CSE 190 M, Spring 2011
Final Exam, Thursday, June 9, 2011

Name: _____

Quiz Section: _____ **TA:** _____

Student ID #: _____

Rules:

- 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 use any paper resources other than practice exams.
- You may *not* use any computing devices, including calculators, cell phones, or music players.
- Unless otherwise indicated, your code will be graded on proper behavior/output, not on style.
- Please do not abbreviate code, such as writing ditto marks ("") or dot-dot-dot marks (...).
- If you enter the room, you must turn in an exam and will not be permitted to leave without doing so.
- You must show your **Student ID** to a TA or instructor for your submitted exam to be accepted.

Good luck!

Problem	Description	Earned	Max
1	PHP		25
2	JavaScript/DOM		25
3	Regular Expressions		25
4	SQL		25
TOTAL	**Total Points**		**100**

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1. PHP

Write the PHP code for a partial web page that searches for names that contain a given letter a given number of times, case-insensitively. Your web service would be located in a file named `q4.php` on the server. In this same directory is a file `peeps.txt`; each line of this file contains a name. For example:

```
Helene Martin
Robert Purple
Marty Stepp
Stuart Reges
Bob Loblaw
```

The names are guaranteed to be non-empty and unique.

Your web service accepts a query parameter named `letter` indicating the character to be searched for, and a parameter named `times` indicating how many times that character must occur, case-insensitively. For each name that contains the letter at least the given number of times, an HTML paragraph should be printed indicating this with the name in bold along with the number of times it contains the letter. For example, if the following query is given, is given, this output is produced:

`q4.php?letter=`**`R`**`&times=`**`2`**

Robert Purple contains 'R' exactly 3 times.

Stuart Reges contains 'R' exactly 2 times.

If no names contain the given character the given number of times, output a message saying so:

`q4.php?letter=`**`x`**`&times=`**`1`**

No name contained 'x' enough times.

If one or both of the required query parameters is not passed, your service must produce an HTTP 400 Invalid Request error. You should also generate an HTTP 400 error if the `letter` parameter is not a one-letter string or if the `times` parameter is not a positive number. (Any `times` value ≤ 0 is invalid and anything else is valid.)

`q4.php?letter=`**`thingy`**`&times=`**`-4`**
`q4.php?letter=`**`t`**
`q4.php?times=7`
`q4.php`

HTTP/1.1 400 Invalid Request

Your code should *not* output a complete HTML page. Output a partial page containing only the paragraphs indicated. Do not use any `print` or `echo` statements in your code.

Write your answer on the next page.

1. **PHP (writing space)**

2. JavaScript/DOM

Write the **JavaScript code** to add behavior to the following page that has a user interface for "blending" a name. The UI allows the user to type his/her name into a text box. The user can click a button to "blend" the name, which causes each character of the name to be individually injected into a `div` with the `id` of `output`. Your code should enable the user to choose a font to use for displaying the characters of the name, which is either Arial, Comic Sans MS, or Times New Roman. The letters of the name will be displayed in the font chosen.

The letters can be positioned differently by choosing one of two radio buttons. If the "Random" button is checked, each letter of the name is positioned randomly with an x-coordinate between 0-300 pixels from the left edge of the `output` area, and a y-coordinate between 0-100 pixels from the top edge of the `output` area. If the "Sequential" button is checked, letters are placed at 15-pixel intervals, with the first at (x=15, y=15) within the `output` area, and the second at (x=30, y=30), the third at (x=45, y=45), and so on. (If there are a lot of letters, they might extend outside of the `output` area, but you don't need to worry about that.)

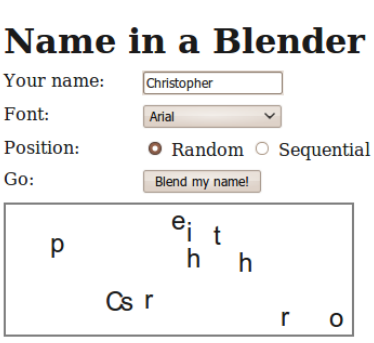
The code should work for multiple clicks of "Blend". On each click it should clear any previously inserted letters.

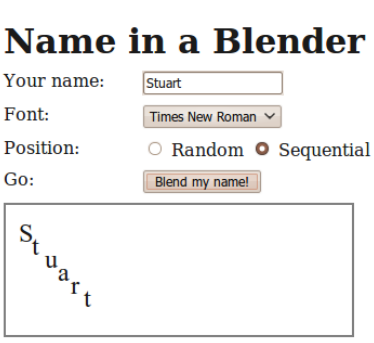
You may assume that Prototype and Scriptaculous are included in the page.

HTML:

```
<h1>Name in a Blender</h1>

<div>
	<span>Your name:</span>
	<input id="yourname" type="text" size="16" />
</div>

<div>
	<span>Font:</span>
	<select id="font">
		<option>Arial</option>
		<option>Comic Sans MS</option>
		<option>Times New Roman</option>
	</select>
</div>

<div>
	<span>Position:</span>
	<input id="random" name="pos" type="radio" value="rand" checked="checked" /> Random
	<input id="sequential" name="pos" type="radio" value="seq" /> Sequential
</div>

<div>
	<span>Go:</span>
	<button id="blend">Blend my name!</button>
</div>

<div id="output"> <!-- your blended characters go here --> </div>
```

These screenshots show the initial state, and after names have been typed and "Blend my name!" has been clicked.





Write your answer on the next page.

2. JavaScript/DOM (additional writing space)

3. Regular Expressions

a) Write a regular expression to match a US zipcode. Zipcodes contain 5 numbers. Sometimes there is a dash after the 5 numbers which is followed by 4 more numbers.

Valid:	Invalid:
`99999`	`abc12345`
`98115`	`123456789`
`67241-1234`	`12345-6`

b) Write a regular expression to match a price. A price always starts with a dollar sign. Any amount of numbers can come before the decimal. Two numbers should always follow the decimal.

Valid:	Invalid:
`$14.99`	`$14`
`$1234567.00`	`$134213.89money`
`$.90`	`$1.1a`

c) Write a regular expression to match a self closing HTML tag. A tag must start with "<" and end with "/>". It must have a name and can have 0, 1 or more properties. You do not need to wory about white space inside the tag.

Valid:	Invalid:
`<img src=”foo.jpg” />`	`</>`
`<img />`	`<img src= />`
`<a href=”foo.html” id=”stuff” />`	

[abc]	A single character of: a, b, or c	.	Any single character
[^abc]	Any single character except: a, b, or c	\s	Any whitespace character
[a-z]	Any single character in the range a-z	\S	Any non-whitespace character
[a-zA-Z]	Any single character in the range a-z or A-Z	\d	Any digit
^	Start of line	\D	Any non-digit
$	End of line	\w	Any word character (letter, number, underscore)
\A	Start of string	\W	Any non-word character
\z	End of string		
(...)	Capture everything enclosed	a+	One or more of a
(a|b)	a or b	a{3}	Exactly 3 of a
a?	Zero or one of a	a{3,}	3 or more of a
a*	Zero or more of a	a{3,6}	Between 3 and 6 of a

4. SQL

Write an SQL query to search the `imdb` database for all directors who have appeared in one of their own movies, playing two or more characters in th same movie. Show only the names of the director, in **alphabetical order** by last name ascending, breaking ties by first name in ascending order. Each director 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
...		

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
...	

movies_genres

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

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

```
+------------+-----------+
| first_name | last_name |
+------------+-----------+
| LeVar      | Burton    |
| Santo      | Cilauro   |
| Claus Theo | Gartner   |
| Tom        | Gleisner  |
| Jane (I)   | Kennedy   |
| Tony (III) | Martin    |
| Bill       | Melendez  |
| Mick (I)   | Molloy    |
| Yves       | Renier    |
| Rob        | Sitch     |
| Jason      | Stephens  |
| James      | Tolkan    |
+------------+-----------+
12 rows in set
```

Note that actor IDs and director IDs are not equal, but you may assume that only one actor and director share the same first/last name. If you join too many tables together that are not needed for the query, you will not receive full credit. You should solve this problem using only the SQL syntax taught in class.