1. What is the average number of comparison’s to locate one of the items chosen at random in the binary tree below?

```
  e
 / \
c   h
 / \ / \n b d f
 / 
 a
 / 
 g
```

2. If the variables are suitably initialized, and if $i$ remains within appropriate bounds, then the following code implements the stack operations Push and Pop when the stack is represented as an array $V[1\ldots N]$ with an index variable $i$.

**Push:** begin $V[i] := x$ ; $i := i + 1$ ; end

**Pop:** begin $i := i - 1$ ; $x := V[i]$ ; end

Which of the following gives the correct initialization for this stack implementation? (A) $i := 0$ (B) $i := 1$ (C) $i := N - 1$ (D) $i := N$ (E) $i := N / 2$
3. Given a binary tree, where each node has a left and right child pointer, write a procedure to create a linked list (using the left/right pointers) which is ordered in-order. (That is, if it is a binary search tree, one outputs a ordered list.)