1996 Paper 8 Question 6

Advanced Algorithms

(a) Sketch a *Binomial Heap* data structure containing the four values $\{2, 4, 6, 8\}$.

(b) Sketch a Binomial Heap storing the thirteen values $\{1, 3, \ldots, 25\}$.

Note that in parts (a) and (b) the values can be arranged in the heaps in several different ways, while still satisfying all the conditions required of a Binomial Heap. Your heaps will of course store the smallest values at the top, but you should explain how much flexibility there was beyond that and what policy you adopted in placing values. [10 marks]

(c) Form the union of the above two heaps, explaining the steps used and showing where the stored values end up. You do not need to display *all* the pointers in your data structures, and need not include any elaborate discussions of other operations on or applications of binomial trees or heaps. [10 marks]