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

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- ***PROBLEM SOLUTION APPROACH***

For question 1, the open addressing coding in the book was done first. Then, an iterator was applied to this class as an inner class. Next (), prev (), hasnext () methods are implemented in this iterator. then a constoructor with a parameter was written. The process is complete.

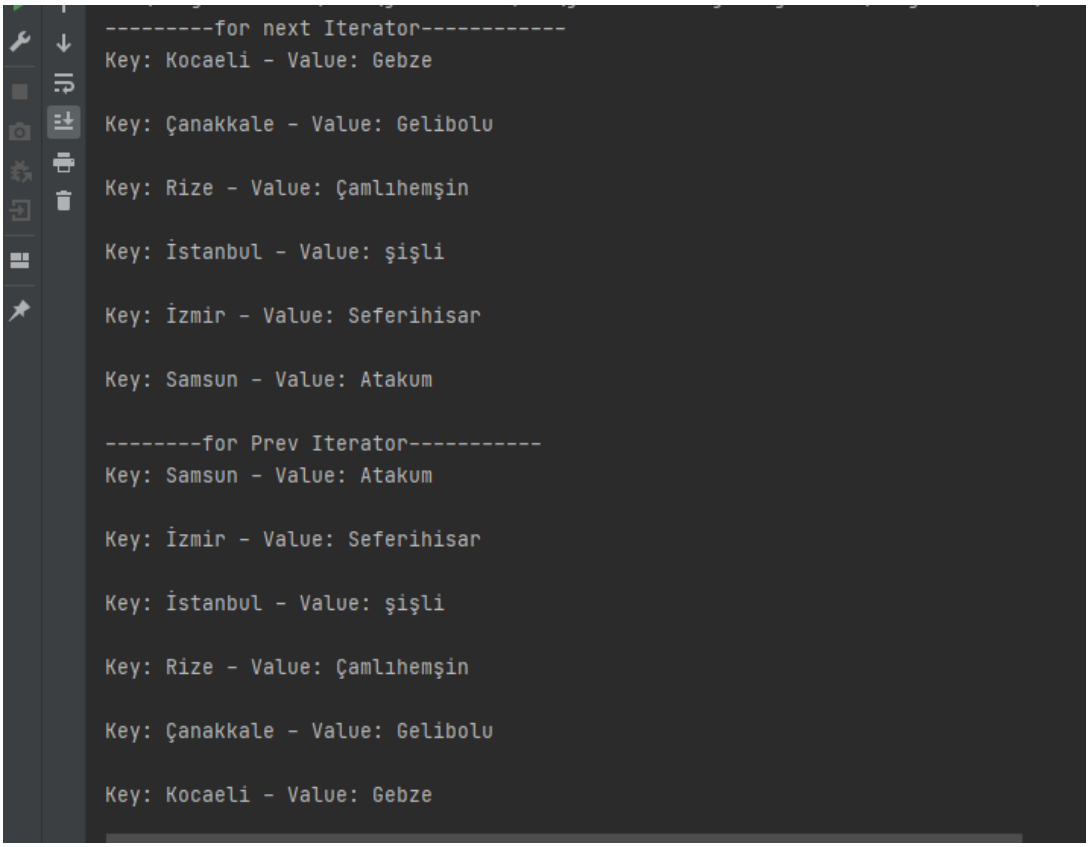
For question 2:

Open adressing encoding was done with linklist, not array. Linklist class in java was used for this. Then, Tree encodings in the book were made for TreeSet.

- **RUNNING AND RESULTS**

Question 1

next () and prev () methods → Hash function = data % 10 (table.length = 10)




```
HashtableOpen<String, String>.MapIterator<String> itz = ht1.iterator("Rize");
```

Question 2:

For Open Adressing → Hash function = data % 10 (table.length = 10)

The example in pdf has been taken to the comment line and its operation is as follows.

```
--------Open Adressing---------------
Put:(3,12,13,25,23,51,42)
Key: 51 - Value: 51
Key: 12 - Value: 12
Key: 3 - Value: 3
Key: 13 - Value: 13
Key: 25 - Value: 25
Key: 23 - Value: 23
Key: 42 - Value: 42

Open Adressing time (put): 54800
Remove(13)
Key: 51 - Value: 51
Key: 12 - Value: 12
Key: 3 - Value: 3
Key: 25 - Value: 25
Key: 23 - Value: 23
Key: 42 - Value: 42

Open Adressing time (remove): 12600
```

Linklist Chain→ Hash function = data % 10 (table.length = 10)

```
--------linkedlist Chain---------------
Put:(3,12,13,25,23,51,42)
[Key: 51 - Value: 51]
[Key: 42 - Value: 42, Key: 12 - Value: 12]
[Key: 23 - Value: 23, Key: 13 - Value: 13, Key: 3 - Value: 3]
[Key: 25 - Value: 25]

Linklist  time (put): 977200
Remove(13)
[Key: 51 - Value: 51]
[Key: 42 - Value: 42, Key: 12 - Value: 12]
[Key: 23 - Value: 23, Key: 3 - Value: 3]
[Key: 25 - Value: 25]

Linklist time (remove): 33700
```

TreeSet(put) → Hash function = data % 10 (table.length = 10)

```
LinkList time (remove): 55700
------------TreeSet-----------------
Key and Value : 51  51
  null
  null
Key and Value : 12  12
  null
  42    42
    null
    null
Key and Value : 3   3
  null
  13    13
    null
    23  23
      null
      null
Key and Value : 25  25
  null
  null

TreeSet time (put): 1207300
```

TreeSet(remove) → Hash function = data % 10 (table.length = 10)

```
Remove(13)
Key and Value : 51  51
  null
  null
Key and Value : 12  12
  null
  42    42
    null
    null
Key and Value : 3   3
  null
  23    23
    null
    null
Key and Value : 25  25
  null
  null

TreeSet time (remove): 30400
```

- Test small ,medium and large data

```
--------------Small data----------------
OpenAdreessing time:(put) 40700
OpenAdreessing time:(get) 31100
OpenAdreessing time:(remove) 26300
Linklist time:(put) 1421400
Linklist time:(get) 54200
Linklist time:(remove) 52400
TreeSet time:(put) 1836700
TreeSet time:(get) 52500
TreeSet time:(remove) 108900
-------------Medium data----------------
OpenAdreessing time:(put) 17600
OpenAdreessing time:(get) 12400
OpenAdreessing time:(remove) 9500
Linklist time:(put) 41000
Linklist time:(get) 22600
Linklist time:(remove) 23500
TreeSet time:(put) 19900
TreeSet time:(get) 16400
TreeSet time:(remove) 64100
-------------Large data----------------
OpenAdreessing time:(put) 11200
OpenAdreessing time:(get) 15200
OpenAdreessing time:(remove) 7100
Linklist time:(put) 32800
Linklist time:(get) 21100
```

```
Linklist time:(remove) 23900
TreeSet time:(put) 15100
TreeSet time:(get) 14400
TreeSet time:(remove) 50200

Process finished with exit code 0
```

Time Tablo

	Open Adressing time	Linklist time	TreeSet Time
Put	17600	41000	19900
Get	12400	22600	16400
Remove	9500	23500	64100