CSE 190 M, Spring 2009
Final Exam, Tuesday, June 9, 2009

Name: _____

Student ID #: _____

Section and/or TA: _____

- You have **110 minutes** to complete this exam.
  You may receive a deduction if you keep working after the instructor calls for papers.
- This test is open-book/notes.
- You may not use any computing devices of any kind including calculators, cell phones, or music players.
- Please do not abbreviate any code, such as with ditto " marks or dot-dot-dot ....
- If you enter the room, you must turn in an exam before you leave.
- You must show your Student ID to a TA or instructor for your exam to be accepted.

Good luck!

Problem	Description	Earned	Max
1	HTML/CSS Tracing		20
2	PHP		20
3	JavaScript/DOM		20
4	Ajax/XML		20
5	SQL		20
X	Extra Credit		+1
TOTAL			100

1. HTML/CSS Tracing

Draw a picture of how the following HTML and CSS code will look when the browser renders it onscreen. Indicate a background coloring by shading lightly or by drawing repeated diagonal lines like this.

HTML

```
<p class="a b">If you only knew
                  the power of the Dark Side.</p>

<ul class="a">
    <li>Luke Skywalker</li>  <li>Princess Leia</li>
    <li>Han Solo</li>  <li>Chewbacca</li>
    <li>C3-PO</li>  <li>R2-D2</li>
</ul>

<p class="b c">Emperor Palpatine (to Luke Skywalker): I'm afraid the
<span>deflector shield</span> will be quite operational when your friends arrive.</p>

<p id="b" class="d">Luke: That's not true.
That's impossible!</p>

<div class="b">
<h1 id="d" class="c">May the Force       be with you</h1> </div>
```

CSS

```
.a {
    background-color: yellow;
    float: right;
    width: 10em;
}

.b .c {
    text-decoration: underline;
    background-color: yellow;
}

.a, #b {
    border: 2px solid black;
}

#c, p span {
    border: 2px dotted black;
    padding-left: 2em;
}

.c #b, .b > .c {
    clear: both;
}

#d {
    text-align: center;
}
```

2. PHP

Write a complete PHP web service that could be saved in a file `ascii.php`, that outputs a single frame from a student's `asciimation.txt` file from Homework 5. Each student's ASCII data is stored on the web server with your PHP file, in a `students` directory within subdirectories that have the same names as the students. For example, student `jsmith`'s ASCII data is stored in `students/jsmith/asciimation.txt`. Suppose that the contents of that file are those shown at right.

```
   o
   O
 o/|\o
  / \
=====
    o
 o_O
   |o
  / \
=====
 o   o
  \O
   o\
  / \
=====
  o
 _O_o
  o|
  / \
```

The service is sent a request parameter named `student` that corresponds to a student whose ASCIImation data should be retrieved. The service also accepts an optional second parameter named `frame` specifying which frame of the animation to output, 0-based. If this parameter is not passed, frame 0 (the first frame) is used. Recall that frames are separated by a line of `=====` . So for example, if your web service is contacted as `ascii.php?student=jsmith&frame=2` , the following should be the output:

```
o   o
 \O
  o\
 / \
```

Your output should use the `text/plain` content type. If the `student` parameter is not passed or refers to a non-existing file/directory, the service produces no output or error. If the `frame` parameter is passed with a value greater than the number of frames in the student's file, no output or error is produced.

3. Javascript/DOM

Write the Javascript code to add behavior to the following HTML code. The page is similar to the number guessing game assigned in CSE 142. When the page loads, your code should randomly choose a number from 1-100 inclusive. (Recall that the `Math.random` function returns a random real number between 0 and 1.)

When the user types a number into the `number` text field and then clicks the `makeguess` button, the game will compare the user's guess to your randomly chosen number, and report whether it was "Too high!", "Too low!", or correct. The information will be shown as text in the `result` span. If the guess is correct, you should show a message such as, "You got it right in 6 tries!" (You can still say "tries" even if it takes 1 guess.) Once the user guesses correctly, disable the button so that no more guesses can be made.

The game will also show a history of all guesses made as a bulleted list. Each guess's number is added as a bullet to the end of the list. If the guess was too low, this bullet should use the `low` CSS class, which displays it in blue italic. If it's too high, the bullet should use the `high` CSS class, which is red and bold. If it is correct, it should be displayed without any class.

You may assume that the text the user types in the field can be interpreted as an integer. You don't need to worry about the case where the user makes the same guess twice. You may assume that Prototype is also included in the page.

The relevant HTML/CSS code for the page is the following.

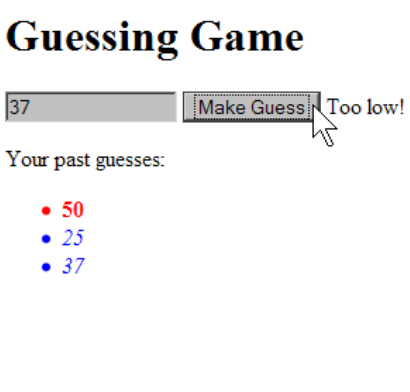
HTML

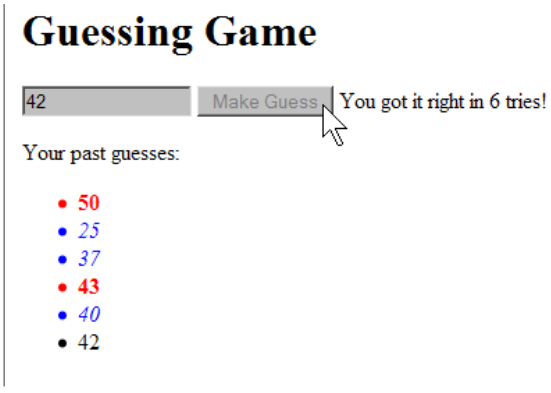
```
<h1>Guessing Game</h1>
<div>
    <input id="number" type="text" size="16" />
    <button id="makeguess">Make Guess</button>
    <span id="result"></span>
</div>

<p>Your past guesses:</p>
<ul id="guesses"></ul>
```

CSS

```
li.low {
    color: blue;
    font-style: italic;
}

li.high {
    color: red;
    font-weight: bold;
}
```

The following screenshots show the initial state and state after several guesses have been made.





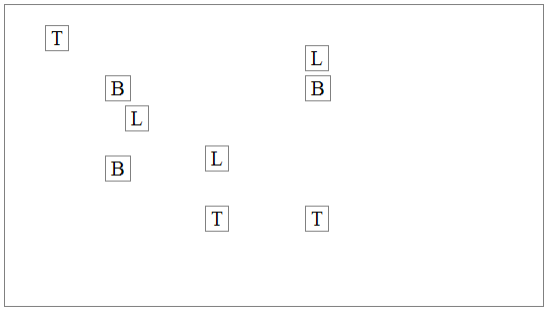
Write your answer on the next page.

3. Javascript/DOM (writing space)

4. Ajax/XML

In this problem we have a web page that displays letters that represent "Critter" animals in a 2D simulation. Each critter is represented with a `span` that has been absolute-positioned to give it an x/y location on the page. The relevant page code and its appearance are shown below:

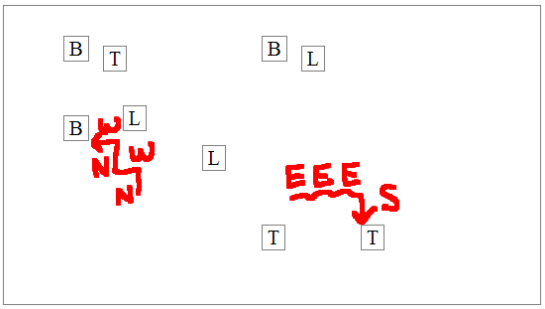
```
<h1>Critters</h1>
<div id="critterarea">
    <span class="critter Bear">B</span>
    <span class="critter Bear">B</span>
    <span class="critter Bear">B</span>
    <span class="critter Lion">L</span>
    <span class="critter Lion">L</span>
    <span class="critter Lion">L</span>
    <span class="critter Tiger">T</span>
    <span class="critter Tiger">T</span>
    <span class="critter Tiger">T</span>
</div>
```



Suppose that there is a web service named `critter.php`, located on your web server in the same directory as your code. This service outputs XML data describing sequences of moves to make on various critters on the page. In this problem you should write Ajax JavaScript code to contact the web service (using a GET request), examine its XML data, and move the corresponding critters appropriately. This code should run when the web page loads.

The XML data returned by the web service consists of a series of one or more `move` elements inside an overall `movelist` element. Each `move` element contains an `animal` attribute describing the class of animals (such as bears or lions) that should be moved and a letter indicating the direction to move. The format matches the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<movelist>
    <move animal="Bear">N</move>
    <move animal="Bear">W</move>
    <move animal="Tiger">E</move>
    <move animal="Bear">N</move>
    <move animal="Bear">W</move>
    <move animal="Tiger">E</move>
    <move animal="Tiger">E</move>
    <move animal="Tiger">S</move>
</movelist>
```



The letter in the `move` data indicates a move of 20 pixels in a given direction. N means north (up on the page), S is south (down), E is east (right), and W is west (left). For example, when processing the `move` elements above, your code should cause all `Bear` critters on the page to move 20px up (N), then 20px left (W), then 20px up (N), then 20px left (W). The expected page appearance after processing the given XML data is shown at right.

Your code doesn't need to worry about animals colliding with each other, walking off the screen, or making the movement animate. You may assume that Prototype is already linked to the page. Write your answer on the next page.

4. Ajax/XML (writing space)

5. SQL

Write an SQL query that searches the `imdb` or `imdb_small` database for all actors who have been in 3 or more total movies, and have been in at least one action film (a movie with the "Action" genre). Your result set should include each actor's first and last name, sorted by last name and then by first name. Each actor should be listed only once. Recall the `imdb` database tables:

actors

id	first_name	last_name	gender
433259	William	Shatner	M
797926	Britney	Spears	F
831289	Sigourney	Weaver	F
...			

movies

id	name	year	rank
112290	Fight Club	1999	8.5
209658	Meet the Parents	2000	7
210511	Memento	2000	8.7
...			

roles

actor_id	movie_id	role
433259	313398	Capt. James T. Kirk
433259	407323	Sgt. T.J. Hooker
797926	342189	Herself
...		

movies_genres

movie_id	genre
209658	Comedy
313398	Action
313398	Sci-Fi
...	

directors

id	first_name	last_name
24758	David	Fincher
66965	Jay	Roach
72723	William	Shatner
...		

movies_directors

director_id	movie_id
24758	112290
66965	209658
72723	313398
...	

When run on the `imdb_small` database, your query would produce the following results:

```
+-------------+-----------+
| first_name  | last_name |
+-------------+-----------+
| Steve       | Buscemi   |
| Michael (I) | Madsen    |
| Bill        | Paxton    |
| Stevo       | Polyi     |
| Uma         | Thurman   |
+-------------+-----------+
```

Hint: You may be tempted to write a very long query, but you only really care about the genre of one of the actor's films. The others can be anything as long as there are 3 distinct films the actor has been in. **If you unnecessarily join too many tables together (more than 8 tables total), you will not receive full credit.**

X. Extra Credit (+1 point)

Draw a picture of your TA surfing one of his/her favorite web sites.

(Any drawing that appears to have taken more than a moment's work will get the +1 point.)