A standard Young tableau is an $m$ by $n$ array of integers and (possibly) $\infty$ such that each row and each column are ordered.

1. Show that the minimum element of a Young tableau is always the coefficient at position $[1,1]$.

2. Develop an $O(n + m)$ algorithm that removes the minimum from a Young tableau and restructures the array so that it remains a Young tableau. (Hint: The removed element is replaced by an $\infty$ value. You can do this recursively by calling the minimum extraction on an array of size $m$ by $(n-1)$ or an $(m-1)$ by $n$ array.)

3. Develop an $O(n + m)$ algorithm that inserts an element into an existing Young tableau (with at least one $\infty$ value).

4. Show how you can use these functions to sort $n$ numbers in time $O(n\sqrt{n})$. 
