6.897
L13.1
Mar. 17, 2005

Integer sorting: sort n w-bit integers

Comparison sort	$O(n \lg n)$	
Counting sort	$O(n+u)$	
radix sort	$O\left(n \frac{w}{\lg n}\right)$ ($\#$ letters)	$= O(n)$ for $w = O(\lg n)$
van Emde Boas sort	$O(n \lg w)$	$= O(n \lg\lg n)$ for $w = \lg^{O(1)} n$
Andersson, Hagerup, Nilsson, Raman —JCSS 1998	TODAY ✱ $O(n)$ for $w = \Omega(\lg^{2+\varepsilon} n)$ $\forall \varepsilon > 0$	$\Rightarrow O(n \lg\lg n)$ for all w
Problem 7	$O\left(n \lg \frac{w}{\lg n}\right)$	$= o(n \lg\lg n)$ for $w = \lg^{1+o(1)} n$
Han —J. Alg. 2004	$O(n \lg\lg n)$ deterministic (on AC^0 word RAM)	
Han & Thorup —FOCS 2002	$O\left(n\sqrt{\lg \frac{w}{\lg n}}\right)$	
	$= O\left(n\sqrt{\lg\lg n}\right)$	for $w = \lg^{O(1)} n$