67. Add Binary

Easy   👍 8239   👎 817   ♡ Add to List   ⬆ Share

Given two binary strings `a` and `b`, return *their sum as a binary string.*

Example 1:

```
Input: a = "11", b = "1"
Output: "100"
```

Example 2:

```
Input: a = "1010", b = "1011"
Output: "10101"
```

We have

$a = "11"$ $b = "1"$

$$
\begin{array}{r}
1\ 1 \\
+\ \ 1 \\
\hline
"1\ 0\ 0"
\end{array}
$$

At first carry = 0

$Sum = a[i] + b[i] + carry$

Getting 0 we will do = $sum\%2 = 0$
if sum = 2

     $carry = sum/2$

$1\%2 = 1$
$2\%2 = 0$

$1/2 = 0$
$2/2 = 1$

$$a[i]$$

$$
\begin{array}{ll}
1 0 & | 0 \\
| 0 & | 1
\end{array}
$$

$$b[i]$$

Carry = 0

Ans "1

$$sum = a[i] + b[i] + 0$$
$$\quad = 0 + 1 + 0 \Rightarrow 1$$

$$ans += sum \% 2 = 1$$
$$carry = sum / 2 = 0$$

```cpp
class Solution {
public:
    string addBinary(string a, string b) {
        int alen=a.length();
        int blen=b.length();

        int i=0,carry=0;

        string ans="";

        while(i<alen || i<blen || carry!=0){
            int x=0;
            if(i<alen && a[alen-i-1]=='1'){
                x=1;
            }
            int y=0;
            if(i<blen && b[blen-i-1]=='1'){
                y=1;
            }
            ans=to_string((x+y+carry)%2)+ans;
            carry=(x+y+carry)/2;
            i+=1;
        }
        return ans;
    }
};
```