

## Recitation 7

### Practice Problems

**R-10.1** What is the worst-case running time for inserting  $n$  key-value pairs into an initially empty map  $M$  that is implemented with the `UnsortedTableMap` class?

```
52 ✓      public V put(K key, V value) {
53          V old_val = get(key);
54          if (old_val == null) {
55              entrylist.addLast(new UnsortEntry<K, V>(key, value));
56              return null;
57          }
58          else{
59              V returnValue = remove(key);
60              entrylist.addLast(new UnsortEntry<K, V>(key, value));
61              return returnValue;
62          }
63      };
64
65
66 ✓      public V get(K key) {
67          Position<Entry<K,V>> current_pos = entrylist.first();
68          for (int i = 0; i < entrylist.size(); i++) {
69              Entry<K, V> entry = current_pos.getElement();
70              if (entry.getKey() == key) return entry.getValue();
71              current_pos = entrylist.after(current_pos);
72          }
73          return null;
74      };
```

**R-10.2** Reimplement the `UnsortedTableMap` class using the `PositionalList` class from Section 7.3 rather than an `ArrayList`.

Use `ArrayList`, instead of `PositionalList`

**R-10.3** The use of null values in a map is problematic, as there is then no way to differentiate whether a null value returned by the call `get( $k$ )` represents the legitimate value of an entry  $(k, \text{null})$ , or designates that key  $k$  was not found. The `java.util.Map` interface includes a boolean method, `containsKey( $k$ )`, that resolves any such ambiguity. Implement such a method for the `UnsortedTableMap` class.

**C-10.33** Consider the goal of adding entry  $(k, v)$  to a map only if there does not yet exist some other entry with key  $k$ . For a map  $M$  (without null values), this might be accomplished as follows.

```
if ( $M.get(k) == \text{null}$ )  
     $M.put(k, v)$ ;
```

While this accomplishes the goal, its efficiency is less than ideal, as time will be spent on the failed search during the get call, and again during the put call (which always begins by trying to locate an existing entry with the given key). To avoid this inefficiency, some map implementations support a custom method `putIfAbsent( $k, v$ )` that accomplishes this goal. Given such an implementation of `putIfAbsent` for the `UnsortedTableMap` class.