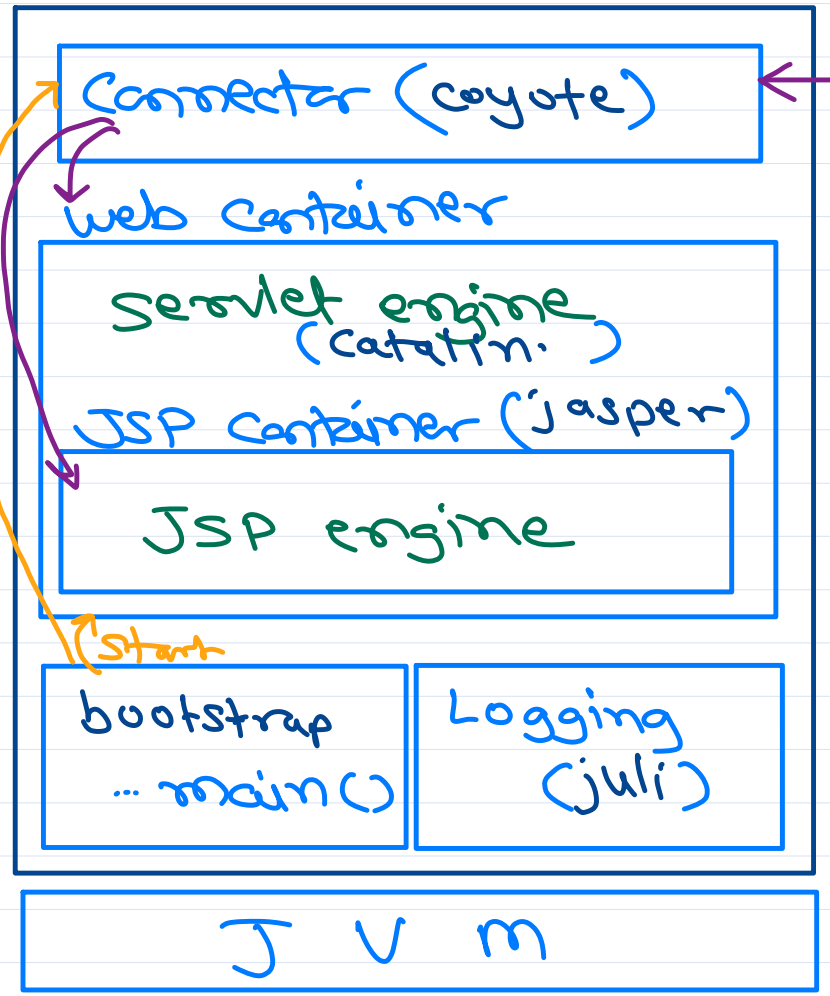
HelloServlet execution



Election Management



Tomcat architecture



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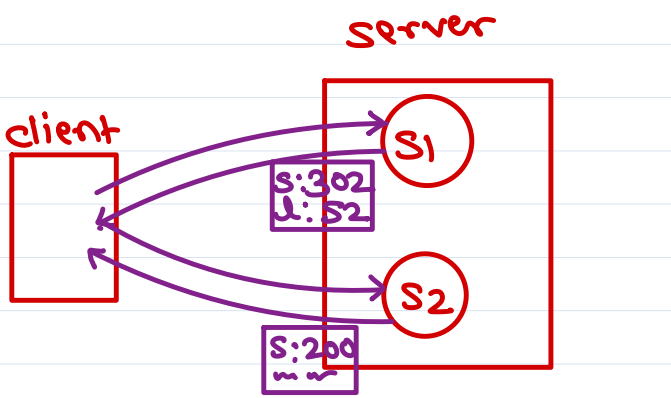
Request parameters

data from prev page controls or query string will come with req object.
It can be accessed in next servlet using.

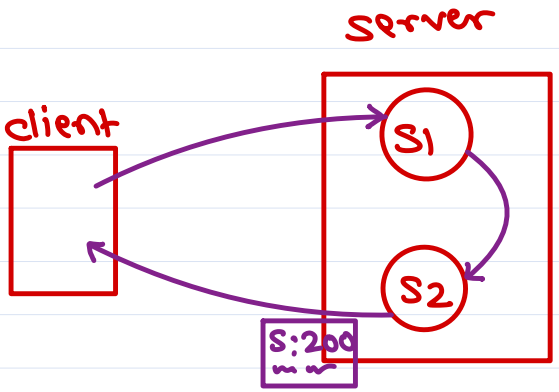
```
String val = req.getParameter("param-name");

String[] vals = req.getParameterValues("param-name");
```

- vals → checkbox, listbox,..
- val → textbox, radio, dropdown,

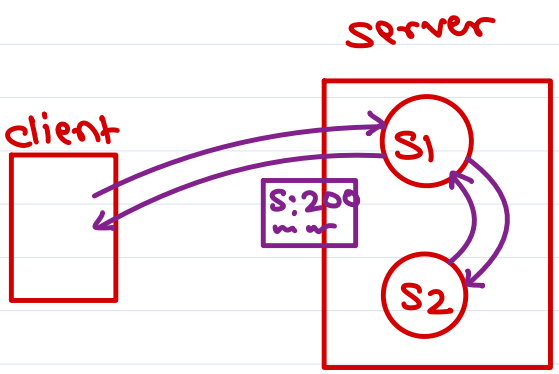
Inter-Servlet Communication



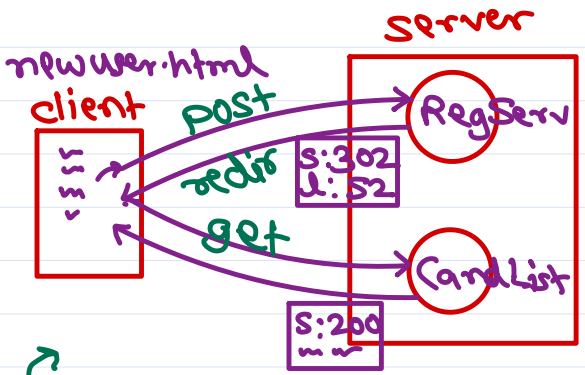
resp.sendRedirect("s2");



rd = req.getRequestDispatcher("s2");
rd.forward(req,resp);

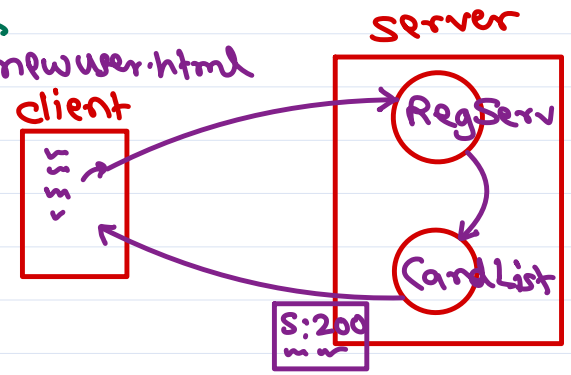


rd = req.getRequestDispatcher("s2");
rd.include(req,resp);



PRG pattern.

when client refresh, last req (ie. post) is replayed, due to which data is sent twice & may be added or updated in db twice.

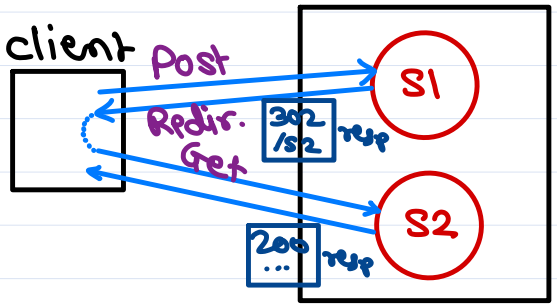


if client refresh, only last req (GET) is replayed & data fetched again. Earlier data not posted twice.

Servlet Communication/Navigation

Http Redirection

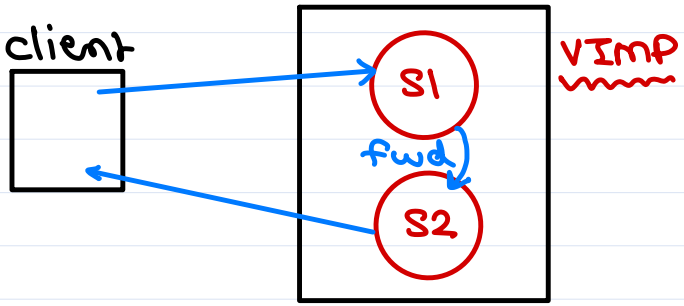
```
resp.sendRedirect("url");
```



① execution as shown in diag. Two diff req from browser - slower.
② url in browser is changed.
③ can navigate to any page in or outside the web appln.
④ Useful after post req, so that same data is not posted again upon refresh.
Redirection → PRG pattern.

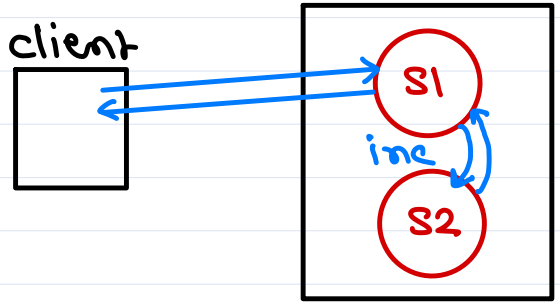
forward() ← RequestDispatcher → include()

```
rd=req.getRequestDispatcher("url");
rd.forward(req,resp);
```



① same req is fwded to next page - faster.
② url in browser is unchanged - browser not aware of navigation.
③ can navigate to any page inside the web appln.
④ final resp generated by next page.

```
rd.include(req,resp);
```



① same req is fwded to next page - faster.
② url in browser is unchanged - browser not aware of navigation.
③ can navigate to any page inside the web appln.
④ final resp is sent by first page.

Thank you!

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