King Fahd University of Petroleum & Minerals
College of Computer Science and Engineering
Information and Computer Science Department
ICS 202 – Data Structures
Binary Heaps

Objectives

The objective of this lab is to design, implement and use Binary Heaps.

Outcomes

After completing this Lab, students are expected to:
- Design classes for Binary Heaps.
- Enqueue into and dequeue from Binary Heaps.

Notes

For the purpose of this lab, you may download the attached programs.

Lab Exercises

1. Complete the class **BinaryHeap.java** by providing the code for **percolateUp, percolateDown, buildHeapBottomUp** and **buildHeapTopDown** methods. Test your methods by modifying the provided test class (main method in the **BinaryHeap.java** file). Are you getting the same result using **topDown** and **bottomUp** methods?

2. Patients arrive at a hospital with varying priorites. Each patient has the following attributes: Name (String), Emergency level (integer: 0 is the most urgent and 5 is the least urgent).

   Write a class in Java modeling a **Patient** which extends **Comparable**. Two patients can be compared based on their emergency level. If the emergency level is the same, then their comparison is based on the alphabetical order of their names.

   Now create an array of 10 patients at random. [Provide their names, but generate the emergency level randomly]. (a) Print the array, (b) Create a binary heap of these patients using **enqueue**, (c) Now dequeue these using **dequeueMin** and print them.

   This application illustrates use of a heap as a priority queue.