

Varun And Binary String Generation

editorial :

Let x_i be the expected length of string when it have i consecutive 0's

For $k=0$, $x_0=0$ no move is required to get 0 consecutive 0's

When we have i consecutive 0's there are two possibilities either

1) we get a 0 , so number of consecutive 0's becomes $i + 1$

2) we get a 1, so number of consecutive 0's become 0

$$x_{i+1} = \frac{1}{2}(x_i + 1) + \frac{1}{2}(x_i + 1 + x_{i+1})$$

$$x_{i+1} = 2(x_i + 1)$$

(degree one recursion equation and base case is $x_0=0$)

$$x_i = 2^{i+1} - 2$$

To compute the Ans for big values of K use binary exponentiation

[Link](#)