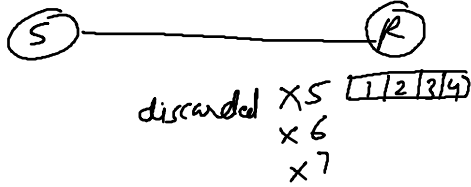
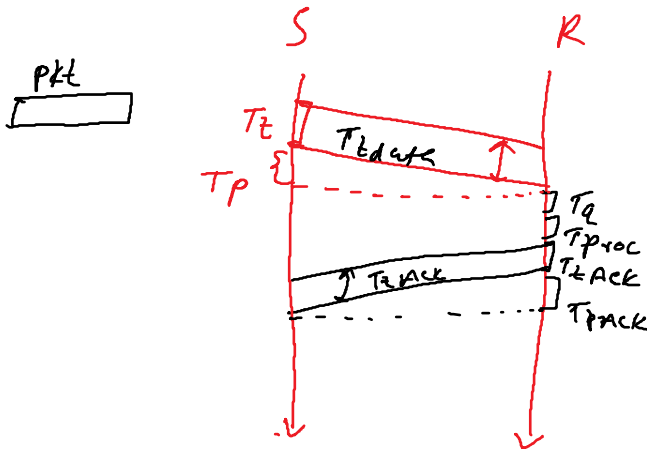
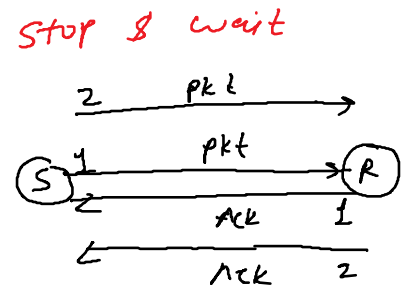


Flow control and error control

Friday, February 18, 2022 8:35 AM



solution
⇒



$$T_t =$$

$$T_p =$$

(1 pkt) delay = *Negligible*

$$= T_{tdata} + T_p + \cancel{T_t} + \cancel{T_{proc}} + T_{tACK} + T_p$$

$$= T_{tdata} + 2T_p + \cancel{T_{tACK}} = 0$$

$$= T_t + 2T_p$$

$$T_t = \frac{L}{B}$$

$$T_p = \frac{d}{S}$$

$$\eta (\text{efficiency}) = \frac{\text{Useful time}}{\text{Total time}}$$

$$= \frac{T_t}{T_t + 2T_p}$$

$$\Rightarrow \frac{1}{1 + 2T_p/T_t}$$

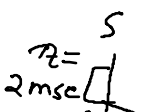
$$\eta \Rightarrow \boxed{\frac{1}{1 + 2a}}$$

where $a = \frac{T_p}{T_t}$

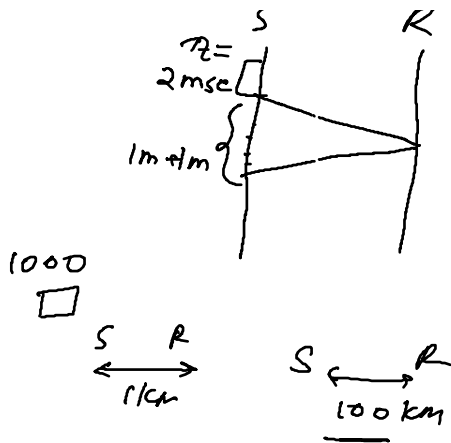
Ex

$$T_t = 2 \text{ msec}$$

$$T_p = 1 \text{ msec}$$



$$\eta = \frac{1}{1 + 2a} = \frac{1}{1 + 2 \times \frac{T_p}{T_t}}$$



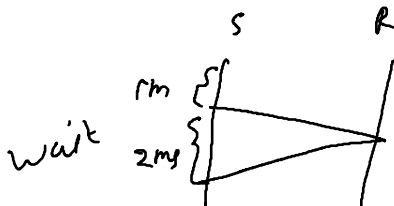
$$\eta = \frac{1}{1+2a} = \frac{1}{1+2 \times \frac{T_p}{T_t}}$$

$$= \frac{1}{1+2 \times \frac{1}{2}}$$

$$= \frac{1}{2} = 50\%$$

$$T_t = 1ms \quad T_p = 1ms$$

$$\eta = \frac{1}{1+2a} = \frac{1}{1+2 \times \frac{1}{1}} = \frac{1}{3}$$



$$\text{ex } \eta > 50\%$$

$$\frac{T_t}{T_t + 2T_p} > \frac{1}{2}$$

$$2T_t > T_t + 2T_p$$

$$T_t > 2 \times T_p$$

$$\frac{L}{B} > 2 \times T_p$$

$$L > 2 \times T_p \times B$$

$$\text{Throughput} = \eta \times B$$

$$B = 4 \text{ Mbps}$$

$$\eta = 50\%$$

$$\text{Throughput} = \frac{1}{2} \times 4$$

$$= 2 \text{ Mbps}$$