Carleton UNIVERSITY

Final
EXAMINATION
FALL 2017

DURATION: 180 Minutes **No. Of Students: 60**

Department Name & Course Number: **Systems and Computer Engineering**
SYSC 4504A: Distributed Network Processing

Course Instructor (s): Thomas Kunz

AUTHORIZED MEMORANDA : Randy Connolly and Ricardo Hoar, Fundamentals of Web Development, 2nd Edition, Pearson 2017, ISBN-10: 0134481267, ISBN-13: 978-0134481265 (or first edition), as book only, no e-book.

Students MUST count the number of pages in this examination question paper before beginning to write, and report any discrepancy to a proctor. This question paper has ____10____pages + cover page = _11__ pages in all.

This examination question paper may not be taken from the examination room.

In addition to this question paper, students require: an examination booklet no
Scantron Sheet no

Name: _____

Student Number: _____

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Exam questions will not be explained, and no hints will be given. If you think that something is unclear or ambiguous, make a reasonable assumption (one that does not contradict the question), write it at the start of the solution, and answer the question. Do not ask questions unless you believe you have found a mistake in the exam paper. If there is a mistake, the correction will be announced to the entire class. If there is no mistake, this will be confirmed, but no additional explanation of the question will be provided.

Question 1: HTML and CSS (10 marks)

HTML should be used for

A. describing the structure of a web page
B. setting the location of data entry boxes in a web form
C. setting the kinds and sizes of fonts you want to use on your web pages
D. all of the above

Answer:

Which of the following is the one false statement?

A. Opening and closing HTML tags are enclosed in “angle brackets”.
B. An HTML tag pair and the enclosed content is called an “element”.
C. In an HTML closing tag the tag name is preceded by a forward slash.
D. HTML tags always come in pairs.

Answer:

Suppose that HTML had a tag called `abcd`. Then the opening tag of an `abcd` element could look like

A. `<ABCD>`
B. `<abcd>`
C. `<AbCd>`
D. any of the above

Answer:

Which of the following elements is not part of the basic structure of every web page?

A. form
B. body
C. title
D. head

Answer:

If you want a style to apply to both the h1 elements and the h2 elements in your document, then in the style rule that you use, those two selectors should appear as

A. h1 h2
B. h1 > h2
C. h1 + h2
D. h1, h2

Answer:

To give the same styles to a number of different elements that are “scattered here and there” on one of your web pages, you should probably use a

A. class selector
B. id selector
C. div element
D. span element

Answer:

True or False:

A table element will generally always contain both `tr` elements and `td` elements.

Answer:

The alt attribute of an `img` tag provides an alternate location for the browser to find an image.

Answer:

The `em` is one of the relative measurement units in CSS.

Answer:

All other things being equal, if two or more styles apply to the same element, the browser will use the first one it sees.

Answer:

Question 2: PHP (10 marks)

The following HTML document allows a user to upload a file to a server. Upon hitting submit, the resource `upload-manager.php` is invoked on the server side. Write `upload-manager.php`, which should complete the following tasks:

1. Be very defensive, checking for things that could have gone wrong or are unexpected when `upload-manager.php`, is invoked. That includes, but is not limited to:
    a. Check whether the file properly uploaded
    b. Enforce the limitations indicated in the submit form
2. Store the uploaded file permanently in a directory called `upload` (which is in the same directory as `upload-manager.php`), using the original (client-side) filename (after checking that no such file exists yet)
3. Return meaningful error messages (simple text is enough, no markup required) in case any errors are discovered in the process. If no error or problem occurred, return a success message such as "Your file was uploaded successfully" or similar.

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>File Upload Form</title>
</head>
<body>
    <form action="upload-manager.php" method="post" enctype="multipart/form-data">
        <h2>Upload File</h2>
        <label for="fileSelect">Filename:</label>
        <input type="file" name="photo" id="fileSelect"
        <input type="submit" name="submit" value="Upload">
        <p><strong>Note:</strong> Only .jpg, .jpeg, .gif, .png formats
          allowed to a max size of 5 MB.</p>
    </form>
</body>
</html>
```

Note: you can use the next page to write down your solution as well…..

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Question 3: SQL (10 marks)

The following SQL commands create a table with information about weather stations and populates the table with three entries:

```
CREATE TABLE STATION
(ID INTEGER PRIMARY KEY,
CITY CHAR(20),
STATE CHAR(2),
LAT_N REAL,
LONG_W REAL);
```

Populate the table STATION with a few rows:

```
INSERT INTO STATION VALUES (13, 'Phoenix', 'AZ', 33, 112);
INSERT INTO STATION VALUES (44, 'Denver', 'CO', 40, 105);
INSERT INTO STATION VALUES (66, 'Caribou', 'ME', 47, 68);
```

Next we also generate a table with weather observations and populate this with some information:

```
CREATE TABLE STATS
(ID INTEGER REFERENCES STATION(ID),
MONTH INTEGER CHECK (MONTH BETWEEN 1 AND 12),
TEMP_F REAL CHECK (TEMP_F BETWEEN -80 AND 150),
RAIN_I REAL CHECK (RAIN_I BETWEEN 0 AND 100),
PRIMARY KEY (ID, MONTH));
```

Populate the table STATS with some statistics for January and July:

```
INSERT INTO STATS VALUES (13, 1, 57.4, 0.31);
INSERT INTO STATS VALUES (13, 7, 91.7, 5.15);
INSERT INTO STATS VALUES (44, 1, 27.3, 0.18);
INSERT INTO STATS VALUES (44, 7, 74.8, 2.11);
INSERT INTO STATS VALUES (66, 1, 6.7, 2.10);
INSERT INTO STATS VALUES (66, 7, 65.8, 4.52);
```

With this simple relational database, write queries and show the resulting output in tabular form that do the following:

1. Select and display all information about Northern weather stations from STATION (Northern latitude > 39.7)
2. Query to look at table STATS, picking up location information by joining with table STATION on the ID column
3. Query to look at the table STATS, ordered by month and greatest rainfall, with columns rearranged in order Month, ID, Rain, Temperature
4. Query to show MAX and MIN temperatures as well as average rainfall for each station.

Note: you can use the next page to write down your answers as well…..

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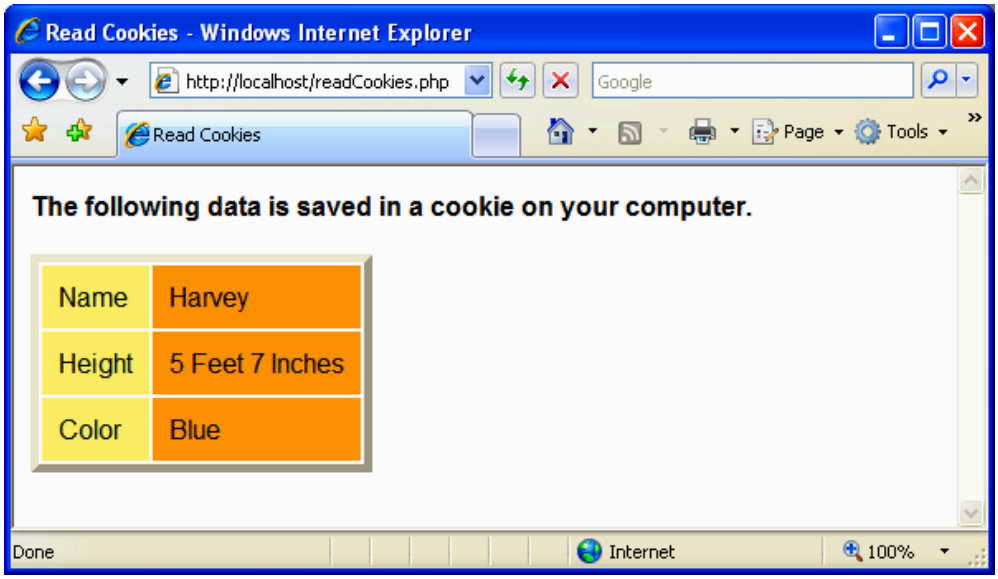
Question 4: State Management (10 marks)

1. Write a PHP program `readCookies.php` that generates a display similar to the one shown below, listing all cookies. Do not worry about the style details.



2. Describe how cookies can be used to store information on a computer and how the information can be retrieved by a PHP script. Assume that cookies are not disabled on the client.

Question 5: Security (10 marks)

1. What is the relationship between the Caesar cipher and the modern RSA cipher?

2. What type of cryptography addresses the problem of agreeing to a secret symmetric key?

3. How are the frequencies of letters in the English language related to cracking a cipher code?

4. What is a cryptographic one-way hash?

5. What does it mean to salt your passwords?

Question 6: XML and Web Services (10 marks)

Assume we have the following XML document:

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

<bookstore>

<book category="cooking">
   <title lang="en">Everyday Italian</title>
   <author>Giada De Laurentiis</author>
   <year>2005</year>
   <price>30.00</price>
</book>

<book category="children">
   <title lang="en">Harry Potter</title>
   <author>J K. Rowling</author>
   <year>2005</year>
   <price>29.99</price>
</book>

<book category="web">
   <title lang="en">XQuery Kick Start</title>
   <author>James McGovern</author>
   <author>Per Bothner</author>
   <author>Kurt Cagle</author>
   <author>James Linn</author>
   <author>Vaidyanathan Nagarajan</author>
   <year>2003</year>
   <price>49.99</price>
</book>

<book category="web">
   <title lang="en">Learning XML</title>
   <author>Erik T. Ray</author>
   <year>2003</year>
   <price>39.95</price>
</book>

</bookstore>
```

Write XPath expressions that will do the following:

1. Select all the title nodes
2. Select the title node of the first book
3. Select all the price nodes
4. Select price nodes with price>35
5. Select title nodes with price>35

Assume we have the XML file on the left, and also the XML style sheet on the right. Draw how the resulting output may be displayed by a browser (do not worry overly much about the styling…..)

```
<?xml version="1.0" encoding="UTF-8"?>
<catalog>
  <cd>
    <title>Empire Burlesque</title>
    <artist>Bob Dylan</artist>
    <country>USA</country>
    <company>Columbia</company>
    <price>10.90</price>
    <year>1985</year>
  </cd>
  <cd>
    <title>Hide your heart</title>
    <artist>Bonnie Tyler</artist>
    <country>UK</country>
    <company>CBS Records</company>
    <price>9.90</price>
    <year>1988</year>
  </cd>
     <title>Eros</title>
    <artist>Eros Ramazzotti</artist>
    <country>EU</country>
    <company>BMG</company>
    <price>9.90</price>
    <year>1997</year>
  </cd>
  <cd>
    <title>One night only</title>
    <artist>Bee Gees</artist>
    <country>UK</country>
    <company>Polydor</company>
    <price>10.90</price>
    <year>1998</year>
  </cd>
</catalog>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
  <html>
  <body>
    <h2>My CD Collection</h2>
    <table border="1">
      <tr bgcolor="#9acd32">
        <th>Title</th>
        <th>Artist</th>
      </tr>
      <tr>
        <td><xsl:value-of select="catalog/cd/title"/></td>
        <td><xsl:value-of select="catalog/cd/artist"/></td>
      </tr>
    </table>
  </body>
  </html>
</xsl:template>
</xsl:stylesheet>
```