UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2015

IS52031A

Programming for Dynamic Websites

Duration: 1.5 hours

Date and time:

*This paper contains three questions. **You should answer TWO questions.** Full marks will be awarded for complete answers to a total of two questions. Each question carries 25 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.*

There are 50 marks available on this paper.

Electronic calculators must not be programmed prior to the examination. Calculators which display graphics, text or algebraic equations are not allowed.

THIS PAPER MUST NOT BE REMOVED
FROM THE EXAMINATION ROOM

PART B

Question 4.

Question 4 concerns PHP, forms and arrays.

(a)

    i.   What does it mean to say that 'PHP is a server-side scripting language'?

    ii. Name two aspects of dynamic websites that are made simpler by using PHP?

[3 marks]

    iii. Explain the difference between 'For...' and 'While...' control structures in PHP and explain when each is appropriate to be used.

[2 marks]

(b)

Consider this simple array:

```
$list = array ('Alan', 'Bob','Charlie');
```

    i.   Write a statement to append the item 'Dave' to the end of the list

    ii.   Write a statement to assign the element 'Charlie' to the variable $user

[2 marks]

Consider the following multidimensional array;

```
$Books = array(


        'PHP' => array(
                'Title'=>'Programming PHP',
                'Author'=>'Kevin Tatroe, Peter MacIntyre and Rasmus
Lerdorf',
                'Publication Date' => '2013'),
        'Javascript' => array(
                'Title'=>'JavaScript: The Good Parts',
                'Author'=>' Douglas Crockford',
                'Publication Date'=>'2008'),
        'MySQL' => array(
                'Title'=>'MySQL Cookbook',
```

```
            'Author'=>'Paul DuBois',

            'Publication Date'=>'2007'),


    'Networking' => array(

            'Title'=>'Computer Networking: A Top-Down Approach',

            'Author'=>'James F. Kurose and Keith W. Ross',

            'Publication Date'=>'2012')

);
```

iii. Write a statement that assigns the array element containing the author names for the networking book to the variable $networking_authors.

iv. Here is a nested loop that will print out the contents of the array. Find five errors in the code, and rewrite with the errors corrected.

```
foreach ($Books as $category =>book) {

        echo '$category:<br />';
        foreach ($book as $key=$value)  {

                echo "$key: $value<br />"
                echo "<br />";
        }
```

[5 marks]

v. Which php function(s) print an array? When might this be useful?

[2 marks]

(c)

Describe the differences between the GET and POST methods for submitting form data, with particular reference to

i. how data is sent to the server
ii. when it is appropriate to use each method

[5 marks]

iii. Here is the PHP code to create a simple online form:

```
print '
<form action="class.onepageform.php" method="post">
<p>first name: <input type="text" name="firstname" size="20" /></p>
```

```
<p>last name: <input type="text" name="lastname" size="20" /></p>
<p><input type="submit" name="submit" value="submit first & last
name" /></p>
</form>';
```

Write the code necessary for the same PHP script to handle the form submission and print out a greeting using the submitted values for firstname & lastname. Include comments to explain what you are doing.

[6 marks]

Question 5

Question 5 concerns PHP, databases, templates and functions.

(a)

    i.   Draw a labelled diagram to represent the request / response communications between browser, web server, php processor and mysql database when the browser requests a web page containing dynamic content.

[5 marks]

A connection between PHP and a MySQL database can be established in the following way:

```
$dbc = mysqli_connect('A','B','C');
mysqli_select_db($dbc, 'D');
```

    ii. What do the parameters A, B, C and D represent?

[4 marks]

    iii. You have a database query in your PHP script, but it is not working correctly. Describe the ways you would go about debugging it.

[3 marks]

(b)

You are using a form on a web page to modify values stored in database. The initial values are retrieved from the database and stored in $row. The PHP print statement that creates the form is:

```
print '<form action="edit.php" method="post">
    <p><label>title <input type="text" name="title" value="'.
    $row['title'].'" /></label></p>
    <p><label>content <textarea name="content" rows="5"
    cols="30">'.$row['content'].'</textarea></label></p>
    <input type="hidden" name="id" value="' .$row['id']. '" />
    <p><input type="submit" name="submit" value="Edit the text"
    /></p>
    </form>';
```

When the script handles the form submission and modifies the data, it constructs the following query:

```
$query = "LLL entries MMM title='$title', entry='$content' WHERE
entry_id=NNN";
```

    i.   What should replace LLL, MMM and NNN?

<div align="right">[4 marks]</div>

    ii.   What is the purpose of mysqli_real_escape_string($dbc, query) and what does it help to prevent?

<div align="right">[1 mark]</div>

[question continues on the next page]

(c)

Consider the following page, which contains a form generated by PHP.

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4     <title>Erewhon Events</title>
5 </head>
6 <body>
7    <div id="header">
8         <ul id="nav">
9             <li><a href="home.php">Home</a></li>
10            <li><a href="cancellation.php">Cancellations</a></li>
11        </ul>
12    </div>
13    <?
14    print'Select days of the week: <br />';
15    print '<form action="event.php" method="post">';
16    $days =
array("Sunday","Monday","Tuesday","Wednesday","Thursday","Friday","Saturda
y");
17    foreach ($days as $day){
18        print "<input type='checkbox' name='days[]' value='$day' /> $day
<br />";
19    }
20   print '<input type="submit" name="submit" value="submit selection"
/></p>';
21    print '</form>';
22    ?>
23   </div>
24    <div id="footer">
25        <p>Design by Erewhon Ltd &copy; 2015</p>
26    </div>
```

```
27 </body>
28 </html>
```

    i. Referring to line numbers, label parts of the page which could be put in to separate template files.

[2 marks]

   ii. Write a re-usable PHP function to generate the form.

[4 marks]

  iii. Re-write the page using your templates and function.

[2 marks]

Question 6

Question 6 concerns internet protocols

(a)

The Internet Protocol Stack can be usefully described in terms of 4 layers that sit above the physical layer.

    i.   Name these 4 layers and describe their essential function(s).

[8 marks]

    ii.   Why do we need TCP in addition to IP?

[1 mark]

(b)

The network settings for a laptop on the Goldsmiths network includes the following:

address 158.223.59.103

netmask 255.255.0.0 gateway 158.223.2.89

    i.   Which part of the IP address is important when traversing the internet, and why?

[2 marks]

    ii.   What is special about IP addresses of the form 192.168.. ?

How are they used?

[2 marks]

    iii. Why does this traceroute listing *not* show the route of an individual IP packet? Describe what is happening.

```
traceroute google.com

traceroute to google.com (216.58.208.46), 30 hops max, 60 byte

packets

 1  router.gold.ac.uk (158.223.2.89)  1.082 ms  1.059 ms  1.031 ms

 2  192.168.0.1 (192.168.0.1)  0.348 ms  0.335 ms  0.546 ms

 3  gi0-6-0-9.londsh-rbr1.ja.net (146.97.136.237)  1.777 ms  1.762

ms  2.099 ms

 4  be2.londic-rbr1.ja.net (146.97.66.34)  2.107 ms  2.786 ms

2.760 ms
```

```
 5  ae24.londpg-sbr1.ja.net (146.97.37.197)  1.993 ms  1.899 ms
1.881 ms
 6  ae29.londhx-sbr1.ja.net (146.97.33.1)  2.546 ms  2.489 ms
2.459 ms
 7  po1.lond-ban3.ja.net (146.97.35.106)  2.381 ms  2.280 ms  2.235
ms
 8  72.14.196.137 (72.14.196.137)  2.196 ms  2.118 ms  2.093 ms
 9  209.85.246.246 (209.85.246.246)  2.021 ms  2.021 ms  1.982 ms
10  216.239.51.235 (216.239.51.235)  2.199 ms  2.123 ms  2.111 ms
11  lhr08s07-in-f14.1e100.net (216.58.208.46)  2.071 ms  2.049 ms
2.022 ms
```

[3 marks]

(c)

    i.   What information is contained in TCP headers that, when combined with IP addresses, makes a 4-tuple (a combination of 4 numbers) that uniquely identifies the connection between a process on one computer connected to the internet and a process on another?

[2 marks]

    ii.   TCP headers can be examined with a tool called tcpdump. Here is the output of a single packet captured with tcpdump. In this case, what are the 4 numbers referred to above?

```
IP 158.223.59.103.32889 > 159.182.165.92.80: Flags [.], ack
1853349429, win 2641, options [nop,nop,TS val 2377088 ecr
58663145], length 0
```

[2 marks]

    iii.   What's the difference between TCP and UDP? Give an example where UDP is used.

[2 marks]

    iv.   Draw a labelled diagram to show how nameservers are queried when looking up the domain www.hiig.de. Ignore cacheing.

[3 marks]

END OF EXAMINATION