

Concordia University – Centre for Continuing Education
Giuseppe Fortino (instructor)

Thursday, April 19th, 2018
9:00 a.m. to noon.
Room FB133

Student full name: _____

Student ID: _____

- You have **3 hours** to complete the exam.
- Please clearly identify your copy right away (see above).
- There are 25 questions on 13 pages.
- This exam is worth 90 points and represents 50% of the final grade for this course.
- The computers and monitors have all been turned off and must remain off for the duration of the exam.
- Please close and stow away any personal computer, tablet, laptop, mobile phone or other electronic device for the duration of the exam.
- No students are allowed in the classroom after 10:30 (midpoint).
- Students are not allowed to leave the classroom before 10:30 (midpoint).

1. What is a singleton? Give a practical example (no PHP code, just a description) of a singleton class. (2 points)

A singleton is a software design pattern that restricts the instantiation of a class to only one object.

A good example of a singleton would be a database connector used throughout an application.

2. What does MVC stand for? What is its purpose? (3 points)

MVC stands for Model-View-Controller.

It is an architectural patterns meant to divide an application into three interconnected parts. The model manages the data, logic and rules of the application. The view is used to output representation of information. The controller converts user input into commands for the model or the view.

3. Name three types of design patterns. (1 point)

Creational, structural and behavioral.

4. Write a jQuery function which sends “*Document loading complete.*” to the console only once the document has completely finished loading. (3 points)

```
$(document).ready(function() {  
    console.log("Document loading complete.");  
});
```

5. Given the code below, what is the value of \$result and why? (3 points)

```
$first = true;  
$second = false;  
$result = $first and $second;
```

\$result will be **true** because the assignment operator (=) has higher precedence than the logical **and** operator, not to be confused with the **&&** operator that has a higher precedence than the assignment operator (=). This is equivalent to adding parentheses as follows:

```
($result = $first) and $second;
```

6. Name three common JavaScript HTML events. (3 points)

Any three of the following : onblur, onchange, onfocus, onselect, onsubmit, onreset, onkeydown, onkeypress, onkeyup, onmouseover, onmouseout, onmousedown, onmouseup, onclick, ondblclick, onload, onunload, onerror, onresize.

7. What happens when we click on the button labeled "Click Me!"? (2 points)

```
<input type="file" id="input1"/>  
<input type="button" value="Click Me!"  
onclick="document.getElementById('input1').click();" />
```

A dialog window is opened to select a file for upload.

8. Describe the content and purpose of these PHP superglobals: (9 points)

`$GLOBALS:`

References all variables available in global scope

`$_SERVER:`

Server and execution environment information

`$_REQUEST:`

An associative array that by default contains `$_GET`, `$_POST` and `$_COOKIE`.

`$_POST:`

HTTP POST variables (normally through form fields)

`$_GET:`

HTTP GET variables (normally as URL parameters)

`$_FILES:`

HTTP File Upload variables

`$_ENV:`

Environment variables.

`$_COOKIE:`

HTTP Cookies.

`$_SESSION:`

Session variables

9. What call must be made in a PHP script before being able to access stored information inside the \$_SESSION superglobal? (1 point)

`session_start();`

10. Draw a diagram representing a database that fulfills the following requirements: (10 points)

users: username, first name, last name, company, email, encrypted password

companies: name, address record, phone number, fax number

addresses: civic number, street line 1, street line 2, province/state, country, postal/zip code

The following constraints and conditions apply:

- username is unique (no duplicates)
- user company is mandatory
- company address is mandatory (there can only be one)
- address street line 2 is optional, all others are mandatory
- company fax number is optional, all other fields are mandatory

```

+-----+
| users                                     |
+-----+
| user_id unique                          |
| username unique                        |
| first_name not null                    |
| last_name not null                     |
+---+ | company_id not null                |
| 1 | email not null                      |
|   | password not null                  |
|   +-----+
|   | companies                           |
| 1 +-----+
+---+ | company_id unique                    |
|   | name not null                      | 1 |
|   | address_id not null                |---+
|   | phone_number not null              |
|   | fax_number null                    |
+-----+

```

```

+-----+
| addresses                               |
+-----+
+---+ | address_id unique                    |
| 1 | civic_number not null                |
|   | street_line_1 not null              |
|   | street_line_2 null                  |
|   | state_province not null             |
|   | country not null                   |
|   | zip_postal_code not null            |
+-----+

```

11. Write an SQL statement which selects all users along with company information and address from the database created in question 10. above. (7 points)

```
SELECT *  
FROM   users, companies, addresses  
WHERE  users.company_id = companies.company_id  
AND    companies.address_id = addresses.address_id
```

or

```
SELECT *  
FROM   users  
JOIN   companies  
      ON users.company_id = companies.company_id  
JOIN   addresses  
      ON companies.address_id = addresses.address_id
```

12. Create classes in PHP which can hold the information returned by the query written in question 11. (7 points)

```
class User {  
    private $user_id, $username, $first_name, $last_name, $company, $email, $password;  
}  
  
class Company {  
    private $company_id, $name, $address, $phone_number, $fax_number;  
}  
  
class Address {  
    private $address_id, $civic_number, $street1, $street2, $state, $county, $zipcode;  
}
```

13. Write the PHP command used to connect to the following database (5 points):

- `$host = 'db.devserver.com';`
- `$port = 3307;`
- `$user = 'devuser';`
- `$pass = '!las8Jf_';`
- `$database = 'project4';`

```
$db = mysqli_connect($host, $user, $pass, $database, $port);
```

14. You been working on a project the whole day and are ready to send your part to the project's repository. Assuming you're working off the **master** branch, list the six (6) commands you should run in GIT to ensure your work is properly saved: (6 points)

```
git status
```

```
git add -A
```

```
git commit -m "Comment related to current commit."
```

```
git fetch origin (git checkout master also accepted due to confusion in question)
```

```
git pull origin master
```

```
git push origin master
```

15. What GIT command let's you know the state of your local files compared to the remote repository? (1 point)

```
git status
```


16. What does **git branch -a** do? (1 point)

Shows all the branches, both local and remote.

17. Assuming you are in **master** branch, how do you create a new **mytask** branch from here and how do you select it as your current working branch? (2 points)

```
git branch mytask  
git checkout mytask
```

or

```
git checkout -b mytask
```

18. What do you need to send in order to have your **mytask** branch reviewed and integrated back into **master** branch? (1 point)

A pull request.

19. Your coworker sends you an SSH link to his repository. What GIT command allows you to download a copy to your local drive? (1 point)

```
git clone [SSH link]
```

20. Given the CSS file located at <https://static.mycompany.com/project4/theme3/styles.css>, write the proper HTML directive to include this file in your document if: (3 points)

Your document is in the same folder as the CSS file:

```
<link rel="stylesheet" type="text/css" href="styles.css">
```

Your document is on the same server as the CSS file but in a different folder:

```
<link rel="stylesheet" type="text/css" href="/project4/theme3/styles.css">
```

Your document is located on a different server entirely:

```
<link rel="stylesheet" type="text/css"  
href="//static.mycompany.com/project4/theme3/styles.css">
```

21. Write a PHP function which splits an “HHMMSS” string into “HH:MM:SS”. For example, “082315” becomes “08:23:15”. (3 points)

```
function StringToTime($str) {  
    $result = "";  
  
    for ($i=0; $i<strlen($str) && $i<6; $i++) {  
        if ($i>0 && $i%2==0) {  
            $result .= ":";  
        }  
        $result .= $str[$i];  
    }  
  
    return $result;  
}
```

22. Write a PHP function which extracts the file name from a URL. For example, “https://www.mysite.com/products/winter/skies.php” would yield “skies.php”. (4 points)

```
function ExtractFile($url) {  
    $parts = explode("/", $url);  
    $parts = array_reverse($parts);  
    return str_replace("/", "", $parts[0]);  
}
```

or

```
function ExtractFile($url) {  
    $parts = explode("/", $url);  
    return array_pop($parts);  
}
```

```
function ExtractFile($url) {  
    $result = "";  
    for ($i=strlen($url)-1; $i>0 && $url[$i] != '/'; $i--) {  
        $result = $url[$i] . $result;  
    }  
    return $result;  
}
```

or any variant yielding the same result.

23. Write a PHP function which returns the factorial of a number using a *for* loop. The factorial of a number is the product of all integers up to and including that number, so the factorial of 4 is $4*3*2*1=24$. (5 points)

```
function factorial($n) {  
    if (!is_numeric($n)) return null;  
    $result = 1;  
    for($i=1; $i<=$n; $i++) {  
        $result *= $i;  
    }  
    return $result;  
}
```

24. What is the output of the following code? (2 points)

```
$original = array( '1','2','3','4','5' );  
echo 'Original array : '. "\n";  
foreach ($original as $x)  
    echo "$x ";  
$inserted = '$';  
array_splice( $original, 3, 0, $inserted );  
echo " \n After inserting '$' the array is : ". "\n";  
foreach ($original as $x)  
    echo "$x ";  
echo "\n";
```

Original array :

1 2 3 4 5

After inserting '\$' the array is :

1 2 3 \$ 4 5

25. Given the following two HTML form fields, write a JavaScript function which counts the number of characters in the textarea field interactively, i.e. as the user types, and displays the result in the *CharCount* div. Rewrite the <textarea> tag to invoke the function using an HTML event. (5 points)

```
<textarea id="SourceText"></textarea>
<div id="CharCount"></div>
```

```
<textarea id="SourceText" onkeypress="CharCount(this);">
```

or

```
<textarea id="SourceText" onchange="CharCount(this);">
```

```
function CharCount(textElement) {
    var placeHolder = document.getElementById('CharCount');
    placeHolder.innerHTML = textElement.value.length();
}
```

