

GTU Department of Computer Engineering
CSE 222/505 - Spring 2021
Homework 5 Report

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1. PROBLEM SOLUTION APPROACH

I started to implement the iterator class according to the assignment's order. The point to consider when implementing the iterator class was the constructor. The constructor whose prototype was given was not using the object of the class. Therefore I implemented MapIterator by extending it from the Java's HashMap class.

I have completed the LinkedList and TreeSet based Hashtable implementations by making additions to book's implementations. I had to implement the remove and rehash methods myself.

Finally, I implemented the HashtableCoalesced class. I had to do a lot of research on coalesced and quadratic probe. I implemented the methods of this class by doing calculations on paper. Especially the remove method was the point to be considered.

2. TEST CASES

It was elaborated in the next step.

3. RUNNING AND RESULTS

```
***** MAPITERATOR TEST *****
```

```
{Alex=10, Neuer=1, Benzema=9, Ronaldo=7, Pirlo=21, Zidane=5, Messi=10}  
-MapIterator created..
```

```
-next method performed 10 time
```

```
Alex  
Neuer  
Benzema  
Ronaldo  
Pirlo  
Zidane  
Messi  
Alex  
Neuer  
Benzema
```

```
-prev method performed 15 time
```

```
Neuer  
Alex  
Messi  
Zidane  
Pirlo  
Ronaldo  
Benzema  
Neuer  
Alex  
Messi
```

```
-Iterator set to 'Alex' with one parameter constructor...
Alex is the first element. hasNext method performed after 'Alex'
true
-Iterator set to 'Messi' with one parameter constructor...
Messi is the last element. hasNext method performed after 'Messi'
false
-Iterator set to 'Zidane' with one parameter constructor...
-next method performed 5 time

Zidane
Messi
Alex
Neuer
Benzema
```

```
***** HashtableCoalesced Test (SIZE 10) *****

Elements added to Hashtable with put method

Get method called for each element

Kaka
Ronaldo
Seedorf
Dida
Shevchenko
Gattuso
Inzaghi
```

Hashtable View:			3 element removed(3,42,12)		
Hash	V.	Key	Next	Hash	V.
0			-1	0	
1		51	-1	1	51
2		12	6	2	
3		3	4	3	23
4		13	7	4	13
5		25	-1	5	25
6		42	-1	6	
7		23	-1	7	
8			-1	8	
9			-1	9	

```
***** Performance Results of 3 Different Tables for Same Tasks *****

HashtableChainLinkedList time in nanoseconds : 1553546

HashtableChainTreeSet time in nanoseconds : 1552061

HashtableCoalesced time in nanoseconds : 24272676
```