Web Design Patterns and Connecting to a Database

CS174

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Outline

- Some Web Design Patterns
- Connecting a Web application to a Database

Design Patterns

- Patterns are described in detail in CS151.
- Here we would like to briefly describe some patterns related to web development.
- Basically, a **design pattern** is a repeatable solution to some common software design problem.
- Patterns are not language specific. The language specific version of a pattern is called an **idiom**.
- The advantage of design patterns is that if you use a pattern to solve a problem you know the solution is one which will (a) likely work, (b) has been tested by many people.
- Further, knowing many patterns expands your horizons about how to solve problems.

More on Patterns

- In defining a pattern one typically:
  1. Gives it a name
  2. Says what the goal or intent of the pattern is
  3. If it has been defined with a different name in the literature one might say what it is also known as
  4. Say what is the problem that motivates defining the pattern.
  5. Say under what other circumstances the pattern might be used.
  6. If one knows UML and if the pattern is object-oriented, one might give a UML diagram for the pattern
  7. Say what are the actors or classes involved in the pattern and how they interact to provide a solution to the problem.
  8. Perhaps give some sample code and related patterns.

Example: Bread Crumb Pattern

Name: Bread Crumb

Type: User interface

Intent: Provide an easy way to navigate to a page that has already been seen on a site.

Problem: The user needs to be able to navigate up (towards the root page) and have an understanding of where he is in relation to the rest of the site.

Solution: Display a horizontal list of labels starting with the topmost page and continuing down the site's hierarchy to the current page.

When to use: This pattern should be used on all subpages of a site, but not on the root page. Accesskeys may be used for web accessibility.

What it looks like: **Chris Pollett** **>** Students **> Basani**

Example: Filter Pattern

Name: Filter (AKA Intercepting Filter)

Type: Structural

Intent: To modify the HTTP request or response into a format usable by a web service or the response agent

Problem: A web service might receive/provide data in one format and the requester might need/send data in a different format

Solution: Write a short program to translate between the two formats.

When to use: When one needs to translate between two XML languages. For instance, RSS and XHTML.

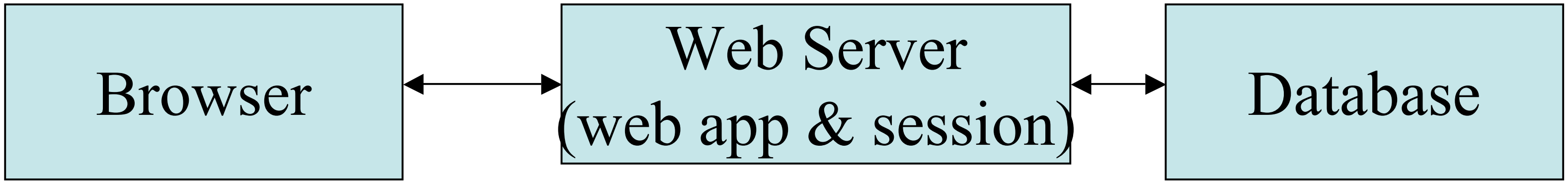
What it looks like: Similar to what we did with XML and JSON data in HW2

Concluding Remarks on Patterns

- As we said at the start patterns are described in detail in CS151.
- This was just to give a flavor of what patterns look like and that many web related patterns have been defined.
- For instance Yahoo! has on its developer page a whole list of interesting web patterns.

Connecting a Web Application to a Database

- Web applications are good at dynamically creating web pages.
- They are not so good at managing and maintaining data persistently.
- Databases are good at this.
- We would like to build applications with the following structure:



- We are going to look at how to do this in a few languages beginning with PHP

PHP and MySQL

- Before, HW3 we saw how to create a MySQL database.
- PHP has interfaces for many different database systems: MySQL, Postgres, DB2, Oracle, ODBC, etc.
- Unlike the other languages we will consider, PHP has a different group of built in functions for each different database system.
- The group of functions for MySQL all begin with mysql_ ; the group of functions for Postgres all begin with pgsql_, etc. Otherwise, the actual functions supported are pretty similar.

Connecting to MySQL

- To start a connect to a MySQL database one can issue the command:

  ```
  $db = mysql_connect();
  ```

- This function actually takes three parameters: the host, the username, and the password.
- These default to localhost, the process name PHP runs under, and blank.

  ```
  $db = mysql_connect(host, uname,pword);
  ```

- Depending on how mysql is configured, the first example above might work and saves some typing.
- This function returns false if a connection is not made.
- To close a database, one can call mysql_close();

Selecting a Database and queries

- To select a database one calls:

```
mysql_select_db(“cars”);
```

- One can then do a query with a command like:

```
$query =“SELECT * FROM Corvettes”;
$result = mysql_query($query);
$num_rows = mysql_num_rows($result);
$num_fields = mysql_num_fields($result);
for($j =1; $j <=$num_rows; $j++)
{
   $row = mysql_fetch_array($result);
   print $row[0].$row[“some_attr”]. “<br />”;
}
```

- mysql_query can also be used to do inserts, etc.