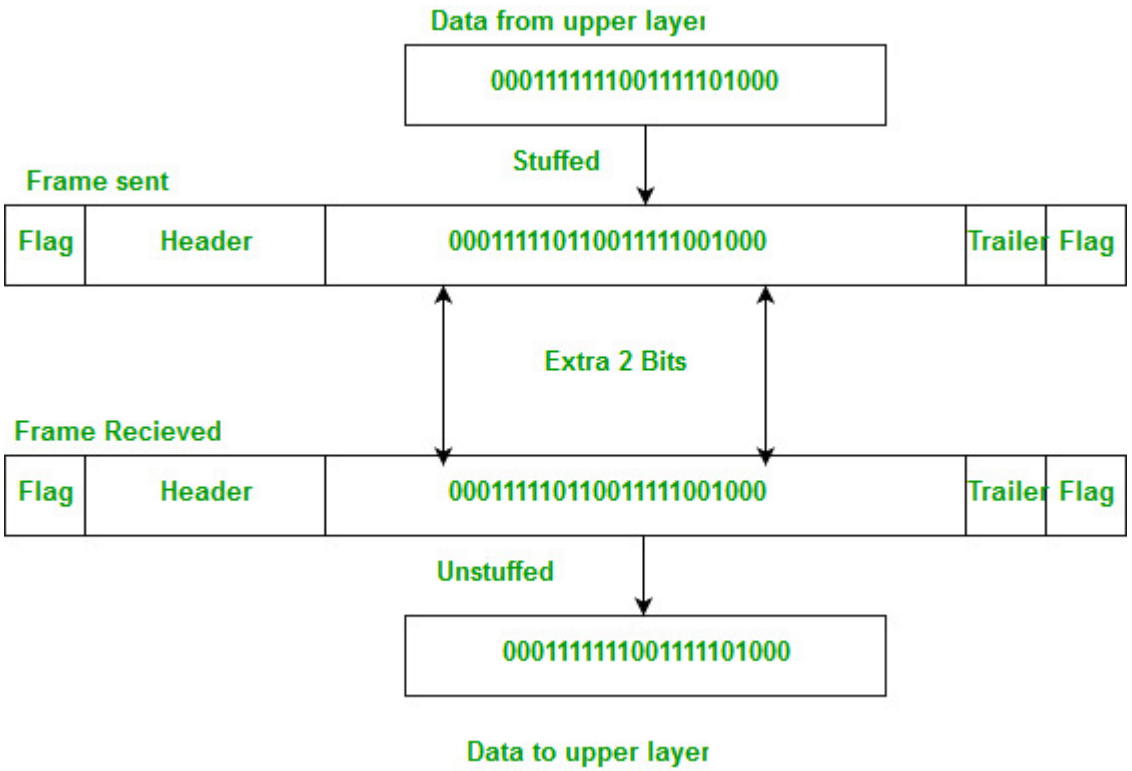
Flag Bits with Bit Stuffing

The data link layer is responsible for something called Framing, which is the division of stream of bits from network layer into manageable units (called frames). Frames could be of fixed size or variable size. In variable-size framing, we need a way to define the end of the frame and the beginning of the next frame.

Bit stuffing is the insertion of non information bits into data. Note that stuffed bits should not be confused with overhead bits.

Overhead bits are non-data bits that are necessary for transmission (usually as part of headers, checksums etc.).



- **Regardless of the intended purpose, the location of the stuffed bits is transmitted to the receiving end of the data transmission, where the extra bits are extracted and sent back to their original form or bit rate. In this way, bit stuffing enables multiple channels to be synchronized, maximizing the use of available bandwidth.**

- **Alternatively, bit stuffing can be used for run-length limited coding, which limits the number of bits that that can pass without a transition. This reduces the number of consecutive bits with the same value in a data stream to ensure reliable transmission and receipt of data.**

- **However, bit stuffing alone does not guarantee that a payload will be free of transmission errors. Instead, it simply ensures that the transmission begins and ends in the right places. For this reason, Ad hoc error detection techniques must be used to check for issues at the end of the frame and, if errors are present, resend the frame.**

- **Bit stuffing is defined by some to include bit padding, which is the addition of bits to a transmission to make the transmission unit conform to a standard size. It is distinct from bit robbing, a type of in-band signaling.**

Producer: Elham Jafari

Computer Engineering