

Write your name and code on the back. **Return by 9:05 AM on October 11, 2006.**

1. { 10 points } Given that $2^{k-1} < n \leq 2^k$, prove (using mathematical induction) that the **merge sort** algorithm applied to the set of n numbers uses at most

$f(k) =$ _____ comparisons of the elements of the set.

Fill an appropriate function $f(k) = O(k2^k)$ for which you can prove the estimate. There will be bonus points, if that function is the optimal one.