Gebze Technical University
Computer Engineering

CSE 222
2017 Spring

HOMEWORK 07 REPORT

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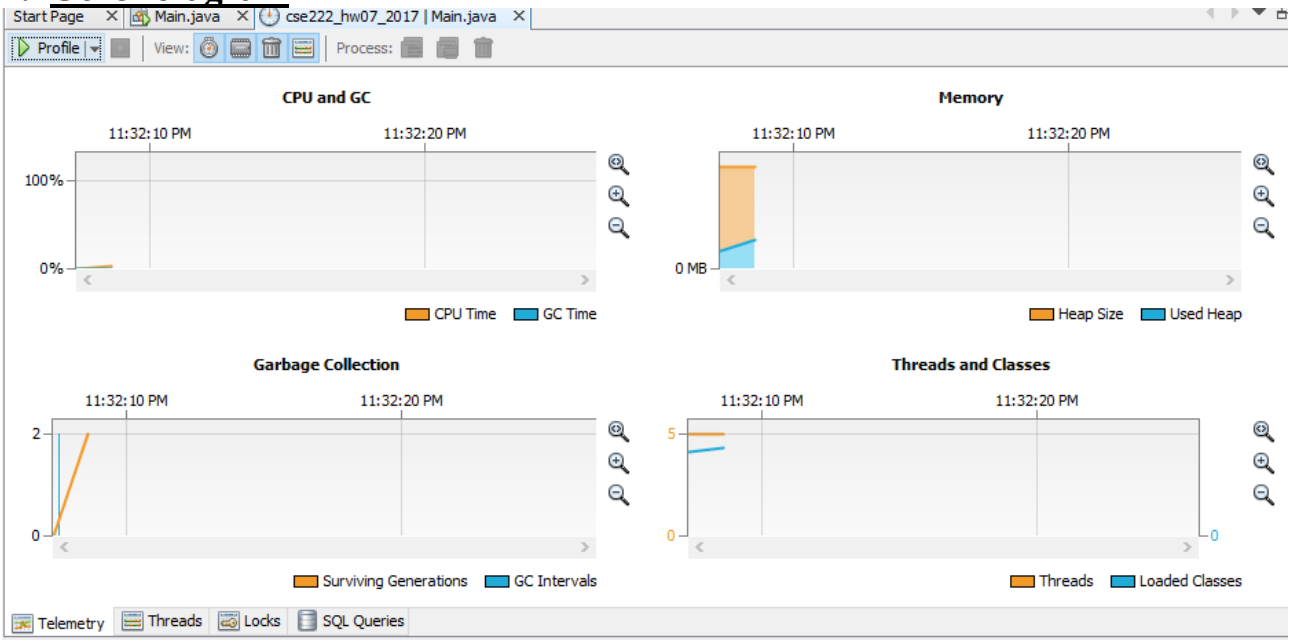
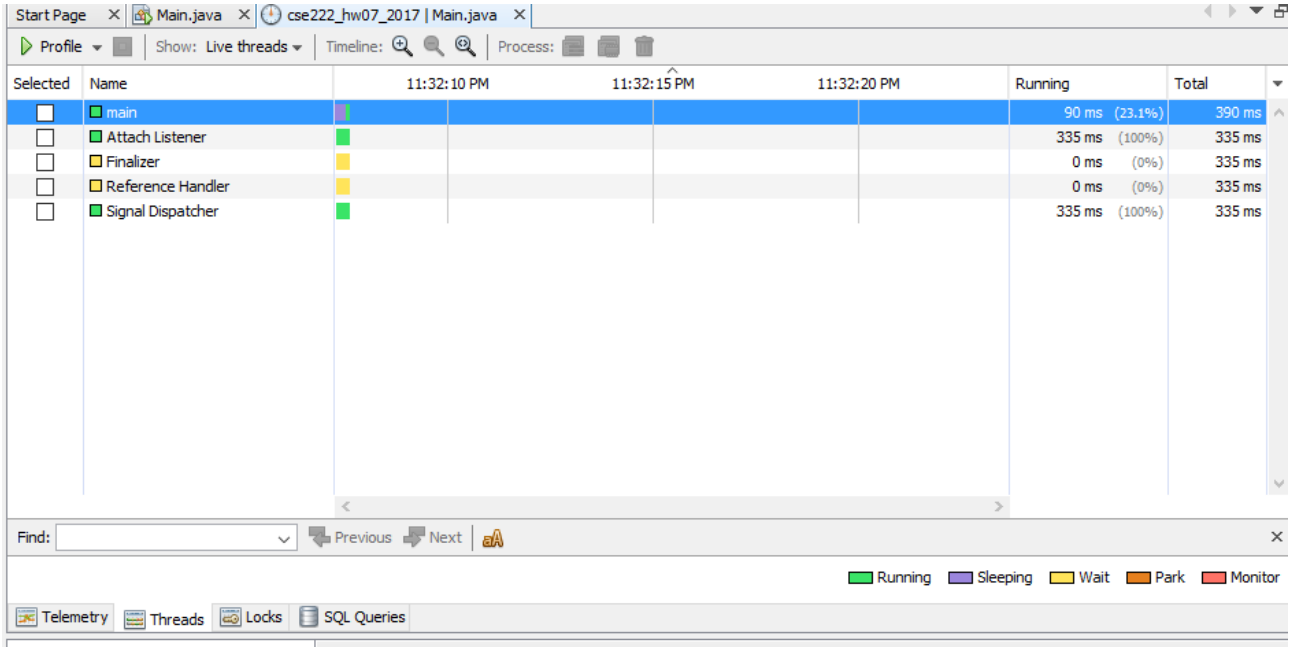
1. Other diagram





2. Problem Solutions Approach

PART_1

BinaryNavMap Class

public class BinaryNavMap<K extends Comparable<K>,V> extends AbstractMap<K,V>

implements NavigableMap<K, V>,Cloneable,Serializablebinary tree have insert method preorder.

BinarySearchTree Class

public class BinarySearchTree<K extends Comparable<K>, V>

extends BinaryTree<K,V>

.....

protected static class Node<K,V> implements Serializable {

// Data Fields

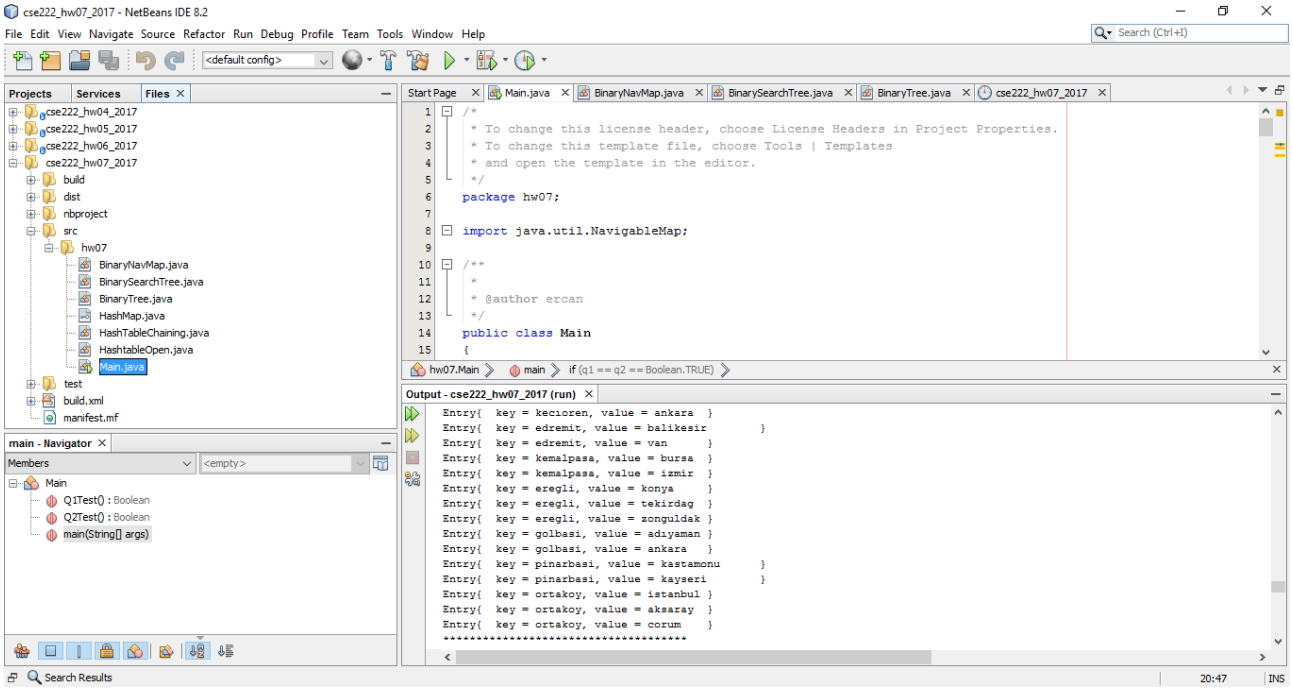
```
        protected K key;            // sorted by key
        protected V val;          // associated value
        protected Node<K,V> left;
        protected Node<K,V> right;    //
left and right subtrees
        protected int size;
```

- public boolean add(K key,V item)

- private Node<K,V> add(Node<K,V> localRoot, K key, V item)

6. Test Cases

For tests use main class and tested all.
After testing result show on screen.



7. Running and Results

```
BinaryNavMap:
**********************************
uskudar->istanbul
  kadıkoy->istanbul
    cekirge->bursa
      aksaray->istanbul
        null
        biga->canakkale
          null
          null
      gebze->kocaeli
        foca->izmir
          null
          null
        null
    niksar->tokat
      kecıoren->ankara
        kahta->adıyaman
          null
          null
        manavgat->antalya
          null
          null
      null
  null

**********************************

turkey.lowerEntry("niksar")          :foca=izmir
turkey.lowerKey("niksar")  :foca
turkey.floorEntry("niksar") :niksar=tokat
turkey.floorKey("niksar")    :niksar
turkey.ceilingEntry("niksar")        :kadıkoy=istanbul
turkey.ceilingKey("niksar"):kadıkoy
turkey.higherEntry("niksar")         :kadıkoy=istanbul
turkey.higherKey("niksar") :kadıkoy
turkey.firstEntry()                  :biga=canakkale
turkey.firstKey()                    :biga
turkey.lastEntry()                   :uskudar=istanbul
turkey.descendingKeySet():[uskudar, niksar, manavgat, kecıoren, kahta, kadıkoy, gebze,
foca, cekirge, biga, aksaray]
turkey.descendingMap()               :{uskudar=istanbul, niksar=tokat, manavgat=antalya,
kecıoren=ankara, kahta=adıyaman, kadıkoy=istanbul, gebze=kocaeli, foca=izmir,
cekirge=bursa, biga=canakkale, aksaray=istanbul}
turkey.tailMap("niksar")      :{niksar=tokat, uskudar=istanbul}
turkey.headMap("niksar")   :{aksaray=istanbul, cekirge=bursa, foca=izmir, gebze=kocaeli,
kecıoren=ankara, manavgat=antalya, niksar=tokat}
```

turkey.subMap("aksaray", "gebze"):{aksaray=istanbul, biga=canakkale, foca=izmir, gebze=kocaeli}
turkey.navigableKeySet() :[aksaray, biga, cekirge, foca, gebze, kadıkoy, kahta, kecıoren, manavgat, niksar, uskudar]
turkey.pollLastEntry() :uskudar=istanbul
turkey.pollFirstEntry() :biga=canakkale
turkey.subMap("uskudar",true,"gebze",false):{aksaray=istanbul, foca=izmir, gebze=kocaeli}
turkey.put("edremit","balikesir");
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
****
Size 1
turkey.put("edremit","van");
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
Entry{ key = edremit, value = van }
****
Size 1
turkey.put("kemalpasa","bursa");
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
Entry{ key = edremit, value = van }
Entry{ key = kemalpasa, value = bursa }
****
Size 2
turkey.put("kemalpasa","izmir");
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
Entry{ key = edremit, value = van }
Entry{ key = kemalpasa, value = bursa }
Entry{ key = kemalpasa, value = izmir }
****
Size 2
turkey.put("ortakoy","istanbul")
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
Entry{ key = edremit, value = van }
Entry{ key = kemalpasa, value = bursa }
Entry{ key = kemalpasa, value = izmir }
Entry{ key = ortakoy, value = istanbul }
****
Size 3
turkey.put("ortakoy","aksaray");
Table Chaning:
****
Entry{ key = edremit, value = balikesir }
Entry{ key = edremit, value = van }
Entry{ key = kemalpasa, value = bursa }
Entry{ key = kemalpasa, value = izmir }
Entry{ key = ortakoy, value = istanbul }
Entry{ key = ortakoy, value = aksaray }
****

```
Size 3
turkey.put("ortakoy","corum");
Table Chaning:
************************************
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir    }
Entry{ key = ortakoy, value = istanbul    }
Entry{ key = ortakoy, value = aksaray    }
Entry{ key = ortakoy, value = corum    }
************************************
Size 3
turkey.put("kecıoren","ankara");
Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara    }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir    }
Entry{ key = ortakoy, value = istanbul    }
Entry{ key = ortakoy, value = aksaray    }
Entry{ key = ortakoy, value = corum    }
************************************
Size 4
turkey.put("pinarbasi","kastamonu");
Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara    }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir    }
Entry{ key = pinarbasi, value = kastamonu    }
Entry{ key = ortakoy, value = istanbul    }
Entry{ key = ortakoy, value = aksaray    }
Entry{ key = ortakoy, value = corum    }
************************************
Size 5
turkey.put("pinarbasi","kayseri");
Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara    }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir    }
Entry{ key = pinarbasi, value = kastamonu    }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul    }
Entry{ key = ortakoy, value = aksaray    }
Entry{ key = ortakoy, value = corum    }
************************************
Size 5
turkey.put("eregli","konya");
Table Chaning:
```

```
**********************************
Entry{ key = kecıoren, value = ankara     }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir     }
Entry{ key = eregli, value = konya }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray     }
Entry{ key = ortakoy, value = corum        }
**********************************
Size 6
turkey.put("eregli","tekirdag");
Table Chaning:
**********************************
Entry{ key = kecıoren, value = ankara     }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir     }
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag        }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray     }
Entry{ key = ortakoy, value = corum        }
**********************************
Size 6
turkey.put("eregli","zonguldak");
Table Chaning:
**********************************
Entry{ key = kecıoren, value = ankara     }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir     }
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag        }
Entry{ key = eregli, value = zonguldak     }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray     }
Entry{ key = ortakoy, value = corum        }
**********************************
Size 6
turkey.put("golbasi","adıyaman");
Table Chaning:
**********************************
Entry{ key = kecıoren, value = ankara     }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir     }
```

```
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag        }
Entry{ key = eregli, value = zonguldak     }
Entry{ key = golbasi, value = adıyaman   }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray      }
Entry{ key = ortakoy, value = corum        }
************************************
Size 7
turkey.put("golbasi","ankara");
Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara      }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir      }
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag        }
Entry{ key = eregli, value = zonguldak     }
Entry{ key = golbasi, value = adıyaman   }
Entry{ key = golbasi, value = ankara       }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray      }
Entry{ key = ortakoy, value = corum        }
************************************
Size 7
turkey.put("biga","canakkale");
Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara      }
Entry{ key = biga, value = canakkale       }
Entry{ key = edremit, value = balikesir    }
Entry{ key = edremit, value = van  }
Entry{ key = kemalpasa, value = bursa    }
Entry{ key = kemalpasa, value = izmir      }
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag        }
Entry{ key = eregli, value = zonguldak     }
Entry{ key = golbasi, value = adıyaman   }
Entry{ key = golbasi, value = ankara       }
Entry{ key = pinarbasi, value = kastamonu        }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray      }
Entry{ key = ortakoy, value = corum        }
************************************
Size 8
turkey.get("edremit")         :balikesir
turkey.get("kemalpasa")       :bursa
turkey.get("ortakoy")         :istanbul
turkey.get("kecıoren")        :ankara
turkey.get("pinarbasi")       :kastamonu
```

```
turkey.get("golbasi")          :adıyaman
turkey.get("eregli")  :konya
turkey.get("biga")    :canakkale

turkey.get("edremit")          :balikesir

turkey.remove("edremit")   :balikesir
turkey.remove("edremit")   :van
turkey.remove("edremit")   :null
Size 7
ToString Table Chaning:
************************************
Entry{ key = kecıoren, value = ankara      }
Entry{ key = biga, value = canakkale       }
Entry{ key = kemalpasa, value = bursa      }
Entry{ key = kemalpasa, value = izmir      }
Entry{ key = eregli, value = konya }
Entry{ key = eregli, value = tekirdag      }
Entry{ key = eregli, value = zonguldak     }
Entry{ key = golbasi, value = adıyaman     }
Entry{ key = golbasi, value = ankara       }
Entry{ key = pinarbasi, value = kastamonu          }
Entry{ key = pinarbasi, value = kayseri    }
Entry{ key = ortakoy, value = istanbul     }
Entry{ key = ortakoy, value = aksaray      }
Entry{ key = ortakoy, value = corum        }
************************************
All test DONE!!!
```

8) Github Link

Hw07 link: https://github.com/erccanuca/cse222_hw07_2017.git