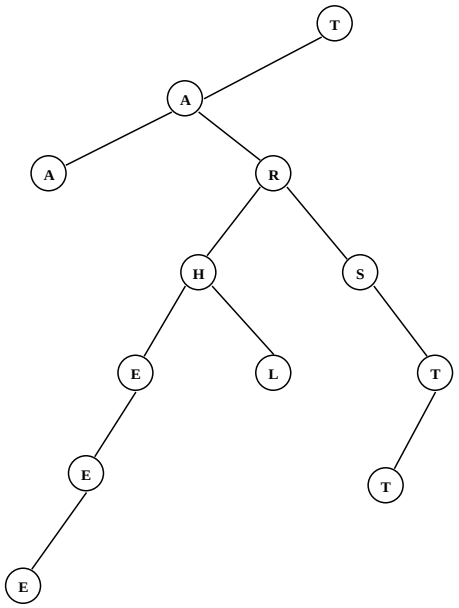
ACSL

2012-2013 **American Computer Science League** **Contest #4**

Intermediate Division Solutions

1. Data Structures

The binary search tree is shown on the right. The depth of the tree is 6.



1. 6

2. Data Structures

The stack is constructed as follows:
R, RA, RAL, RALE, RAL, RA, RAI, RAIG, RAIGH, RAIG, RAIGD, RAIGDU, RAIGD, RAIG, RAIGR, RAIGRH, RAIGR, RAIGRM, RAIGR, RAIG, RAI. The next popped item is I since stacks are LIFO.

2. I

3. Digital Electronics

The circuit translates to: $\overline{\overline{A\overline{B}} + (B + C)}$

$\overline{\overline{A\overline{B}} + (B + C)} = \overline{\overline{A\overline{B}}} * \overline{B + C} = A\overline{B}\,\overline{BC} = 0$

Therefore no triples make the circuit true.

3. NONE

4. Digital Electronics

The circuit translates to: $\overline{((A + \overline{A}B) + \overline{\overline{BC}})\overline{C}}$

$\overline{((A + \overline{A}B) + \overline{\overline{BC}})\overline{C}} = 1 \Rightarrow \overline{\mathrm{C}} = 1 \Rightarrow C = 0$

$\overline{((A + \overline{A}B) + \overline{\overline{BC}})} = 1 \wedge \mathrm{C} = 0 \Rightarrow \mathrm{A} + \overline{\mathrm{A}}\mathrm{B} + \overline{\mathrm{B0}} = 1 \Rightarrow A + \overline{A}B + 1 = 0$

which is impossible. Therefore no ordered triples make it true.

4. 0

5. LISP

(CAR(CAR(CDR(CDR(CDR '(1(2 3)4((5 6)(7 8)9)))))))
= (CAR(CAR(CDR(CDR '((2 3)4((5 6)(7 8)9))))))
= (CAR(CAR(CDR '(4((5 6)(7 8)9)))))
= (CAR(CAR '(((5 6)(7 8)9))))
= (CAR '((5 6)(7 8)))
= (5 6)

5. (5 6)