BSc Degree in Information Technology

Model Paper

IT 251 Advance Web Development

1. The "IT-Piks" is a startup company that had been established 5 years ago, which is now a middle scale company specialized to develop web-based application. Suppose you are given a task in the newly accepted project of online POS System to develop the user dashboard with the relevant requirements. Mention any Full-stack development approach that you would suggest.

   1.1. The company CTO, Project manage and the senior development team had decided to use Node.js and Express as the backend technology. What the main features of node.js that speed up your web applications 'performance?

   1.2. Dependencies are the external modules and packages required for Node.js Applications to function properly. What is the package manager used to install dependencies?

   1.3. List down all the dependencies you need to install in your project to perform authentication and authorization. Briefly explain each of them.

   1.4. How does Node.js handle incoming requests using a callback function and the event loop, and what is the process for handling multiple requests concurrently? Explain using an appropriate diagram and code segments.

   1.5. Discuss MongoDB and Mongoose, and how does Mongoose simplify working with MongoDB in Node.js?

   (40 Marks)

2. PHP is a server-side scripting language used to create dynamic web pages and web applications. It was originally designed for web development but has also been used as a general-purpose programming language. PHP code can be embedded directly into HTML code, or it can be used to generate dynamic content on the server-side.

   2.1. What does "===" operator mean in PHP?

2.2. Write a PHP program to calculate the total of the first ten squared numbers.

2.3. Write a PHP function that has any string value as the parameter and check the count of vowel letters in the given string.

2.4. Write what is the output of the following code segments explain line by line.

```php
<? php

$x = 0;
if ($x == 1){
        if ($x >= 0){
                print "true";
        }else
                print "false";
}

?>
```

2.5. Laravel is an open-source PHP web application framework that follows the MVC architectural pattern and offers elegant syntax, powerful routing, advanced security features, and a vibrant ecosystem of third-party packages. It is widely used for building modern, scalable, and maintainable web applications.

  a)   What is middleware in Laravel and how does it work?

  b)   How can you create custom middleware in Laravel and when would you use it?

  c)   How do you test middleware in a Laravel application?

2.6. Explain the uses of Eloquent ORM and Blade template engine in Laravel.

2.7. Give advantages of following design decisions in Blade templates.

  a) Creating a base layout template for overall site.

  b) Using a separate navigation template.

(30 Marks)

3.

3.1. MVC is a software architecture pattern used to separate the concerns of an application's user interface, business logic, and data model. It divides an application into three interconnected components:

a) How does the MVC architecture separate the concerns of an application's user interface, business logic, and data model?

b) What are the similarities and differences between the MVC, MVP, and MVVM software architecture patterns, and when might one be more suitable than the others?

3.2. "An API provides a standardized way for software components to communicate with each other, regardless of their underlying technology or architecture."

Differentiate between SOAP API and REST API.

(30 Marks)