**Useful formulae:**

Utilization:

- For Ethernet: \( u = \frac{1}{1 + 5a} \), where \( a = \frac{T_{\text{prop}}}{T_{\text{trans}}} = \frac{p_{\text{propationDelay}}}{p_{\text{transmissionDelay}}} \)
- For token ring (release after transmission): \( u = \frac{1}{1 + \frac{a}{N}} \)
- For token ring (release after reception): \( u = \frac{1}{1 + a} \)
- For stop-and-wait: \( u = \frac{1 - p}{1 + 2a} \), where \( p \) is the probability that a frame is in error.

Utilization for sliding-window mechanisms with window of \( w \):

- Go back N: \( u = \frac{1 - p}{1 + 2ap} \), if \( w \) fills the pipe, or \( u = \frac{w(1 - p)}{(1 + 2a)(1 - p + wp)} \) otherwise
- Selective reject: \( u = (1 - p) \), if \( w \) fills the pipe, or \( u = \frac{w(1 - p)}{(1 + 2a)} \) otherwise