Lecture 25: Setup Problems
11:00 AM, Apr 3, 2020

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Motivating Question

What are heaps used for in practice?

1 Lecture Preparation Tasks

Prior to lecture, review the study questions from last class and think about the following questions, recording your answers in the Canvas setup quiz for this lecture.

1. Last class, we talked about two approaches to implementing heaps: implementing doubly-linked trees with classes for nodes and leaves, and implementing doubly-linked trees with arrays.
   Which is more efficient in terms of running-time? Why?
   Which is more efficient in terms of space usage? Why?
   Which approach do you prefer? Why?

2. Think back to our original problem of wanting to manage security alerts based on their priorities. The alert class looked like:

   ```scala
   class Alert(val username: String, val descr: String, val severity: Int) {}
   ```

   Assume we wanted to use the following code to create a heap of Alerts.

   ```scala
   object Main extends App {
     Heap h = new Heap[Alert](10)
     val a1 = new Alert("Kathi", "login", 7)
     val a2 = new Alert("David", "saving", 5)
     h.insert(a1)
     h.insert(a2)
   }
   ```

   Which of the Alert, Heap, and Main classes would need to be edited so that the heap orders the alerts by max priority? What kind of edits would be needed?
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