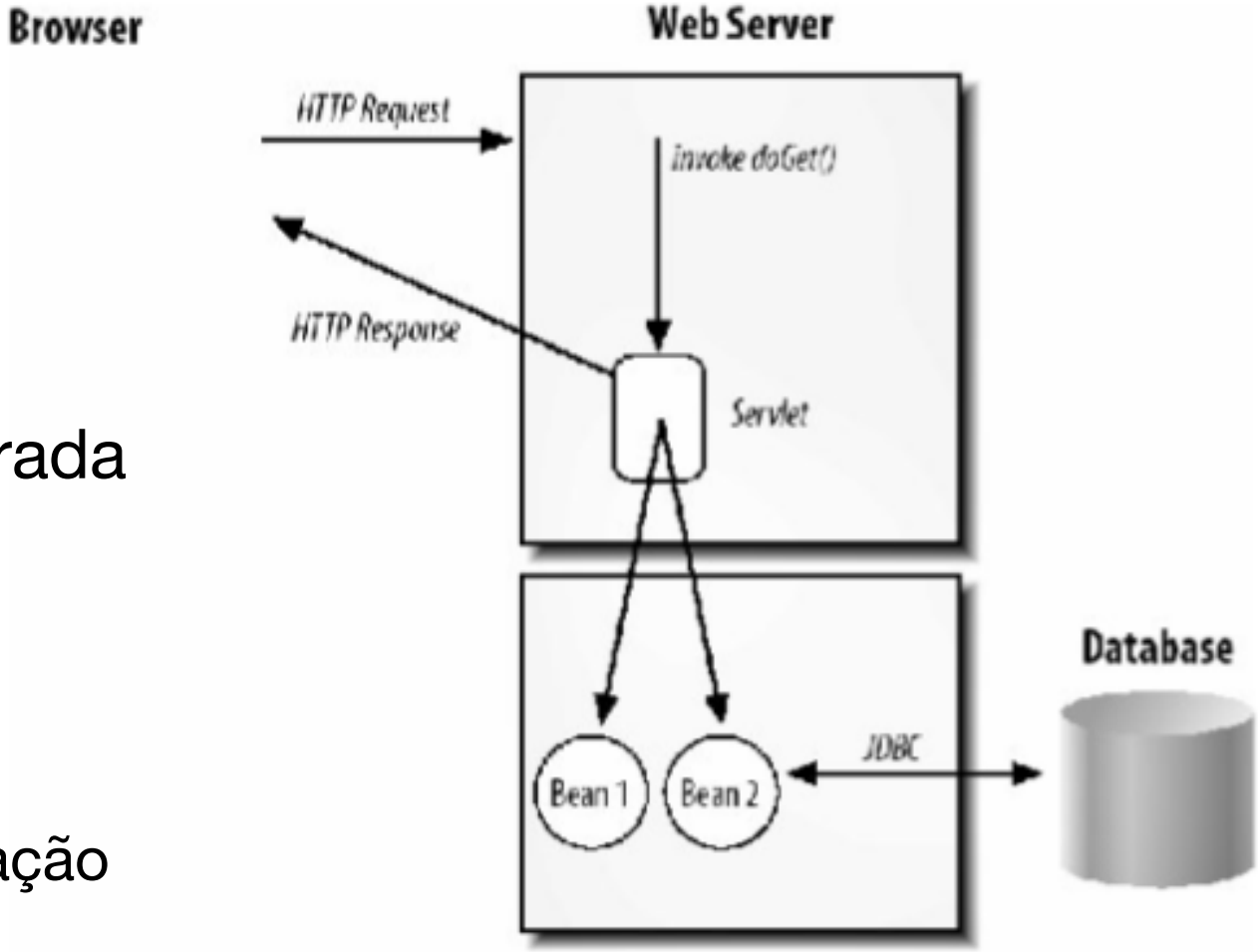
Módulo 12

PROG. WEB. 3 - JAVASERVER PAGES

Servlets

- Tecnologia Java
- Geração de HTML *on the fly* no servidor
- Nova vista (página) gerada a cada pedido
  - Vista é programada imperativamente, não desenhada
  - Não encorajam separação entre apresentação e negócio/conteúdo

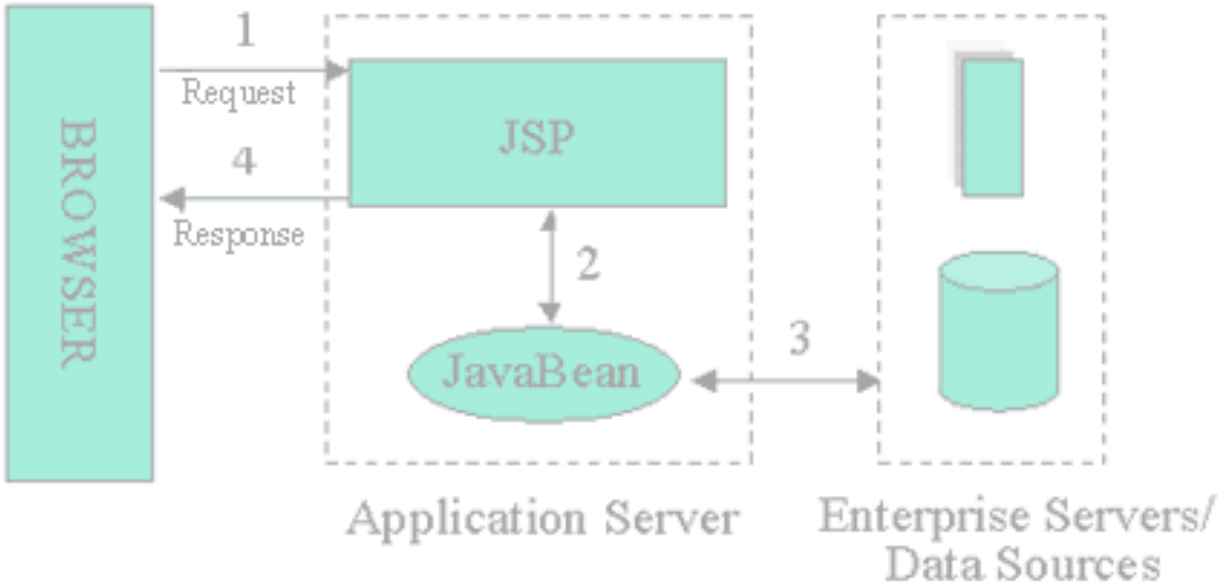


JSP (Java Server Pages)

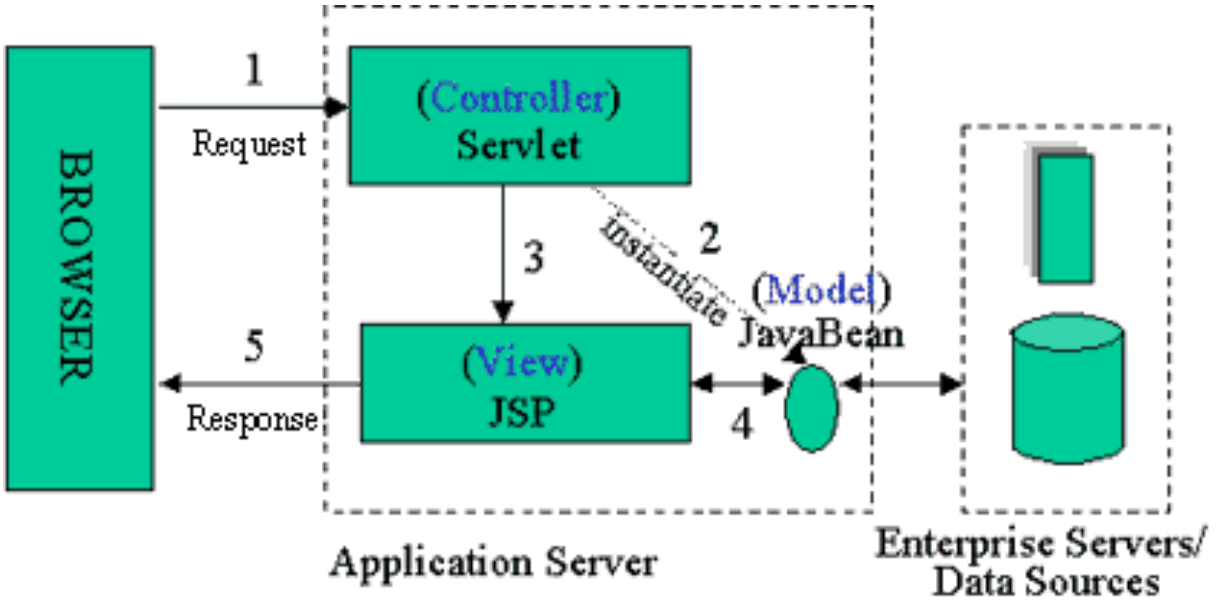
- Um salto de abstracção em relação às Servlets
- Ficheiros .jsp compilados para Java (servlets)
  - ou directamente para bytecode
  - ou interpretados *on the fly*…
  - Permitem incluir código Java no HTML
- Código Java compilado e executado para gerar HTML
- Necessário Web server com um Java Servlet container
  - Apache Tomcat, (JBoss) Undertow, Eclipse Jetty

JSP: Arquitecturas

- Model 1 architecture



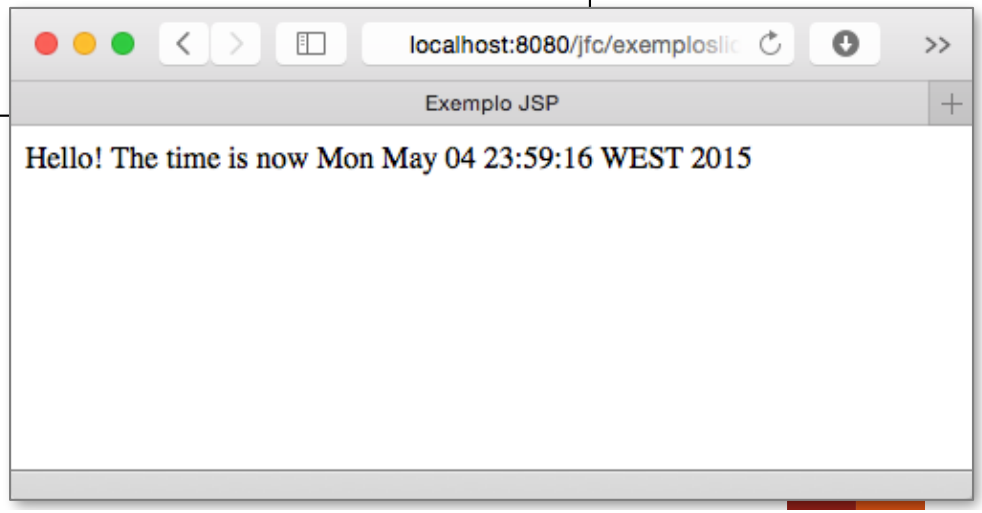
- Model 2 architecture (MVC-like)



JSP – Expressões

- <%= *expressão Java* %> ou
  <jsp:expression> *expressão Java* </jsp:expression>

```
<doctype html>
<html>
    <head>
        <title>Exemplo JSP</title>
    </head>
    <body>
        Hello! Time is now <%= new java.util.Date() %>
    </body>
</html>
```

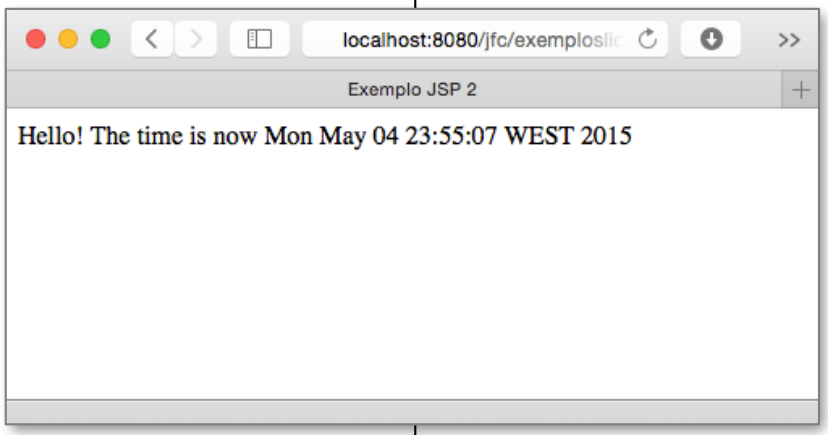


- Expressão avaliada em *run time*

JSP – Directivas

- <%@ *tipo atributo* %> ou <jsp:directive.*tipo atributo* />
  - tipo: page/include/taglib/…

```
<doctype html>
<%@ page import="java.util.Date" %>
<html>
    <head>
        <title>Exemplo JSP 2</title>
    </head>
    <body>
        Hello! Time is now <%= new Date() %>
    </body>
</html>
```



JSP – Directivas (ctd.)

- Directiva page: informação sobre a servlet a gerar
  - import/contentType/pageEncoding/session/…
- Directiva include:

```
<%@ include file="relativeURL" %>
```

```
<jsp:directive.include file="relativeURL" />
```

- Directiva taglib
  - bibliotecas de tags externas (taglibs)

```
<%@ taglib uri="URIForLibrary" prefix="tagPrefix" %>
```

```
<jsp:directive.taglib uri="URIForLibrary"
                      prefix="tagPrefix" />
```


JSP: Declarações

- <%! *declarações Java (class level)* %>
- <jsp:declaration> *declarações Java (class level)* </jsp:declaration>

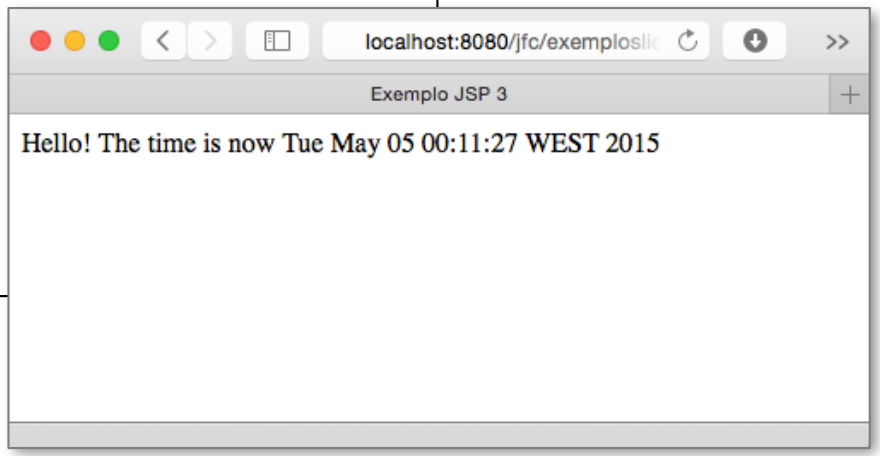
```
<html>
    <head><title>Exemplo JSP 3</title></head>
    <body>
        <jsp:declaration>
            Date theDate = new Date();
            Date getDate() {
                System.out.println( " Evaluating date now!" );
                return theDate;
            }
        </jsp:declaration>
        Hello!  Time is now <%= getDate()%>
    </body>
</html>
```

- Mas agora a data não muda!

JSP – Scriptlets

- *<% bloco de código Java %>*
- <jsp:scriptlet> *bloco de código Java* </jsp:scriptlet>

```
<doctype html>
<%@ page import="java.util.Date" %>
<html>
    <head><title>Exemplo JSP 3</title></head>
    <body>
        <% System.out.println( "Evaluating date now!" );
            Date date = new Date();
        %>
        Hello! The time is now <%= date %>
    </body>
</html>
```



- Por si só uma Scriptlet não produz HTML
  - consideradas má ideia…

JSP – Gerar HTML

```
<body>
    <%! public int factorial(int n) {
            int fact = 1;
            for (int i = 1; i <= n; i++) { fact *= i; }
            return fact; }
    %>
    <% out.println("<table border=1>");
       for ( int i = 1; i <= 5; i++ ) {
            out.println("<tr>");
            out.println("<td>"+i+"</td>");
            out.println("<td>"+factorial(i)+"</td>");
            out.println("</tr>");
       }
       out.println("</table>");
    %>
</body>
```

1	1
2	2
3	6
4	24
5	120

- o mesmo que uma servlet?!

JSP – Gerar HTML

```
<body>
    <%! public int factorial(int n) {
            int fact = 1;
            for (int i = 1; i <= n; i++) { fact *= i; }
            return fact; }
    %>
    <table border=1>
        <% for ( int i = 1; i <= 5; i++ ) { %>
            <tr>
                <td><%= i %></td>
                <td><%= factorial(i) %></td>
            </tr>
        <%}%>
    </table>
</body>
```

1	1
2	2
3	6
4	24
5	120

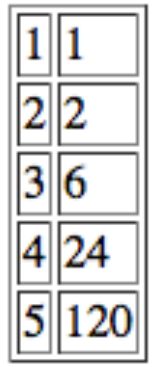
- Alternativa a utilizar out é misturar HTML e Java

Java scriptlets are obsolete

- **Readability** – There are already enough languages in web page programming (HTML, JavaScript and CSS). Keep the Java code in Java classes where it belongs.
- **Separation of Concerns** – Presentation logic and business logic should not be mixed. Easier to take advantage of the Java bean paradigm.
- **Reusability** – Scriptlets break OOP. They cannot be extended or encapsulated.
- **Maintainability** – Easier to refactor Java classes than Java code in JSP pages.

JSP – JSTL (JSP Standard Tag Library)

```
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>
<jsp:useBean id="fB" scope="session" class="com.slides.Factorial"/>
...
<table border=1>
    <c:forEach var="i" begin="1" end="5">
        <c:set target="${fB}" property="fact" value="${i}" />
        <tr>
            <td>${i}</td>
            <td>${fB.fact}</td>
        </tr>
    </c:forEach>
</table>
```




```
<c:out value="${fB.fact}" />
```

```
package com.slides;
import java.io.Serializable;
public class Factorial implements Serializable {
    private int fact;
    public Factorial () { this.fact = 0; }
    public void setFact(int n) {
        this.fact = 1;
        for (int i = 1; i <= n; i++) { this.fact *= i; }
    }
    public int getFact() { return this.fact; }
}
```

- Solução recomendada

JSP – JSTL (JSP Standard Tag Library)

```
<nav>
    <ul class="pagination">
        <li>
            <c:set var="previousPageClass" value="${ currentPage > 1 ? \"enabled-link\" : \"disabled-link\" }"/>
            <a id="previous-page" href="/GMS_web/AllGames?page=${ currentPage - 1 }" class="${ previousPageClass }">
                <span>«</span>
            </a>
        </li>
        <c:forEach varStatus="i" begin="1" end="${ maxPage }">
            <c:choose>
                <c:when test="${ i.current == currentPage }">
                    <li><a href="/GMS_web//AllGames?page=${ i.current }" class="currentPage">${ i.current }</a></li>
                </c:when>
                <c:otherwise>
                    <li><a href="/GMS_web//AllGames?page=${ i.current }">${ i.current }</a></li>
                </c:otherwise>
            </c:choose>
        </c:forEach>
        <li>
            <c:set var="nextPageClass" value="${ currentPage < maxPage ? \"enabled-link\" : \"disabled-link\" }"/>
            <a id="next-page" href="/GMS_web/AllGames?page=${ currentPage + 1 }" class="${ nextPageClass }">
                <span>»</span>
            </a>
        </li>
    </ul>
</nav>
```

JSP – Expression Language (EL)

- Sintaxe base: ${expr}
- Acesso simplificado a propriedades Beans e a outros objectos (request, session, application, etc.)

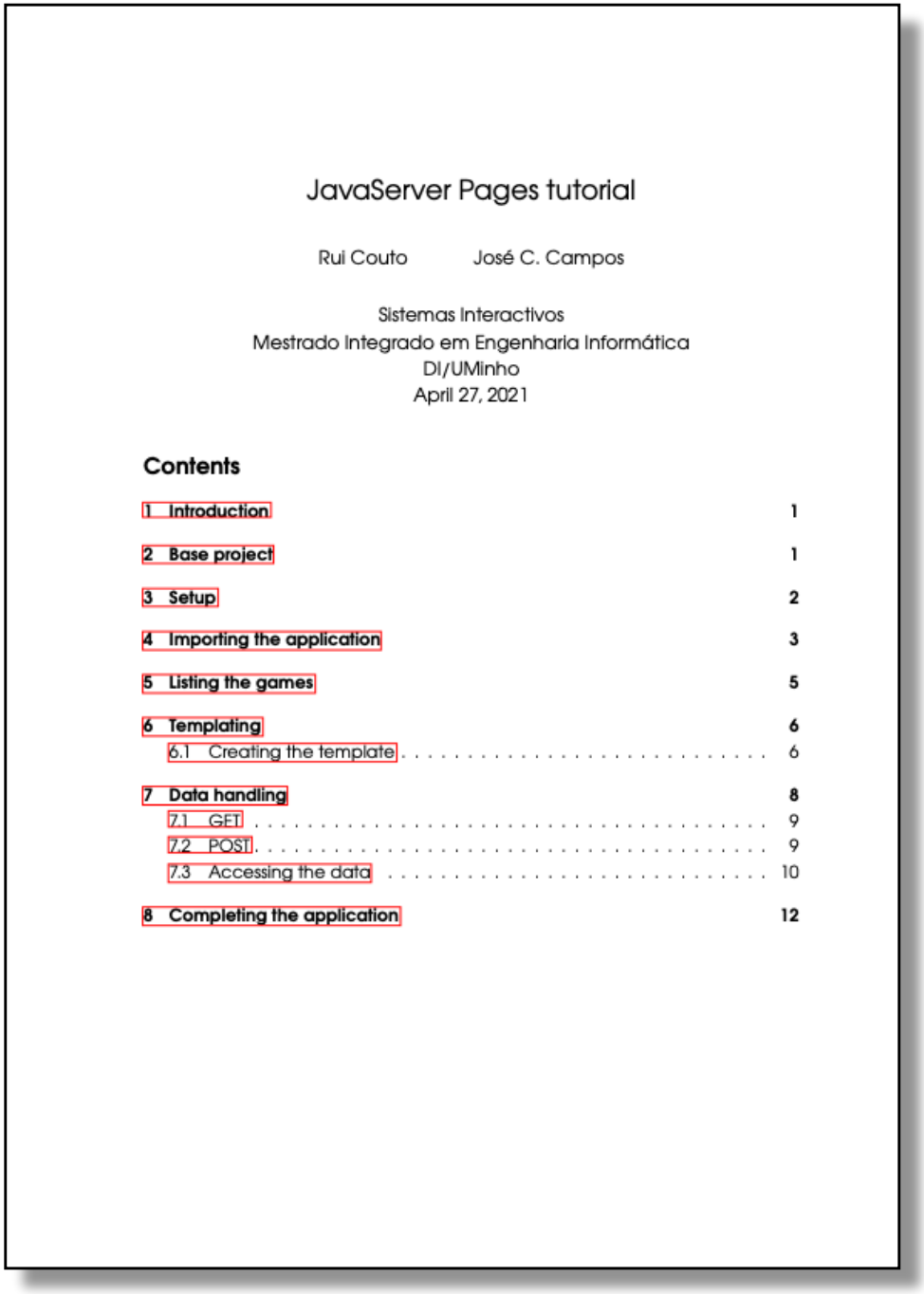
. (ponto)	aceder a uma propriedade de um objecto ou a uma entrada num Map
[]	aceder a um array ou List
empty	testar se variável está vazia

- Avaliação de expressões

+, -, *, /, etc.	Operações aritméticas
< (lt), > (gt), <= (le), etc.	Operações de comparação.
! (not)&& (and), || (or), etc.	Operações lógicas

- Acesso simplificado a funções (definidas em tag libraries) ${name_space:função(params)}

Tutorial de JSP...



JavaServer Pages tutorial

Rui Couto José C. Campos

Sistemas Interactivos
Mestrado Integrado em Engenharia Informática
DI/UMinho
April 27, 2021

Contents