

EllysPopcounts

Everybody knows that Elly is incredibly beautiful. A less know fact is that she is also quite smart. She is in fact so smart that she successfully understood Einstein's Standard Relativity Model while doing her makeup. That's why she works as a TA in the Physics department in her university.

One of her tasks as a TA is to prepare problems for the other students. Many of them are good friends of Elly and she knows that the Standard Relativity Model is not so straight-forward thing for most. That's why she decided to prepare easy SRM problems for them.

The first task in fact has nothing to do with Physics whatsoever. It is the following: Given two integers **L** and **R**, what is the sum of the number of set bits in the binary representations (also known as "popcounts") of all numbers between **L** and **R**, inclusive? You should implement a method that receives the integers **L** and **R** and calculates that.

Notes

- ❖ To get the popcount of a number, first represent it in binary, then count the number of 1s in that representation. For example $\text{popcount}(42) = 3$, since 42 is 101010 in binary, and 101010 has 3 set bits. $\text{Popcount}(1337) = 6$, since 10100111001 has 6 set bits.

Constraints

- ❖ **L** and **R** will be between 1 and 2,000,000,000, inclusive.
- ❖ **L** will be less than or equal to **R**.