

Example of Countdown: Search to combine a set of numbers with basic arithmetic operations to reach a target number.

### Problem

You will be given four numbers and a target number, your task is to find a way to use all four numbers exactly once, along with the basic operations (+, -, \*, /), to reach the target number.

Numbers: [44, 48, 35, 6]

Target: 25

### Solving Procedure

Initial number set: [44, 48, 35, 6], target: 25. Options for choosing two numbers: [(44, 48), (44, 35), (44, 6), (48, 35), (48, 6), (35, 6)].

- Pick two numbers (44, 48) (numbers left: [35, 6]). Try possible operations.
  - Try  $48 + 44 = 92$ . Add 92 to the number set. Current number set: [92, 35, 6], target: 25. Options for choosing two numbers: [(92, 35), (92, 6), (35, 6)].
  - Pick two numbers (92, 35) (numbers left: [6]). Try possible operations.
    - Try  $92 + 35 = 127$ . Add 127 to the number set. Current number set: [127, 6], target: 25, just two numbers left.
      - Try  $127 + 6 = 133$ . Evaluate  $133 \neq 25$ , drop this branch.
      - Try  $127 - 6 = 121$ . Evaluate  $121 \neq 25$ , drop this branch.
      - Try  $127 * 6 = 762$ . Evaluate  $762 \neq 25$ , drop this branch.
      - Try  $127 / 6 = 21.2$ . 21.2 is a decimal, drop this branch.
    - Try  $92 - 35 = 57$ . Add 57 to the number set. Current number set: [57, 6], target: 25, just two numbers left.
      - Try  $57 + 6 = 63$ . Evaluate  $63 \neq 25$ , drop this branch.
      - Try  $57 - 6 = 51$ . Evaluate  $51 \neq 25$ , drop this branch.
      - Try  $57 * 6 = 342$ . Evaluate  $342 \neq 25$ , drop this branch.
      - Try  $57 / 6 = 9.5$ . 9.5 is a decimal, drop this branch.
    - Try  $92 * 35 = 3220$ . 3220 exceeds the maximum intermediate result, drop this branch.
    - Try  $92 / 35 = 2.6$ . 2.6 is a decimal, drop this branch.
  - Pick two numbers (92, 6) (numbers left: [35]). Try possible operations.
    - Try  $92 + 6 = 98$ . Add 98 to the number set. Current number set: [98, 35], target: 25, just two numbers left.
      - Try  $98 + 35 = 133$ . Evaluate  $133 \neq 25$ , drop this branch.
      - Try  $98 - 35 = 63$ . Evaluate  $63 \neq 25$ , drop this branch.
      - Try  $98 * 35 = 3430$ . 3430 exceeds the maximum intermediate result, drop this branch.
      - Try  $98 / 35 = 2.8$ . 2.8 is a decimal, drop this branch.
    - Try  $92 - 6 = 86$ . Add 86 to the number set. Current number set: [86, 35], target: 25, just two numbers left.
      - Try  $86 + 35 = 121$ . Evaluate  $121 \neq 25$ , drop this branch.
      - Try  $86 - 35 = 51$ . Evaluate  $51 \neq 25$ , drop this branch.
      - Try  $86 * 35 = 3010$ . 3010 exceeds the maximum intermediate result, drop this branch.
      - Try  $86 / 35 = 2.5$ . 2.5 is a decimal, drop this branch.
    - Try  $92 * 6 = 552$ . Add 552 to the number set. Current number set: [552, 35], target: 25, just two numbers left.
      - Try  $552 + 35 = 587$ . Evaluate  $587 \neq 25$ , drop this branch.
      - Try  $552 - 35 = 517$ . Evaluate  $517 \neq 25$ , drop this branch.
      - Try  $552 * 35 = 19320$ . 19320 exceeds the maximum intermediate result, drop this branch.
      - Try  $552 / 35 = 15.8$ . 15.8 is a decimal, drop this branch.
    - Try  $92 / 6 = 15.3$ . 15.3 is a decimal, drop this branch.
  - Pick two numbers (35, 6) (numbers left: [92]). Try possible operations.
    - Try  $35 + 6 = 41$ . Add 41 to the number set. Current number set: [41, 92], target: 25, just two numbers left.
      - Try  $92 + 41 = 133$ . Evaluate  $133 \neq 25$ , drop this branch.
      - Try  $92 - 41 = 51$ . Evaluate  $51 \neq 25$ , drop this branch.
      - Try  $92 * 41 = 3772$ . 3772 exceeds the maximum intermediate result, drop this branch.
      - Try  $92 / 41 = 2.2$ . 2.2 is a decimal, drop this branch.
    - Try  $35 - 6 = 29$ . Add 29 to the number set. Current number set: [29, 92], target: 25, just two numbers left.
      - Try  $92 + 29 = 121$ . Evaluate  $121 \neq 25$ , drop this branch.
      - Try  $92 - 29 = 63$ . Evaluate  $63 \neq 25$ , drop this branch.
      - Try  $92 * 29 = 2668$ . 2668 exceeds the maximum intermediate result, drop this branch.
      - Try  $92 / 29 = 3.2$ . 3.2 is a decimal, drop this branch.
    - Try  $35 * 6 = 210$ . Add 210 to the number set. Current number set: [210, 92], target: 25, just two numbers left.
      - Try  $210 + 92 = 302$ . Evaluate  $302 \neq 25$ , drop this branch.
      - Try  $210 - 92 = 118$ . Evaluate  $118 \neq 25$ , drop this branch.
      - Try  $210 * 92 = 19320$ . 19320 exceeds the maximum intermediate result, drop this branch.
      - Try  $210 / 92 = 2.3$ . 2.3 is a decimal, drop this branch.
    - Try  $35 / 6 = 5.8$ . 5.8 is a decimal, drop this branch.
  - Try  $48 - 44 = 4$ . Add 4 to the number set. Current number set: [4, 35, 6], target: 25. Options for choosing two numbers: [(4, 35), (4, 6), (35, 6)].
  - Pick two numbers (4, 35) (numbers left: [6]). Try possible operations.

- | - Try  $35 + 4 = 39$ . Add 39 to the number set. Current number set: [39, 6], target: 25, just two numbers left.
  - | - Try  $39 + 6 = 45$ . Evaluate  $45 \neq 25$ , drop this branch.
  - | - Try  $39 - 6 = 33$ . Evaluate  $33 \neq 25$ , drop this branch.
  - | - Try  $39 * 6 = 234$ . Evaluate  $234 \neq 25$ , drop this branch.
  - | - Try  $39 / 6 = 6.5$ . 6.5 is a decimal, drop this branch.
- | - Try  $35 - 4 = 31$ . Add 31 to the number set. Current number set: [31, 6], target: 25, just two numbers left.
  - | - Try  $31 + 6 = 37$ . Evaluate  $37 \neq 25$ , drop this branch.
  - | - Try  $31 - 6 = 25$ . Evaluate  $25 == 25$ , target found!

Now we have found the target, let's trace back the solution:

Final step:  $31 - 6 = 25$

The step before:  $35 - 4 = 31$

The first step:  $48 - 44 = 4$

Output the solution in the required format:

<Solution>

$48 - 44 = 4$

$35 - 4 = 31$

$31 - 6 = 25$

</Solution>