Something about Computer Science

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Fibonacci heaps

In this chapter we focus on Fibonacci heaps, which is a data structure that has a forest of rooted trees as opposed to a binary heap that only has one tree [1]. The data structure was invented by Michael L. Fredman and Robert Endre Tarjan and was published in the Journal of ACM in 1989. It has it name because the size of any subtree in a Fibonacci heap will be lower bounded by F_{k+2} where k is the degree of the root and F is the Fibonacci function. Below is the time-complexities of each of the heap operations listed:

Operation	2 Binary heap	Fibonacci heap v1	Fibonacci heap v2
MakeHeap	$\Theta(1)$	$\Theta(1)$	
FindMin	$\Theta(1)$	$\Theta(1)$	
Insert	$\Theta(\lg n)$	$O(1)$	
DeleteMin	$\Theta(\lg n)$	$O(\lg n)$	
DecreaseKey	$\Theta(\lg n)$	$O(1)$	
Delete	$\Theta(\lg n)$	$O(\lg n)$	$\Theta(1)$
Meld	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$

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Bibliography

[1] Robert Endre Tarjan Michael L. Fredman and. Fibonacci heaps and their uses in improved network optimization algorithms. *Journal of the ACM (JACM)*, 34(3):596–615, 1987.