



**Daffodil International University**  
**Department of Computer Science and Engineering**  
**Faculty of Science & Information Technology**  
**Midterm Examination, Spring 2024**  
**Course Code: CSE123, Course Title: Data Structures**  
**Level:1 Term:2 Batch: ALL**

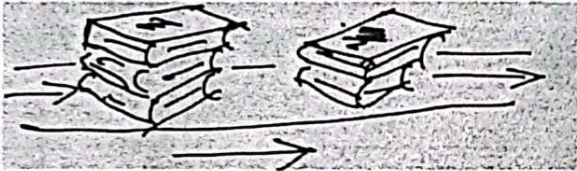
Time: 1.5 Hours

Marks: 25

**Answer ALL Questions**

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                               |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1 | <p>Consider the following figure of a doubly link list:</p> <p>The Node shown above has data of type integer and prev and next as pointer of the same type.</p> <p><b>Answer the following questions:</b></p> <p>(A) Define the node and write required code to implement the scheme shown in the above figure.</p> <p>(B) Suppose a new node having data 11 is to be inserted after the node having "7". Draw the connection scheme for the new node and write the required code to insert in this doubly link list shown.</p> <p>(C) Suppose you need to delete the node having data 11. Show the deletion operation with required code.</p> <p>(D) Why doubly link list is useful for computing.</p> | <p>4 → 4<br/>3 → 3<br/>3 → 3<br/>2 → 2</p> <p>CO2<br/>CO2<br/>CO2<br/>CO1</p> |
| 2 | <p>Consider the following figure of two link list <i>lst1</i> and <i>lst2</i>:</p> <p>Write required code using C language to join this two list to make a third list named <i>lst3</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>3 → 3</p> <p>CO2</p>                                                       |

|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |            |
|---|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|
| 3 | (A) | Consider the following infix expressions:<br><br><div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> a) <math>2^2 + 6 / 3 - 2 * 3</math><br/> b) <math>4 / 2 - 3 + 2 * 4</math> </div> <p>(A) Convert the above infix expressions into <u>postfix</u> expression and evaluate using Stack. During the process demonstrate each of the stack content both for conversion and evaluation.</p> <p>(B) Consider the following process diagram:</p> <div style="text-align: center;">  </div> <p>Based on your understanding of the above business scenario, where books are in the packing flow, propose data structure to use to simulate the above business scenario. Please feel free to do necessary assumptions to justify your answer.</p> | 5<br>5-1 | CO2<br>CO2 |
|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |            |
|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |            |
|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |            |

Good Luck