

1. What Does This Program Do?

If A\$ is 128 characters in length, what is the length of E\$ after the following program is RUN?

10 B\$ = LEFT\$(A\$, 100)

20 C\$ = MID\$(A\$, 52, 12) + MID\$(B\$,26,13)

30 D\$ = RIGHT\$(C\$, 13)

40 E\$ = B\$ + C\$ + D\$

2. Prefix-Infix-Postfix

Rewrite the following infix expression in postfix:

$$A (B + D) / (C - E)$$

3. Prefix-Infix-Postfix

Given A = 2, B = 4 and C = 8, evaluate the following prefix expression:

$$+ - + A * B C + A C C$$

4. Data Structures

If a binary tree is formed using the letters of the word MONTREAL, what is the internal path length of the tree?

5. Data Structures

Consider an initially empty stack and then execute the following commands on that stack. What element is at the top of the stack?

PUSH (A)

PUSH (B)

POP (X)

PUSH (C)

POP (X)

POP (X)

PUSH (D)

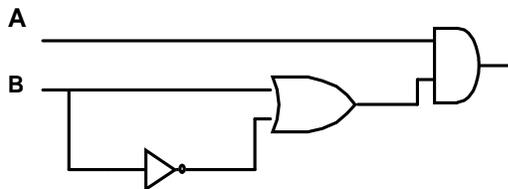
PUSH (E)

PUSH (F)

POP (X)

POP (X)

1. Digital Electronics



List all of the following statements that are true about the circuit above.

- a. It is TRUE for all possible inputs.
- b. It is FALSE for all possible inputs
- c. It is TRUE only when the two inputs are different.
- d. It is sometimes TRUE when the two inputs are different.
- e. It is FALSE whenever B is TRUE.

2. Prefix/Postfix

Convert the following postfix expression into prefix.

AAB + CAB / - / *

3. Prefix/Postfix

The volume of a sphere is given by the formula $V = \frac{4}{3} \pi R^3$. Translate the formula, as written above, into prefix.

4. Data Structures

Consider the following operations on an initially empty queue. If a POP is now performed, what value would be popped?

- | | |
|----------|----------|
| PUSH (B) | PUSH (D) |
| PUSH (I) | POP (X) |
| PUSH (N) | PUSH (S) |
| POP (X) | POP (X) |
- (Note: An arrow points from the POP (X) in the second column to the POP (X) in the first column.)*

5. Data Structures

Insert the key "VULCAN" into the following binary search tree.

What is the new external path length?

