

Solutions

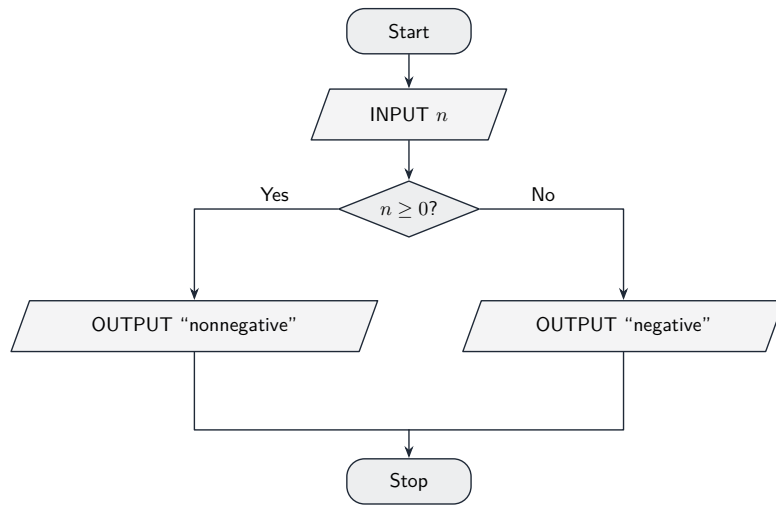
2.1

Successive totals are 1, 3 and 6. Correct repeated-update method earns M1. Final output 6.

2.2

After comparing 1, smallest becomes 1; comparing 4 leaves it at 1. Correct update/retain sequence. Final minimum 1.

■ 2.3 Flowchart



2.4

First middle is 3, value 11. Since 14 is greater, set low to 4; next middle is 5, value 17. Set high to 4; next middle is 4, value 14, found. The compared middle indices are 3, 5, 4.

3.1

(a) The original loop adds 1, 2 and 3. It outputs 6 rather than 10.

(b) The strict condition excludes n . Use i less than or equal to n .

(c) Correct output for 4 is 10. For 0, the corrected loop executes zero times and outputs the initial total 0. The input restriction excludes negative and noninteger n .

3.2

(a) First remainder is $48 \text{ MOD } 18 = 12$, giving pair (18,12). Next remainder $18 \text{ MOD } 12 = 6$ gives (12,6). Final remainder $12 \text{ MOD } 6 = 0$ gives (6,0), so output 6.

(b) The remainder must use the old a and b ; overwriting them first changes the division. A temporary r preserves it.

(c) For positive b , the new nonnegative remainder is strictly smaller than b . A strictly descending sequence of nonnegative integers reaches zero, so the procedure terminates. Euclidean remainder replacement preserves common divisors, and the final output is the greatest common divisor.

(d) The zero test immediately outputs a without taking MOD by zero.