LLJ II Assessment – School of Computing (8 marks)

Higher Order Thinking Skills (HOTS) Based Multiple Choice Questions (MCQs) (3 marks)

Date of Assessment (28.10.2024 - Day Order 2)

Conduct an assessment with 15 HOTS-based MCQs in **Data Structures and Algorithms** provides a comprehensive way to evaluate students' higher-order thinking skills This assessment should focus on challenging students to think critically and make decisions based on their understanding of core concepts in Data Structures and Algorithms and to assess students' in-depth understanding of the subject, with an emphasis on their ability to apply, analyze, and evaluate practical and complex scenarios.

The questions should be designed to assess more than just memorization of definitions; they aim to evaluate the students' ability to apply theoretical concepts, conduct in-depth analysis, and critically evaluate different approaches in complex scenarios ensuring thorough understanding of the subject using core principles.

General Instructions to be given to the students

1. **Number of Questions**: The assessment consists of **15 multiple-choice questions (MCQs)**.
2. **Time Duration**: You will have **30 minutes** to complete the assessment.
3. **Marks**: Each question carries **1 mark**. The total marks for the assessment are **15 marks**.
4. **Question Difficulty**: The questions vary in difficulty:
    - **5 easy questions** for testing fundamental concepts.
    - **7 medium questions** focusing on the application and analysis of concepts.
    - **3 difficult questions** requiring evaluation of multiple concepts.

Topic Coverage

To ensure a balanced assessment, the 15 questions should cover the following topics:

1. **Basic Data Structures** (Arrays, Linked Lists, Stacks, Queues, Heaps)
2. **Trees and Graphs** (Binary Trees, Binary Search Trees, AVL Trees, Graph Traversal Algorithms)
3. **Algorithmic Complexity** (Time and Space Analysis)
4. **Advanced Data Structures** (B-Trees)

Conceptual Solutions Task in Data Structures and Algorithms (3 marks)

A Conceptual Solutions Task in Data Structures and Algorithms focuses on testing a student's ability to apply their knowledge and understanding of core concepts to solve problems. These tasks often require not just implementing algorithms but also selecting the appropriate data structure or method for a given problem based on various constraints, such as time and space complexity.

The emphasis is on understanding the fundamental characteristics of data structures, such as their operational efficiency and suitability for specific tasks.

Mode of Evaluation: The Problem can be selected by the concerned student, or a set of problems can be floated by the concerned faculty by fixing the deadline for submission of the solution. During Evaluation, the following points can be considered

1. Problem Understanding

- The task typically begins by representing a problem that can be solved using core data structures.

2. Data Structure Selection

- Based on the problem's requirements, students must choose the most appropriate core data structures

3. Operations on Data Structures

- Once the data structure is chosen, students need to describe how to perform the necessary operations efficiently.

4. Efficiency and Justification

- Students should analyze the time and space complexity of the operations within the context of the problem.
- They need to justify why a particular data structure is the best choice based on the problem's constraints and required operations.

Student's Portfolio (2 marks)

The Student Portfolio for Data Structures and Algorithms is a comprehensive and detailed compilation that showcases a student's understanding and practical application of key concepts within the field. It serves as a reflection of the student's learning journey and experience, emphasizing the skills acquired and the problem-solving ability throughout the course.