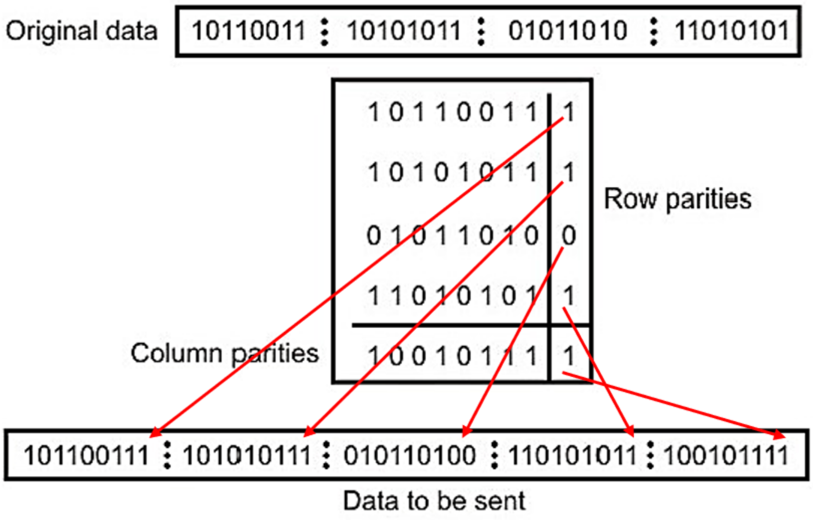
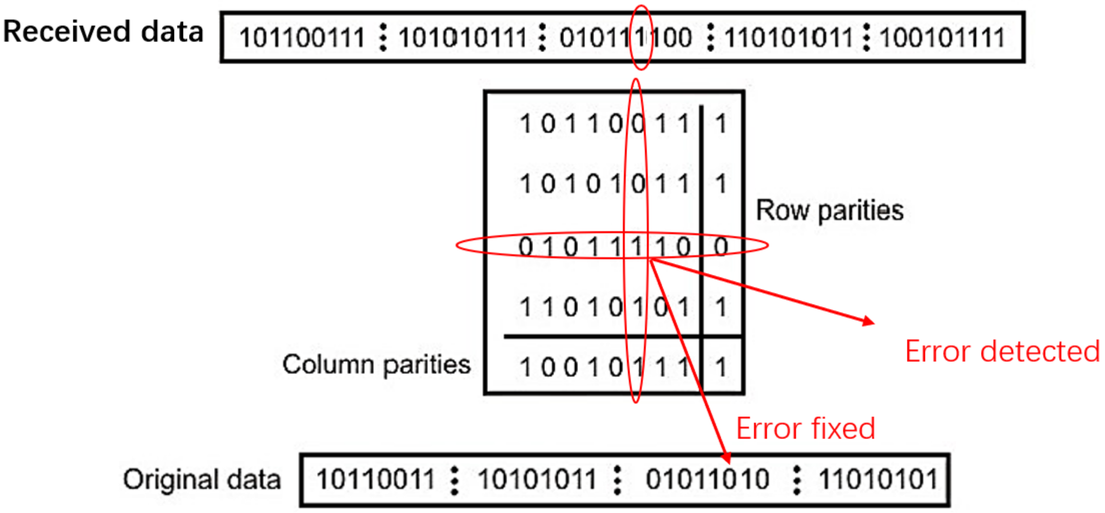
2-dimensional parity

A **parity bit**, is a bit added to a string of binary code. The parity bit ensures that the total number of 1-bits in the string is even or odd, which can be used for error detection. **Two-dimensional** parity check, which organizes the block of bits in the form of a table, parity check bits are calculated for each row and column. Here is how the parity bits are generated, the original data is 32 bit it will be organized as a 4 × 8 table, and generate **even parity bit** for all rows and columns, the data to be sent is 45 bit.



In this problem, you will receive the 45-bits data, and you need to recover the original 32-bits data, for some testcases, there is **one bit error** in the data received (and we ensure only one bit error), but you can still recover the original data.

You can check whether there is a bit error by checking whether all rows and columns satisfy even number of 1-bit, if not, the bit at the wrong row number and wrong column number is the error bit, you should fix it (if it is 0, the correct bit should be 1, if it is 1, the correct bit should be 0)



Example1:

Input:

```
101100111101010111010110100110101011100101111
```

Output:

```
10110011101010110101101011010101
```

Explain: There is no error in the received data, just filter out the original data.

Example2:

Input:

```
101100111101010111010111100110101011100101111
```

Output:

```
10110011101010110101101011010101
```

Explain: 10110011110101011101011**1**100110101011100101111, you should detect the one-bit error and recover the original data 101100111010101101011**0**1011010101