

University of Rajshahi
Dept. of Computer Science and Engineering
B. Sc. Engineering, Part-3 (Odd Semester) Examination 2023
Course: CSE3131 (Web Engineering)

Time: 3 hours

Full Mark: 52.5

(Answer 3 questions from each Section)

Section -A

1. a) Explain the roles of HTML, CSS and pure JavaScript as frontend website development technologies 3.0
b) What are the differences between client-side JavaScript and server-side JavaScript? 2.75
c) Name few frontend and backend website development technologies. Explain what connects these two aspects of website. 3.0

2. Suppose you are tasked with creating a news website for a leading print newspaper in Bangladesh. The goal is to deploy a significant web application within 6 months, aiming to enhance the newspaper's digital presence, reach a broader audience, and boost overall revenue through subscriptions, advertisements, and sponsored content. To achieve this, you have adopted an incremental development approach, delivering the web application in four increments. Each increment will focus on delivering specific features while maintaining flexibility for feedback and improvement.
After several discussions with stakeholders, you have identified a set of core requirements that align with the newspaper's objectives. You are tasked with breaking these functionalities into increments, scheduling the project timeline, and defining the key user categories that will interact with the website.
a) Use your imagination to come up with a set of functionalities, and then break down these functionalities into each increment. 4
b) Create a macroscopic schedule for the web app based on the increments you have planned. 3
c) Estimate your development budget based on the time and people needed to deliver the web application. 1.75

3. a) What do you understand by 'scalability' in the context of web application? 2
b) How does load balancer work? 3
c) Discuss Weighted Round Robin load balancing algorithm with its pros and cons. 3.75

4. a) File upload features are a common and convenient functionality in web applications, but they can also introduce significant security risks if not properly managed. Attackers often exploit vulnerabilities in this feature to gain unauthorized access or execute malicious actions. Explain how an attacker can exploit a file upload vulnerability to execute arbitrary code on the server and how can we protect against this vulnerability. 5
- b) Websites handle a vast amount of sensitive data, from user credentials to business-critical information. Without proper safeguards, unintended information leaks can occur, compromising security and user trust. What are some common ways a website might unintentionally leak information, and what measures can be taken to prevent such leaks? 3.75

Section -B

5. a) How does SQL injection work? 3.0
- b) List some methods through which SQL statements are injected into vulnerable systems. 3.0
- c) What are the traits in Laravel? 2.75
6. a) In web applications, the flow of data between the client and server is controlled by HTTP requests. This process involves several stages, beginning with the client clicking a hyperlink and ending with the web page being displayed in response. Can you describe the life cycle of an HTTP request from start to finish? 3.5
- b) How can caching improve the performance of a web application? 2.75
- c) Although HTTP is a stateless protocol, how does a web server maintain state and remember a client between requests during communication over the HTTP protocol? 2.5
7. a) Is there any way to automate the process of loading classes in PHP, so you don't have to manually call '*require_once*' or '*include_once*' for each class? Explain. 4
- b) What is the function of a '**Router**' in MVC bases web application? 3
- c) Briefly explain the PSR-4 autoloading standard for PHP. 1.75
8. a) What are the characteristics of a bad website design and how to avoid them? 4
- b) Distinguish between performance testing, load testing and stress testing. 3
- c) What is JSON? Briefly discuss JSON syntax. 1.75

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(Answer 3 questions from each Section)

Section -A

- | | | |
|----|---|------|
| 1. | a) What are the different types of web-based systems? Provide examples for each. | 3.5 |
| | b) What are the unique characteristics that separates web applications from other software applications? | 4 |
| | c) What do you understand by semantic web? | 1.25 |
| 2. | a) What is a web engineering process framework? Discuss different components of this process framework. | 3 |
| | b) What is the importance of ‘communication activity’ in defining the overall web application requirements? | 3 |
| | c) Construct a use case scenario for ‘User Login’ functionality for a web application. | 2.75 |
| 3. | a) Discuss various categories of risks that can delay/hamper the development of a web app. | 3 |
| | b) How can you evaluate those risks and prepare for them? | 3 |
| | c) Discuss the technique of developing a schedule for a web application. | 2.75 |
| 4. | a) Changes are inevitable during different stages of web app development. How would you address those changes in a systematic way? | 2.75 |
| | b) Why modeling is necessary? | 1 |
| | c) Suppose you are developing a web-based system for a company named “SafeHome” that sells security products and surveillance service. Using their web app user will be able to access cameras installed in their home from internet and check for any possible break-in. Draw a UML sequence diagram for the use-case – ‘Access camera surveillance via the Internet.’ | 5 |

Section -B

- | | | |
|----|---|------|
| 5. | a) What are the three components of the MVC architecture, and what is the role of each component? | 4.5 |
| | b) How does a router interact with a controller in a MVC web application? | 3 |
| | c) What is Object-Relational Mapping (ORM)? How it is done in Laravel MVC Framework? | 1.25 |

6. a) Explain how hacker can perform SQL injection attack on a website. How we can protect against this attack? 4
- b) Discuss how insecure handling of file upload can leads to your web application getting hacked. How can you protect that? 4.75
7. a) What is PDO? Distinguish between **query** and **exec** method in PDO. 2.5
- b) Suppose you have access to a remote database server with the following information 5

DB Server Address	192.168.31.108
DB User Name	cse user
DB Password	cse@123
User's database	books db

Design a book title search form and implement server-side logic to search for books in the *books* table (id, isbn, title, author, price, stock) using a partial author name as input, and display the results on a webpage

- c) What is a Cookie? How you can access the cookie in PHP? 1.25
8. a) What is the front-end of a web application, and what technologies are commonly used to develop it? 3.5
- b) What do you understand by REST API? 2.5
- c) Discuss the role of client-side scripting in building web application. 2.75



University of Rajshahi
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.Sc. Engineering Part IV Even Semester Exam-2021
Course Code: CSE4221 Course Title: Web Engineering

Time: 3 Hours

Full Marks: 52.50

SECTION A
ANSWER ANY THREE OF THE FOLLOWINGS

- 1.(a) What are the different types of web-based systems? Provide examples for each. [4.00]
(b) What agility principles are adopted by a good Web Engineering Team? [4.75]
- 2.(a) Emphasize the importance of communication activity in WebbE process. What technique is used for communication with the stakeholders? [2+3]
(b) Discuss 'use case diagram' as web app analysis tools. [3.75]
- 3.(a) Define composer. [2.75]
(b) Explain important directories used in a common Laravel application. [3.00]
(c) What are named Routes in Larevel? [3.00]
- 4.(a) How does `spl_autoload_register` allow for more flexibility and customization in autoloading classes than `_autoload`? [3.00]
(b) What is trait in PHP, and how is it different from a class or interface? [4.00]
(c) What is the difference between `require()` and `require_once()` function? [1.75]

SECTION B
ANSWER ANY THREE OF THE FOLLOWINGS

- 5.(a) Why testing is necessary for web application? [3.00]
(b) How does Integration test differ from Acceptance test? [3.00]
(c) Briefly explain the idea of 'code coverage'. ~~**~~ [2.75]
- 6.(a) What are the three components of the MVC architecture, and what is the role of each component? [4.50]
(b) How does a router interact with a controller in a MVC web application? [3.00]
(c) What is Object-Relational Mapping (ORM)? How it is done in Laravel MVC Framework? [1.25]
- 7.(a) What are the advantages of using prepared statements in PDO? Rewrite the code below so that it uses PDO prepare statement.
\$db = new PDO(...);
\$author = 'Adam Smith';
\$row = \$db->query("SELECT * FROM book where author ='". \$author ."'); [2+3]
(b) What is the possible use-case for anonymous function? [1.75]
(c) Explain how composer is used for dependency management in PHP? [2.00]
- 8.(a) List out common artisan commands used in Laravel. [3.00]
(b) State the difference between get and post method. [3.00]
(c) Why are migrations important? [2.75]

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. Engineering Part IV Even Semester Examination 2020
Course Code: CSE 4221
Course Title: Web Engineering

Full Marks: 52.5

Time: 3 Hours

[Answer any SIX (06) questions taking THREE (03) from each section]

Section A

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|-------|---|------|
| 1. a) | What is a Web App? Discuss how Web Apps are different from traditional software? | 4.00 |
| b) | Briefly discuss various categories of web applications. | 4.75 |
| 2. a) | What do you understand by web engineering? | 1.25 |
| b) | Discuss the generic activities that are the parts of a Web Engineering framework. | 4.00 |
| c) | What tasks are required to develop an increment plan for Web Apps? | 3.50 |
| 3. a) | Discuss the life cycle of a http request. | 3.50 |
| b) | How a web server remembers a web client between requests? | 2.50 |
| c) | Explain different ways of including CSS to a HTML page. | 2.75 |
| 4. a) | Mention some benefits of OOP in the context of web application development. | 2.75 |
| b) | Write a very simple class in PHP programming language, with one private variable and its setter and getter functions. Also, give an example of using the class. | 1.50 |
| c) | What does it mean to autoload classes in PHP? Explain the concepts of inheritance, interfaces and traits in the context of OOP in PHP. | 4.50 |

Section B

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|-------|---|--------|
| 5. a) | Discuss the various reasons you need to test for developing Web App. | 3.00 |
| b) | Explain the AEIOU principles of application testing. | 2.75 |
| c) | What types of tests are performed during the lifecycle of a Web App. Discuss. | 3.00 |
| 6. a) | Compare among MySQL, MySQLi and PDO extensions of PHP for interacting with databases. | 3.00 |
| b) | When is the right time to start designing the database in web application development process? Why do you think so? | 3.00 |
| c) | What is the MVC design pattern? Why some of the most popular web application development frameworks use MVC? | 2.75 |
| 7. a) | For communicating with various RDBMS, what APIs are available in PHP? Discuss advantages and disadvantages of them. | 5.00 |
| b) | How query() and exec() methods differ in PDO? | 2.00 |
| c) | What is composer? Explain the basic structure of a composer.json file. | 1.75 |
| 8. a) | Discuss how the following attacks are performed on an <u>insecure Web App</u> and how can we protect against those attacks: | 2.25×3 |
| | (i) <u>SQL Injection</u> | |
| | (ii) <u>File upload attack</u> | |
| | (iii) <u>Cross-site request forgery</u> | |
| b) | What measure should you take to secure your website? | 2.00 |