Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]

EXAMINATION FOR: May - June 2024

    MODULE   **:** Server-Side Web Technologies [OUbs033211]

    DATE   **:**

    DURATION   **:** 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **FOUR (4) QUESTIONS**.
2. Answer **ALL** **Questions**.
3. Always start a new question on a fresh page.
4. Total marks: **100**

This question paper contains 4 questions and 7 pages.

ANSWER ALL QUESTIONS

QUESTION 1 [25 MARKS]

a) The World Wide Web (WWW) has become an integral part of modern society, revolutionizing the way people access information, communicate, and conduct business.

    i.   Explain the concept of the World Wide Web.

[2 Marks]

    ii.   Explain how the World Wide Web has changed the way people access information, communicate, and conduct business.

[3 Marks]

    iii.   Identify and discuss **two (2)** challenges associated with the World Wide Web.

[4 Marks]

b) You are developing an ecommerce website called "FashionFusion" that specializes in selling a variety of fashion products online. The site provides users with a platform to browse and purchase a wide range of fashion products, including clothing, shoes, accessories, and more. The website organizes its products into different categories, with each category represented by a folder in the URL structure. Additionally, FashionFusion offers consultancy services in fashion design through a separate subdomain.

    i.   Suggest an appropriate URL for FashionFusion's website for the e-commerce part, that includes the subdomain, domain name, and path to a specific product category.

[2 Marks]

    ii.   Draw a tree diagram showing the hierarchies of the root domain, top level domain, domain name, and subdomains for FashionFusion's ecommerce website. Include labels to identify each part of the DNS hierarchy, including the main website domain and the customer support subdomain.

[6 Marks]

    iii.   Identify and explain 2 key characteristics of domain names and their significance for FashionFusion's ecommerce website. Discuss how these characteristics contribute to identifying and accessing fashion products on the internet.

[8 Marks]

QUESTION 2 [25 MARKS]

a) You are a software engineer tasked with designing a new online banking system for a financial institution. The system needs to handle a large volume of transactions securely while providing a seamless user experience. To achieve this, you decide to implement a three-tier architecture, as shown in figure 1:
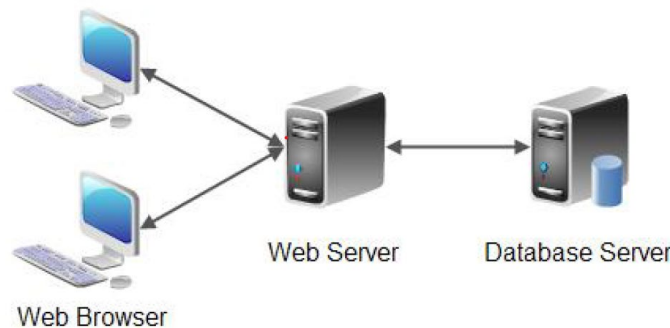

Figure 1: three-tier architecture

    i.   Explain the role of the web browser, web server and database server in the 3-tier client-server architecture.

[6 Marks]

    ii.   Identify and discuss two challenges associated with the client-server architecture in the context of developing the online banking system.

[4 Marks]

b) As part of developing the online banking system for the financial institution, you need to implement validations to ensure data integrity and security. These validations can be performed either at the client side or the server side.

    i.   Give **two (2)** differences between client-side scripting and server-side scripting.

[4 Marks]

    ii.   Discuss where it is more appropriate to use client-side scripting and server-side scripting for validations in the online banking system.

[4 Marks]

    iii.   PHP can be utilized for developing the online banking system on the server-side. Identify and discuss **five (5)** key characteristics of PHP that make it suitable for server-side scripting in this context.

[5 Marks]

    iv.   PHP allows us to create our own customized functions called the user-defined functions. Give **two (2)** rules for creating a user-defined function.

[2 Marks]

QUESTION 3 [25 MARKS]

a) Imagine you are a web developer tasked with building an online shopping platform for a retail company. The platform will allow users to browse products, add items to their shopping cart, and proceed to checkout to make purchases. As part of the development process, you need to implement session management and cookies to enhance user experience and streamline the shopping process.

    i.   Define PHP session.

                  [2 Marks]

    ii.   Explain **two (2)** ways you can use session management for the online shopping platform.

                  [4 Marks]

    iii.   What PHP function is used to start the session?

                  [1 Mark]

    iv.   Define PHP cookies.

                  [2 Marks]

    v.   The syntax setcookie(name, value, expire, path, domain, secure, httponly) is used to set/create cookies in PHP. Discuss any 3 attributes from the setcookie() function, and explain their significance in creating and managing cookies.

                  [6 Marks]

b) Websites and web systems are vulnerable to various types of attacks. Briefly explain the following types of attacks:
    i.   SQL Injection
    ii.   Cross-Site Scripting (XSS)
    iii.   Cookie/Session hijacking
    iv.   Shell Script Upload
    v.   Brute Force/dictionary attack

                  [10 Marks]

QUESTION 4 [25 MARKS]

a) Consider the following PHP code snippets that utilize different types of loops:

Code Snippet 1: For Loop

```php
<?php
for ($i = 1; $i <= 5; $i++) {
    echo $i . " ";
}
?>
```

Code Snippet 2: While Loop

```php
<?php
$num = 1;
while ($num <= 5) {
    echo $num . " ";
    $num++;
}
?>
```

Code Snippet 3: Do-While Loop

```php
<?php
$num = 1;
do {
    echo $num . " ";
    $num++;
} while ($num <= 5);
?>
```

      i.   Briefly explain each type of loop used in the code snippets and describe how they differ in their structure and execution behavior.

[6 Marks]

      ii.   Provide the exact output that would be displayed in the browser or console for each loop.

[3 Marks]

b) Given the following series of if-else statements used to determine the shipping cost based on the weight of a package.

```
if ($weight <= 1) {
    $shippingCost = 5.00;
} elseif ($weight <= 5) {
    $shippingCost = 8.00;
} elseif ($weight <= 10) {
    $shippingCost = 12.00;
} elseif ($weight <= 20) {
    $shippingCost = 18.00;
} else {
    $shippingCost = 25.00;
}
```

Rewrite the above conditional statements using a case statement.

[6 Marks]

c) The following PHP code snippet attempts to establish a connection to a MySQL database:

```php
<?php
$db_host = "localhost";
$db_user = "root";
$db_pass = "pwd";
$db_name = "exam";

$connection = mysqli_connect($db_user, $db_pass, $db_name, $db_host);

if (!$connection) {
    die("Connection failed: " . mysqli_connect_error());
}

echo "Connected successfully";
?>
```

Identify and correct any errors in the code to ensure a successful connection to the MySQL database.

[2 Marks]

d) The following codes were used to create a form to record employee details:

```
<form id="form1" name="form1" method="post" action="employee_reg.php">
        <div>Employee ID: <input type="text" id="emp_id" value=""></div><br>
        <div>Name: <input type="text" id="name" value=""></div><br>
        <div>Address: <input type="text" id="address" value=""></div><br>
        <div>Phone: <input type="text" id="phone" value=""></div><br>
        <div>Department: <input type="text" id="department" value=""></div><br>
        <input id="smt" type="submit" value="Submit">
</form>
```

The database named hr contains a table named employees, with the following fields.
- id
- name
- address
- phone
- department

i. Assuming you have an external file named connect.php located in your site directory, write PHP code for the employee_reg.php file. The file should perform the following tasks:
    - Include the connect.php file to establish a connection to the database.
    - Collect form data submitted by users.
    - Construct an SQL statement to insert the collected form data into the 'employees' table.

[8 Marks]