

**GIT Department of Computer Engineering**  
**CSE 222/505 - Spring 2020**  
**Homework 7\_Q3/Q4**

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## Q3

### Problem Approach for Q3

I cannot implement the methods for the red black tree I had problem with coding part I tested insertion for the skiplist btree and bst data structures. but I havent had time to test all results and compare them because it takes already soo much time so as I research ;

**for the b tree:** insertion deletion and search operations take  $\Theta(\log n)$  time.

**For skiplist :** insertion deletion and operations takes  $O(\log n)$  time for average,  $O(n)$  for worst case times.

**For bst :** insertion deletion and search operations take  $\Theta(\log n)$  time for best case it takes  $O(n)$  for the worst case

**for red-black tree:** insertion deletion and search operations take  $\Theta(\log n)$  time

as result we can say that for the search and update operations the red black tree avl trees are appropriate also btrees are using to reach data database because of sector block relations of disks but for the insertion generally bst trees more appropriate because it doesnt need to six tree to get balanced after insertion operations

## Q4

### Problem Approach for Q4

Firstly we need to create a softwarePackage class which keeps the information about softwares like name price version etc. and that class have to be comparable since we can do only one element to compare for each class I compared the names of the softwares. And also I need a softwareStoreCreate class to call searchTree mehods regardless data structures so I define the data structure type in constructor of this class and after implement the search tree methods it decides for appropriate method to call. I implemented the menu of the softwarestore program in Software Store class which has the main For the searching it searches accordign to name of software I indicated the usage in the program for example if the user sell a product I let him to update quantity and price if the user enters the quantity of product as zero it deletes the product or he /she can delete it manually also I put another option to print all

products in the store. Note that to print the all elements in the store you should implement toString methods for all type of node and for doata structure.

#### Q4 -Test Case Table

Test number	Test Senario	Expected Result	Pass/Fail/Not Executed
1	Login system as admin with invalid password	Gives error and forward to menu	PASS
2	Login system as admin with valid password	Enters admin panel	PASS
3	Show all elements	Prints all products	PASS
4	Add some softwares and show element	Adds the given elements	PASS
5	Delete some element and show	Deletes the given element	PASS
6	Update the price and quantity	Changes the price and quantity of a product	PASS
7	Change the quantity 0	Deletes the product	PASS
8	Try to add element which is already in store	It behaves according to data structure generally it does not add	PASS
9	Delete a non-exist element	Throws nullPointer exception probably(behaves datastructure) but I will catch it	PASS
10	Change to user menu	Switch the user panel	PASS
11	Browse a product	Shows the product info	PASS
12	Browse an non exist product	Throws exception and I will catch it	PASS

For skiplist below

13	Create another data structures and try with it too	Gives error and forward to menu	PASS
14	Login system as admin with invalid password	Enters admin panel	PASS
15	Login system as admin with valid password	Prints all products	PASS
16	Show all elements	Adds the given elements	PASS
17	Add some softwares and show element	Deletes the given element	PASS

18	Delete some element and show	Changes the price and quantity of a product	PASS
19	Update the price and quantity	Deletes the product	PASS
20	Change the quantity 0	It behaves according to data structure generally it does not add	PASS
21	Try to add element which is already in store	Throws nullPointer exception probably(believes datastructure) but I will catch it	PASS
22	Delete a non-exist element	Switch the user panel	PASS
23	Change to user menu	Shows the product info	PASS
24	Browse a product	Throws exception and I will catch it	PASS
25	Browse an non exist product	Gives error and forward to menu	

I put the test case results as running result file.

**PS:**

- >For running result of test cases you can check report folder.
- >For uml classdiagrams you can look up the report directory.
- >For the java doc files you can look up the related question directory "doc" file.