Intro

TCP (Transmission Control Protocol) - Transport layer protocol. It is a reliable, byte stream based protocol.

It is connection oriented - it has official “start” (3-way handshake) and “end” (4-way handshake).

It is reliable - has confirmation of data delivery (ACK packets). Data bytes arrive in order they were sent. Sender is aware of errors?. TCP also has packet retransmission.

It has flow control - TCP adjusts transmission rate (receiver can tell sender to slow down sending data or to speed up)

Sequence and Acknowledgement numbers

In short, sequence numbers track what has been sent and acknowledgement numbers track what has been received. Sequence/Acknowledgement numbers are a measure of **bytes** sent/received.

Initially, SEQ numbers are chosen semi-randomly.

ACK(n) = SEQ(n) + L(n)
SEQ(n+1) = ACK(n)
Here n is the n-th sent packet number. L(n) is the length of n-th sent TCP packet

These rules are true during the data transmission stage, when the connection was successfully established and before connection is terminated.

SEQ number is also a label of the first byte in payload and ACK number minus one is the last byte in payload.