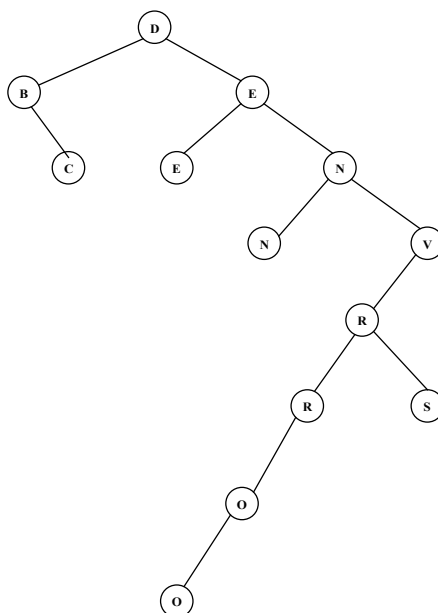


## Intermediate Division Solutions

## 1. Data Structures

The binary search tree is shown on the right. The nodes with only one child are: B, V, R, and O.



1. 4

## 2. Data Structures

The queue is constructed as follows:  
P, PI, PIK, IK, K, KE, KES, KESP, ESP, ESPE, SPE, PE,  
PEA, PEAK. The next popped item is P since stacks are FIFO.

2. P

## 3. Digital Electronics

The circuit translates to:  $\overline{\overline{\overline{A + BC}}C}$   
 $\overline{\overline{\overline{A + BC}}C} = \overline{\overline{\overline{A + BC}} + \overline{C}} = \overline{\overline{A + BC}} + C = \overline{A + BC} + C$   
 $\overline{A + BC} + C = 0 \rightarrow \overline{A} = 0 \wedge C = 0$  Therefore (1, \*, 0) makes it FALSE.

3. (1, \*, 0)

## 4. Digital Electronics

The circuit translates to:  $\overline{A[(\overline{\overline{AB}}(B + C)) + \overline{C}]}$   
 $\overline{A[(\overline{\overline{AB}}(B + C)) + \overline{C}]} = \overline{A[(\overline{\overline{AB}}(B + C))\overline{C}]} = \overline{A[(\overline{\overline{AB}} + \overline{(B + C)})C]}$   
 $AC(\overline{\overline{AB}} + \overline{BC}) = AC\overline{AB} + AC\overline{BC} = \overline{ABC}$

4.  $\overline{ABC}$ 

## 5. LISP

```

(CAR (CDR (CDR '(1 (2) (3 (4))))))
= (CAR (CDR '( (2) (3 (4)))))
= (CAR '((3 (4))))
= (3 (4))
  
```

5. (3 (4))