Homework 7

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Question 3

Problem-solution approach

Codes from the book are taken and java's structures are used. Execution times are calculated and output into the console. Data structures are all printed to be verified but since there is a huge number of elements in each data structure I could not screenshot all of them. I recommend you to run the code if you want to see them verified(each data structure's elements will be output to the screen, you can comment out sections in order to be able to see it more clearly). However, there is no problem with these structures anyways since they are taken from the book or java's implementations are used. Execution times are in nanosecond. The only thing missing was book's b tree remove method which was not mentioned in the book.

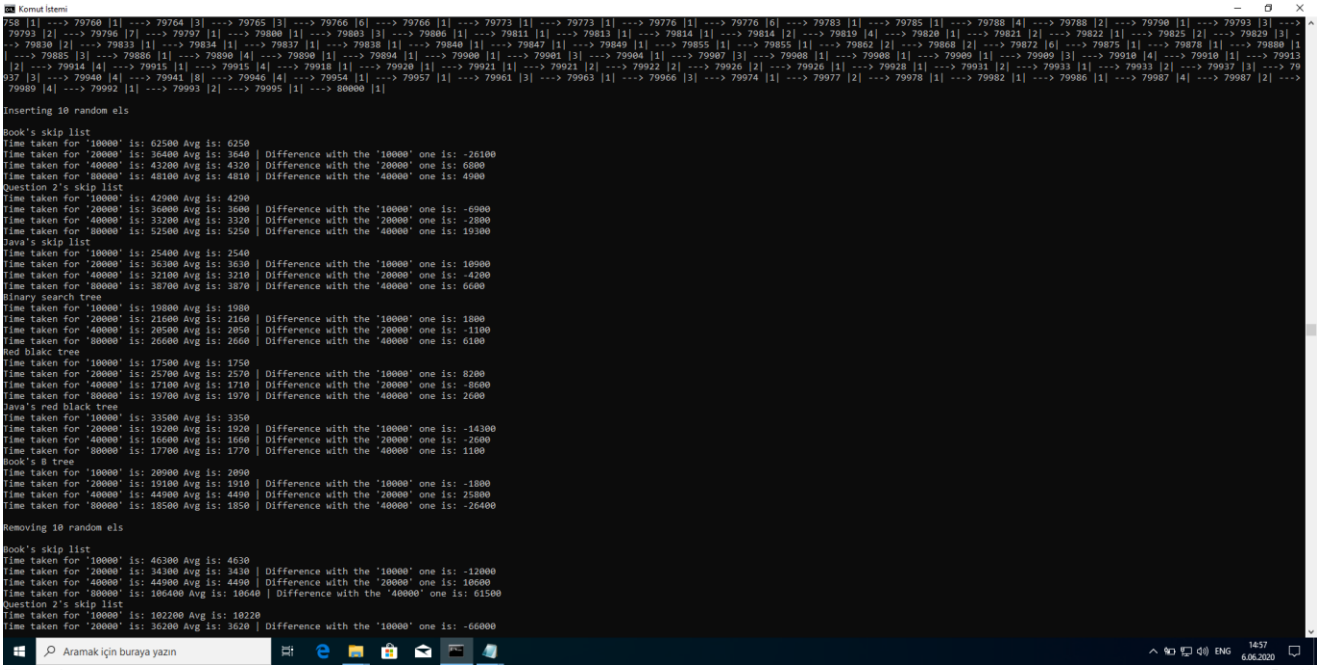
Tests cases

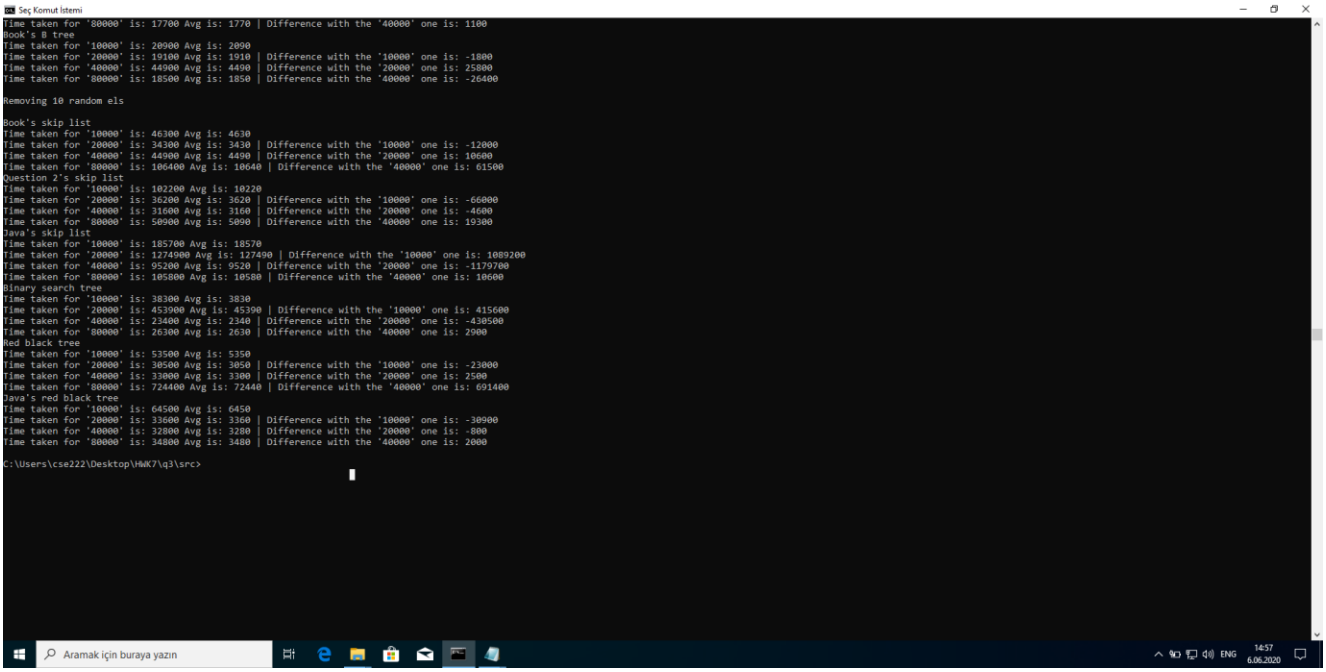
No test cases, just the output

Class diagram

No class diagram

Command and output


Komut İstemi
758 |1| ---> 79760 |1| ---> 79764 |3| ---> 79765 |3| ---> 79766 |6| ---> 79766 |1| ---> 79773 |1| ---> 79773 |1| ---> 79776 |1| ---> 79776 |6| ---> 79783 |1| ---> 79785 |1| ---> 79788 |4| ---> 79788 |2| ---> 79790 |1| ---> 79793 |3| ---> 79793 |2| ---> 79796 |7| ---> 79797 |1| ---> 79800 |1| ---> 79803 |3| ---> 79806 |1| ---> 79811 |1| ---> 79813 |1| ---> 79814 |1| ---> 79814 |2| ---> 79819 |4| ---> 79820 |1| ---> 79821 |2| ---> 79822 |1| ---> 79825 |2| ---> 79829 |2| ---> 79830 |2| ---> 79833 |1| ---> 79834 |1| ---> 79837 |1| ---> 79838 |1| ---> 79840 |1| ---> 79847 |1| ---> 79849 |1| ---> 79855 |1| ---> 79855 |1| ---> 79862 |2| ---> 79868 |2| ---> 79872 |6| ---> 79875 |1| ---> 79878 |1| ---> 79880 |1| ---> 79885 |3| ---> 79886 |1| ---> 79890 |4| ---> 79890 |1| ---> 79894 |1| ---> 79900 |1| ---> 79901 |3| ---> 79904 |1| ---> 79907 |3| ---> 79908 |1| ---> 79908 |1| ---> 79909 |1| ---> 79909 |3| ---> 79910 |4| ---> 79910 |1| ---> 79913 |2| ---> 79914 |4| ---> 79915 |1| ---> 79915 |4| ---> 79918 |1| ---> 79920 |1| ---> 79921 |1| ---> 79921 |2| ---> 79922 |2| ---> 79926 |2| ---> 79926 |1| ---> 79928 |1| ---> 79931 |2| ---> 79933 |1| ---> 79933 |2| ---> 79937 |3| ---> 79937 |3| ---> 79940 |4| ---> 79941 |8| ---> 79946 |4| ---> 79954 |1| ---> 79957 |1| ---> 79961 |3| ---> 79963 |1| ---> 79966 |3| ---> 79974 |1| ---> 79977 |2| ---> 79978 |1| ---> 79982 |1| ---> 79986 |1| ---> 79987 |4| ---> 79987 |2| ---> 79989 |4| ---> 79992 |1| ---> 79993 |2| ---> 79995 |1| ---> 80000 |1|
Inserting 10 random els
Book's skip list
Time taken for '10000' is: 62500 Avg is: 6250
Time taken for '20000' is: 36400 Avg is: 3640 | Difference with the '10000' one is: -26100
Time taken for '40000' is: 43200 Avg is: 4320 | Difference with the '20000' one is: 6800
Time taken for '80000' is: 48100 Avg is: 4810 | Difference with the '40000' one is: 4900
Question 2's skip list
Time taken for '10000' is: 42900 Avg is: 4290
Time taken for '20000' is: 36000 Avg is: 3600 | Difference with the '10000' one is: -6900
Time taken for '40000' is: 33200 Avg is: 3320 | Difference with the '20000' one is: -2800
Time taken for '80000' is: 52500 Avg is: 5250 | Difference with the '40000' one is: 19300
Java's skip list
Time taken for '10000' is: 25400 Avg is: 2540
Time taken for '20000' is: 36300 Avg is: 3630 | Difference with the '10000' one is: 10900
Time taken for '40000' is: 32100 Avg is: 3210 | Difference with the '20000' one is: -4200
Time taken for '80000' is: 38700 Avg is: 3870 | Difference with the '40000' one is: 6600
Binary search tree
Time taken for '10000' is: 19800 Avg is: 1980
Time taken for '20000' is: 21600 Avg is: 2160 | Difference with the '10000' one is: 1800
Time taken for '40000' is: 20500 Avg is: 2050 | Difference with the '20000' one is: -1100
Time taken for '80000' is: 26600 Avg is: 2660 | Difference with the '40000' one is: 6100
Red blakc tree
Time taken for '10000' is: 17500 Avg is: 1750
Time taken for '20000' is: 25700 Avg is: 2570 | Difference with the '10000' one is: 8200
Time taken for '40000' is: 17100 Avg is: 1710 | Difference with the '20000' one is: -8600
Time taken for '80000' is: 19700 Avg is: 1970 | Difference with the '40000' one is: 2600
Java's red black tree
Time taken for '10000' is: 33500 Avg is: 3350
Time taken for '20000' is: 19200 Avg is: 1920 | Difference with the '10000' one is: -14300
Time taken for '40000' is: 16600 Avg is: 1660 | Difference with the '20000' one is: -2600
Time taken for '80000' is: 17700 Avg is: 1770 | Difference with the '40000' one is: 1100
Book's B tree
Time taken for '10000' is: 20900 Avg is: 2090
Time taken for '20000' is: 19100 Avg is: 1910 | Difference with the '10000' one is: -1800
Time taken for '40000' is: 44900 Avg is: 4490 | Difference with the '20000' one is: 25800
Time taken for '80000' is: 18500 Avg is: 1850 | Difference with the '40000' one is: -26400
Removing 10 random els
Book's skip list
Time taken for '10000' is: 46300 Avg is: 4630
Time taken for '20000' is: 34300 Avg is: 3430 | Difference with the '10000' one is: -12000
Time taken for '40000' is: 44900 Avg is: 4490 | Difference with the '20000' one is: 10600
Time taken for '80000' is: 106400 Avg is: 10640 | Difference with the '40000' one is: 61500
Question 2's skip list
Time taken for '10000' is: 102200 Avg is: 10220
Time taken for '20000' is: 36200 Avg is: 3620 | Difference with the '10000' one is: -66000
Aramak için buraya yazın
ENG
14:57
6.06.2020


Seç Komut İstemi
Time taken for '80000' is: 17700 Avg is: 1770 | Difference with the '40000' one is: 1100
Book's B tree
Time taken for '10000' is: 20900 Avg is: 2090
Time taken for '20000' is: 19100 Avg is: 1910 | Difference with the '10000' one is: -1800
Time taken for '40000' is: 44900 Avg is: 4490 | Difference with the '20000' one is: 25800
Time taken for '80000' is: 18500 Avg is: 1850 | Difference with the '40000' one is: -26400
Removing 10 random els
Book's skip list
Time taken for '10000' is: 46300 Avg is: 4630
Time taken for '20000' is: 34300 Avg is: 3430 | Difference with the '10000' one is: -12000
Time taken for '40000' is: 44900 Avg is: 4490 | Difference with the '20000' one is: 10600
Time taken for '80000' is: 106400 Avg is: 10640 | Difference with the '40000' one is: 61500
Question 2's skip list
Time taken for '10000' is: 102200 Avg is: 10220
Time taken for '20000' is: 36200 Avg is: 3620 | Difference with the '10000' one is: -66000
Time taken for '40000' is: 31600 Avg is: 3160 | Difference with the '20000' one is: -4600
Time taken for '80000' is: 50900 Avg is: 5090 | Difference with the '40000' one is: 19300
Java's skip list
Time taken for '10000' is: 185700 Avg is: 18570
Time taken for '20000' is: 1274900 Avg is: 127490 | Difference with the '10000' one is: 1089200
Time taken for '40000' is: 95200 Avg is: 9520 | Difference with the '20000' one is: -1179700
Time taken for '80000' is: 105800 Avg is: 10580 | Difference with the '40000' one is: 10600
Binary search tree
Time taken for '10000' is: 38300 Avg is: 3830
Time taken for '20000' is: 453900 Avg is: 45390 | Difference with the '10000' one is: 415600
Time taken for '40000' is: 23400 Avg is: 2340 | Difference with the '20000' one is: -430500
Time taken for '80000' is: 26300 Avg is: 2630 | Difference with the '40000' one is: 2900
Red black tree
Time taken for '10000' is: 53500 Avg is: 5350
Time taken for '20000' is: 30500 Avg is: 3050 | Difference with the '10000' one is: -23000
Time taken for '40000' is: 33000 Avg is: 3300 | Difference with the '20000' one is: 2500
Time taken for '80000' is: 724400 Avg is: 72440 | Difference with the '40000' one is: 691400
Java's red black tree
Time taken for '10000' is: 64500 Avg is: 6450
Time taken for '20000' is: 33600 Avg is: 3360 | Difference with the '10000' one is: -30900
Time taken for '40000' is: 32800 Avg is: 3280 | Difference with the '20000' one is: -800
Time taken for '80000' is: 34800 Avg is: 3480 | Difference with the '40000' one is: 2000
C:\Users\cse222\Desktop\HWK7\q3\src>
Aramak için buraya yazın
ENG
14:57
6.06.2020