1. Suppose we have eight seats, three boys and five girls. In how many different ways can these people sit such that no two boys are sitting next to each other?

2. What is the explicit form of the following recurrence relation $T(n) = 3T(n/3) + 1; T(1) = 1$.

3. What is the explicit form of the following recurrence relation $T(n) = T(n-1) + \log_2 n; T(0) = 0$. Hint $n!$ is approximately $\sqrt{2\pi n} n^n e^{-n}$.

4. Consider mergesort.

   (a) Give two sorted arrays of size 4 whose merging requires the maximum number of comparisons.

   (b) What is the minimum and maximum number of comparisons needed when merging two nonempty sorted lists of size $n$ into a single list?