1. **What Does This Program Do?**

   LEN (B$) = 100
   LEN (MIDS(A$,52,12)) = 12
   LEN (MIDS(B$,$26,13)) = 13
   LEN (C$) = 12 + 13 = 25
   LEN (D$) = 13
   LEN (E$) = 100 + 25 + 13 = 138

   1. 138

2. **Prefix-Infix-Postfix**

   A ( B + D ) / ( C – E ) translates as follows:
   A * (B D +) / (C – E) = ABD + * C E - /
   A * (B + D) / (C – E) = A * (B D +) / (C – E) =
   (A B D +) / (C E –) = ABD + * C E - /

   2. ABD + * C E - /

3. **Prefix-Infix-Postfix**

   Converting + - + A * B C + A C C to infix gives:
   + - + A (B * C) (A + C) C = ((A + B C) – (A + C)) + C =
   (A + B C) – (A + C) + C. Substituting the given values gives:
   (2 + 4 * 8) – (2 + 8) + 8 = 34 – 10 + 8 = 32

   3. 32

4. **Data Structures**

   The tree is formed as shown and has an internal path length of 13.
   13 = 2(1) + 4(2) + 3

   4. 13

5. **Data Structures**

   A stack processes commands in LIFO order (Last In – First Out).
   The five items POPPED in order are B, C, A, F and E. The only item
   left in the stack is D.

   5. D
6. Digital Electronics
The circuit translates to $A(B + B)$. This simplifies to $A$. The circuit is TRUE for (1, 0) and (1, 1). It is FALSE for (0, 1) and (0, 0).

7. Prefix/Postfix
The given expression converts to infix as follows:

$$A \left( \frac{(A + B)}{(C - (A / B))} \right)$$

This converts to prefix as follows:

$$* A / + AB - C / AB$$

8. Prefix/Postfix
Converting the formula to infix produces the following:

$$V = \frac{4}{3} \times \pi \times R \uparrow 3$$

This converts to prefix as follows

$$= V ** / 4 3 \pi \uparrow R 3$$

9. Data Structures
The following is the result after each operation:

B, BI, BIN, IN, IND, ND, NDS, DS
The next item to be popped would be the D

10. Data Structures
Vulcan becomes the right child of VENUS. The values to be added are:

$$2 + 3 + 3 + 3 + 4 + 4 + 4 + 4 = 30$$