Notes on Designing and Building the Department of Computer Science Assessment Database

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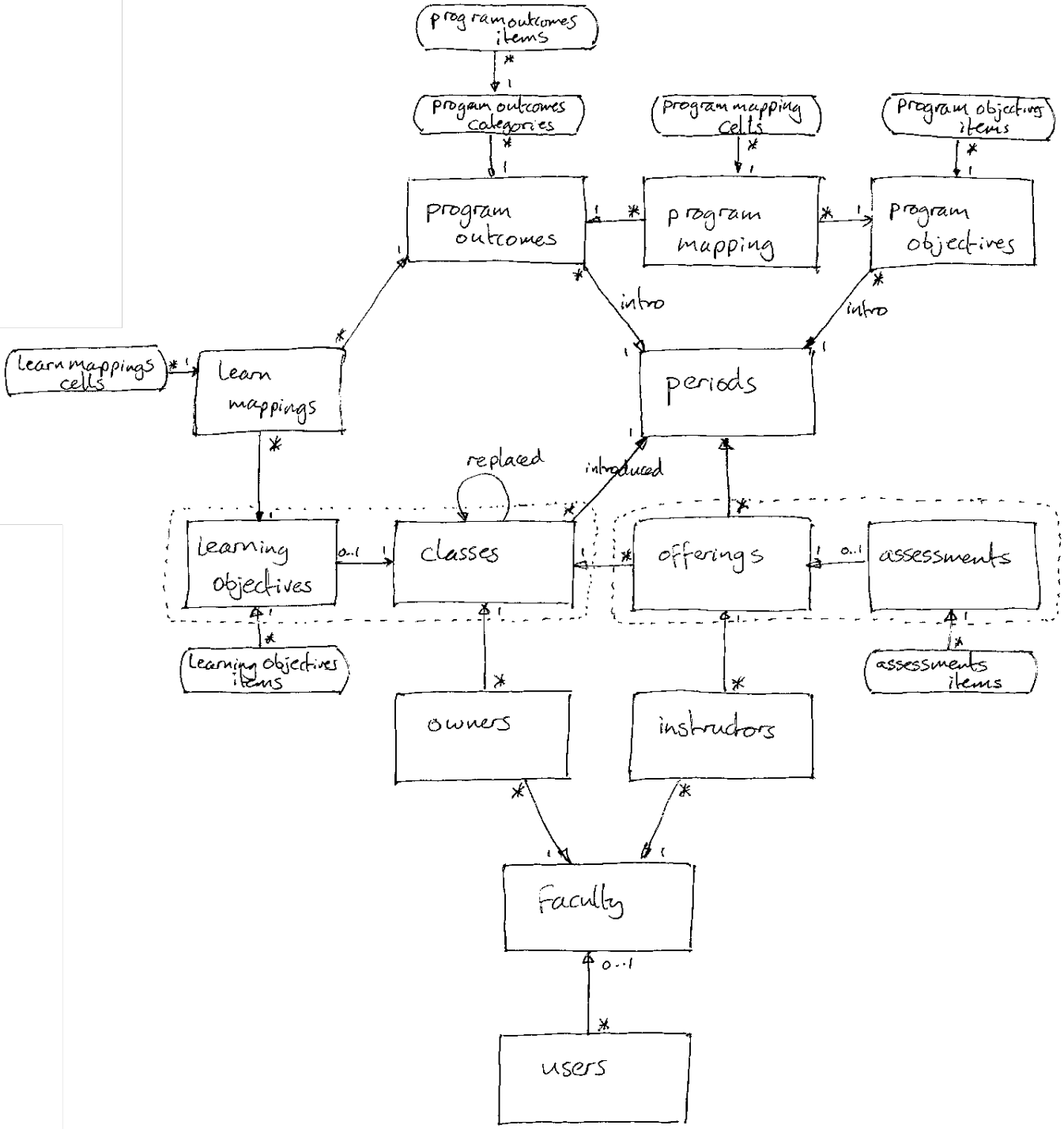


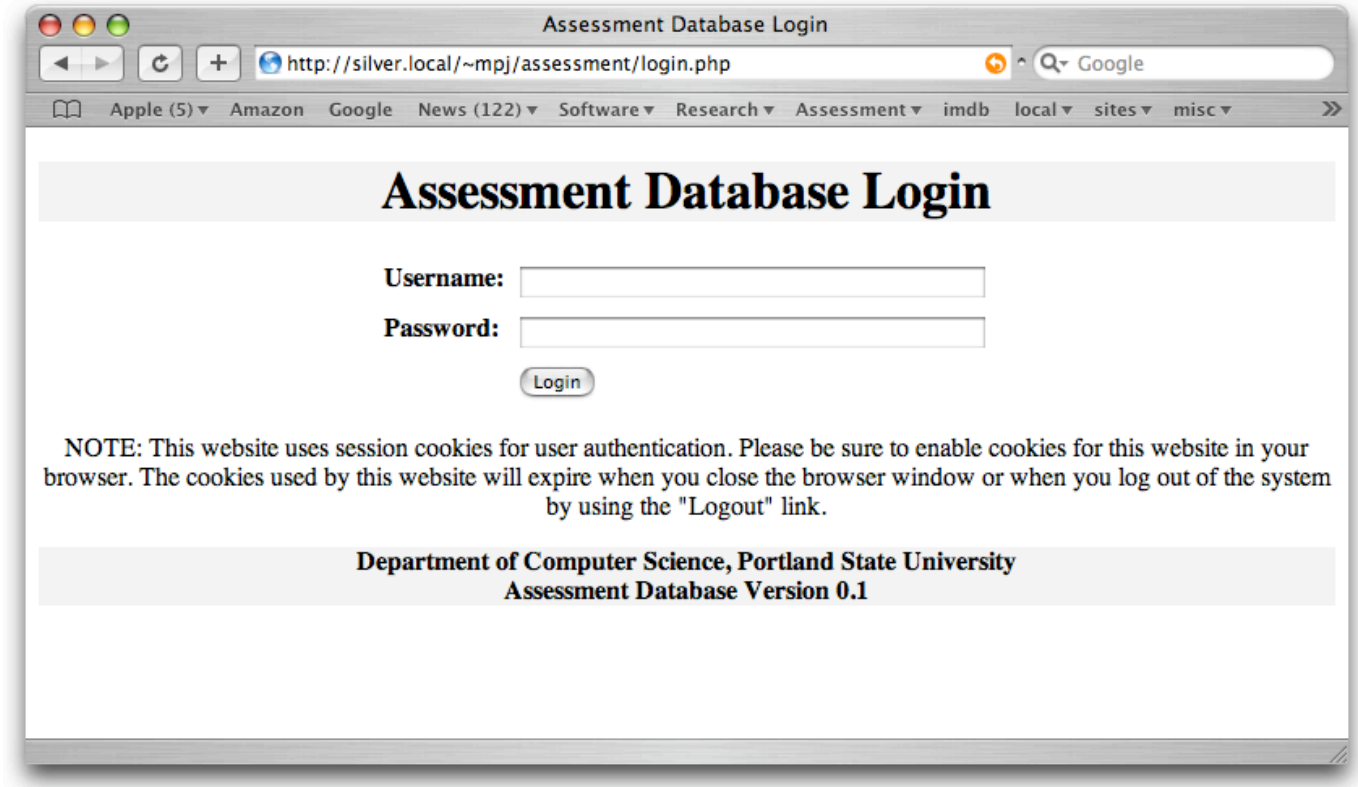
SQL Schema

```
#  CREATE TABLE name (
#     ... spec of primary key ...
#     ... data attributes ...
#     ... id links to other tables ...
#  );

USE assessment;

CREATE TABLE users (
  user_id    SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  username   VARCHAR(40) NOT NULL,
  password   CHAR(40) NOT NULL,
  lastlogin  DATETIME,
  faculty_id SMALLINT UNSIGNED,
  PRIMARY KEY (user_id)
);

CREATE TABLE periods (
  period_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  name      VARCHAR(30) NOT NULL,
  start     DATE NOT NULL,
  end       DATE NOT NULL,
  PRIMARY KEY (period_id)
);

CREATE TABLE faculty (
 faculty_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
 first      VARCHAR(40) NOT NULL,
 last       VARCHAR(40) NOT NULL,
 email      VARCHAR(50) NOT NULL,
 active     ENUM('Y','N') default 'Y' NOT NULL,
 updated    DATETIME NOT NULL,
 comments   TEXT NOT NULL,
 PRIMARY KEY (faculty_id)
);

CREATE TABLE courses (
   course_id  SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,

   subj       VARCHAR(4) NOT NULL,        # course subject (e.g., CS)
   num        SMALLINT UNSIGNED NOT NULL, # course number  (e.g., 101)
   name       VARCHAR(80) NOT NULL,       # course name (e.g., 'Intro to X')
   descrip    TEXT NOT NULL,              # course description
   comments   TEXT NOT NULL,              # comments about this course

   introduced SMALLINT UNSIGNED NOT NULL, # period introduced
   replaced   SMALLINT UNSIGNED,          # id of replacement course

   PRIMARY KEY (id)
);

# The "coordinators" table captures the (many-many) relationship between course
# versions and their coordinators:
#
CREATE TABLE coordinators (
  coordinator_id   SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  course_id        SMALLINT UNSIGNED NOT NULL,
  faculty_id       SMALLINT UNSIGNED NOT NULL,
  PRIMARY KEY(coordinator_id)
```

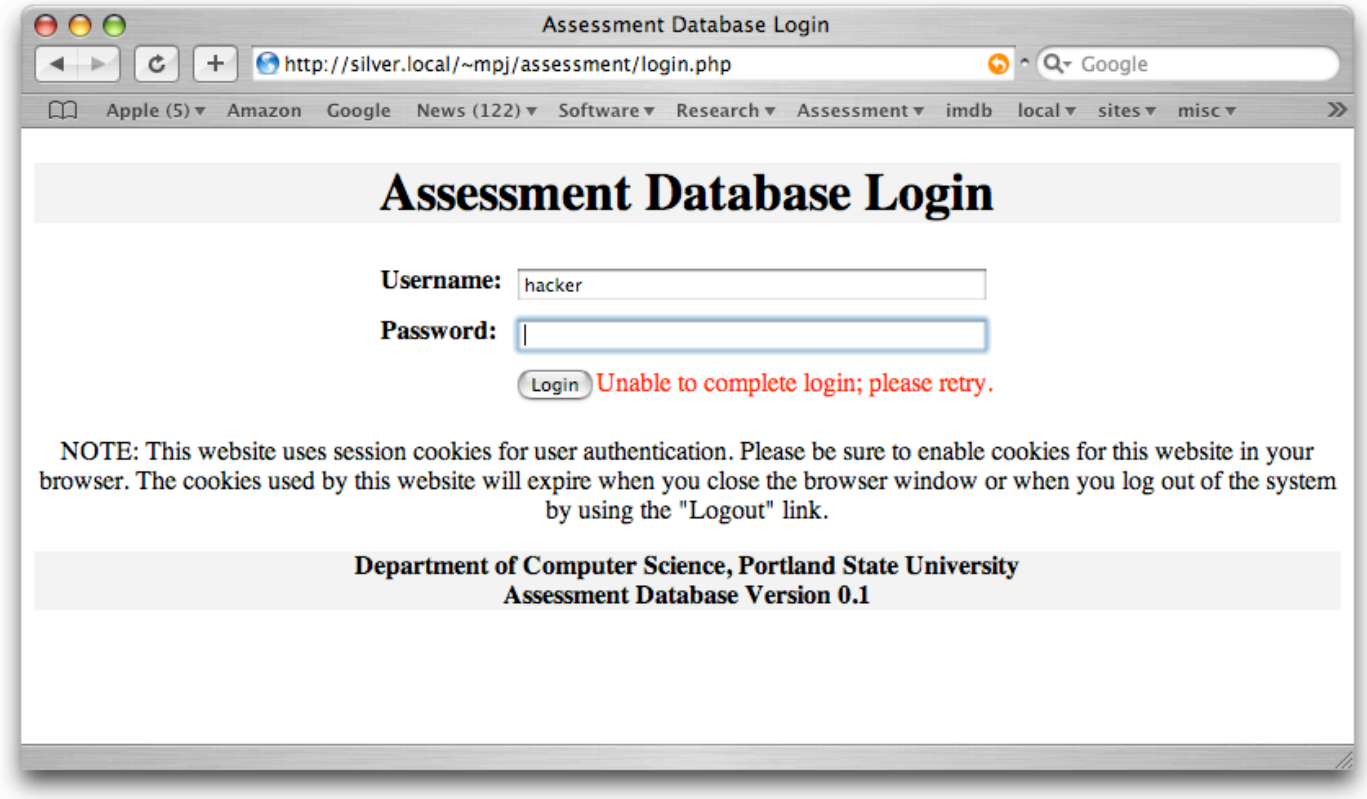
```
);

CREATE TABLE offerings (
  offering_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  section     VARCHAR(4) NOT NULL,          # section reference
  course_id   SMALLINT UNSIGNED NOT NULL,  # which course is this for?
  period_id   SMALLINT UNSIGNED NOT NULL,  # when is this offering?
  PRIMARY KEY(offering_id)
);

# The "instructors" table captures the (many-many) relationship between
# offerings and their instructors:
#
CREATE TABLE instructors (
  instructor_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  review        DATETIME,                    # date of last review
  revcomments   TEXT              NOT NULL, # reviewer comments
  offering_id   SMALLINT UNSIGNED NOT NULL, # which offering is this for?
  faculty_id    SMALLINT UNSIGNED NOT NULL, # which faculty?
  PRIMARY KEY(instructor_id)
);

# Program objectives: ----------------------
CREATE TABLE programobjectives (
  progobj_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  name       VARCHAR(30)       NOT NULL,
  preamble   TEXT              NOT NULL,
  comments   TEXT              NOT NULL,
  intro      SMALLINT UNSIGNED NOT NULL,
  PRIMARY KEY(progobj_id)
);

CREATE TABLE programobjectivesitems (
  progobjitem_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  progobj_id     SMALLINT UNSIGNED NOT NULL,
  itemnum        SMALLINT UNSIGNED NOT NULL,
  itemtext       TEXT              NOT NULL,
  PRIMARY KEY(progobjitem_id)
);

# Program outcomes: ------------------------
CREATE TABLE programoutcomes (
  progout_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  name       VARCHAR(30)       NOT NULL,
  preamble   TEXT              NOT NULL,
  comments   TEXT              NOT NULL,
  intro      SMALLINT UNSIGNED NOT NULL,
  PRIMARY KEY (progout_id));

CREATE TABLE programoutcomescategories (
  progoutcat_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  progout_id    SMALLINT UNSIGNED NOT NULL,
  catnum        SMALLINT UNSIGNED NOT NULL,
  catname       VARCHAR(30)       NOT NULL,
  catpreamble   TEXT              NOT NULL,
  PRIMARY KEY(progoutcat_id)
);

CREATE TABLE programoutcomesitems (
  progoutitem_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  progoutcat_id  SMALLINT UNSIGNED NOT NULL,
```

```
  itemnum        SMALLINT UNSIGNED NOT NULL,
  itemtext       TEXT              NOT NULL,
  PRIMARY KEY(progoutitem_id)
);

# Program assessment mappings: ---------------
CREATE TABLE programmappings (
  progmap_id  SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  progobj_id  SMALLINT UNSIGNED NOT NULL,
  progout_id  SMALLINT UNSIGNED NOT NULL,
  comments    TEXT NOT NULL,
  PRIMARY KEY (progmap_id)
);

CREATE TABLE programmappingscells (
  progmap_id SMALLINT UNSIGNED NOT NULL,
  obi        SMALLINT UNSIGNED NOT NULL, /* obi = objective id */
  oci        SMALLINT UNSIGNED NOT NULL, /* oci = outcome id */
  data       VARCHAR(8) NOT NULL,
  PRIMARY KEY (progmap_id, obi, oci)
);

# Learning objectives: ----------------------
CREATE TABLE courseobjectives (
  courseobj_id SMALLINT UNSIGNED NOT NULL,
  preamble    TEXT              NOT NULL,
  comments    TEXT              NOT NULL,
  PRIMARY KEY(courseobj_id)
);

CREATE TABLE courseobjectivesitems (
  courseobjitem_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  courseobj_id     SMALLINT UNSIGNED NOT NULL,
  itemnum         SMALLINT UNSIGNED NOT NULL,
  itemtext        TEXT              NOT NULL,
  PRIMARY KEY(courseobjitem_id)
);

# Course mappings: ---------------------------
CREATE TABLE coursemappings (
  coursemap_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  courseobj_id SMALLINT UNSIGNED NOT NULL,
  progout_id   SMALLINT UNSIGNED NOT NULL,
  comments     TEXT NOT NULL,
  PRIMARY KEY(coursemap_id)
);

CREATE TABLE coursemappingscells (
  coursemap_id SMALLINT UNSIGNED NOT NULL,
  obi          SMALLINT UNSIGNED NOT NULL, /* obi = objective index */
  oci          SMALLINT UNSIGNED NOT NULL, /* oci = outcome   index */
  data         VARCHAR(8) NOT NULL,
  PRIMARY KEY(coursemap_id, obi, oci)
);

# Assessments: ------------------------------
CREATE TABLE assessments (
  assess_id SMALLINT UNSIGNED NOT NULL,   /* also an offering_id */
  prep      TEXT              NOT NULL,
  impareas  TEXT              NOT NULL,
  PRIMARY KEY(assess_id)
);
```

```
CREATE TABLE assessmentsitems (
  assessitem_id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
  assess_id     SMALLINT UNSIGNED NOT NULL,
  num           SMALLINT UNSIGNED NOT NULL,
  how           TEXT              NOT NULL,
  percent       SMALLINT UNSIGNED NOT NULL,
  PRIMARY KEY(assessitem_id)
);

# ------------------------------------------
```

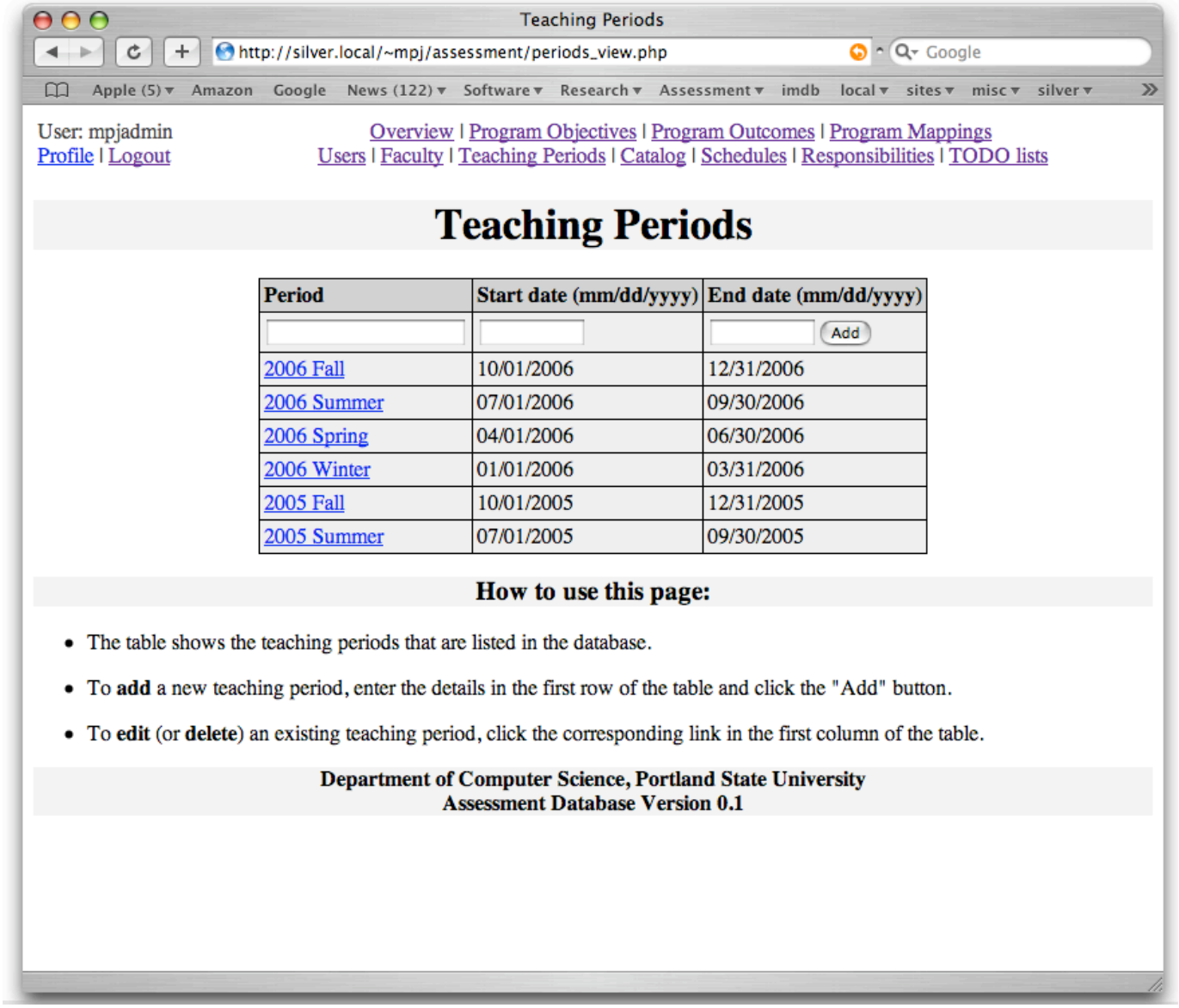



```
<!DOCTYPE html PUBLIC "-//W3C/DTD XHTML 1.0 Transitional//EN"
                      "http://www.w3c.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3c.org/1999/xhtml" xml:lang="en" lang="en">
<head>
    <meta http-equiv="content-type" content="text/html; charset=iso-8859-1"/>
    <link rel="stylesheet" href="includes/layout.css" type="text/css">
<script language="JavaScript">
if (navigator.appVersion.indexOf('MSIE') != -1) {
document.write('<link rel="stylesheet" href="includes/msie.css" type="text/css">');
}
</script>
    <title>Assessment Database Login</title>
</head>
<body>
<div class="header"><h1>Assessment Database Login</h1></div>
<center><form method="post" action="login.php"><table
xclass="adb"><tr><td><b>Username:</b></td><td><input type="text" name="username"
size="40" maxlength="40" title="Please enter your username in this box."
value=""/></td></tr><tr><td><b>Password:</b></td><td><input type="password"
name="password" size="40" maxlength="40" title="Please enter your password in this
box."/></td></tr><tr><td/><td><input type="submit" name="login" title="Please enter
your user name and password in the boxes above and then click this button to access
to the assessment database." value="Login"/></td></tr></table></form>NOTE: This
website uses session cookies for user authentication.
       Please be sure to enable cookies for this website in your browser.
       The cookies used by this website will expire when you close the
       browser window or when you log out of the system by using the
       "Logout" link.</center><div class="footer">
<p><b>Department of Computer Science, Portland State University<br/>
Assessment Database Version 0.1<b>
</p></div>
</div>
</body>
</html>
```




```
<!DOCTYPE html PUBLIC "-//W3C/DTD XHTML 1.0 Transitional//EN"
                      "http://www.w3c.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3c.org/1999/xhtml" xml:lang="en" lang="en">
<head>
    <meta http-equiv="content-type" content="text/html; charset=iso-8859-1"/>
    <link rel="stylesheet" href="includes/layout.css" type="text/css">
<script language="JavaScript">
if (navigator.appVersion.indexOf('MSIE') != -1) {
document.write('<link rel="stylesheet" href="includes/msie.css" type="text/css">');
}
</script>
    <title>Assessment Database Login</title>
</head>
<body>
<div class="header"><h1>Assessment Database Login</h1></div>
<center><form method="post" action="login.php"><table
xclass="adb"><tr><td><b>Username:</b></td><td><input type="text" name="username"
size="40" maxlength="40" title="Please enter your username in this box."
value="hacker"/></td></tr><tr><td><b>Password:</b></td><td><input type="password"
name="password" size="40" maxlength="40" title="Please enter your password in this
box."/></td></tr><tr><td/><td><input type="submit" name="login" title="Please enter
your user name and password in the boxes above and then click this button to access
to the assessment database." value="Login"/><span class="errors">Unable to complete
login; please retry.</span></td></tr></table></form>NOTE: This website uses session
cookies for user authentication.
       Please be sure to enable cookies for this website in your browser.
       The cookies used by this website will expire when you close the
       browser window or when you log out of the system by using the
       "Logout" link.</center><div class="footer">
<p><b>Department of Computer Science, Portland State University<br/>
Assessment Database Version 0.1<b>
</p></div>
</div>
</body>
</html>
```

```php
<?php
 # ------------------------------------------------------------------------
 # Assessment Database Login.
 # Mark P Jones, February 2006.

 require_once('assess_inc.php');

 # Connect to the database: ---------------------------------------------
 require_once(dbconnect);

 # Try to authenticate login session: -----------------------------------
 $username = init_post_text('username');
 $password = init_post_text('password');
 $msg      = '';

 if (isset($_POST['login'])) {
   $query    = "SELECT user_id, faculty_id FROM users
                WHERE username='$username' AND password=SHA('$password')";
   $result   = @mysql_query($query);
   if ($result && $row=mysql_fetch_assoc($result)) {
     begin_session();
     $_SESSION['username'] = $username;
     $uid                  = $row['user_id'];
     $_SESSION['uid_auth'] = $uid;
     $_SESSION['fid_auth'] = $row['faculty_id'];
     $_SESSION['agent']    = md5($_SERVER['HTTP_USER_AGENT']);
     mysql_free_result($result);
     run_query('update last login time',
               "UPDATE users SET lastlogin=NOW() WHERE user_id=$uid");
     redirect('home.php');
   }
   $msg = '<span class="errors">Unable to complete login; please retry.</span>';
 }
 $password = '';

 # Close the database connection: ---------------------------------------
 mysql_close();

 # Begin the web page: --------------------------------------------------
 beginPage('Assessment Database Login');

 # Create the form: -----------------------------------------------------
 echo '<center><form method="post" action="login.php">';
 echo '<table xclass="adb"><tr><td><b>Username:</b></td><td>';
 echo textBox('username', 40, 40, $username,
              'Please enter your username in this box.');
 echo '</td></tr><tr><td><b>Password:</b></td><td>';
 echo password('password', 40,
               'Please enter your password in this box.');
 echo '</td></tr><tr><td/><td>';
 echo button('login',  'Login',
             'Please enter your user name and password in the boxes '
           . 'above and then click this button to access to the '
           . 'assessment database.');
 echo $msg;
 echo '</td></tr></table></form>';
 echo 'NOTE: This website uses session cookies for user authentication.
       Please be sure to enable cookies for this website in your browser.
       The cookies used by this website will expire when you close the
       browser window or when you log out of the system by using the
       "Logout" link.';
 echo '</center>';

 # Terminate the web page: ----------------------------------------------
 endPage();
?>
```




```php
<?php
 # ------------------------------------------------------------------------
 # View teaching periods.
 # Mark P Jones, December 2005 -- January 2006.

 require_once('privilegeduser.php');
 require_once('periods_common.php');

 # Clear fields on data entry form: ---------------------------------------
 $p_name  = $p_start = $p_end   = '';
 $msg     = '';

 # Connect to the database: -----------------------------------------------
 require_once(dbconnect);

 # Validate form data: ----------------------------------------------------
 if (isset($_POST['new'])) {
   $o_name = '';  # validate uses this to determine when to check the
                  # database for an existing period with a similar name.
   include('periods_validate.php');

   # Add the new period, so long as there weren't any errors:
   if (empty($errors)) {
     # Normalize dates to the SQL yyyy-mm-dd format:
     $n_start = date('Y-m-d', $t_start);
```

```
    $n_end   = date('Y-m-d', $t_end);

    # Insert new time period into database:
    $query = "INSERT INTO periods (name, start, end)
              VALUES ('$p_name','$n_start','$n_end')";
    $result = @mysql_query($query);
    if ($result) { # Reset field entries after a successful insert:
      $msg = 'You have just added the period "' . $p_name . '".';
      $p_name  = $p_start = $p_end  = '';
    } else {
      $errors[] = 'Query to insert new period failed' . pleaseReport;
    }
  }
}

# Begin the web page: ------------------------------------------------------
beginPage('Teaching Periods');
if (!empty($msg)) {
  echo '<p class="inform">' . safe($msg) . '</p>';
}

# Query to determine the current list of teaching periods: ---------------
# TODO: should we add something here to limit number of periods shown?
$query = "SELECT period_id, name,
                 DATE_FORMAT(start, '%m/%d/%Y') AS startdate,
                 DATE_FORMAT(end  , '%m/%d/%Y') AS enddate
          FROM periods
          ORDER BY start DESC";
$result = @mysql_query($query); # echo "<p>Query: <pre>$query</pre></p>";

if (!$result) {
    echo '<p>Query to list teaching periods failed' . pleaseReport .'</p>';
} else {
  # Start form, including table headers:
  echo '<center class="adb">
        <form method="post" action="periods_view.php">
        <table class="adb" border="1">
        <tr>
         <th>Period</th>
         <th>Start date (mm/dd/yyyy)</th>
         <th>End date (mm/dd/yyyy)</th>
        </tr>';

  # Position data entry fields for form in the first row of the table:
  echo '<tr><td>';
  echo textBox('p_name',  20, 30, $p_name);
  echo '</td><td>';
  echo textBox('p_start', 10, 10, $p_start);
  echo '</td><td>';
  echo textBox('p_end',   10, 10, $p_end);
  echo button('new', 'Add');
  echo '</td></tr>';

  # Add rows for existing periods:
  while ($row = mysql_fetch_assoc($result)) {
    echo '<tr><td>' . link_period($row['period_id'], $row['name'])
       . '</td><td>' . $row['startdate']
       . '</td><td>' . $row['enddate']
       . '</td></tr>';
  }
  echo '</table></form></center>';

  mysql_free_result($result);
}
```

```php
# Close the database connection: ----------------------------------------
mysql_close();

# Terminate the web page: -----------------------------------------------
endPage(
  'The table shows the teaching periods that are listed in the database.',
  'To <b>add</b> a new teaching period, enter the details in the first row
   of the table and click the "Add" button.',
  'To <b>edit</b> (or <b>delete</b>) an existing teaching period, click the
   corresponding link in the first column of the table.'
);
?>
```