Write a function that takes the binary representation of a positive integer and returns the number of

set bits

it has (also known as the [Hamming weight](http://en.wikipedia.org/wiki/Hamming_weight)).

**Example 1:**

**Input:** n = 11

**Output:** 3

**Explanation:**

The input binary string **1011** has a total of three set bits.

**Example 2:**

**Input:** n = 128

**Output:** 1

**Explanation:**

The input binary string **10000000** has a total of one set bit.

**Example 3:**

**Input:** n = 2147483645

**Output:** 30

**Explanation:**

The input binary string **1111111111111111111111111111101** has a total of thirty set bits.

**Constraints:**

* The input must be a **binary string** of length 32.

**Follow up:** If this function is called many times, how would you optimize it?