Dear students, your exam will cover these topics. Please ensure that you revise them thoroughly, as it will include both written and multiple-choice questions. Prepare well and aim for excellent grades. Good luck!

### 1. ****Introduction to Data Structures****

* Definition and Importance
* Types of Data Structures: Linear vs. Non-Linear, Static vs. Dynamic
* Memory Organization: Stack, Queue, Linked List, Trees, Graphs
* Algorithms and Data Structures Relationship

### 2. ****Arrays****

* Definition and Basic Operations
* Single-dimensional Arrays
* Multi-dimensional Arrays (Matrices)
* Dynamic Arrays and Resizing
* Applications of Arrays

### 3. ****Stacks****

* Definition and Operations (Push, Pop, Peek)
* Stack Implementation (Array-based, Linked List-based)
* Applications of Stacks (e.g., function calls, expression evaluation)

### 4. ****Queues****

* Definition and Operations (Enqueue, Dequeue, Front, Rear)
* Queue Implementation (Array-based, Linked List-based)
* Circular Queue
* Deque (Double-ended Queue)
* Applications of Queues (e.g., scheduling, breadth-first search)

### 5. ****Linked Lists****

* Definition and Types (Singly Linked List, Doubly Linked List, Circular Linked List)
* Operations (Insertion, Deletion, Traversal, Searching)
* Linked List Implementation (Memory Allocation)
* Applications of Linked Lists (e.g., dynamic memory allocation, navigation)

### 6. ****Trees****

* Definition and Terminology (Nodes, Root, Leaves, Height, Depth)
* Binary Trees and Binary Search Trees (BST)
* Tree Traversals (Pre-order, In-order, Post-order)
* Balanced Trees (AVL Trees, Red-Black Trees)
* Priority Queues (Heaps)
* Applications of Trees (e.g., decision trees, hierarchical data representation)

### 7. ****Sorting and Searching Algorithms****

* Sorting Algorithms (Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort)
* Searching Algorithms (Linear Search, Binary Search)
* Comparison-based vs. Non-comparison-based Sorting
* Time Complexity of Sorting and Searching Algorithms