

# Codeforces Gym

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## 1 Question 1(Watermelon 800):

Concept: Parity of addition of odd and even numbers

Let  $n$  be even if  $n = 2k$ . Let  $n$  be odd if  $n = 2k + 1$ .

Hence,

- for  $x, y$  are odd,  $x + y = 2w + 1 + 2z + 1 = 2(w + z + 1)$ , hence  $x + y$  is even (by definition of even numbers)
- for  $x$  is even and  $y$  is odd,  $x + y = 2w + 2z + 1 = 2(w + z) + 1$ , hence  $x + y$  is odd (by definition of odd numbers)
- for  $x, y$  are even,  $x + y = 2w + 2z = 2(w + z)$ , hence  $x + y$  is even (by definition of even numbers)

Concept: LSB of odd numbers is 1.

Let  $x$  be an odd number and  $y$  be an even number. Use this property to check parity fast.

$$x \& 1 = 1 \tag{1}$$

$$y \& 1 = 0 \tag{2}$$