

**Instructor: Dr. Sartaj Sahni
Summer 2012**

**Advanced Data Structures
(COP 5536)
Exam 2**

**CLOSED BOOK
60 Minutes**

Name: _____

UFID: _____

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. **For all problems, use only the algorithms discussed in class/text.**
2. **Write your name at the top of every exam sheet.**
3. **Write your answers directly on the exam question sheet.** You may use scrap paper (supplied by your proctor) for work, but these will not be graded.
4. All answers will be graded on correctness, efficiency, clarity, elegance and other normal criteria that determine quality.
5. The points assigned to each question are provided in parentheses.
6. You may use only a pen or a pencil. No calculators allowed.
7. Do not write on the reverse side of the exam sheet.
8. Do not write close to the margins since those areas do not always make it through when faxed.

Name: _____

1. (10 points) For the following min Fibonacci heap, assume that the *ChildCut* field of all nodes is TRUE.

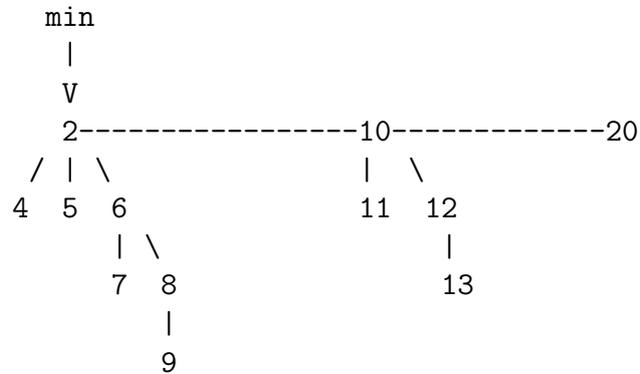


Figure 1. Min Fibonacci heap

- (a) (5) For the min Fibonacci heap of figure 1, perform a *DecreaseKey* operation by changing 8 to 1. Draw the resulting *min Fibonacci* heap, clearly label *ChildCut* values.
- (b) (5) Perform a *Delete* 10 operation on the resulting Fibonacci heap of (a) , clearly label *ChildCut* values. (Show each step)

Name: _____

Continue work here if necessary.

Name: _____

2. (10 points) Start with an empty *two – pass min* pairing heap,
 - (a) (5 points) Insert the following sequence of keys: 5, 8, 4, 12, 3, 14, 20, 15 and 9. Show the pairing heap after each insert.
 - (b) (5 points) Perform a *RemoveMin* operation on the result min heap of (a), show each step.

Name: _____

Continue work here if necessary.

Name: _____

- (10 points) Start with an empty AVL tree, and perform *insert* operations using the following sequence of keys: 1, 3, 7, 6, 4, 5, and 2. Show each step.

Name: _____

Continue work here if necessary.

Name: _____

Continue work here if necessary.

Name: _____

Continue work here if necessary.