This document provides the necessary instructions for completing the Week 10 lab exercises.

**Exercise 1: Comparator interface**

Create a class that describes Employee objects. Declare the following instance variables:

private String fullName;

private String socialInsuranceNumber;

private Date hireDate;

Provide comparison functionalities by implementing *Comparator* interface. Use employee’s *hire date* to compare employees. Test your implementation.

**Exercise 2: UnsortedPriorityQueue**

Using the *Comparator* implementation from Exercise 1, create an unsorted priority queue, add several employee objects, list all entries, print the key of the first entry, and print the entry with minimal value.

All this code should be in the main method of *UnsortedPriorityQueue.java* class.

**Exercise 3: SortedPriorityQueue**

Using the *Comparator* implementation from Exercise 1, create a sorted priority queue, add several employee objects, list all entries, print the key of the first entry, and print the entry with minimal value.

All this code should be in the main method of *SortedPriorityQueue.java* class.

**Exercise 4: Heaps, Bottom-Up Heap Construction**

Construct a heap for the following list:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 23 | 34 | 28 | 51 | 32 | 17 | 25 |

In this exercise, insert the keys in the given order using breadth-first and then fix it.

Draw all the steps as illustrated in the video example.

**Exercise 5: Heap-Sort**

Perform the heap-sort algorithm to the heap in the Exercise 4 and print results. To do this, you can write the code in the main method of HeapPriorityQueue.java class. Instantiate a HeapPriorityQueue object, populate the heap with keys from Exercise 4, then write a loop which uses removeMin method to return the sorted keys.