Today’s Outline

• Announcements
  – Midterm #1, this Fri, Oct 19.
  – Assignment #3, due Thurs, Oct 25.

• Today’s Topics:
  – Priority Queues
    • Binary Min Heap - buildheap
    • D-Heaps

Facts about Binary Min Heaps

Observations:
• finding a child/parent index is a multiply/divide by two
• operations jump widely through the heap
• each percolate step looks at only two new nodes
• inserts are at least as common as deleteMins

Realities:
• division/multiplication by powers of two are equally fast
• looking at only two new pieces of data: bad for cache!
• with huge data sets, disk accesses dominate

Representing Complete Binary Trees in an Array

From node i:
left child: right child: parent:

A Solution: $d$-Heaps

• Each node has $d$ children
• Still representable by array
• Good choices for $d$:
  – (choose a power of two for efficiency)
  – fit one set of children in a cache line
  – fit one set of children on a memory page/disk block
Operations on \(d\)-Heap

- Insert : runtime = 
- deleteMin: runtime =