

Algorithms Lab

Exercise – Maximize it!

Your company often needs to solve simple optimization problems of two types.

$$\begin{array}{ll} (1) & \max b \cdot y - a \cdot x \\ & s.t. \ x, y \geq 0 \\ & \quad x + y \leq 4 \\ & \quad 4x + 2y \leq ab \\ & \quad -x + y \leq 1 \\ (2) & \min a \cdot x + b \cdot y + z \\ & s.t. \ x, y, z \leq 0 \\ & \quad x + y \geq -4 \\ & \quad 4x + 2y + z \geq -ab \\ & \quad -x + y \geq -1 \end{array}$$

For any values of parameters a and b , find the optimal value.

Input The input consists of several test sets. Each test set appears on a separate line, consisting of three integers $p \ a \ b$, where p is the type of the problem to solve ($p \in \{1, 2\}$) and a, b are the values of the parameters ($0 \leq a \leq 100, -100 \leq b \leq 100$). The input is terminated by a line containing only 0.

Output For each test set, write on a separate line the optimal value of the problem of type p with parameters a, b , rounded down to the next integer for the maximization problem, and rounded up to the next integer for the minimization problem. If there is no solution, write `no`, and if there are solutions of arbitrarily high value (arbitrarily low for minimization), then output `unbounded`.

Sample Input

```
1 1 1
1 3 -3
2 1 1
2 2 1
0
```

Sample Output

```
0
no
-1
-2
```