

Data structure (CS 201)

Assignment 1

Submission deadlines: Part 1 - No submission

Part 2 – 1st August 2016

Part 3 – 7th August 2016

1 - Reading part (Topics till 3 week) - Included in your quizzes and exam

From Robert Sedgewick: Read Q/As of topic 1.1, 1.2 and 1.3 (partial)

Study all exercise solved questions

2 - Handwritten part (Algorithm designing and complexity analysis)

From Goodrich and Tamasia: R 2.11, 2.12, 2.13, 4.2, 4.3, 4.6, 4.8, 4.9 to 4.13 (Total number of primitive operations, Oh, omega and theta notations), 4.22 to 4.26 (Prove, find n and c), 4.28 to 4.33, 4.35, 4.36, 4.42, 4.43, 4.45, 4.46 (For insertion, selection and bubble), 4.56, 4.59

From Robert Sedgewick: Exercise 1.1.18, 1.1.19, 1.1.34, 1.2.7, 1.3.2, 1.3.3, 1.3.6

3 - Programming part (Implementation of Data structure and Algorithm)

1 doc file containing the screen shots of your small programs.

3 java files are required one for each scenario.

From Goodrich and Tamasia: R 1.8, 1.9

From Robert Sedgewick: Exercise 1.1.11, 1.1.13, 1.1.15, 1.2.6, 1.3.4

Scenario based implementation:

1. Implement a stack and queue that can grow and shrink on the requirement of user. Expand by a factor of 2 if there is no place to insert an item in stack or queue. Shrink if array length is thrice (3 times) the number of items.

2. Assuming that you know only Array as a fundamental data structure and you also know how to implement queue and stack using that data structure. Implement a Double Ended Queue (Deque) using two simpler data structure (Stacks and Queue) such that the complexity of operations becomes better or at least same than the use of single array. Also explain computational complexity of all operations that could be performed on your proposed data structure.

3. Understand the issues that Rootish Array Stack is dealing with. Implement it in JAVA.