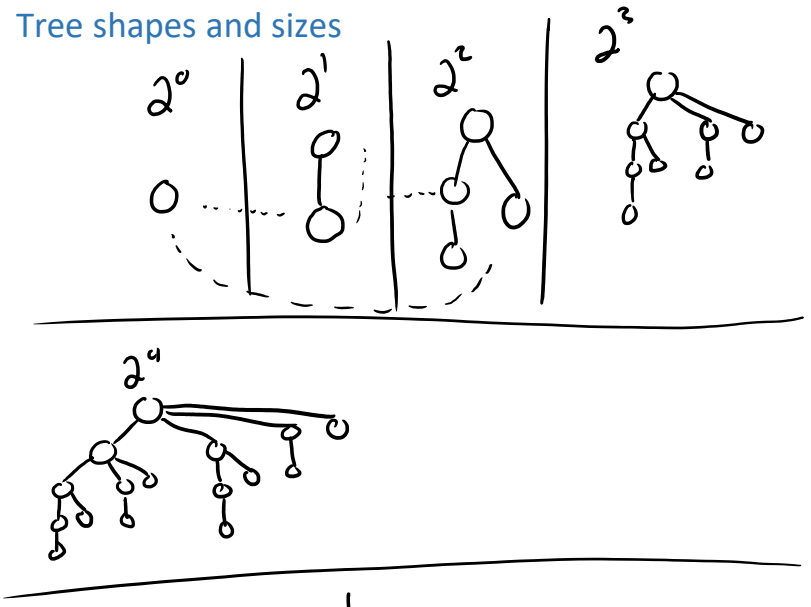
2019-04-04 Binomial Heaps

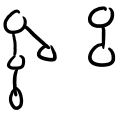
Thursday, April 4, 2019 10:04 AM

- Binomial heaps use linked lists instead of (or in addition to) vectors
- Binomial heaps are comprised of multiple trees
  - We call this collection of trees a forest
- Each tree in a binomial forest has a unique structure
  - Every tree size is a power of 2
  - Tree patterns repeat

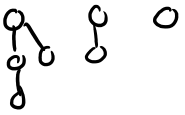
Tree shapes and sizes



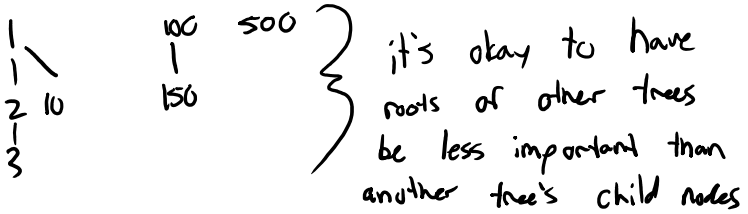
Binomial forest of size 6



Binomial forest of size 7



- Each tree in a forest follows standard heap rules
  - Everything below must be less important



Adding to a binomial heap

1. Add a new tree of size 1 with value
2. If this violates the uniqueness rule of each tree having a unique size, merge trees until uniqueness rule is satisfied

Example add 9 to tree above

a unique size, merge trees until uniqueness rule is satisfied

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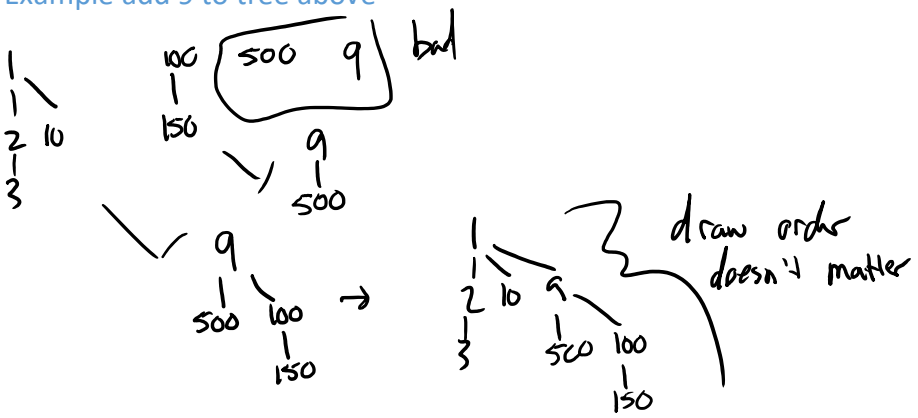

Removing an item from a binomial forest

- Pop off whatever tree with node having the most important value
- If this causes a uniqueness violation, merge until fixed