ACSL

2013 - 2014 **American Computer Science League** **Contest #4**

Junior Division

1. Data Structures

List the nodes that are at depth 6 in the binary search tree for :

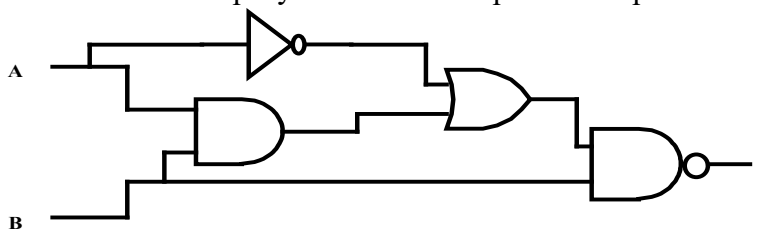
DENVERCOLORADO

2. Data Structures

Given an initially empty stack and the following sequence of operations, what would be the next POPPED element?

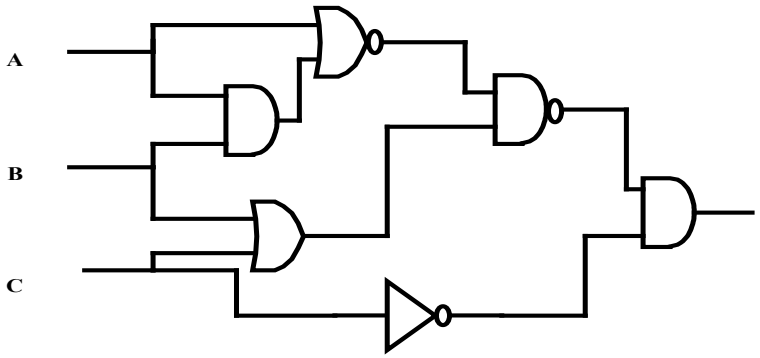
PUSH(R), PUSH(O), PUSH(C), PUSH(K), POP(X), POP(X), PUSH(Y), PUSH(M), POP(X), PUSH(T), PUSH(N), POP(X), POP(X)

3. Digital Electronics Simplify the Boolean expression represented by this circuit.



4. Digital Electronics

Translate this circuit into a Boolean expression. Do not simplify.



5. What Does this Program Do?

What is printed when this program is run?

```
b$="": c$="": d$="": e$="":z=0
a$="kitscatssacksandwiveshowmanyaregoingtostives"
for i=1 to len(a$)
    if mid$(a$, i,1)="k" or mid$(a$,i,1)>"m" then b$=b$+mid$(a$,i,1)
    if mid$(a$, i,1)="i" or mid$(a$,i,1)>"w" then c$=c$+mid$(a$,i,1)
next i
d$=b$+c$
for i = 1 to len(d$)-1
    if mid$(d$, i,1)  > mid$(d$, i+1 ,1) then e$=e$+mid$(d$, i+1,1)
next i
for i= 1 to len(e$)
    if mid$(e$,i,1)="n" then z = z + 1
next i
print z
end
```