

Today's topic: Pairing heaps and applications. Textbook §§ 23.2.

Next class: Graphs, shortest-path algorithms. Textbook §§ 14.\*

**Midterm exam 2** will be held on Thursday, November 15th.

1. List the members of your group below. Underline your name.
  
2. Consider an initially empty pairing heap that is maintained using a simple one-pass linking strategy in which subtrees are merged one at a time in left-to-right order. Trace the insertion of the keys  $1, 2, \dots, 10$  into this heap. Then perform two *deleteMin* operations, followed by one *decreaseKey* operation that updates 7 to 2. Depict the state of the heap after each operation.

3. Repeat Question 2 using a two-pass linking strategy that merges pairs of subtrees left to right in the first pass and then merges the merged pairs also in left-to-right order in the second pass.

4. Repeat Question 3 using a right-to-left second pass. Explain any differences between this strategy and that of the textbook.

5. Trace the execution of Dijkstra's shortest-path algorithm, with a pairing heap, from source vertex  $A$  on the following graph. Depict the state of the heap after the computation of the shortest path to each vertex.

