

American Computer Science League

2018-2019

Contest #3

INTERMEDIATE DIVISION

<p>1. Boolean Algebra Simplify the following Boolean expression:</p> $AB + \overline{A}(B + A) + A$	<p>1.</p>
<p>2. Boolean Algebra Which ordered triple(s) make the following Boolean expression TRUE?</p> $A\overline{B}(A + C) + B(\overline{A}C + \overline{B}C)$	<p>2.</p>
<p>3. Data Structures How many nodes have only one child in the binary search tree for:</p> <p>WAYNENEWJERSEY</p>	<p>3.</p>
<p>4. Data Structures Define the operation REV as follows: reverse the items in the list. Begin with an initially empty stack, perform the operations listed. What is the next item to be popped?</p> <p>PUSH(S), PUSH(U), PUSH(N), POP(X), REV, POP(X), PUSH(R), PUSH(A), PUSH(I), PUSH(N), REV, POP(X), POP(X), REV, POP(X), PUSH(W), PUSH(I), PUSH(N), PUSH(D), POP(X), REV, POP(X), PUSH(C), PUSH(L), PUSH(O), PUSH(U), PUSH(D), PUSH(S), REV, POP(X), POP(X), REV, POP(X), REV, POP(X), POP(X), REV</p>	<p>4.</p>
<p>5. FSA/Regular Expressions What is the length of the smallest string that can be produced by the following regular expression?</p> $ab^*ba(ab \cup aa^*b)a(b \cup ab^*a)a(ab \cup (a \cup b))$	<p>5.</p>