

Pseudocode Tracing Method

Do not solve pseudocode by intuition. Use trace tables.

Standard trace table

Use this layout:

```
Step | i | j | x | y | condition | output
```

Only track variables that change.

Method

1. Read full code once.
2. Identify variables and initial values.
3. Identify loop condition.
4. Trace each iteration.
5. Stop exactly when condition fails.
6. Write final output.

Example 1: Simple loop

```
SET x = 1
SET sum = 0
WHILE x <= 5
    SET sum = sum + x
    SET x = x + 1
END WHILE
DISPLAY sum
```

Trace:

Iteration	x before	sum after	x after
1	1	1	2
2	2	3	3
3	3	6	4
4	4	10	5
5	5	15	6

Output: 15

Example 2: Update order

```
SET a = 2
SET b = 3
SET a = a + b
SET b = a - b
DISPLAY a, b
```

Trace:

- initially a=2, b=3
- $a = 2+3 = 5$
- $b = 5-3 = 2$

Output: 5, 2

Common mistake: using old value of a after it has changed.

Example 3: Integer division

```
SET x = 17
SET y = x / 5
SET z = x % 5
DISPLAY y, z
```

If integer division is used:

- $17 / 5 = 3$
- $17 \% 5 = 2$

Output: 3, 2

Example 4: WHILE vs REPEAT UNTIL

```
SET x = 10
WHILE x < 5
    DISPLAY x
END WHILE
```

Output: nothing.

```
SET x = 10
REPEAT
```

```
DISPLAY x
UNTIL x < 5
```

Output: 10 once, because repeat-until executes before checking.

Fast error checklist

Before selecting answer:

- Did the loop include last value?
- Was division integer?
- Was variable updated before display?
- Did AND / OR change the condition?
- Did array index start at 0 or 1?
- Was the recursive base case reached?