Sample

00220

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc.(IT) DEGREE PROGRAMME – LEVEL 03
DEPARTMENT OF COMPUTER SCIENCE
ITU3201 – WEB DEVELOPMENT
FINAL EXAMINATION– 2023/2024
DURATION: **TWO HOURS ONLY** (2 HOURS)

Date: 12.12.2024 **Time: 09.30 a.m. – 11.30 a.m.**

ANSWER **FOUR (04)** QUESTIONS **ONLY**

QUESTION 01 – 25 Marks

1.1. What is a computer network, and what are its uses?

1.2. What is an IP address, and what is DNS?

1.3. What are web servers and clients?

1.4. How does web server-client communication work?

1.5. What is the difference between a domain name and a URL?

QUESTION 02 – 25 Marks

2.1. Why is HTML important for web development?

2.2. What are HTML tags and elements?

2.3. What are HTML attributes of an element?

2.4. What is the id attribute, and why is it important?

2.5. What is the difference between block-level and inline elements?

QUESTION 03 – 25 Marks

3.1. What is CSS ?

3.2. What is inline CSS?

3.3. What are CSS selectors?

3.4. What are the advantages of using external CSS?

3.5. How can you style link states with CSS?

QUESTION 04 – 25 Marks

4.1. What is dynamic content and how does JavaScript contribute to it?

4.2. How does the id attribute work in HTML and how can it be used with JavaScript?

4.3. What is external JavaScript and why is it used?

4.4. What are some example uses of JavaScript in web development (e.g., tabs, sliders)?

4.5. How does server-client communication work for AJAX requests?

QUESTION 05 – 25 Marks

5.1. What are server-side scripting languages?

5.2. What is the difference between Dynamic Content and Static Content?

5.3. How is a Database involved in Dynamic Websites?

5.4. How do server-side scripting languages interact with databases?

5.5. What are the disadvantages of database intervention in web development?

QUESTION 06 – 25 Marks

6.1. How to add comments in HTML?

6.2. What is the usage of comments in web development?

6.3. What is web hosting?

6.4. What is shared hosting and VPS hosting?

6.5. Why is a domain name important?

THE OPEN UNIVERSITY OF SRI LANKA

DEPARTMENT OF COMPUTER SCIENCE

B.Sc. DEGREE PROGRAMME 2024/2025

FINAL EXAMINATION **CSU5302: WEB TECHNOLOGIES**

DURATION: **TWO HOURS ONLY (2 HOURS)**

6th December 2024 **Time: 2.00 p.m. to 4.00 p.m.**

Answer **FOUR** Questions **ONLY**.

All questions carry equal marks.

Q1). In the banking sector, effective web design integrates security, usability, and accessibility to create a reliable, user-centred digital experience that aligns with the high expectations of modern customers.

i. Identify and briefly explain two (2) advantages of implementing a client-server model for the IT system of a bank.

ii. Identify four (4) specific drawbacks of implementing a client-server model.

iii. Discuss the common web design aspects for the IT system of a bank.

iv. Identify email protocols are suitable for banks' staff communication? Provide a brief description of each.

v. Describe what Thick client, Thin Client and Rich Client are.

Q2). While most client-side scripting languages shape the layout of web pages, PHP is a server-side scripting language that serves as a powerful tool for building dynamic and interactive web content.

i. List five (5) important factors to be considered on design of a website.

ii. Identify and explain three methods for applying CSS to HTML documents in web design, highlighting the advantages of each approach.

iii. Briefly explain five (5) purposes of CSS in web design and development.

iv. Evaluate the strengths and limitations of using PHP for developing dynamic web applications and provide examples to support your evaluation.

v. Identify two other types of loops in PHP, apart from the 'do while' loop, and compare their structures.

Q3). Although web hosting and Search Engines serve different purposes, they are interconnected.

i. List the steps involved in hosting a web application.

ii. Briefly explain what a shared server.

iii. Briefly explain how Search Engines recommend/list the website when a person searches for an item.

iv. Analyse five (5) effective methods for improving a website's ranking on Search Engines.

v. Discuss five (5) key areas of future research in Search Engines and their potential impact.

Q4). XML is more powerful than HTML for data representation. By allowing users to define their own tags, XML enables the creation of a customized markup language tailored to specific problem sets.

i. Explain briefly how XML can be used to store and organize book inventory data, including an example of how the data might be structured using XML tags for attributes like book title, author, ISBN, price, and quantity.
ii. Define and briefly explain three advantages of using XML in web applications.
iii. Identify five (5) XML-based technologies widely used in internet.
iv. Briefly explain three (3) main advantages of using web services in application development.
v. Analyse the differences and similarities between WAMP server and XAMPP server.

Q5). Ensuring web security is an essential aspect of developing web applications.

i. Briefly define web security risk, highlighting its impact on both users and the organization.
ii. Identify and explain the key differences between known and unknown web security vulnerabilities in terms of detection methods and prevention strategies.
iii. Explain why it is crucial for web developers to continuously update their knowledge of web security, providing two key reasons.
iv. What are five common best practices that help developers create efficient, secure, and user-friendly web applications?
v. Briefly describe three (3) common best practices mentioned in the previous question.

Q6). Smartphones and other mobile devices now dominate internet usage, prompting continuous advancements in markup and scripting languages to enhance their capabilities.

i. Define three (3) key differences between desktop and mobile platforms.
ii. Identify and explain one design consideration and one development consideration that are important for creating mobile-compatible websites.
iii. Is it possible to browse a website designed for desktop computers on a smartphone or other mobile device? Provide two (2) reasons to justify your answer.
iv. Explain the significance of HTML5 in enhancing the mobile user experience by providing two (2) features.
v. Briefly describe three (3) important ways CSS contributes to mobile web design and development, improving the user experience on mobile devices.

Sample

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. (IT) DEGREE PROGRAMME 2023/2024
LEVEL 03
ISU3300 – FUNDAMENTALS OF INFORMATION SYSTEMS
FINAL EXAMINATION
DURATION: TWO HOURS ONLY (02 HOURS)

Date: 07.12.2024 **Time: 09.30 a.m. - 11.30 a.m.**

General Instructions.

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **06** questions on **02** pages.
3. Answer any **04** questions only. All questions carry equal marks.
4. The answer for each question should commence from a new page.
5. Involvement in any activity that is considered an exam offense will lead to punishment.
6. Use blue or black ink to answer the questions.
7. Clearly state your index number in your answer script.

Q1.

a) Define the term "Information System". [04 Marks]
b) Provide four (04) examples of quantitative data. [04 Marks]
c) Briefly explain two (02) types of knowledge. [05 Marks]
d) Briefly discuss two (02) disadvantages of computer-based information systems. [06 Marks]
e) Differentiate between data and information using three (03) aspects. [06 Marks]

[Total 25 Marks]

Q2.

a) Briefly explain the following two (02) strategies for competitive advantage.
   i. Cost Leadership
   ii. Differentiation [04 Marks]
b) Briefly explain Porter's five (05) competitive forces. [08 Marks]
c) Briefly explain the term "extranet" and mention two (02) disadvantages of it. [06 Marks]
d) What is e-commerce? Mention four main types of e-commerce. [07 Marks]

[Total 25 Marks]

Q3.

a) Briefly explain the following steps of the order fulfillment process.
   i. Order confirmation
   ii. Billing
   iii. Return [06 Marks]

b) Briefly explain two (02) advantages and two (02) challenges due to the globalization of companies. [08 Marks]

c) State the three (03) levels of management and provide an example of an information system used at each level. [06 Marks]

d) Explain what a decentralized organizational structure is and provide two (02) examples. [05 Marks]

[Total 25 Marks]

Q4.

a) Define the term "Value Chain". [03 Marks]

b) What is the role of support activities in Porter's value chain analysis? [02 Marks]

c) Briefly explain "outsourcing" and provide two (02) benefits of outsourcing. [06 Marks]

d) List three (03) challenges of downsizing. [06 Marks]

e) How many components are there in the primary activities of Porter's value chain analysis? Briefly discuss each component. [08 Marks]

[Total 25 Marks]

Q5.

a) State four (04) SDLC models other than Waterfall and Prototype models. [04 Marks]

b) What are the seven (07) stages of the Waterfall model? [07 Marks]

c) Mention three (03) advantages of the Prototype model. [06 Marks]

d) What is Supply Chain Management? [03 Marks]

e) Briefly discuss two (02) benefits for organizations of maintaining ethical practices in supply chain management. [05 Marks]

[Total 25 Marks]

Q6.

a) Define the term "Visual Analytics". [03 Marks]

b) Mention two (02) benefits of using dashboards. [04 Marks]

c) Briefly explain the following careers in the field of information systems.
   i. Network Architect
   ii. Software Engineer [06 Marks]

d) Briefly explain the following computer attacks:
   i. Ransomware
   ii. Trojan Horses
   iii. Viruses [12 Marks]

[Total 25 Marks]

Sample

00161

The Open University of Sri Lanka
B.Sc. (IT) Degree Programme - 2023/2024
Department of Computer Science
Level 3
COU3306 – Data Structures and Algorithms
Final Examination – 2023/2024
Duration: Two hours only (2 hours)

Date: 16.12.2024 **Time: 9.30 a.m. – 11.30 a.m.**

There are six (06) questions on the paper and answer **FOUR (04)** questions **ONLY**.

Question 01

1) Distinguish between the following concepts.
   (a) The Big-Oh, Big-Omega and Big-Theta notations used in algorithm analysis
   (b) Linear and Non-linear data structures
   (c) Array List and Linked List in Java

[7 marks]

2) The following Java method is used to perform an operation on a data structure.

```
public void function(Node x) {
     if (head == null || x == null) {
          return;
     }
     if (head == x) {
          head = x.next;
     }
     if (x.next != null) {
          x.next.prev = x.prev;
     }
     if (dxel.prev != null) {
          x.prev.next = x.next;
     }
}
```

Answer the following questions.
   (a) Identify and write the data structure this method belongs to.
   (b) Which type of implementation is used to create the data structure mentioned in (a)?
   (c) What type of operation is performed using the above method?

[3 marks]

3) Perform the following operations on a binary search tree.
   (a) Construct a binary search tree for the following set of integers.

       12, 08, 06, 07, 14, 20, 04, 18, 30, 10

   (b) Provide the output when you traverse the constructed binary search tree in the following orders?
       (i) Pre-Order
       (ii) In-Order
       (iii)Post-Order

   (c) Determine the depth of the constructed binary search tree.

   (d) Identify the non-leaf nodes with a single child in the constructed binary search tree?

[12 marks]

4) Answer the following questions related to memory management in Java.
   (a) Describe garbage collection.
   (b) Analyze the memory allocation process performed by the JVM when the following statement is executed

```
Stack myStack = new Stack();
```

[3 marks]

Question 02

1) Write Java code to perform the following tasks.
   (a) Define a data structure to implement a **queue**. The structure should contain:

       i. Variables to store the **front** and **rear** positions of the queue.
       ii. An **array** to hold numeric data of elements of type int in the queue.

   (b) Declare a queue named `myQueue` using the structure defined in (a).

   (c) Write a Java method to delete a data item from `myQueue`. Use `int deleteQueue()` as the method name. Include a check for queue underflow before deleting an item.

   (d) Write a Java method to insert a data item into `myQueue`. Use `void insert(int x)` as the method name. Include a check for queue overflow before inserting an item.

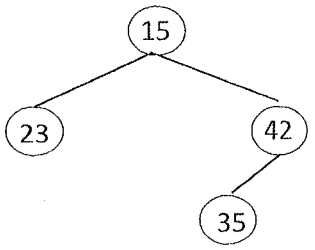
[11 marks]

2) Describe the following terms with respect to graph data structure.
   (a) Adjacent Vertices
   (b) Path
   (c) Cycle
   (d) Degree of a vertex

[4 marks]

3) Answer the following questions on AVL trees
   (a) the AVL condition.

   (b) Insert the value 33 into the AVL Tree given below and show all steps.



[6 marks]

4) Trace the output of the following recursive method when the value 6 is passed as the parameter. Show all steps.

```
int factorial(int n){
      if (n == 0){
            return 1;
      } else{
            return n * factorial(n-1);
      }
}
```

[4 marks]

Question 03

1) Answer the following questions about external sorting.
   (a) What is external sorting and why do we need external sorting algorithm?
   (b) State the two types of external sorting algorithms.

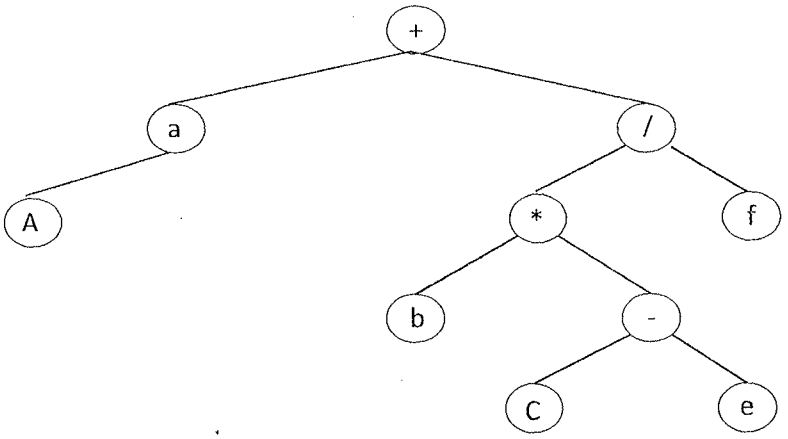
[9 marks]

2) Using an initially empty hash table with **5 slots**, and with the hash function `h(x) = x mod 5`, resolve collisions using **chaining**. Insert the following sequence of keys into the table and draw the resulting hash table.
   35, 2, 18, 6, 3, 10, 8, 5

[7 marks]

3) Consider the following arithmetic expression and its binary tree representation.

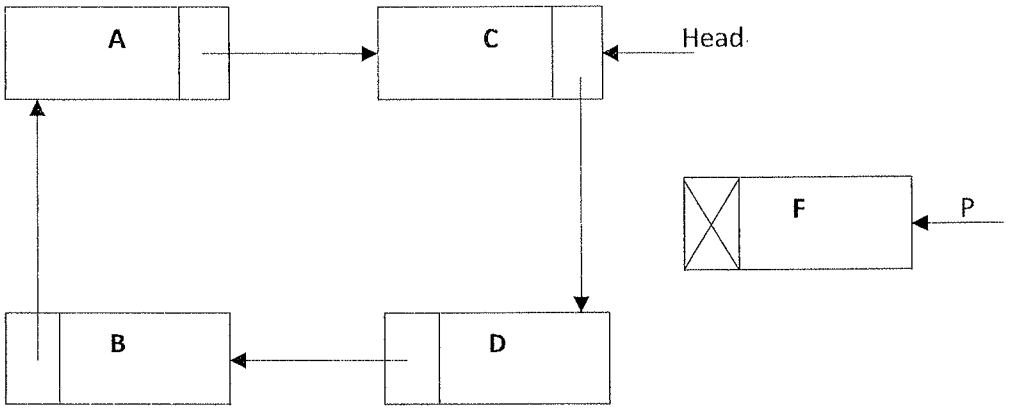
a + ((b*(c-e))/f



(a) Write the prefix form of the expression.
(b) Write the postfix form of the expression.

[4 marks]

4) The diagram below represents a circular linked list. Write a java method to add the new node, pointed by P at the beginning of the list.



[5 marks]

Question 04

1) A librarian has consulted you to develop a system for managing a collection of returned books. The books are arranged on a single counter, and the librarian always processes the most recently returned book first.
   (a) What data structure would you recommend for this implementation?
   (b) Justify your answer.

[3 marks]

2)

(a) State and briefly explain the two types of algorithm complexities.

(b) Consider the following algorithm.

```
j = n;
while (j >= 1){
      for I = 1 to n
            x = x + 1;
      j = j / 2;
}
```

Write the asymptotic notation for the number of times that the statement `x = x + 1` is executed.

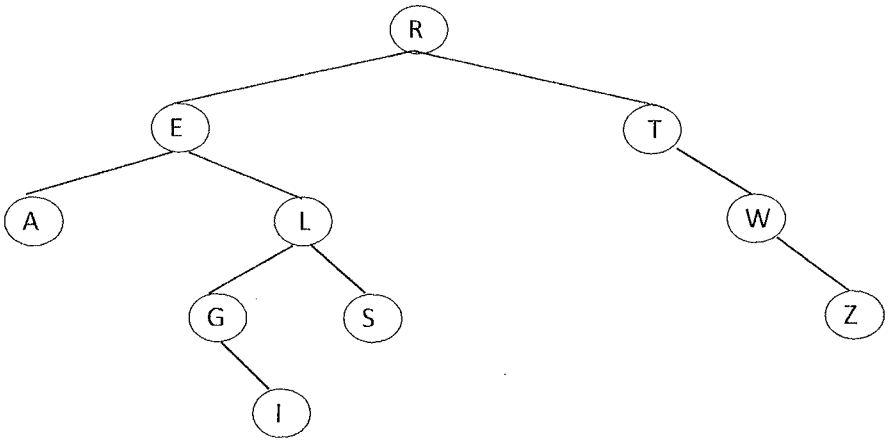
[4 marks]

3)

(a) Briefly explain what a binary search tree (BST) is, listing its properties.

(b) Is the following binary tree a BST?

(c) Justify your answer.



[5 marks]

4) Quicksort is a sorting algorithm that divides the given array into two parts based on a chosen value and then sorts each part separately using repeated calls to the sorting process.

(a) Explain what the pivot is.

(b) Briefly describe input and output parameters of the `quicksort()` method.

(c) Graphically show the steps of sorting the following dataset by using the quick sort algorithm.

10	7	2	9	1	5

(d) Analyze the worst-case behavior of quicksort and discuss possible ways of improving it.

[13 marks]

Question 05

1) For each of the following methods used to design algorithms, provide:
   (a) An example of a problem that can be solved using each method.
   (b) An example of an algorithm that uses each method to solve the problem mentioned in (a).

   i. Divide and conquer
   ii. Breadth-first search
   iii. Greedy algorithms
   iv. Dynamic programming

[8 marks]

2) The adjacency matrix of a directed graph is given below.

	A	B	C	D	E	F
A	0	1	0	0	0	0
B	0	0	1	0	1	0
C	0	0	0	1	0	0
D	1	1	0	0	0	0
E	0	0	0	0	0	1
F	0	1	0	0	0	0

   (a) Draw the directed graph that corresponds to the above given adjacency matrix.
   (b) Write down the edges in the graph.
   (c) State, with reasons, whether the graph you have drawn is **strongly connected** or **weakly connected**.

[5 marks]

3) State whether the following statements are true or false.
   (a) The running time of the `treeSearch` algorithm is $O(n)$, where n is the number of nodes in the binary search tree.
   (b) The successor of a node in a binary search tree can be found using its right subtree.
   (c) A sorted array can be obtained from a binary search tree by performing an inorder traversal.
   (d) In Red-Black trees all leaves are red.
   (e) An extended binary tree is a special type of binary tree where each node has either 0 or 2 children.

[5 marks]

4)

(a) Write a Java method to implement the bubble sort. Use the following method signature.

```
void bubbleSort(int data[], int n){}
```

where 'data[]' array has the elements to be sorted and 'n' gives the number of elements

(b) What is the running time of bubble sort in the worst-case scenario? Use Big O notation.

[7 marks]

Question 06

1) If we want to create a binary tree whose nodes contain integer values, we can represent the nodes using instances of the following Java class.

```
/** binary tree node with integer node values */
public class Node {
    public int value; // value contained in this node
    public Node left; // left subtree
    public Node right; // right subtree
}
```

Complete the definition of the following method so it returns the **sum of the values** contained in nodes of the binary tree with root n. Use recursion to answer this question.

```
/* Return the sum of the values in a binary tree with
root n */

 public int sum(Node n) {

    // Complete the method here

}
```

[6 marks]

2)

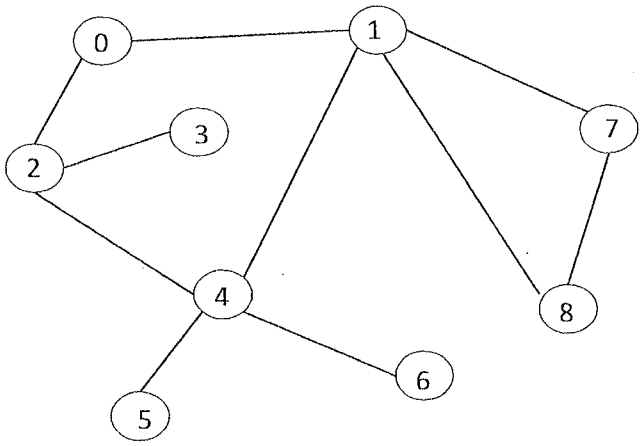
(a) What is the running time of the merge sort in the worst-case scenario? Use Big O notation.

(b) Graphically show the steps of sorting the following dataset by using the merge sort algorithm.

37	28	42	4	8	80	10

[8 marks]

3) For the following graph, use 0 as the starting node and determine the order in which the vertices are visited for:
   (a) Depth-First Traversal
   (b) Breadth-First Traversal



[5 marks]

4) Consider the following scenario.

"Input/output buffer is an area of a computer memory used to temporarily store data and instructions transferred into and out of a computer, permitting several such transfers to take place simultaneously with processing of data. Instructions are processed according to the arrival time, and they are executed one by one."

   (a) Which of the studied data structures would be most appropriate for the following task?
   (b) Briefly explain your answer.

[6 marks]