Exercise 1: Sentinel Value Program

START

DECLARE total\_sum AS INTEGER = 0

DECLARE number AS INTEGER

DISPLAY "Enter numbers repeatedly. Enter '0' to stop."

DO

DISPLAY "Enter a number: "

INPUT number

IF number != 0 THEN

total\_sum = total\_sum + number

END IF

WHILE number != 0

DISPLAY "The total sum of entered numbers is: ", total\_sum

END

**Walkthrough Example**:

1. Input: 5 → total\_sum = 0 + 5 = 5
2. Input: 10 → total\_sum = 5 + 10 = 15
3. Input: -3 → total\_sum = 15 - 3 = 12
4. Input: 0 → Loop exits, display: "The total sum of entered numbers is: 12"

Exercise 2: Retirement Planning Tool

START

PROMPT "Enter years until retirement: "

INPUT years\_until\_retirement

PROMPT "Enter annual savings amount: "

INPUT annual\_savings

CALCULATE total\_savings = 0

FOR i = 1 TO years\_until\_retirement

total\_savings = total\_savings + annual\_savings

ADD simple\_interest = total\_savings \* 0.03

total\_savings = total\_savings + simple\_interest

PROMPT "Projected savings at retirement: " + total\_savings

PROMPT "Retirement duration in years (up to 30): "

INPUT retirement\_years

INITIALIZE remaining\_balance = total\_savings

INITIALIZE schedule = []

FOR j = 1 TO retirement\_years

CALCULATE annual\_interest = remaining\_balance \* 0.03

remaining\_balance = remaining\_balance + annual\_interest - 60000

IF remaining\_balance <= 0 THEN

PRINT "Savings depleted in year " + j

BREAK

ENDIF

APPEND {Year: j, Remaining Balance: remaining\_balance} TO schedule

OUTPUT schedule

END

**Walkthrough Example**:

* Input: Years until retirement = 20, Annual savings = $10,000
* Initial balance: $200,000 (approx. with interest)
* Year 1:
  + Starting balance: $200,000
  + Interest earned: $6,000
  + Ending balance: $146,000
* Continue calculating until balance is depleted or 30 years pass.