November 21, 2002 Data Structure II

SOLVE EXACTLY THREE OUT OF THE FOLLOWING FIVE PROBLEMS:

1. 1) Show the result of the following heap after insert 14.

```
   13
   / \  
  21 16
  /   /  
24 31 19 68
/   /  
65 26 32
```

2) Show the result of the heap obtained in (1) after deleting the root.

2. Suppose $T(N)$ is the running time for the mergesort of the data of size $N$. We know

\[
T(1) = 1 \\
T(N) = 2T(N/2) + N
\]

Find a closed formula for $T(N)$

3. Sort 3, 4, 5, 9, 2, 6, 5, 3, 5 using quick sort with medium of three partitioning and a cut off of 3.
4. Give an algorithm to find a maximum spanning tree, suppose the undirected graph is represented by an adjacency list.

```
  B ______ A
    |     |
  C D F
```