Analysis of Algorithms - Scrimmage II

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Please attempt as many problems as you can in class. The scrimmage will not be graded, i.e. there are no points. The solutions are posted at:
`http://www.csee.wvu.edu/~ksmani/courses/fa02/cs320/cs320.html`

1. Write down the order in which the nodes of tree **T** in Figure (1), will be visited, assuming an inorder traversal.

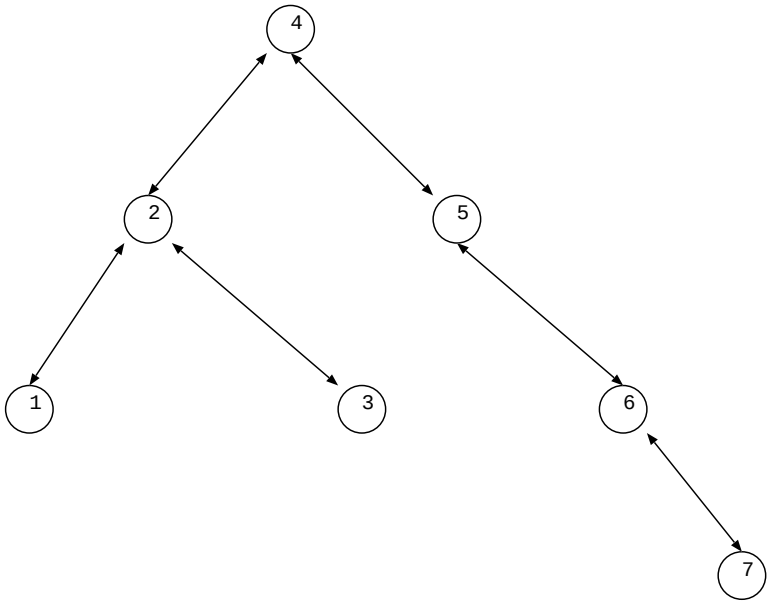

Figure 1: Binary Tree **T**

2. A fair coin is flipped three times. What is the probability that you see more heads than tails?

3. Solve the recurrence:

$$\begin{aligned} T(1) &= 1 \\ T(n) &= T(n-1) + n^2, \ \ n > 1 \end{aligned}$$

4. Write an algorithm for finding the second smallest element in a binary search tree? What is its worst-case running time?

5. Show that the worst-case running time of MERGE-SORT() is $O(n \log n)$, assuming that

$$\begin{aligned} T(1) &= O(1) \\ T(n) &= 2 \cdot T(\frac{n}{2}) + O(n) \end{aligned}$$

6. Show that if $f(n) = \Theta(g(n))$ and $g(n) = \Theta(h(n))$, then $f(n) = \Theta(h(n))$