

Gebze Technical University  
Computer Engineering

CSE 222  
2017 Spring

HOMEWORK 07 REPORT

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Q-1

## 1-Problem Solution Approach

Türkiye de bulunan şehirler ve onların ilçeleri verilmiş, ilçeler tek yani başka bir aynı isimli ilçe yok. Kısa süre içinde istenilen ilçenin il bilgisine ulaşılması istenmiş. Bunun içinde bir BinaryNavMap classı yazıp BinarySearchTree kurallarına göre çalışması istenmiş.

BST kurallarına uygun olması için öncelikle inner node sınıfı yazdım sonrada bu node sınıfı için gerekli methodları implement ettim. Sonra BST kurallarına uygun şekilde verilerimi tutabilmek için put methodunu kendim kullanabileceğim şekilde override ettim ve put methodu için gerekli helper(wrapper) methodlarını yazdım. Verileri halfabetik sırada tutacağımızdan ötürü BST'yi inOrder sırada traverse ettim. Inorder traverse edebilmek için gerekli methodları yazdım.

Methodlarda exception fırlatmalarını yaptım ancak test ederken try-catch bloklarını handle etmedim kullanmak isteyen kendi kullanır diye.

Ayrıca public Comparator<? super K> comparator() methodunu implement edemedim.

## 2-Test Cases

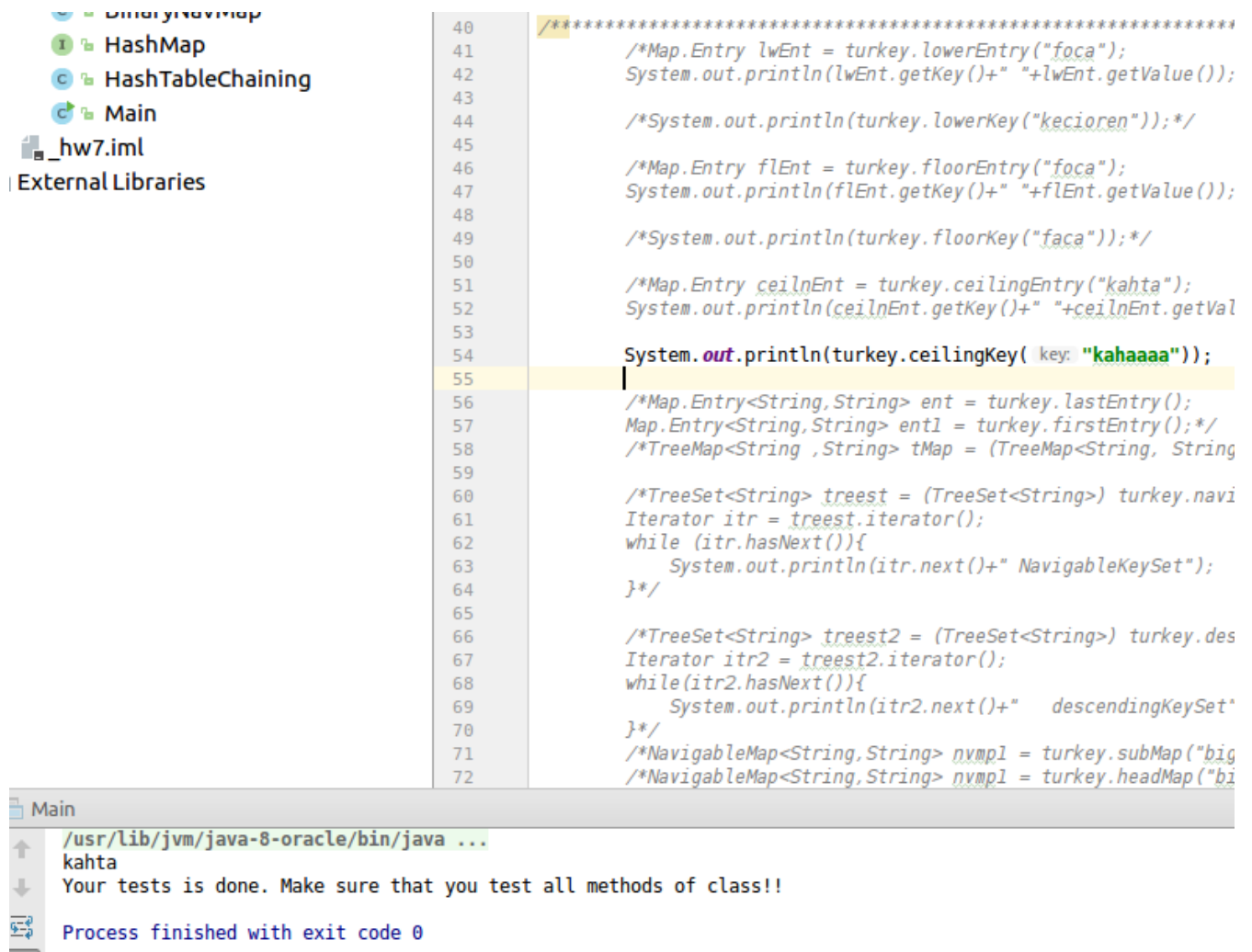
```
src
├── .idea
├── BinaryNavMap
├── HashMap
├── HashTableChaining
├── Main
├── _hw7.iml
└── ernal Libraries

36 while(itr.hasNext()){
37     Map.Entry mp= (Map.Entry) itr.next();
38     System.out.println(mp.getKey());
39 }*/
40 /**
41  *Map.Entry lwEnt = turkey.lowerEntry("foça");
42  *System.out.println(lwEnt.getKey()+" "+lwEnt.getValue());*/
43
44  *System.out.println(turkey.lowerKey("kecioren"));*/
45
46  *Map.Entry flEnt = turkey.floorEntry("foça");
47  *System.out.println(flEnt.getKey()+" "+flEnt.getValue());*/
48
49  *System.out.println(turkey.floorKey("faça"));*/
50
51  *Map.Entry ceilnEnt = turkey.ceilingEntry( key: "kahta");
52  *System.out.println(ceilnEnt.getKey()+" "+ceilnEnt.getValue());
53
54  *Map.Entry<String,String> ent = turkey.lastEntry();
55  *Map.Entry<String,String> ent1 = turkey.firstEntry();*/
56  *TreeMap<String ,String> tMap = (TreeMap<String, String>) turk
57
58  *TreeSet<String> treest = (TreeSet<String>) turkey.navigableKey
59  Iterator itr = treest.iterator();
60  while (itr.hasNext()){
61      System.out.println(itr.next()+" NavigableKeySet");
62  }*/
63
64  *TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingI
65  Iterator itr2 = treest2.iterator();
66  while(itr2.hasNext()){
67      System.out.println(itr2.next()+" descendingKeySet");
68  }*/
69  *NavigableMap<String,String> nymp1 = turkey.subMap("bıga", true,
70  *NavigableMap<String,String> nymp1 = turkey.headMap("bıga", true
71  *NavigableMap<String,String> nymp = turkey.tailMap("bıga", true,
72

ain
/usr/lib/jvm/java-8-oracle/bin/java ...
kahta adıyaman
Your tests is done. Make sure that you test all methods of class!!

Process finished with exit code 0
```

ceilingEntry() method: Verilen key değerine göre eşit veya yoksa ondan büyük en küçük Entry değeri return eder. Burada eşit olan değeri test ettim.



The screenshot shows an IDE with a project named `hw7.iml`. The left sidebar lists the project structure: `UnlabeledMap`, `HashMap`, `HashTableChaining`, `Main`, and `External Libraries`. The main editor displays Java code from lines 40 to 72. The code uses `turkey` to interact with a `Map` and a `TreeSet`. Line 54 shows a call to `System.out.println(turkey.ceilingKey(key: "kahaaaa"));`. The bottom panel shows the execution output for the `Main` class, indicating the process finished with exit code 0.

```
40  /**
41  /**Map.Entry lwEnt = turkey.lowerEntry("foca");
42  System.out.println(lwEnt.getKey()+" "+lwEnt.getValue());
43
44  /**System.out.println(turkey.lowerKey("kecioren"));*/
45
46  /**Map.Entry flEnt = turkey.floorEntry("foca");
47  System.out.println(flEnt.getKey()+" "+flEnt.getValue());
48
49  /**System.out.println(turkey.floorKey("faca"));*/
50
51  /**Map.Entry ceilEnt = turkey.ceilingEntry("kahta");
52  System.out.println(ceilEnt.getKey()+" "+ceilEnt.getValue());
53
54  System.out.println(turkey.ceilingKey(key: "kahaaaa"));
55
56  /**Map.Entry<String,String> ent = turkey.lastEntry();
57  Map.Entry<String,String> ent1 = turkey.firstEntry();*/
58  /**TreeMap<String,String> tMap = (TreeMap<String,String>
59
60  /**TreeSet<String> treest = (TreeSet<String>) turkey.navigableKeySet().iterator();
61  Iterator itr = treest.iterator();
62  while (itr.hasNext()){
63      System.out.println(itr.next()+" NavigableKeySet");
64  }*/
65
66  /**TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet().iterator();
67  Iterator itr2 = treest2.iterator();
68  while(itr2.hasNext()){
69      System.out.println(itr2.next()+" descendingKeySet");
70  }*/
71  /**NavigableMap<String,String> nvmp1 = turkey.subMap("big",true,"small",true);
72  /**NavigableMap<String,String> nvmp1 = turkey.headMap("big",true);
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
kahta
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

`ceilingKey()` methodu: Verilen key değerine göre eşit yada yoksa ondan büyük en küçük key değeri return eder. Burada kahaaa key değerini vermişim ama ondan bir büyük olan kahta değeri return etmiş durumda.

hw7.iml  
External Libraries

```
56  /*Map.Entry highEnt = turkey.higherEntry("Kahta");  
57  System.out.println(highEnt.getKey()+" "+highEnt.getValue());*/  
58  
59  /*System.out.println(turkey.higherKey("kahaaaaa"));*/  
60  
61  /*Map.Entry Lent = turkey.lastEntry();  
62  Map.Entry Fent = turkey.firstEntry();  
63  System.out.println(Fent.getKey()+" "+Fent.getValue());  
64  System.out.println(Lent.getKey()+" "+Lent.getValue());*/  
65  
66  /*TreeMap<String,String> tMap = (TreeMap<String,String>) turkey.descen  
67  
68  /*TreeSet<String> treest = (TreeSet<String>) turkey.navigableKeySet();  
69  Iterator itr = treest.iterator();  
70  while (itr.hasNext()){  
71      System.out.println(itr.next()+" -> NavigableKeySet");  
72  }*/  
73  
74  TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet();  
75  Iterator itr2 = treest2.iterator();  
76  while(itr2.hasNext()){  
77      System.out.println("descendingKeySet ->"+itr2.next());  
78  }  
79  
80  /*NavigableMap<String,String> nvmp1 = turkey.subMap("bıga",true,"kadıkoy  
81  /*NavigableMap<String,String> nvmp1 = turkey.headMap("bıga",true);*/  
82  /*NavigableMap<String,String> nvmp = turkey.tailMap("bıga",true);*/  
83  
84  /*TreeMap<String,String> mpp= (TreeMap<String,String>) turkey.subMap("k
```

Main  
/usr/lib/jvm/java-8-oracle/bin/java ...  
descendingKeySet -> uskudar  
descendingKeySet -> niksar  
descendingKeySet -> manavgat  
descendingKeySet -> kecioren  
descendingKeySet -> kahta  
descendingKeySet -> kadikoy  
descendingKeySet -> gebze  
descendingKeySet -> foca  
descendingKeySet -> cekirge  
descendingKeySet -> bıga  
descendingKeySet -> aksaray

descendingKeySet() methodu: Set değerlerini descending sırada return eder. Iterator ü ile gezip test ettim(Halfabetik sıranın tersinde).

```
57      System.out.println(highEnt.getKey()+" "+highEnt.getValue());*/
58
59      /*System.out.println(turkey.higherKey("kahaaaa"));*/
60
61      /*Map.Entry Lent = turkey.lastEntry();
62      Map.Entry Fent = turkey.firstEntry();
63      System.out.println(Fent.getKey()+" "+Fent.getValue());
64      System.out.println(Lent.getKey()+" "+Lent.getValue());*/
65
66
67      TreeMap<String ,String> tMap = (TreeMap<String, String>) turkey.descendingMap();
68
69      /*TreeSet<String> trees1 = (TreeSet<String>) turkey.navigableKeySet();
70      Iterator itr = trees1.iterator();
71      while (itr.hasNext()){
72          System.out.println(itr.next()+" NavigableKeySet");
73      }*/
74
75      /*TreeSet<String> trees2 = (TreeSet<String>) turkey.descendingKeySet();
76      Iterator itr2 = trees2.iterator();
77      while(itr2.hasNext()){
78          System.out.println(itr2.next()+" descendingKeySet");
79      }*/
79
Main
/usr/lib/jvm/java-8-oracle/bin/java ...
descendingMap -> uskudar
descendingMap -> niksar
descendingMap -> manavgat
descendingMap -> kecioren
descendingMap -> kahta
descendingMap -> kadikoy
descendingMap -> gebze
descendingMap -> foca
descendingMap -> cekirge
descendingMap -> biga
descendingMap -> aksaray
Your tests is done. Make sure that you test all methods of class!!
```

descendingMap() methodu: Mapteki ikili değerlerini key değerine göre azalan sırada ekrana yazdırılmakta. Main de map I gezemediğimden ötürü fonksiyonun içinde yazdırdım değerleri.

```
14  // HashTableChaining
15  // Main
16  // _hw7.iml
17  // External Libraries
18
19  public static Boolean Q1Test(){
20      NavigableMap<String,String> turkey = new BinaryNavMap<>();
21      turkey.put("uskudar","istanbul");
22      turkey.put("kadikoy","istanbul");
23      turkey.put("cekirge","bursa");
24      turkey.put("gebze","kocaeli");
25      turkey.put("niksar","tokat");
26      turkey.put("kecioren","ankara");
27      turkey.put("aksaray","istanbul");
28      turkey.put("foca","izmir");
29      turkey.put("manavgat","antalya");
30      turkey.put("kahta","adiyaman");
31      turkey.put("biga","canakkale");
32
33      Set<Map.Entry<String, String>> trSET = turkey.entrySet();
34      Iterator itr = trSET.iterator();
35      while(itr.hasNext()){
36          Map.Entry mp= (Map.Entry) itr.next();
37          System.out.println(mp.getKey()+" "+mp.getValue());
38      }
39      //*****
40      //Map.Entry lwEnt = turkey.lowerEntry("foca");
41      //System.out.println(lwEnt.getKey()+" "+lwEnt.getValue());*/
42      //System.out.println(turkey.lowerKey("kecioren"));*/
43
44
45
46      System.out.println("Your tests is done. Make sure that you test all methods of class!!");
47      return;
48  }
49  }
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
uskudar istanbul
niksar tokat
manavgat antalya
kecioren ankara
kahta adiyaman
kadikoy istanbul
gebze kocaeli
foca izmir
cekirge bursa
biga canakkale
aksaray istanbul
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

entrySet() methodu: Set return eder ve main methodunda da iteratoru ile key değerlerine göre azalan sırada gezerek test ettim.

Main  
\_hw7.iml  
External Libraries

```
70 while (itr.hasNext()){
71     System.out.println(itr.next()+" -> NavigableKeySet");
72 }*/
73
74 /*TreeSet<String> treest2 = (TreeSet<String>) turkey.d
75 Iterator itr2 = treest2.iterator();
76 while(itr2.hasNext()){
77     System.out.println("descendingKeySet ->"+itr2.ne
78 }*/
79
80 /*NavigableMap<String,String> nvmp1 = turkey.subMap("b
81
82 //NavigableMap<String,String> nvmp1 = turkey.headMap("
83 //NavigableMap<String,String> nvmp = turkey.tailMap("b
84
85 /*TreeMap<String,String> mpp= (TreeMap<String, String>
86
87 /*TreeMap<String,String> mpp= (TreeMap<String, String>
88
89 //TreeMap<String,String> mpp= (TreeMap<String, String>
90
91 //System.out.println(mpp.get("manavgat"))+" AAAAAAAAAE
92
93 System.out.println("lastKey -> "+turkey.lastKey());
94 System.out.println("firstKey -> "+turkey.firstKey());
95
96 /*
97 * COMPARETO İLE İLGİLEN . SİRALAMA YAPIP EKLEMESİNDE
98 * YAPARKEN YANLIŞ EKLİYOR OLABİLİR
99 * */
```

Main  
/usr/lib/jvm/java-8-oracle/bin/java ...  
lastKey -> uskudar  
firstKey -> aksaray  
Your tests is done. Make sure that you test all methods of class!!  
Process finished with exit code 0

firstKey() ve lastKey() methodları: tree deki (halfabetik sıraya göre) ilk ve son key değerlerini return ederler.




```
58
59      /*System.out.println(turkey.higherKey("kahaaaa"));*/
60
61      Map.Entry Lent = turkey.lastEntry();
62      Map.Entry Fent = turkey.firstEntry();
63      System.out.println(Fent.getKey()+" "+Fent.getValue());
64      System.out.println(Lent.getKey()+" "+Lent.getValue());
65
66      /*TreeMap<String,String> tMap = (TreeMap<String,String>) turkey;
67
68      /*TreeSet<String> treest = (TreeSet<String>) turkey.navigableKeySet();
69      Iterator itr = treest.iterator();
70      while (itr.hasNext()){
71          System.out.println(itr.next()+" NavigableKeySet");
72      }*/
73
74      /*TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet();
75      Iterator itr2 = treest2.iterator();
76      while (itr2.hasNext()){
77          System.out.println(itr2.next()+" descendingKeySet");
78      }*/
```

un Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
aksaray istanbul
uskudar istanbul
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

firstEntry() ve lastEntry() methodları: key değerlerine göre tree deki(arf sırasına göre) ilk ve son Entry yapılarını return ederler.

```
43
44  /*System.out.println(turkey.lowerKey("kecioren"));*/
45
46 Map.Entry flEnt = turkey.floorEntry( key: "foca");
47 System.out.println(flEnt.getKey()+" "+flEnt.getValue());
48
49 /*Map.Entry<String,String> ent = turkey.lastEntry();
50 Map.Entry<String,String> ent1 = turkey.firstEntry();*/
51 /*TreeMap<String,String> tMap = (TreeMap<String,String>
52
53 /*TreeSet<String> treest = (TreeSet<String>) turkey.navig
54 Iterator itr = treest.iterator();
55 while (itr.hasNext()){
56     System.out.println(itr.next()+" NavigableKeySet");
57 }*/
58
59 /*TreeSet<String> treest2 = (TreeSet<String>) turkey.desc
60 Iterator itr2 = treest2.iterator();
61 while(itr2.hasNext()){
62     System.out.println(itr2.next()+" descendingKeySet").
63 }*/
64 /*NavigableMap<String,String> nvmp1 = turkey.subMap("biga
65 /*NavigableMap<String,String> nvmp1 = turkey.headMap("big
66 /*NavigableMap<String,String> nvmp = turkey.tailMap("biga
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
foca izmir
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

floorEntry() methodu: verilen key e eşit veya ondan büyük olup en küçük key değerini value değeri ile birlikte Entry yapısı olarak return eder.

## External Libraries

```
41      /*Map.Entry lwEnt = turkey.lowerEntry("foca");
42      System.out.println(lwEnt.getKey()+" "+lwEnt.getValue());
43
44      /*System.out.println(turkey.lowerKey("kecioren"));
45
46      /*Map.Entry flEnt = turkey.floorEntry("foca");
47      System.out.println(flEnt.getKey()+" "+flEnt.getValue());
48
49      System.out.println(turkey.floorKey(key: "faca"));
50
51      /*Map.Entry<String,String> ent = turkey.lastEntry();
52      Map.Entry<String,String> ent1 = turkey.firstEntry();
53      /*TreeMap<String,String> tMap = (TreeMap<String,String>) turkey;
54
55      /*TreeSet<String> treest = (TreeSet<String>) turkey;
56      Iterator itr = treest.iterator();
57      while (itr.hasNext()){
58          System.out.println(itr.next()+" NavigableKeySet");
59      }*/
60
61      /*TreeSet<String> treest2 = (TreeSet<String>) turkey;
62      Iterator itr2 = treest2.iterator();
63      while(itr2.hasNext()){
64          System.out.println(itr2.next()+" descendingKeySet");
65      }*/
66      /*NavigableMap<String,String> nvmap1 = turkey.subMap(
```

Main

/usr/lib/jvm/java-8-oracle/bin/java ...

cekirge

Your tests is done. Make sure that you test all methods of class!!

Process finished with exit code 0

floorKey() methodu: verilen key e eşit veya ondan büyük olup en küçük key değerini return eder. faca örneği ile denedim ve test ettim. foca yazmış olsaydım foca'yı return edecekti ancak faca yazıp ondan büyük ve en küçük olan cecirge değerini return etti.

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Main

22

[Main](#)

headMap() methodu: verilen key değerine kadar, verilen key değeri dail olmamak üzere treenin başından verilen değere kadar bir Sorted map return eder(halfabetik sıraya göre.).

```
49      /*System.out.println(turkey.floorKey("faça"));*/
50
51      /*Map.Entry ceilEnt = turkey.ceilingEntry("kahta");
52      System.out.println(ceilEnt.getKey()+" "+ceilEnt.getValue());*/
53
54      /*System.out.println(turkey.ceilingKey("kahaaaa"));*/
55
56      Map.Entry highEnt = turkey.higherEntry( key: "kahta");
57      System.out.println(highEnt.getKey()+" "+highEnt.getValue());
58
59      /*Map.Entry<String,String> ent = turkey.lastEntry();
60      Map.Entry<String,String> ent1 = turkey.firstEntry();*/
61      /*TreeMap<String ,String> tMap = (TreeMap<String, String>) turkey
62
63      /*TreeSet<String> treest = (TreeSet<String>) turkey.navigableKeySet();
64      Iterator itr = treest.iterator();
65      while (itr.hasNext()){
66          System.out.println(itr.next()+" NavigableKeySet");
67      }*/
68
69      /*TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet();
70      Iterator itr2 = treest2.iterator();
71      while(itr2.hasNext()){
72          System.out.println(itr2.next()+" descendingKeySet");
73      }*/
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
kecioeren ankara
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

higherEntry() methodu: verilen key değerinden büyük ilk değeri Entry (key-value ikilisi) olarak return eder.

```
56      /*Map.Entry highEnt = turkey.higherEntry("kahta");
57      System.out.println(highEnt.getKey()+" "+highEnt.getValue());
58
59      System.out.println(turkey.higherKey( key: "kahaaaa"));
60
61      /*Map.Entry<String,String> ent = turkey.lastEntry();
62      Map.Entry<String,String> ent1 = turkey.firstEntry();*/
63      /*TreeMap<String,String> tMap = (TreeMap<String,String>) t;
64
65      /*TreeSet<String> treest = (TreeSet<String>) turkey.navigabl
66      Iterator itr = treest.iterator();
67      while (itr.hasNext()){
68          System.out.println(itr.next()+" NavigableKeySet");
69      }*/
70
71      /*TreeSet<String> treest2 = (TreeSet<String>) turkey.descend
72      Iterator itr2 = treest2.iterator();
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
kahta
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

higherKey() methodu: verilen key değerinden büyük ilk değeri key olarak return eder. Kahaaa key değeri verilerim arasında olmamış olsada String sıralamasında kendisinden bir büyük olan kahta key değerini return etmektedir.

```
90      //System.out.println("lastKey -> "+turkey.lastKey());
91      /*System.out.println("lastKey -> "+turkey.lastKey());
92      System.out.println("firstKey -> "+turkey.firstKey());*/
93
94
95      System.out.println("The original set odds is " + turkey.toString());
96      NavigableMap<String,String> m = turkey.subMap("gebze",true,"uskudar",false);
97      System.out.println("The ordered set m is " + m);
98      System.out.println("The first entry is " +turkey.firstEntry().getKey()+" "+turkey.firstEntry().getValue());
99
100      //you should write your test function to chek your solution
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
The original set odds is
aksaray istanbul
biga canakkale
cekirge bursa
foca izmir
gebze kocaali
kadikoy istanbul
kahta adiyaman
kecioren ankara
manavgat antalya
niksar tokat
uskudar istanbul

subMap -> gebze kocaali
subMap -> kadikoy istanbul
subMap -> kahta adiyaman
subMap -> kecioren ankara
subMap -> manavgat antalya
subMap -> niksar tokat
The ordered set m is {gebze=kocaali, kadikoy=istanbul, kahta=adiyaman, kecioren=ankara, manavgat=antalya, niksar=tokat}
The first entry is aksaray istanbul
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

Hocam sizin yazdığınız ilk kısa test.

out

src

.idea

- BinaryNavMap
- HashMap
- HashTableChaining
- Main

\_hw7.iml

External Libraries

```

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52
53
54
55
56
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62
63
64
65
66
turkey.put("foca", "izmir");
turkey.put("manavgat", "antalya");
turkey.put("kahta", "adiyaman");
turkey.put("biga", "canakkale");

/*Set<Map.Entry<String, String>> trSET = turkey.entrySet();
Iterator itr = trSET.iterator();
while(itr.hasNext()){
    Map.Entry mp= (Map.Entry) itr.next();
    System.out.println(mp.getKey());
}*/

Map.Entry lwEnt = turkey.lowerEntry( key: "foca");
System.out.println(lwEnt.getKey()+" "+lwEnt.getValue());

/*System.out.println(turkey.higherKey("niksar"));*/

/*Map.Entry<String,String> ent = turkey.lastEntry();
Map.Entry<String,String> ent1 = turkey.firstEntry();*/
/*TreeMap<String,String> tMap = (TreeMap<String,String>) turk

/*TreeSet<String> treest = (TreeSet<String>) turkey.navigableKey
Iterator itr = treest.iterator();
while (itr.hasNext()){
    System.out.println(itr.next()+" NavigableKeySet");
}*/

/*TreeSet<String> treest2 = (TreeSet<String>) turkey.descending
Iterator itr2 = treest2.iterator();
while(itr2.hasNext()){
    System.out.println(itr2.next()+" descendingKeySet");
}*/

/*NavigableMap<String,String> nvmp1 = turkey.subMap("biga", true.
/*NavigableMap<String,String> nvmp1 = turkey.headMap("biga", true
/*NavigableMap<String,String> nvmp = turkey.tailMap("biga", true.

/*TreeMap<String,String> mpp= (TreeMap<String,String>) turkey.

```




Main

```

/usr/lib/jvm/java-8-oracle/bin/java ...
cekirge bursa
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0

```

lowerEntry() methodu: verilen key değerinden küçük en büyük değeri key-value(Entry olarak) değeri olarak return eder.

 HashTableChaining  
 Main  
 \_hw7.iml  
 External Libraries

```

38      System.out.println(tmp.getKey());
39    }*/
40
41    /*Map.Entry lwEnt = turkey.lowerEntry("foca");
42    System.out.println(lwEnt.getKey()+" "+lwEnt.getValue())
43
44    System.out.println(turkey.lowerKey( key: "kecioren"));
45
46    /*Map.Entry<String,String> ent = turkey.lastEntry();
47    Map.Entry<String,String> ent1 = turkey.firstEntry();*/
48    /*TreeMap<String,String> tMap = (TreeMap<String,String>)
49
50    /*TreeSet<String> treest = (TreeSet<String>) turkey.nav.
51    Iterator itr = treest.iterator();
52    while (itr.hasNext()){
53        System.out.println(itr.next()+" NavigableKeySet");
54    }*/
55
56    /*TreeSet<String> treest2 = (TreeSet<String>) turkey.de.
57    Iterator itr2 = treest2.iterator();
58    while(itr2.hasNext()){
59        System.out.println(itr2.next()+" descendingKeySet
60    }*/
61    /*NavigableMap<String,String> nympl = turkey.subMap("bi
62    /*NavigableMap<String,String> nympl = turkey.headMap("b
63    /*NavigableMap<String,String> nympl = turkey.tailMap("bi
64
65    /*TreeMap<String,String> mpp= (TreeMap<String,String>)
66
67    /*TreeMap<String,String> mpp= (TreeMap<String,String>)
68
69    //System.out.println(mpp.get("manavgat")+ " AAAAAAABB

```

Main  
 /usr/lib/jvm/java-8-oracle/bin/java ...  
 kahta  
 Your tests is done. Make sure that you test all methods of class!!  
 Process finished with exit code 0

lowerKey() methodu: verilen key değerinden küçük en büyük değeri key değeri olarak return eder.



1 HashMap  
 2 HashTableChaining  
 3 Main  
 4 \_hw7.iml  
 5 External Libraries

```

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```

```

System.out.println(turkey.ceilingKey("kahaaaaa"));
/*System.out.println(turkey.ceilingKey("kahaaaaa"));*/
/*Map.Entry highEnt = turkey.higherEntry("kahaa");
System.out.println(highEnt.getKey()+" "+highEnt.getValue());*/
/*System.out.println(turkey.higherKey("kahaaaaa"));*/
/*Map.Entry Lent = turkey.lastEntry();
Map.Entry Fent = turkey.firstEntry();
System.out.println(Fent.getKey()+" "+Fent.getValue());
System.out.println(Lent.getKey()+" "+Lent.getValue());*/
/*TreeMap<String,String> tMap = (TreeMap<String,String>) turkey.descendi
TreeSet<String> treest = (TreeSet<String>) turkey.navigableKeySet();
Iterator itr = treest.iterator();
while (itr.hasNext()){
    System.out.println(itr.next()+" -> NavigableKeySet");
}
/*TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet();
Iterator itr2 = treest2.iterator();
while(itr2.hasNext()){
    System.out.println(itr2.next()+" descendingKeySet");
}*/
/*NavigableMap<String,String> nympl = turkey.subMap("biga",true,"kadikoy",
/*NavigableMap<String,String> nympl = turkey.headMap("biga",true);*/
/*NavigableMap<String,String> nympl = turkey.tailMap("biga",true);*/
/*TreeMap<String,String> mpp= (TreeMap<String,String>) turkey.subMap("keç

```

Main  
 /usr/lib/jvm/java-8-oracle/bin/java ...  
 aksaray -> NavigableKeySet  
 biga -> NavigableKeySet  
 cekirge -> NavigableKeySet  
 foca -> NavigableKeySet  
 gebze -> NavigableKeySet  
 kadikoy -> NavigableKeySet  
 kahta -> NavigableKeySet  
 kecioren -> NavigableKeySet  
 manavgat -> NavigableKeySet  
 niksar -> NavigableKeySet  
 uskudar -> NavigableKeySet  
 Your tests is done. Make sure that you test all methods of class!!

navigableKeySet() methodu: NavigableSet return eder. Iteratoru ile ascending sırada gezip test ettim.

```
72     */
73
74     /*TreeSet<String> treest2 = (TreeSet<String>) turkey.descendingKeySet();
75     Iterator itr2 = treest2.iterator();
76     while(itr2.hasNext()){
77         System.out.println("descendingKeySet  ->"+itr2.next());
78     }*/
79
80     /*NavigableMap<String,String> nvmp1 = turkey.subMap("biga",true,"kadikoy",false);*/
81
82     //NavigableMap<String,String> nvmp1 = turkey.headMap("cekirge",true);
83     //NavigableMap<String,String> nvmp = turkey.tailMap("biga",true);
84
85     TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.subMap("biga","manavgat");
86
87     /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.headMap("kecioren");*/
88
89     //System.out.println(mpp.get("manavgat")+ " AAAAAAAAAABBBBBAAAA");
90
```

Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
subMap -> biga canakkale
subMap -> cekirge bursa
subMap -> foca izmir
subMap -> gebze kocaeli
subMap -> kadikoy istanbul
subMap -> kahta adiyaman
subMap -> kecioren ankara
Your tests is done. Make sure that you test all methods of class!!

Process finished with exit code 0
```

subMap() methodu: verilen iki key değeri arasındaki ilk key değeri dahil olmak üzere ve ikinci key değeri dahil olmamak üzere subMap (SortedMap) return eder.

Map I iteratorü ile gezemediğimden fonksiyonun içinde gezdim ve maine sadece fonksiyonu çağırdım.

```
76         while(itr2.hasNext()){
77             System.out.println("descendingKeySet  ->"+itr2.next());
78         }*/
79
80         NavigableMap<String,String> nvmp1 = turkey.subMap("biga",true,"kadikoy",false);
81
82         /*NavigableMap<String,String> nvmp1 = turkey.headMap("biga",true);*/
83         /*NavigableMap<String,String> nvmp = turkey.tailMap("biga",true);*/
84
85         /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.subMap("kecioren","k");
86
87         /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.headMap("kecioren");*/
```

Main

```
↑ /usr/lib/jvm/java-8-oracle/bin/java ...
↓ subMap -> biga canakkale
subMap -> cekirge bursa
subMap -> foca izmir
subMap -> gebze kocaeli
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

subMap() methodu: aldığı key değerleri arasındaki değerleri altMap olarak return eder verilen key değerlerinin subMap e dahil olup olmayacağı verilen true or false değerlerine göre değişecektir. Navigable Map return eder.

```
85         /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.subMap("biga","manavgat");*/
86
87         /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.headMap("kecioren");*/
88
89         TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.tailMap( fromKey: "kecioren");
90
91         //System.out.println(mpp.get("manavgat")+ " AAAAAAABBBBBAAAA");
92
93         /*System.out.println(turkey.lastKey()+ " LASTKEY");*/
```

Main

```
↑ /usr/lib/jvm/java-8-oracle/bin/java ...
↓ tailMap -> kecioren ankara
tailMap -> manavgat antalya
tailMap -> niksar tokat
tailMap -> uskudar istanbul
Your tests is done. Make sure that you test all methods of class!!
Process finished with exit code 0
```

tailMap() methodu: verilen key değerinden treenin sonuna kadar(halfabetik sıraya göre), verilen key değeride dahil olmak üzere bir SortedMap return eder.

```
79
80      /*NavigableMap<String,String> nvmp1 = turkey.subMap("biga",true,"kadikoy");
81
82      //NavigableMap<String,String> nvmp1 = turkey.headMap("cekirge",true);
83      NavigableMap<String,String> nvmp = turkey.tailMap("biga",true);
84
85      /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.subMap("biga",true,"kadikoy");
86
87      /*TreeMap<String,String> mpp= (TreeMap<String, String>) turkey.headMap("cekirge",true);
88
89      //System.out.println(mpp.get("manavgat")+ " AAAAAAAAAABBBBBAAAA");
90
```

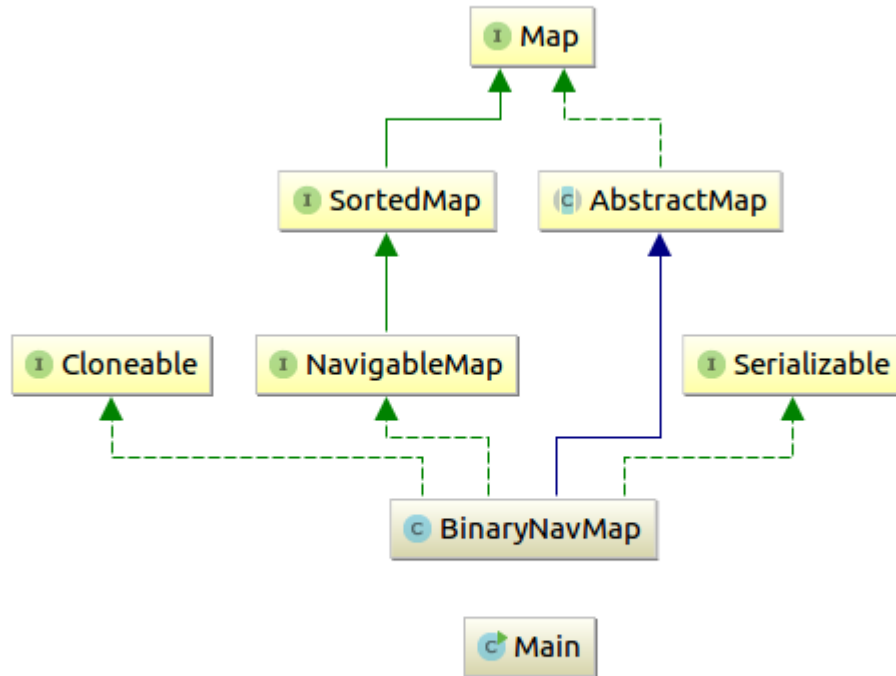
Main

```
/usr/lib/jvm/java-8-oracle/bin/java ...
tailMap -> biga canakkale
tailMap -> cekirge bursa
tailMap -> foca izmir
tailMap -> gebze kocaeli
tailMap -> kadikoy istanbul
tailMap -> kahta adiyaman
tailMap -> kecioren ankara
tailMap -> manavgat antalya
tailMap -> niksar tokat
tailMap -> uskudar istanbul
Your tests is done. Make sure that you test all methods of class!!

Process finished with exit code 0
```

tailMap() methodu: verilen key değerinden itibaren tree nin sonuna kadar olan yeri NavigableMap olarak return eder. Methodun ikinci parametresi verilen key değerinin içerip içermeyeceğini belirler.

### 3-Class Diagram



Methodların gösterildiği class diagramını büyüklüğünden ötürü ekleyemediğimden bu şekilde bir class diagram çizdim.

### 4-Running Command and Result

Test durumları vs. herşey kontrol edilmiştir. Projeyi direkt olarak çalıştırıp sonuçları görebilirsiniz.

Q-2

### 1-Problem Solution Approach

Bu parti kitaptaki kodlarıda kullanarak birşeyler yapmaya çalıştım ancak (*//private HashTableOpen<Entry<K, V>>[] table;*) burayı çözemediğimden ötürü tam yapamadım.

[https://github.com/mstfbngl/141044077\\_hw7](https://github.com/mstfbngl/141044077_hw7)