Data Structures and Algorithms

Fibonacci Heaps

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Glossary

Here are some terms that are used when discussing *Fibonacci* heaps:

- **degree** — the number of children a node has
- **root list** — a circular, doubly-linked list holding the root nodes of the subheaps
- **child list** — a circular, doubly-linked list holding the children of a node in a subheap
- **rootify** — turn a degree array into a root list (in log *n* time)
- **union** — merge the root lists of two Fibonacci heaps creating a new heap (and destroying the original heaps)
- **consolidation** — the process of linking individual subheaps having the same degree into a subheap with one degree larger – the ultimate goal of consolidation is a root list with no two heaps having the same degree – consolidation works via the *degree array*
- **linking** — joining two subheaps together by making one of the subheaps a child of the other – the heap with the larger valued root (for a min heap) becomes the child
- **degree array** — an array with size on the order of the log of the number of nodes in the Fibonacci heap. The array slot with index 0 is a place to hold a subheap of degree zero. The slot with index 1 is a place ot hold a subheap of degree one, and so on – it is used by the consolidation operation to keep track of which subheaps have which degree

Note that the term *rootify* is not found in other Fibonacci heap descriptions.

Fibonacci heap operations

A *Fibonacci* heap has the following properties:

operation	time bound (amortized)
insert	constant
findMin	constant
extractMin	log
union	constant
decreaseKey	constant
delete	log

Next: Inserting into a *Fibonacci* heap

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