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WEB DEVELOPMENT

JAVA JEE
HTML5
CSS
JAVASCRIPT
JQUERY
JSON

Apache
HTTP SERVER PROJECT

WHY

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TRAINER BACKGROUND

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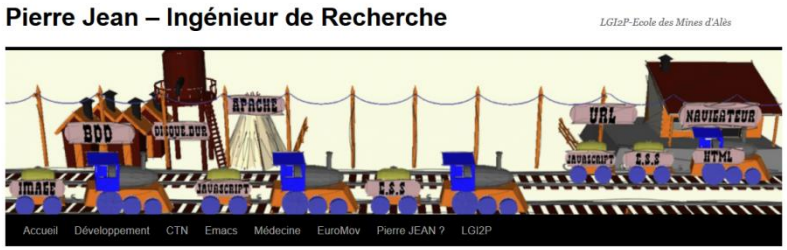
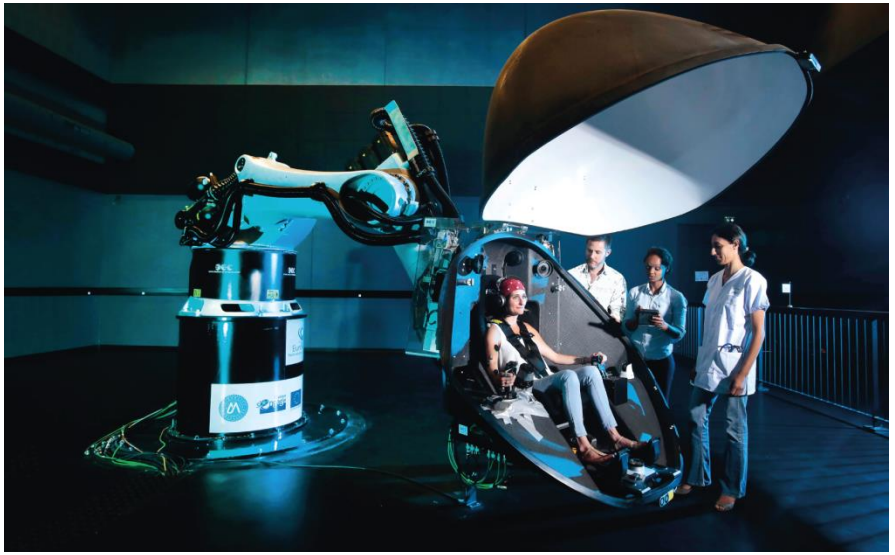
Pierre Jean
Software engineer CERIS - IMT Mines Alès
R&D computer science, arduino, linux, android, wings 3D, 3D print, java

- **pierre.jean@mines-ales.fr**



- **http://pierrejean.wp.imt.fr**



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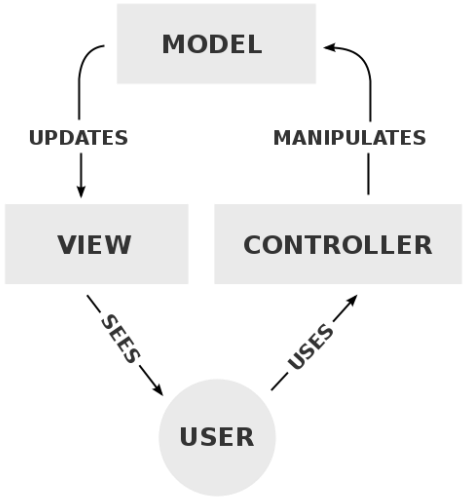
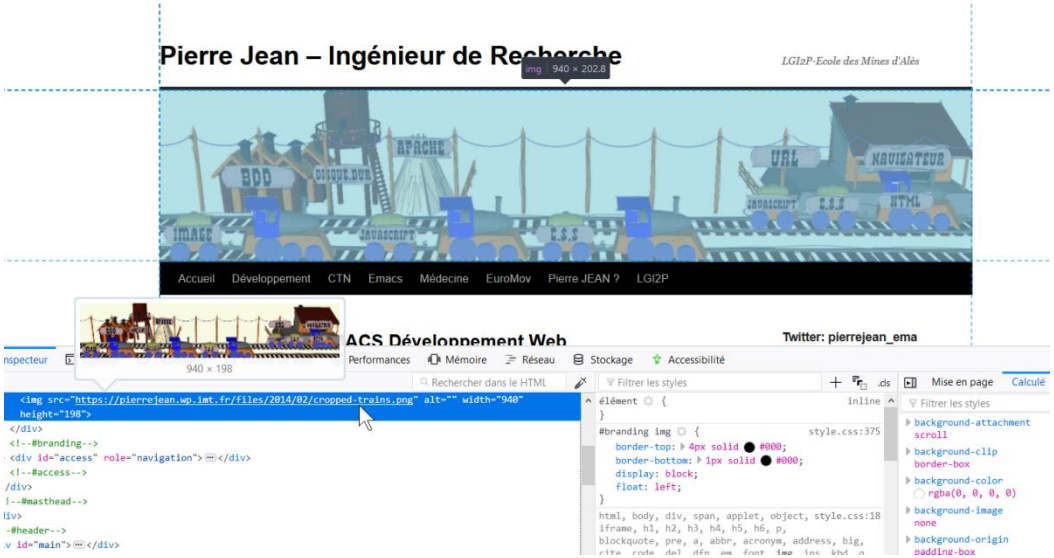
EuroMov

GOALS





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FINAL EXAMINATION

- Last day is examination
- Individual project
- Very limited time
- On your computer as usual
- eXtreme Programming concepts
- Send on campus web site
- Same as usual practical work

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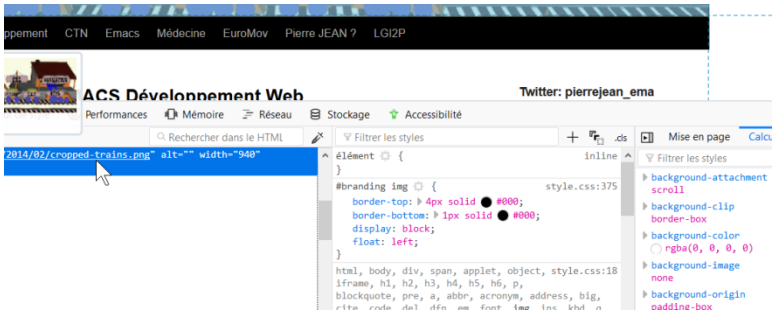
TOOLS: FREE AND OPENSOURCE



- Modern browser with Dev Tools
- Database: Sqlite, MySql
- Web server : Apache WS, Tomcat, Django, NodeJs
- Language: Asp.Net/C#, Java J2EE, Python, Javascript
- Editor: Eclipse J2EE, IntelliJ Ultimate, Vscode :-(

We will use Eclipse J2EE with Java Servlet & JSP

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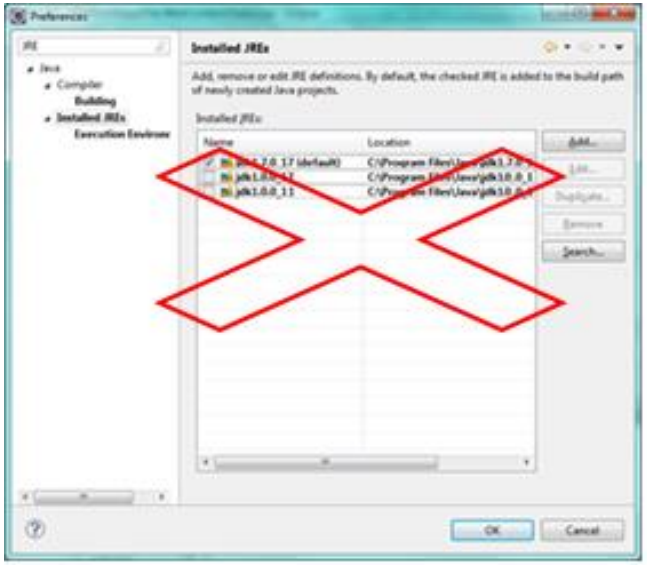
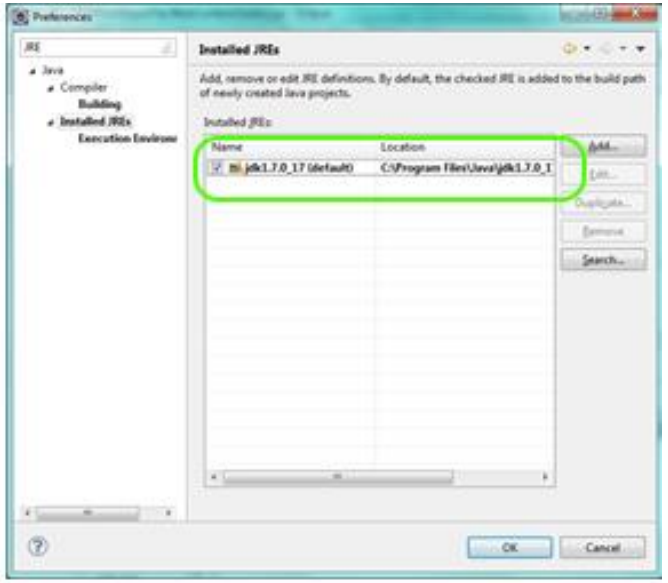
CRITICAL INFORMATION

- Start Apache Tomcat Web Server with a Java Oracle JDK not a JRE even from Oracle
- My advise: only one JDK into Eclipse





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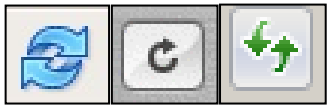
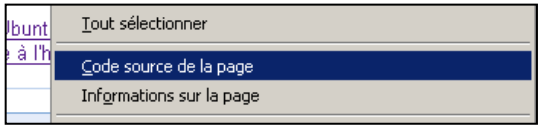
ADVISES

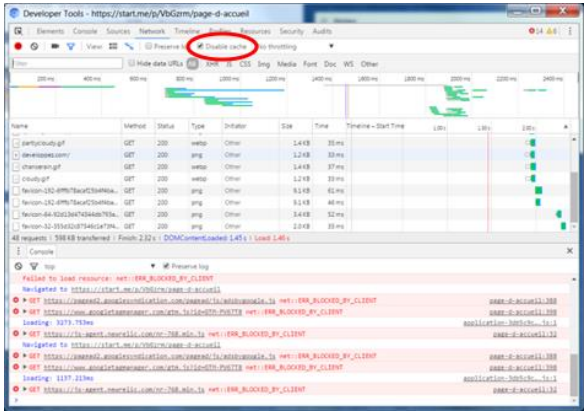
- All the time, refresh the browser (F5 key)



- Study HTML source code



- Learn to use Dev tools into a modern browser
- Disable browser cache



- Backup yours files

FIRST STEP
BASIC CONCEPTS

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BASIC CONCEPTS

- TCPI/IP and DNS
- Lookback and port
- Asynchronous communication
- URL
- HTML
- Basic HTML
- Samples of HTML Tag
- URL and Web Server
- Virtualhost and alias

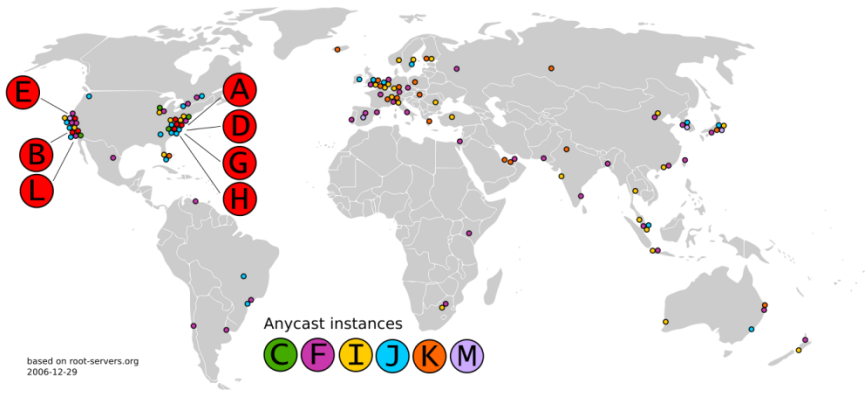
TCP/IP AND DNS

Extract TCP packet sniffer tcpdump from ssh link between 2 computers

```
12:10:08 IP 193.51.154.140.10600 > 159.31.200.21.ssh: Flags [.],
```

Try command this command:

```
nslookup euromov.fr
```



euromov.fr

```
@ 10800 IN A 193.51.158.210
pop 10800 IN CNAME access.mail.gandi.net.
smtp 10800 IN CNAME relay.mail.gandi.net.
webmail 10800 IN CNAME webmail.gandi.net.
www 10800 IN A 193.51.158.210
```

IP web server www.euromov.fr

LOOKBACK AND PORT

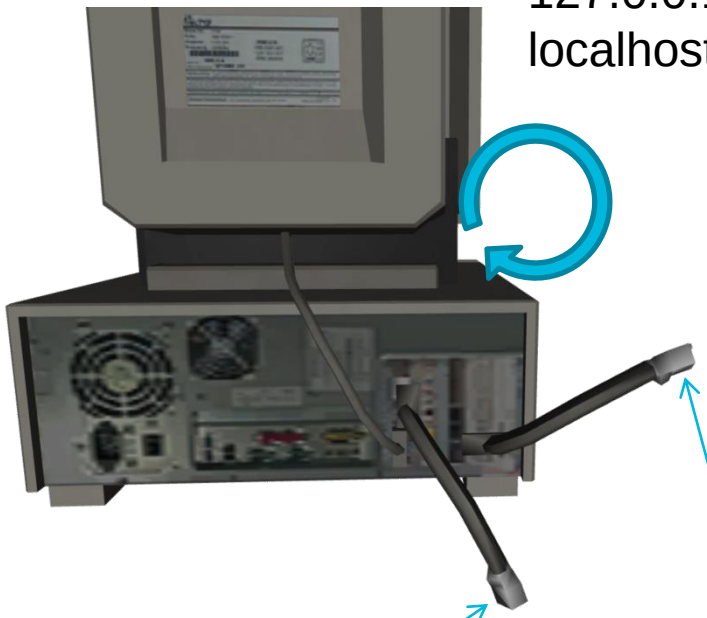
ssh connection from one ip:port to 159.31.200.21:22 with Tcpview (Sysinternal)

Process	PID	Protocol	Local Address	Local Port	Remote Address	Remote Port	Sent Packets	Rcvd Packets
putty.exe	4724	TCP	desktop-bpkalf4.univ-montp3.fr	4392	159.31.200.21	ssh	10	11

Short common default port list on a computer

Port	Service name
20, 21	File Transfer Protocol (FTP)
22	Secure Shell (SSH)
23	Telnet
25	Simple Mail Transfer Protocol (SMTP)
50, 51	IPSec
53	Domain Name Server (DNS)
80	Web Server http
443	Web Server https
3306	Mysql database Server
8080	Tomcat Web Server

Internal network IP 127.0.0.1 or localhost



First network card IP 192.168.1.20

Second network card IP 146.19.2.23

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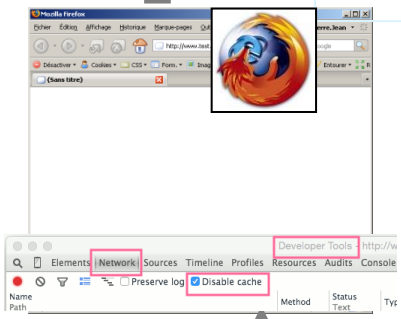
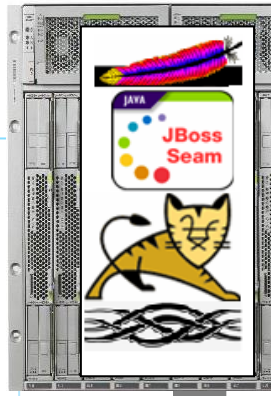
ASYNCHRONOUS COMMUNICATION

1

```
GET /index.html HTTP/1.1
Host: www.example.com
Accept: text/plain
Accept-Charset: iso-8859-5
Accept-Encoding: compress, gzip
Accept-Language: fr
Date: Tue, 14 Jan 2023 08:12:31 GMT
User-Agent: Mozilla/5.0 (Linux; X11; UTF-8)
```



Disable cache !

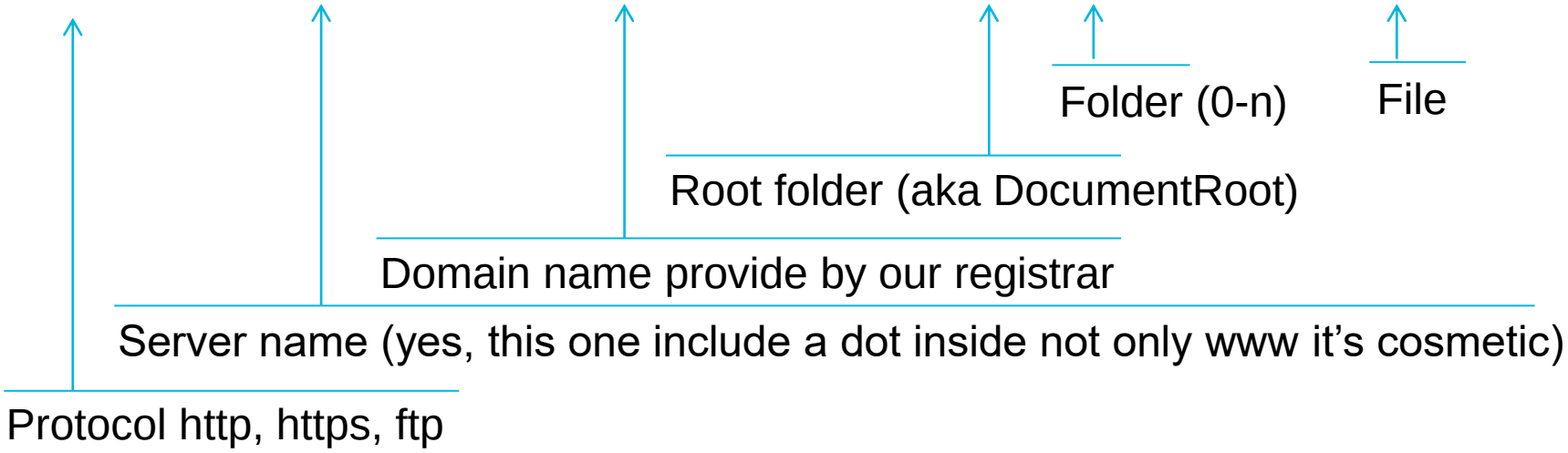



```
HTTP/1.1 200 OK
Date: Mon, 14 January 2023 08:13:34 GMT
Server: Apache/1.3.3.7 (Unix)  (Red-Hat/Linux)
Last-Modified: Wed, 09 Jan 2008 13:11:55 GMT
Accept-Ranges: bytes
Content-Length: 438
Connection: close
Content-Type: text/html; charset=UTF-8
```

2

UNIFIED RESSOURCE LOCATOR

- http:// www.cube .mines-ales.fr / logo/ imt.jpg



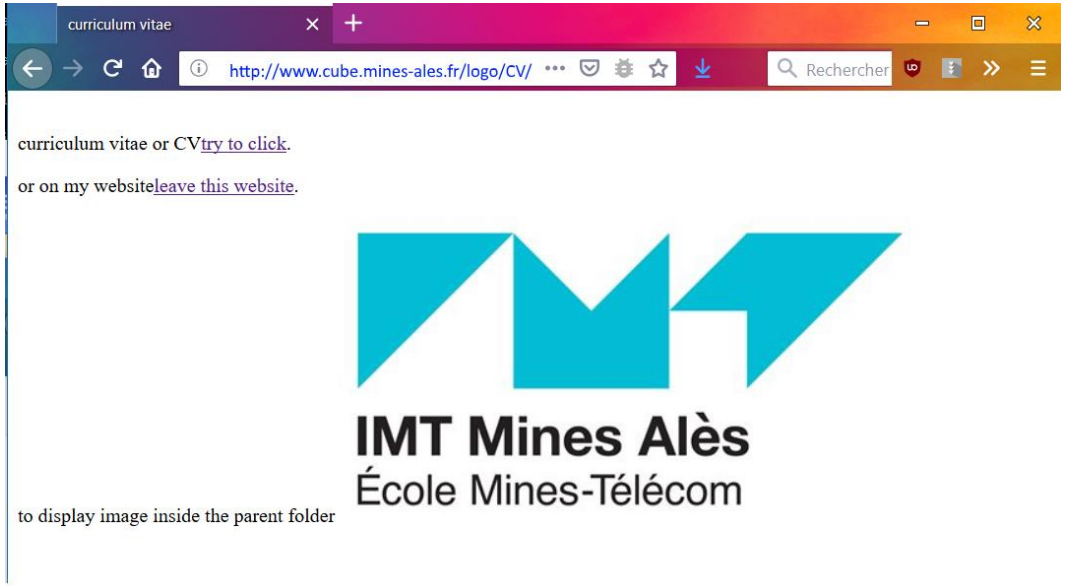
- Try also http://www.cube.mines-ales.fr/logo/

HYPER TEXT MARKUP LANGUAGE

```
<!DOCTYPE html PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html>
 <head>
  <title>
   curriculum vitae
  </title>
 </head>
 <body>
  <p>
  curriculum vitae or CV<a href="cv.html">try to click</a>.
  </p>



  <p>
  or   on     my website<a href="http://pierrejean.wp.imt.fr">leave this website</a>.
  </p>

  <p>
  to display image inside the     parent folder


                <img src="../imt.jpg" />
  </p>
 </body>
</html>

```

HTML Source

Webkit rendering engine



BASIC HTML

```
<a href="http://google.com" name="Google"> <img src= "logog.png" /> </a>
```

Attribut value

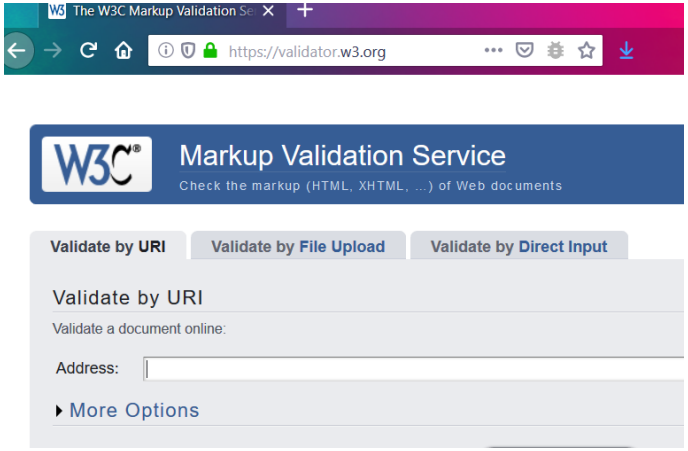
Attribut href

Attribut name

Closing part of tag a

Open tag a (ie: anchor)

Single tag img (ie: image)



SAMPLES OF HTML TAG

<title></title> – Web pages must have a text into the title bar of your browser

<a> – Since the web exist this is hypertext

<img /> – Web pages are supposed to show images together with text.

** ** – Paragraph text

<h1> … <h6></hX> – Header size as historical printer and publisher

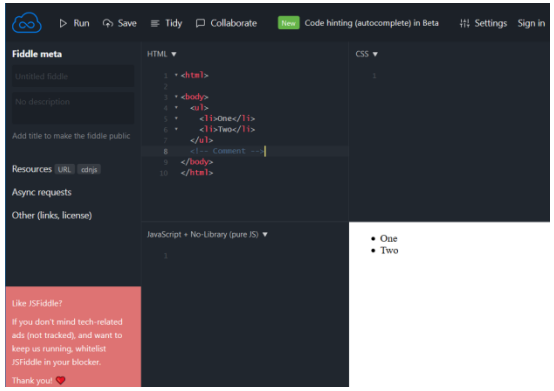
**
** – A tag to start an unordered list with bullet points

**
** – an item that belongs to a list

<body></body> a section of html that contains content

<!-- --> a section of comment, not displayed in the browser

https://jsfiddle.net/



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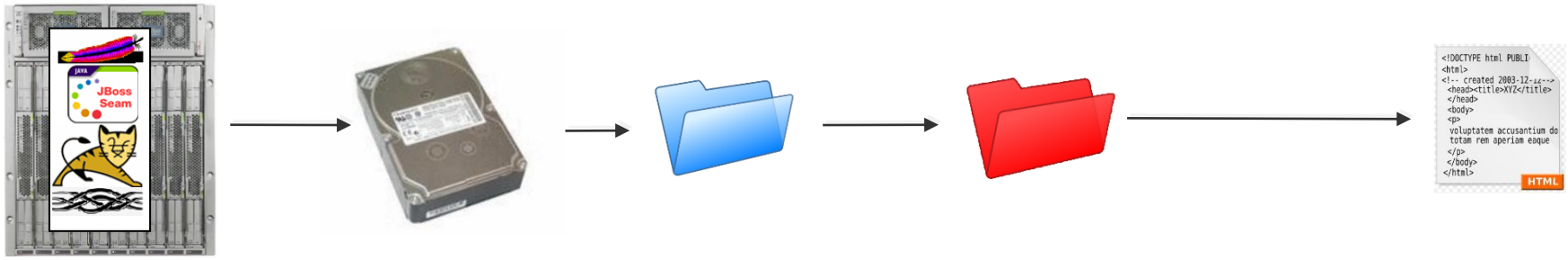
URL AND WEB SERVER

URL http://www.test.fr/rep1/srep12/page4.html

Web Server Sites wwwsite1/ rep1/srep12/ page4.html



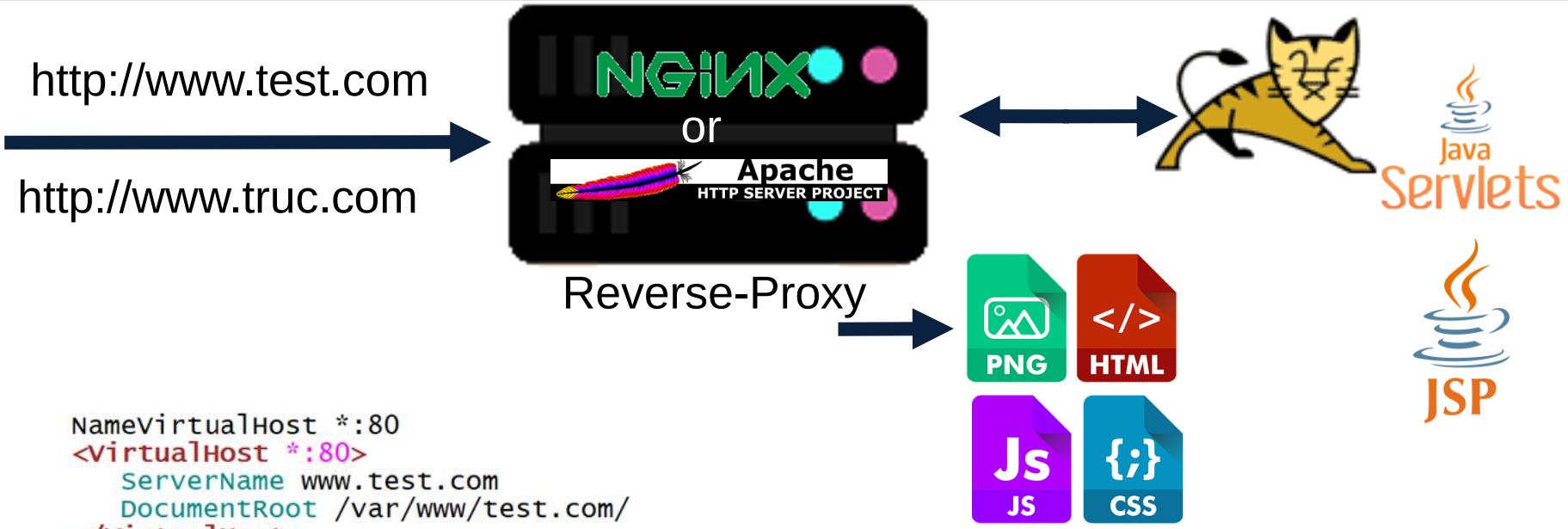
Computer /var/www/ wwwsite1/ rep1/srep12/ page4.html

URI file://d:/web/wwwsite1/rep1/srep12/page4.html

Relatif URL instead of absolute URL

```
<a href="acceuil.html" >
<img src="../logo/fr/ema.gif" />
```

VIRTUALHOST AND ALIAS




```
NameVirtualHost *:80
<VirtualHost *:80>
    ServerName www.test.com
    DocumentRoot /var/www/test.com/
</VirtualHost>
<VirtualHost *:80>
    ServerName truc.com
    DocumentRoot /var/www/truc.com/
    ServerAlias  www.truc.com
    Alias "/logos/" "/var/local/ftp/logos/"
    ProxyRequests On
    ProxyPass /application          ajp://192.168.2.1:8000/app-v1
    ProxyPassReverse /application   ajp://192.168.2.1:8000/app-v1
</VirtualHost>
```

SECOND STEP
ADVANCED CONCEPTS

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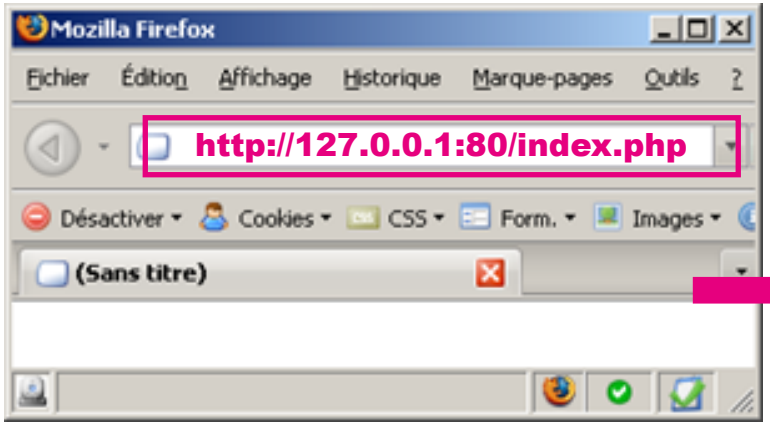
ADVANCED CONCEPTS

- Dynamic website
- Html Generator by JSP, PHP, NodeJs, Python, Servlet
- How to use JSP and HttpServlet
- A Form
- The most important slide
- How to debug
  - Most everything inside Eclipse Ide
  - Debug with browser
  - Hello world form in PHP
  - Hello world form in Java

DYNAMIC WEBSITE

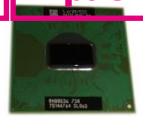
Client story: a website shows the date from 0 to 2030
First solution: 741 457 HTML pages

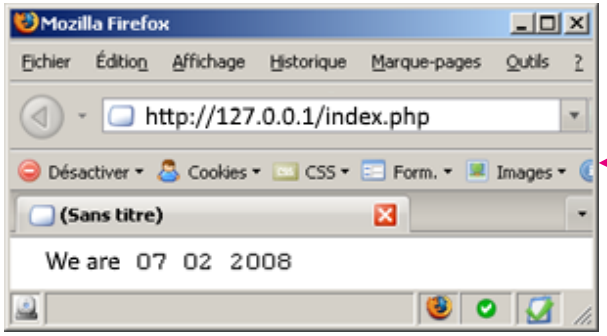


1 File c:/wamp/www/index.php

```
<html>
 <head></head>
 <body>
   <p> We are
     <?php
       echo( date ("d m Y" ) );
     ?>
   </p>
 </body>
</html>
```

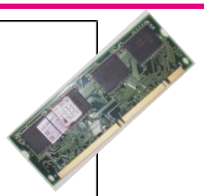
2 Apache Web server + php module





3 Html generation in memory

```
<html>
  <head>
  </head>
  <body>
    <p>We are
       07 02 2008
    </p>
  </body>
</html>
```



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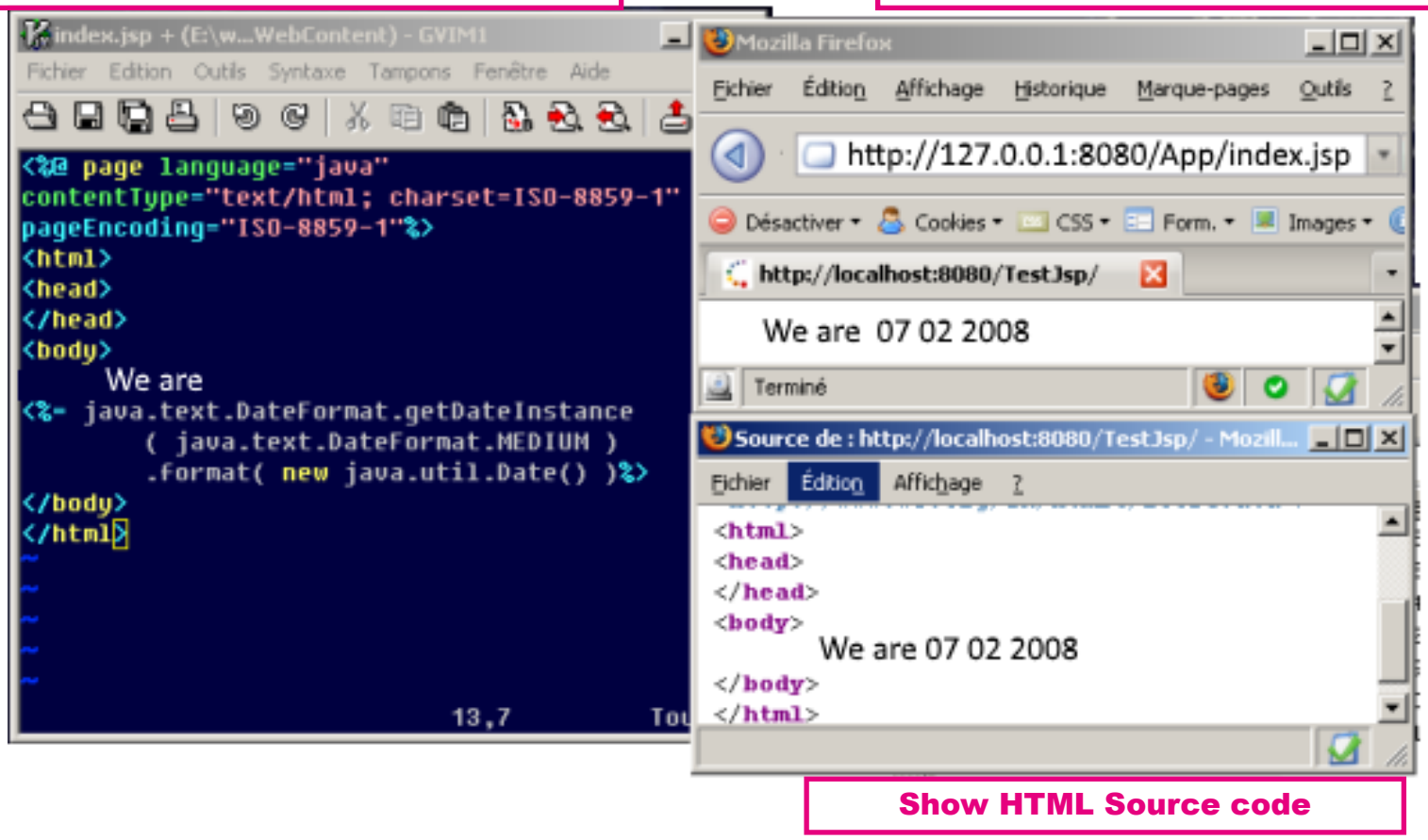
HTML GENERATOR BY JSP

Initial JSP code to generate HTML

HTML result into the browser



Show HTML Source code

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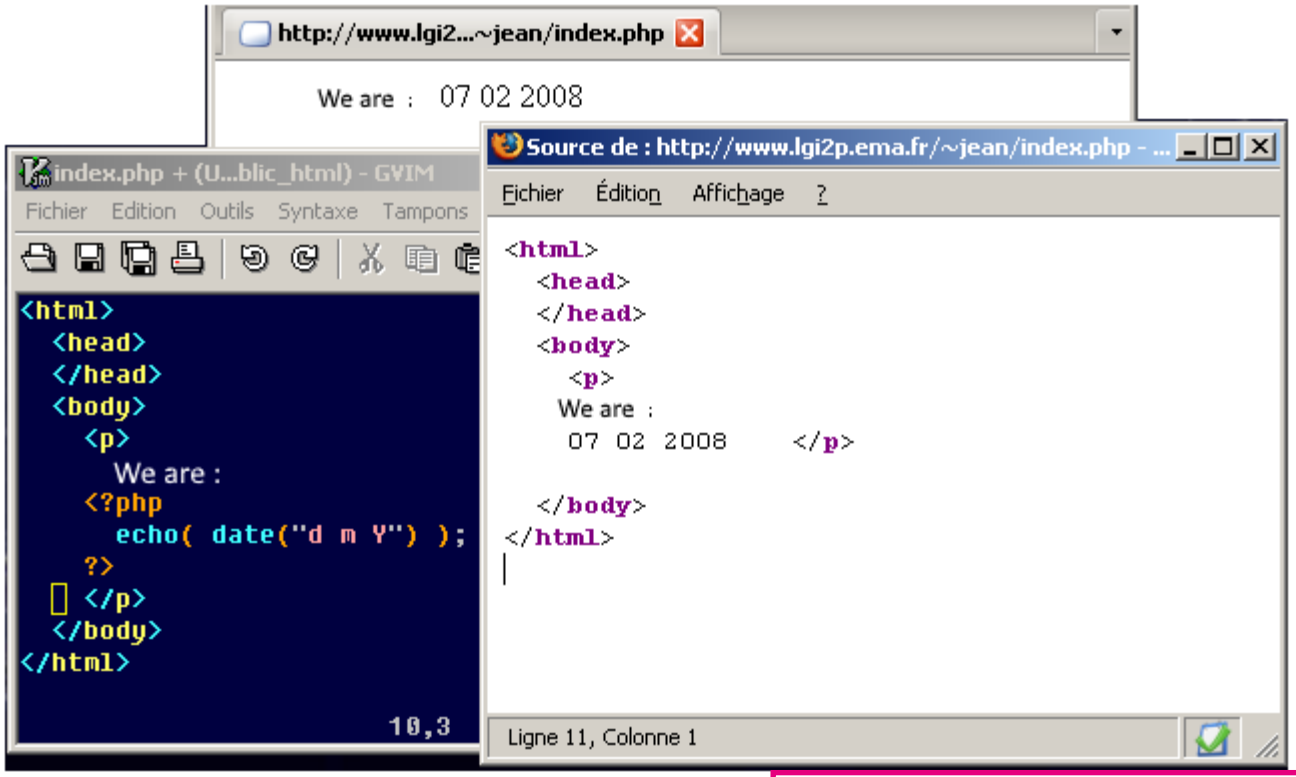
HTML GENERATOR BY PHP

HTML result into the browser

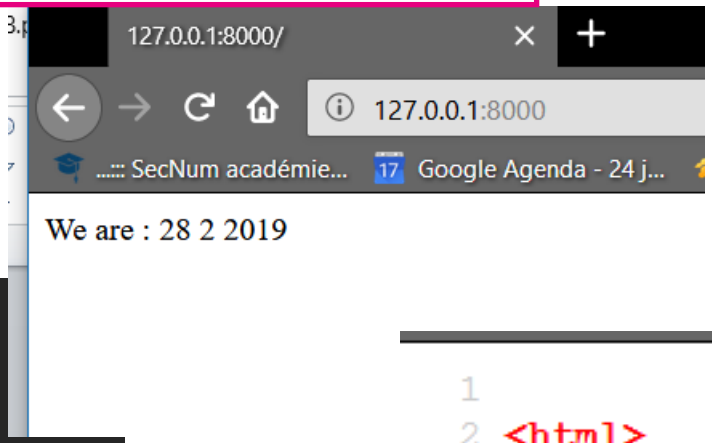


Initial PHP code to generate HTML

Show HTML Source code

HTML GENERATOR BY NODEJS

HTML result into the browser




```
const http = require('http');
const port = 8000;

const requestHandler = (request, response) => {
  var now = new Date();
  var html = `
<html>
 <head>
 </head>
 <body>
 We are :
  ${ now.getDate() } ${ now.getMonth()+1 } ${ now.getFullYear() }
 </body>
</html>`;

  response.end( html );
}


const server = http.createServer(requestHandler);

server.listen(port, (err) => {
  if (err) {
    return console.log(err);
  }
  console.log(`server is listening on ${port}`);
})
```

Initial JS code to generate HTML

```
1
2 <html>
3   <head>
4   </head>
5   <body>
6   We are :
7     28 2 2019
8   </body>
9 </html>
```

Show HTML Source code

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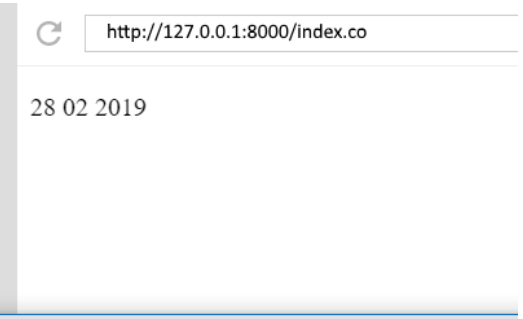
HTML GENERATOR BY PYTHON DJANGO

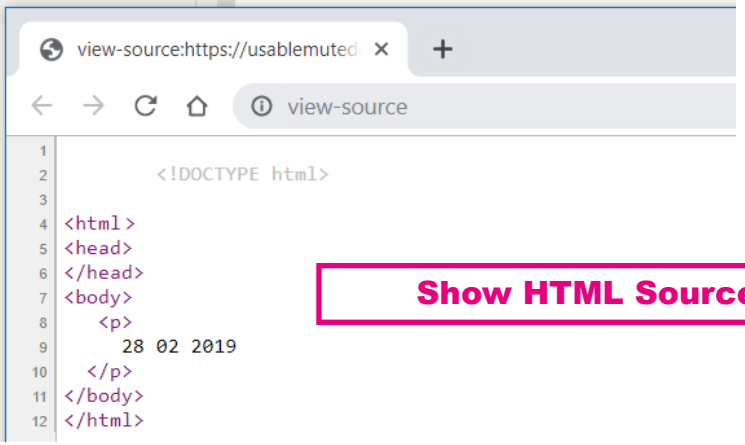
templates/base.html saved

```
1  {% load staticfiles %}
2      <!DOCTYPE html>
3
4  <html>
5  <head>
6  </head>
7  <body>
8      <p>
9        {% now "d m Y" %}
10     </p>
11 </body>
12 </html>
```

Initial Python code to generate HTML

HTML result into the browser





Show HTML Source code

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HTML GENERATOR BY SERVLET OR JSP

JSP VERSION

index.jsp | Now.java

```
1  <%@ page language="java" contentType="text/html; charset=UTF-8"
2      pageEncoding="UTF-8"%>
3  <%@ page import="java.text.DateFormat" %>
4  <%@ page import="java.util.Date" %>
5  <!DOCTYPE html>
6  <html>
7  <head>
8  <meta charset="UTF-8">
9  <title>My first JSP</title>
10 </head>
11 <body>
12 We are: <%= DateFormat.getDateInstance( DateFormat.SHORT).format( new Date() ) %>
13 </body>
14 </html>
```

Import

Java echo without ; at the end

SERVLET VERSION

index.jsp | Now.java

```
1  package main;
2
3  import java.io.IOException;
4
5  import javax.servlet.ServletException;
6  import javax.servlet.annotation.WebServlet;
7  import javax.servlet.http.HttpServlet;
8  import javax.servlet.http.HttpServletRequest;
9  import javax.servlet.http.HttpServletResponse;
10 import java.text.DateFormat;
11 import java.util.Date;
12
13
14 @WebServlet("/Now")
15 public class Now extends HttpServlet {
16     private static final long serialVersionUID = 1L;
17
18     public Now() {
19         super();
20     }
21
22     protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
23         response.getWriter().append("<!DOCTYPE html>\r\n" +
24                 "<html>\r\n" +
25                 "<head>\r\n" +
26                 "<meta charset=\"UTF-8\">\r\n" +
27                 "<title>My first JSP</title>\r\n" +
28                 "</head>");
29         response.getWriter().append("<body>");
30         response.getWriter().append("We are :");
31         response.getWriter().append(DateFormat.getDateInstance( DateFormat.SHORT).format( new Date() ));
32         response.getWriter().append("</html>");
33     }
34
35 }
36
```

imports

Extend HttpServlet

HTML GENERATOR

SAME HTML

```
1  <!DOCTYPE html>
2  <html>
3  <head>
4  <meta charset="UTF-8">
5  <title>My first JSP</title>
6  </head>
7  <body>
8  We are 16/03/19
9  </body>
10 </html>
11
```

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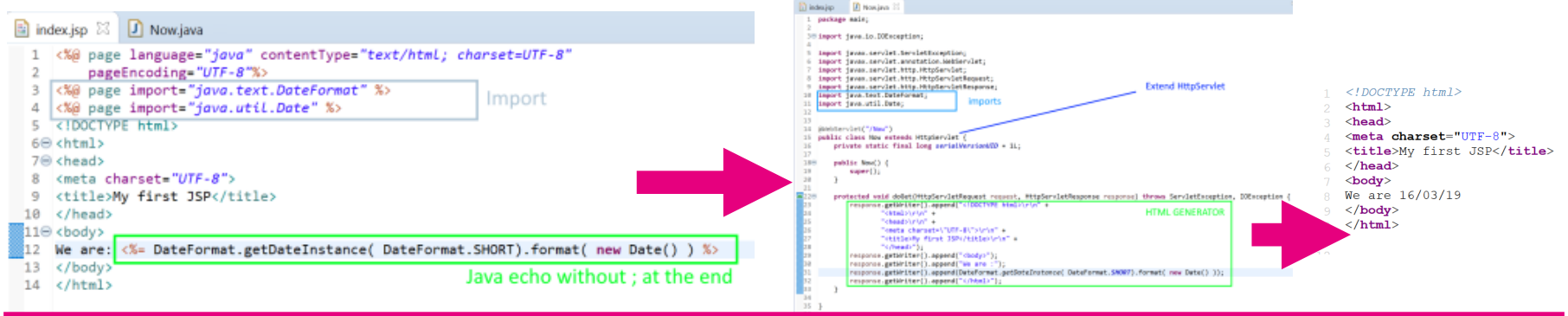
HOW TO USE JSP AND HTTPSERVLET

JSP is :

- cool to read as HTML
- close to PHP/template style
- easy to import into Css designer tools like Dreamweaver
- one JSP by user interface
- some JSP to export Json/XML
- group into Web-Content folder

HttpServlet

- cool to read as Java
- first technology before JSP
- manage de C of MVC
- call by # URLs and with *
- every JSPs are converted into HttpServlet by Tomcat Web Server

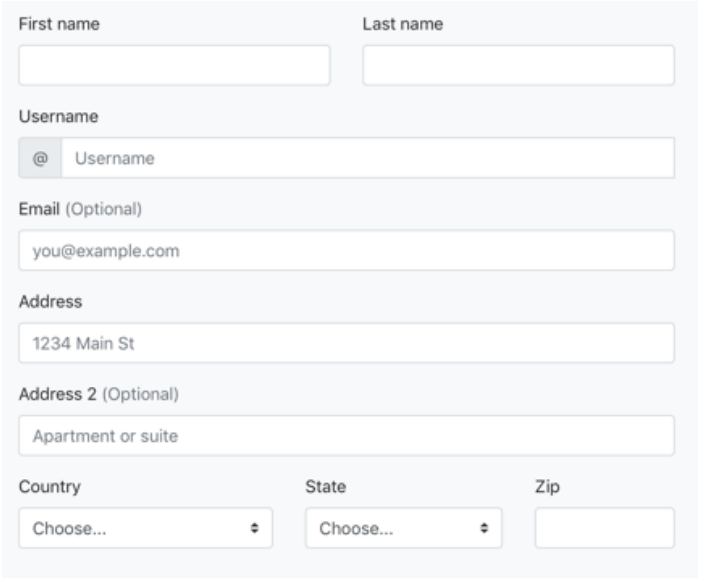


.metadata\.plugins\org.eclipse.wst.server.core\tmp0\work\Catalina\localhost\Project1\org\apache\jsp

A FORM

A Html form is capable to

- show fields to input informations into the browser
- submit/send fields from browser to one servlet
- receive a response into the browser
  after submit information
- GET method, fields are visible into the URL
- POST method, fields are into the header
  perfect to send files

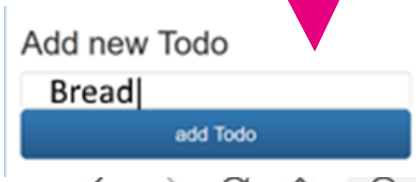


Use the network tab into your browser's web development tools to see submit header and response

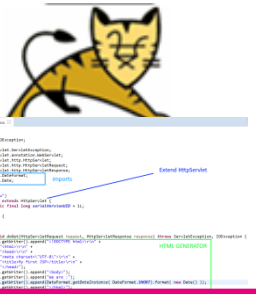
THE MOST IMPORTANT SLIDE

Send form from index.jsp

```
<form method="get" action="./Control" >
  <h2>Add new Todo</h2>
  <input name="todo_text" type="text" />
  <input name="action" value="add Todo" type="submit" />
</form>
```



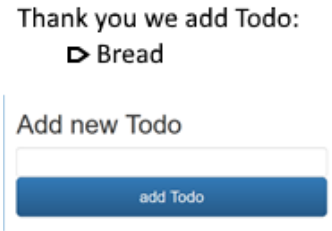
Submit input to tomcat URL ./Control



URL to Control.java Servelt

HttpServlet Control receives fields values and call a JSP to answer back

Send Html from todos_view.jsp



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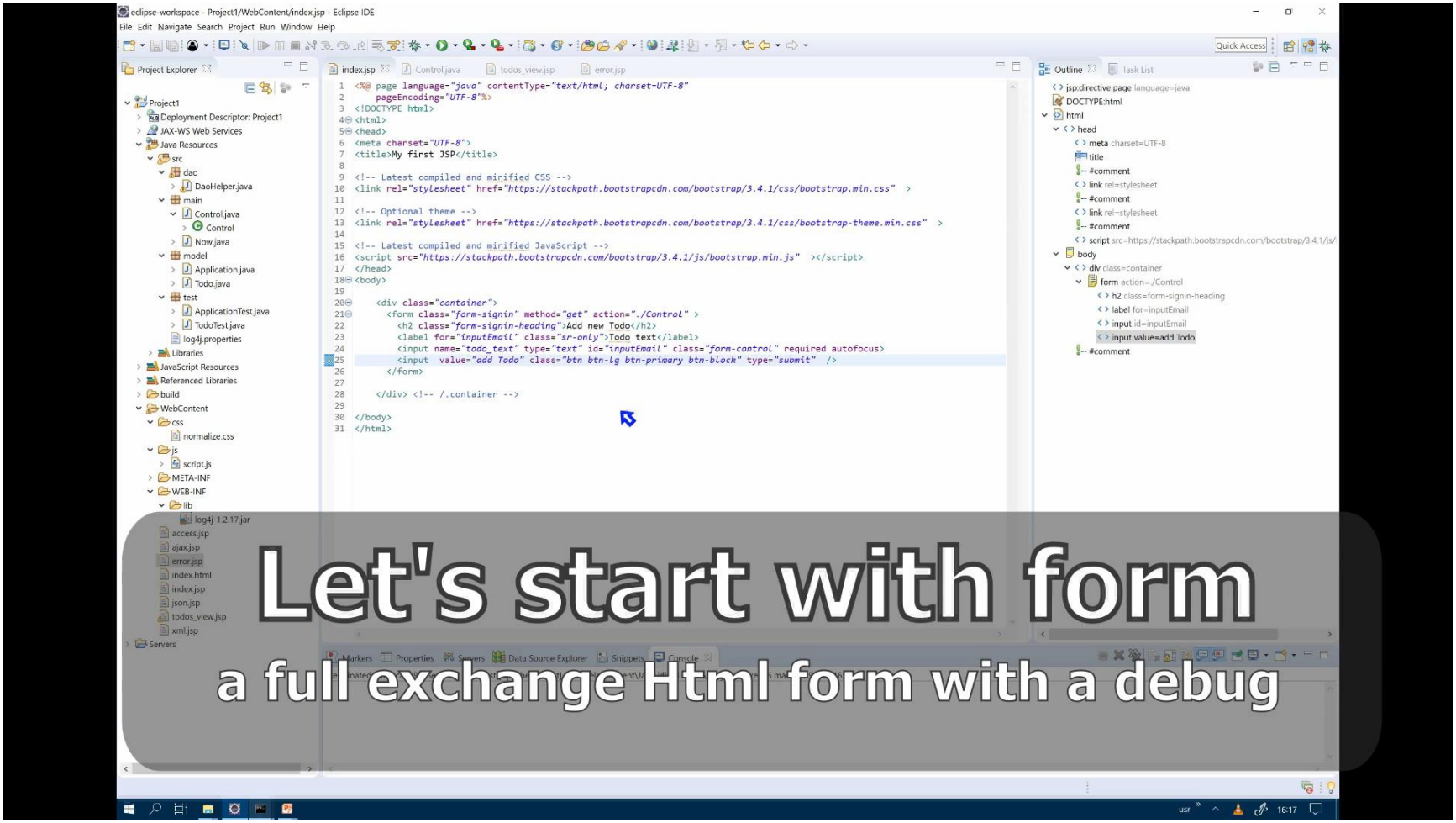
HOW TO DEBUG



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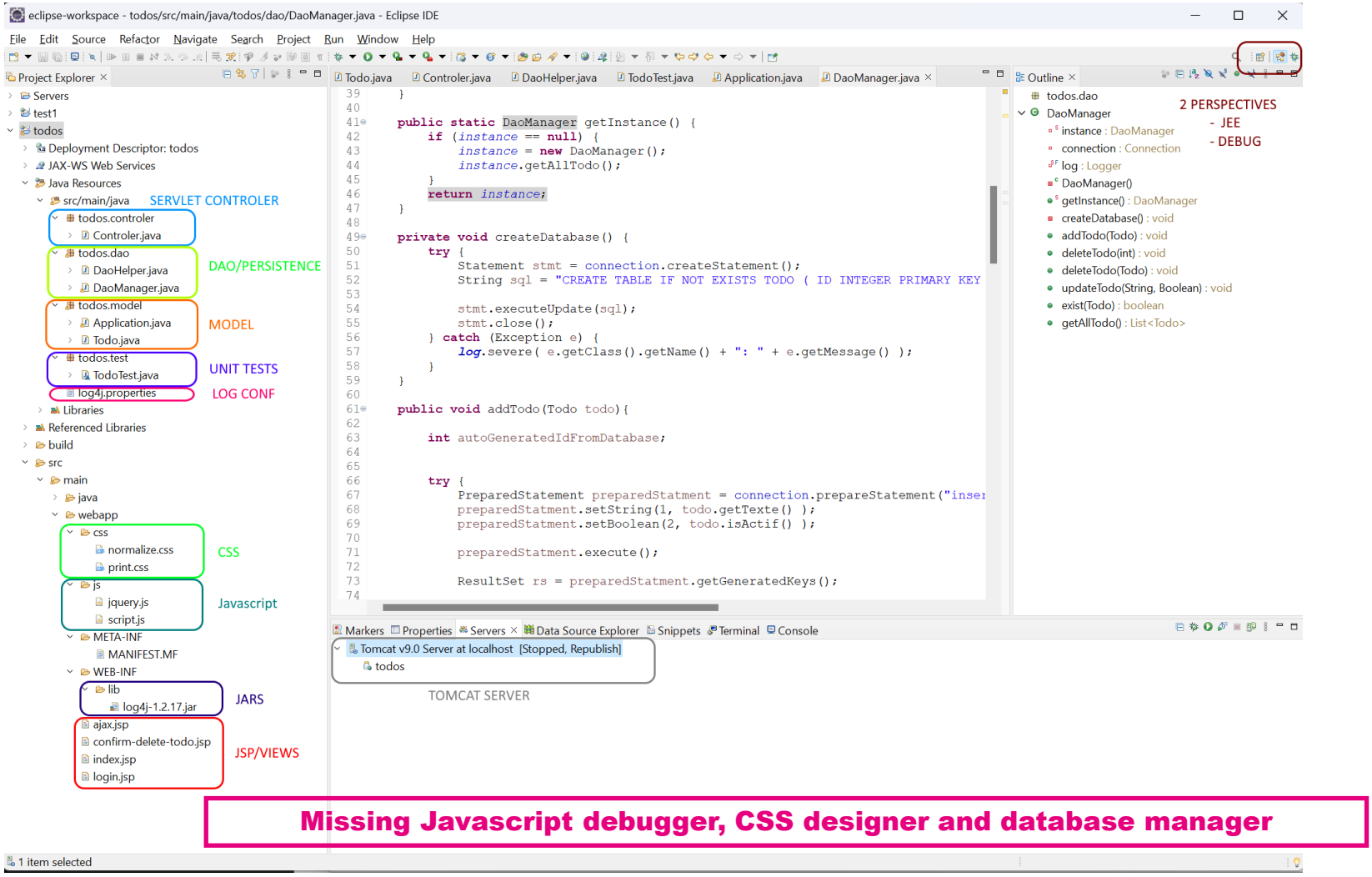
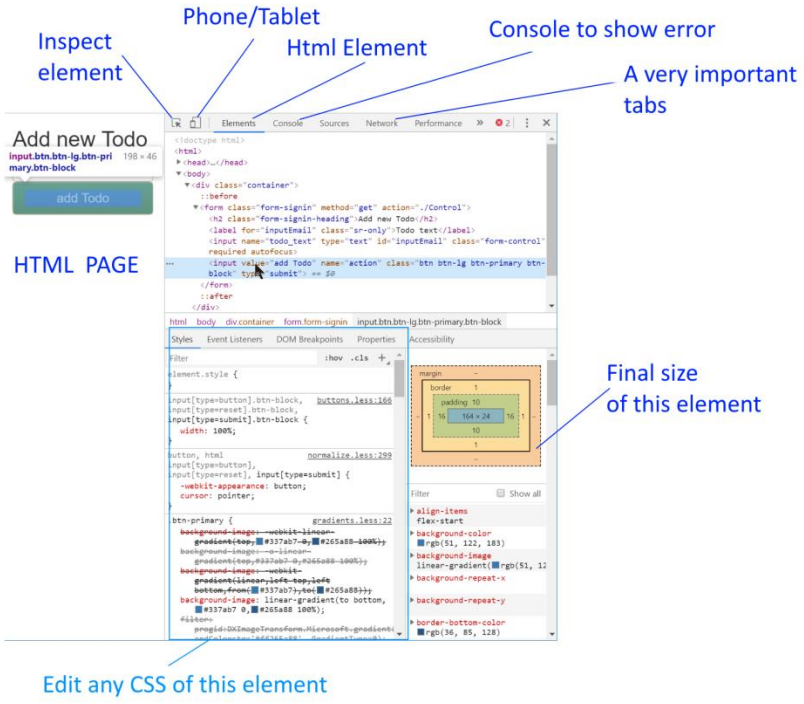
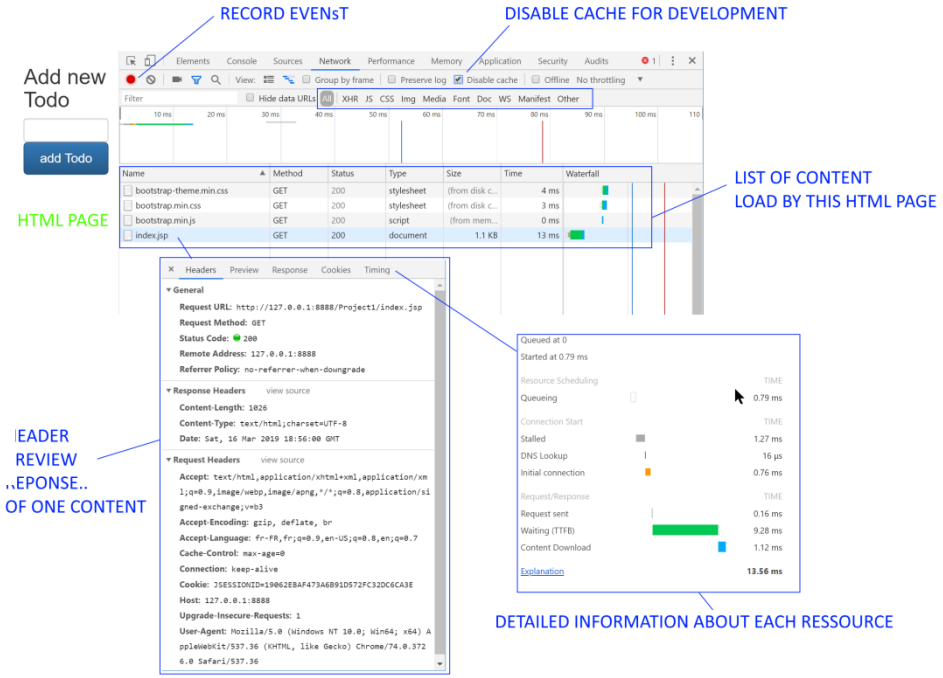
MOST EVERYTHING INSIDE ECLIPSE IDE JEE



Missing Javascript debugger, CSS designer and database manager

DEBUG WITH BROWSER





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LAST STEP

ADDITIONAL CONCEPTS

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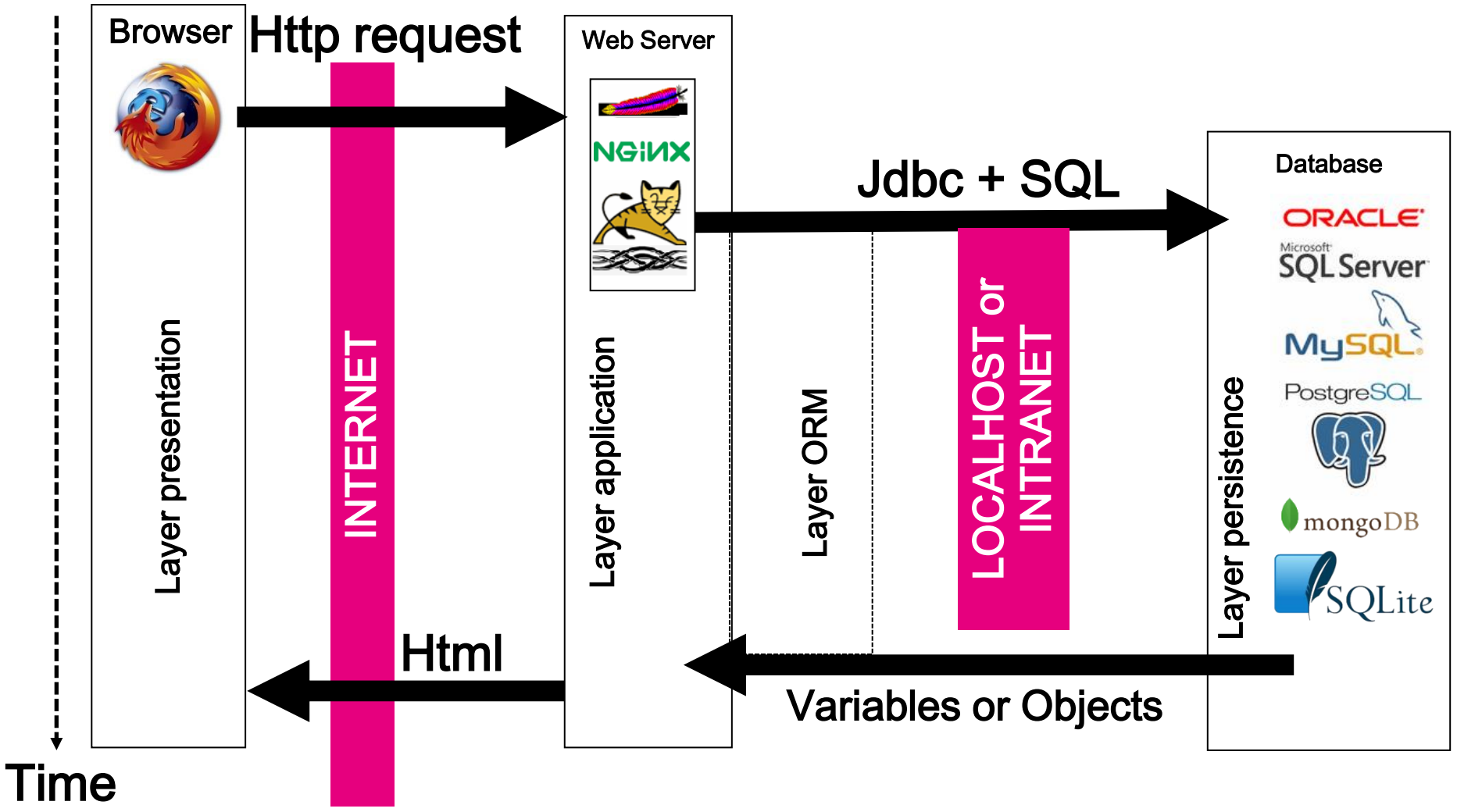
ADDITIONAL CONCEPTS

- 3-tiers architecture
- URL Rewriting & RESTFull
- CSS
- How to Css
- Framework as Boostrap
- Javascript & Jquery
- Ajax
- Framework JS: AngularJS, ReactJS
- At the end

3-TIER ARCHITECTURE



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Potential timeout on each layer

URL REWRITING & RESTFULL

http://www.site.com/2018/02/27/

RewriteRule ^[^/]*/(.*)/(.*)/(.*)$ index.php?year=$1&month=$2&day=$3 [L,QSA]

http://monsite.com/index.php?year=2018&month=02&day=27

URL Rewriting and RESTFull

- GET / POST / DELETE / PUT
- Bookmark compatible for GET
- User friendly
- Javascript and command line API for integration with other system
- SEO

CSS

```
<html><head>
<style type="text/css">
        h1{font-size : 2em; margin : 0.67em 0;}
        .attention{ color:red; }
        #intro{ font-style: italic; }
        h3.attention{ color: black; }
</style>
<body>
<h1>Web site title</h1>
<p class="attention">This site is under construction</p>
<p id="intro" class="attention">Introduction</p>
<h3 class="attention">Warning </h3>
</body>
</html>
```

Or load from a CSS file

```
<link rel='stylesheet'
      href='css/style.css'
      type='text/css />
```

CSS ++

- Preprocessor SASS / LESS
- Content Delivery Network
- CSS 4 with variables

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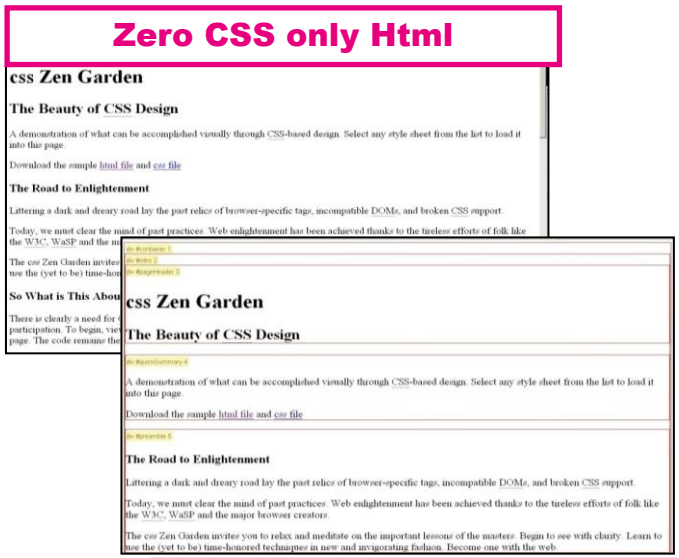
HOW TO CSS

Css Zen Garden design challenge : don’t touch HTML and no JS only CSS

So visit, learn and copy content !

Zero CSS only Html



Display DIV grouping tag

Same Html + one Css Design

Same HTML + an other Css Design

http://www.csszengarden.com/058/

http://www.csszengarden.com/202/

http://www.csszengarden.com/198/

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FRAMEWORK AS BOOTSTRAP

EXAMPLE

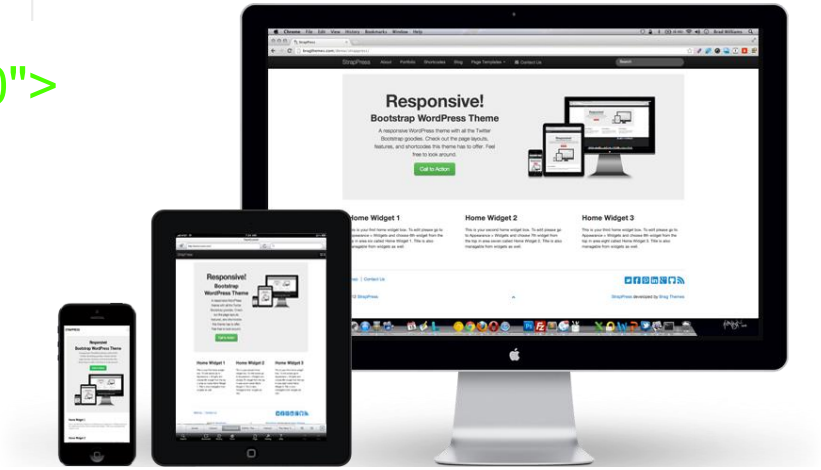
Email Email

Password Password

Remember me

Sign in

```
<div class="col-md-offset-2 col-md-10">
    <div class="checkbox">
      <label>
        <input name="remenberMe"
           type="checkbox">
            Remember me
      </label>
    </div>
  </div>
```



.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1
.col-md-8								.col-md-4			
.col-md-4				.col-md-4				.col-md-4			
.col-md-6						.col-md-6					

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JAVASCRIPT & JQUERY

Javascript (Vanilla) is

- an other language inside the browser
- able to manipulate DOM from browser event
- extend into several multi browser framework as jquery

Jquery is

- write in Javascript
- with $(" ") function to find element with CSS notation
- Compatible with lot of browsers

```
<html>
  <body>
    <script>
      $( "input#bouton" ).click(function() {
          $( this ).slideUp();
      });
    </script>
    <input type="button" id="bouton" />
  </body>
</html>
```

AJAX

Asynchronous Javascript & Xml is

- a javascript function
- a new way to exchange between browser and web server
- a brackground browser event function
- receive data in XML or now more in JSON

```
$(document).ready(function(){

    setInterval(
        function(){
            $.ajax({url:"./ajax-time.jsp" ,
                 dataType: "xml",
                 success: function( result ){
                     $("#clock").html( result.firstElementChild.innerHTML );
                 }
            });
        }, 2000);
});
</script>
</head>
<body>
<div id="clock"> </div>
```

Name	Method	Status	Type	Size	Time
ajax-time.jsp	GET	200	xhr	199 B	2 ms
ajax-time.jsp	GET	200	xhr	199 B	4 ms
ajax-time.jsp	GET	200	xhr	199 B	6 ms
ajax-time.jsp	GET	200	xhr	199 B	4 ms

Headers Preview Response Cookies Timing

```
<?xml version="1.0" encoding="utf-8"?>
<now>
lundi 18 mars 2019
15:40:47 CET
</now>
```

FRAMEWORK JS : ANGULARJS A REACTJS

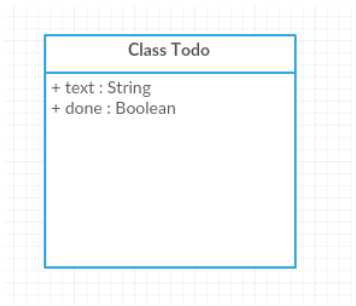
```html
<html>
  <head>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.4.8/angular.min.js"></script>
    <script src="todo.js"></script>
  </head>
  <body ng-app="todoApp" >

    <div ng-controller="TodoListController as todoList">
      <ul>
        <li ng-repeat="todo in todoList.todos">
          <input type="checkbox" ng-model="todo.done">
          |
          <span class="done-{{todo.done}}">
              {{todo.text}}
          </span>
        </li>
      </ul>
    </div>
  </body>
</html>
```

Todo List for shopping

- [x] Bread
- [ ] Egg
- [x] Oil

```
1
2
3  angular.module('todoApp', [])
4    .controller('TodoListController', function() {
5      var todoList = this;
6      todoList.todos = [
7        {text:'learn angular', done:true},
8        {text:'build an angular app', done:false}];
9
10 });
11
```



[Aucun nom] + - GVIM

Fichier Edition Outils Syntaxe Tampons Fenêtre Aide

```
const rootElement = document.getElementById('main')

class TodoItem extends React.Component {
    render() {
        return (
            <li><input type="checkbox" name={this.props.name}
                checked={this.props.checked} />
                {this.props.name}
            </li>
      );}
}
class TodoList extends React.Component {

    render() {
        return (
        <div className="todo-list">
        <h1>Todo List for {this.props.name}</h1>
          <ul>
                <TodoItem name="Bread" checked="checked" />
                <TodoItem name="Egg" checked="" />
                <TodoItem name="Oil" checked="checked" />
          </ul>
        </div>
      );
      }
}

function App(){
  return( <div>    <TodoList name="shopping" />   </div>  )
}
    ReactDOM.render(  <App />, rootElement   )
```

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AT THE END


Class Todo
+ text : String
+ done : Boolean
UNIFIED MODELING LANGUAGE
JHipster
HIBERNATE
MariaDB
MySQL
PostgreSQL
mongoDB
SQLite
JUnit
Chain of tools
Java
jQuery
write less, do more.
Se
CSS
HTML
B
Jenkins
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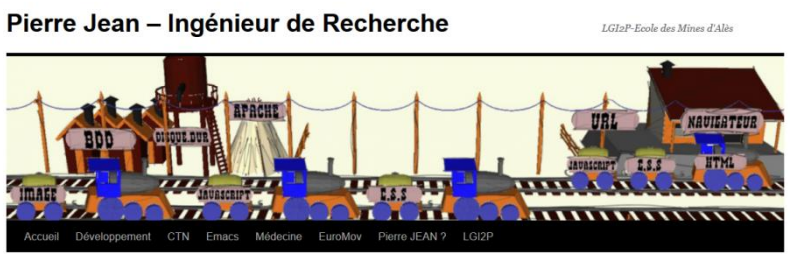
THE END
QUESTIONS ?

pierre.jean@mines-ales.fr



http://pierrejean.wp.imt.fr

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