UNIVERSITY OF TORONTO
Faculty of Arts and Science

AUGUST 2016 EXAMINATIONS
CSC309H1Y: Programming on the Web

Duration – 2 hours
No Aids Allowed; Pass Mark: 32/80

This exam is worth 35% of your final mark. Additionally, you must get 32 out of 80 in this final exam to pass this course. This means that if your grade on this exam falls below 40%, your final grade in the course will be capped at 40%. Please answer all questions in the space provided. Good luck!

Last Name	
First Name	
Student Number	
CDF ID	

Marks

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total
4	6	4	8	12	8	10	4	8	7	9	80

Q1. CSS

Observe the way that CSS has been included in the code below.

In main.html:

```
<!doctype html>
<html lang="en">
 <head>
  <style type="text/css">
  main#content {
    border-color: green;
    border-color: blue !important;
  }
  main {
    border-color: yellow;
  }
  </style>
  <meta charset="utf-8">
  <title>CSS</title>
  <link rel=stylesheet
href="assets/css/base.css">
 <body>
  <main id="content" style="border-
color: black;"></main>
 </body>
</html>
```

In base.css:

```
main#content {
  border-style: solid;
  border-width: 3px;
  border-color: red;
}
```

[a] [2 points] What colour does the border of main#content start out being? (What is the first style to be applied?)

[b] [2 points] What colour does the border of main#content end up being? (What is the last style to be applied?)

Q2. Web Graphics [6 points]

List and briefly explain three benefits of using vector graphics in modern web apps.

1.

2.

3.

Q3. Semantic Web [4 points]

What is semantic HTML and why is it important? Provide one semantic example and one equivalent non-semantic counter-example to illustrate the difference between semantic and non-semantic HTML code.

Q4. XML and JSON [8 points]

Translate the JSON document below into an equivalent XML document.

JSON

```
{
   "virtuamons": [
   {
      "id": 148,
      "name": "Codemander",
      "evolvesAt": 15,
      "evolvesTo": 149,
      "type": "digital",
      "moves": [
         "foobar",
         "spaghetticode"
      ],
      "favourite": true
   },
   {
      "id": 149,
      "name": "Codeizard",
      "type": "digital",
      "moves": [
         "foobar",
         "spaghetticode",
         "minify"
      ],
   }]
}
```

Q4. Continued: Your XML code:

```
<?xml version="1.0" encoding="UTF-8"?>
```

Q5. JavaScript + jQuery [12 points]

Carefully review the following code. Circle any errors you see (syntax, scoping, etc.) and provide a possible correction in the right column.

CODE	CORRECTIONS

$(document).start(function()
{
/**
* We love jQuery!
/
var images = [{
"title": Andromeda Galaxy,
"url": "assets/images/space-1.jpg"
}, {
"title": Collection of galaxies,
"url": "assets/images/space-2.jpg"
}];
 	
/ Let's use a list element for the images.
var $slider = $('
', {
id: slider
});
 	
each(image, function(index, item) {
var $li = $(' ', {
style: "left: 120cm",
id: "li-"+i
});
 	
var $img = ('<img/>', {
src: item.link,
alt: item.title
});
 	
$slider.append($li);
$li.append($img);
});
 	
$("section#gallery").appendTo($slider);
 	
};	

Q6. Databases

(a) [4 points] List and briefly explain two reasons why you would choose a relational database management system (RDBMS).

(b) [3 points] Translate the following real-life model into an entity-relationship diagram by drawing it using the established shapes and lines for entities and relationships. Indicate the arity of each relationship.

Real-life Model: Your goal is to model the relationship between students, courses, and instructors. Students have a student ID, first and last names, and a phone number; students are enrolled in at least one course. Each course has a course ID, name, and duration; courses are taught by a single instructor, who could teach many courses. Each instructor has an instructor ID, first and last names, and a phone number.

[c] [1 point] What could be a unique ID for each of the student and instructor?

Student:

Instructor:

Q7. Forms & Validation

[a] [4 points] What are four validation checks you should make for HTML forms?

The next two parts of this question—[b] and [c] on the next page—refer to this code:

```
<form action="/signup" method="...">
  <input type="hidden" name="ipaddress" value="127.0.0.1" required>
  <fieldset>
    <legend>Sign Up</legend>
    <label for="username">Email:</label>
    <input type="email" name="username" required>
    <label for="password">Password:</label>
    <input type="password" name="password" value="foobar" required>
  </fieldset>
  <label for="favewebtech">Favourite Web Technology:</label>
  <select name="favewebtech">
    <option value="jquery" selected>jQuery</option>
    <option value="react">ReactJS</option>
  </select>
  <textarea name="comment" rows="4" cols="40"></textarea>
  <input type="url" name="homepage" placeholder="jquery.com">
  <input type="submit" value="Submit">
</form>
```

[b] [3 points] If the method of the form on the previous page is set to "GET," what URL would be generated if the form is submitted as-is, without additions or alterations?

http://localhost:3000/

[c] [3 points] If the method is set to "POST," what variable names and values are produced upon submission of the form if submitted as-is, without additions or alterations? If empty or null, write "N/A". You may not need to use all rows.

Variable Name	**Variable Value**

Q8. Terms [4 points]
Give a one-sentence definition for each of the following terms:

Packet:

Single Responsibility Principle:

Non-blocking:

AJAX:

Q9. Stateful HTTP [8 points]

List and briefly describe two different ways you can maintain state in a web app given the stateless nature of HTTP. Identify one limitation of each.

Q10. Web Architectures

[a] [4 points] What are the core differences between 3-tier and MVC? Briefly describe.

1.

2.

[b] [3 points] Say that you have a Node.js server using MongoDB and React.js. If you were to take a 3-tier approach, what would the tiers and layers be?

Q11. Security

[a] [5 points] What is SQL injection? Briefly describe with an example. List and briefly describe (a) one method of protecting against it and (b) one method of mitigating it.

[b] [4 point] Briefly describe how public key cryptography works: what is involved and how the process plays out (you can use an example or scenario to explain).

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Total pages = 17 Total marks = 80