Subject: Concept Review: Heaps (Part 1)
Posted by davidmccoy on Sat, 11 Feb 2017 16:32:28 GMT
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This thread is part of the proposed schedule for study for the first exam. Discuss the practice problems here.
View questions here: http://beastie.cs.ua.edu/concepts/cs/al/heaps.html
This thread covers questions 1-15 of heaps.

Work together on the proposed answers to questions on this shared Google Doc (comment reasoning/arguments behind answers)

Full schedule

Subject: Re: Concept Review: Heaps (Part 1)
Posted by davidmccoy on Mon, 13 Feb 2017 17:09:52 GMT
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With a sequence of n insertions into an empty fib heap, there are n number of subheaps in the root list (singletons). Performing one extraction, it doesn't matter which one is the min, there will be singletons, you shouldn't be able to know how many after two extractions, right? Anyone agree?

Subject: Re: Concept Review: Heaps (Part 1)
Posted by lusth on Tue, 14 Feb 2017 13:51:18 GMT
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Hint: After the first extractMin, the fibheap looks just like a binomial heap. What about after the second extractMin?

Subject: Re: Concept Review: Heaps (Part 1)
Posted by SSinischo on Thu, 16 Feb 2017 21:37:29 GMT
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Quote:Consider inserting the consecutive integers from 0 to 12, inclusive and in increasing order, into an empty binomial heap. After deleting the value 5, the value 12 can be found in the subheap whose root has value:
I thought the only supported operations were extracting the minimum value; what is the procedure for deleting a specific value? In this case, 5 is a "leaf" of the biggest subheap (order 3). Does one simply prune the value?

Subject: Re: Concept Review: Heaps (Part 1)
Posted by lusth on Thu, 16 Feb 2017 21:40:06 GMT
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There are two more operations, decreaseKey and delete. Both assume you already have a pointer to the node that is being modified or deleted.

Subject: Re: Concept Review: Heaps (Part 1)
Posted by SSinischo on Thu, 16 Feb 2017 21:52:10 GMT
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So if I understand this correctly, removing a value simply sets the key to null, and keeps swapping values with its (new) parent until the value we are trying to prune is the root of the subheap?

In this particular example, I believe we end up with two subheaps of order 2 and 3, with roots 8 and 0, respectively. The value 12 is in the subheap with the root value 0.

Is this correct?

Subject: Re: Concept Review: Heaps (Part 1)
Posted by SSinischo on Thu, 16 Feb 2017 22:33:06 GMT
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Quote:Consider inserting the consecutive integers from 0 to 12, inclusive and in increasing order, into an empty fibonacci heap. After deleting the value 5, the value 12 can be found in the subheap whose root has value:

I believe the structure should look like the figure below, in which case the answer is 9, which is not a listed option.