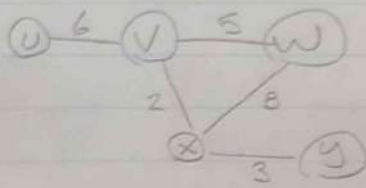


# Last Challenge

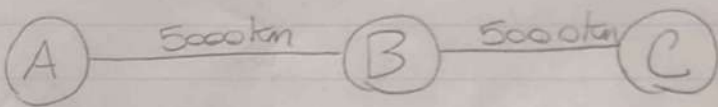
1.



(11, 5, 0, 7, 10)

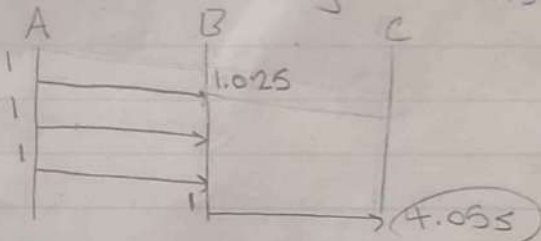
2.

30mb File | two links 5000km ea | trans = 10Mbps  
 prop =  $2 \times 10^8$  m/s | total distance = 10,000 km  
 divided into 3 packets each 10mb



total delay

propagation delay =  $\frac{10,000,000 \text{ m}}{2 \times 10^8 \text{ m/s}} = 0.05 \text{ s}$   
 Transmission delay =  $\frac{10 \text{ MB}}{10 \text{ Mbps}} = 1 \text{ s}$  x 3 packets = 3s



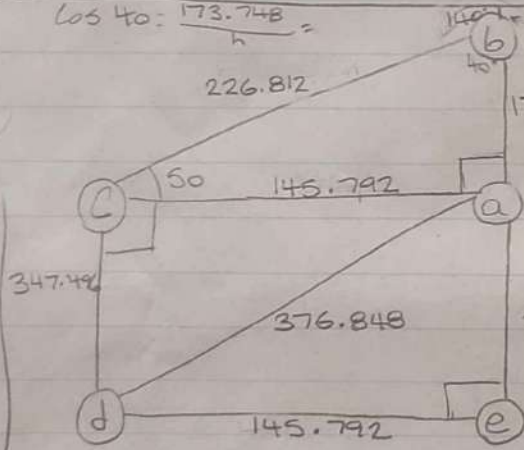
∴ The total delay is 4.05s

to find angles

$$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta}$$

\*Note: this is all assuming that the right angle on a is 90° and that the car

$$\cos 40 = \frac{173.748}{h} =$$



$$\text{max packet} = 80,088 \times 8 = 640,704 \text{ bits}$$

$$S = 2 \times 10^8 \text{ m/s}$$

Share tables every 5s

$$\frac{22.22}{600} = 0.03703 \text{ m/s}^2 \rightarrow 6665.4 \text{ m}$$

$$v_i = 22.22, v_f = 1.389, t = 600 \rightarrow 7082.7 \text{ m} = 173,748.1 \text{ m}$$

$$E \text{ to } A = 2(A \text{ to } B)$$

$$= 347,496.2$$

Transmission delay:  $\frac{L}{R}$

$$BC = \frac{640,704}{5 \times 10^6} = 0.1281408 \text{ s}$$

$$CA = \frac{640,704}{10 \times 10^6} = 0.0640704 \text{ s}$$

$$CD = \frac{640,704}{1 \times 10^6} = 0.640704 \text{ s}$$

$$AD = \frac{640,704}{10 \times 10^6} = 0.0640704 \text{ s}$$

$$DE = \frac{640,704}{4 \times 10^6} = 0.160176 \text{ s}$$

Processing delays to seconds

$$a = 0.01 \text{ s} \quad b = 0.05 \text{ s}$$

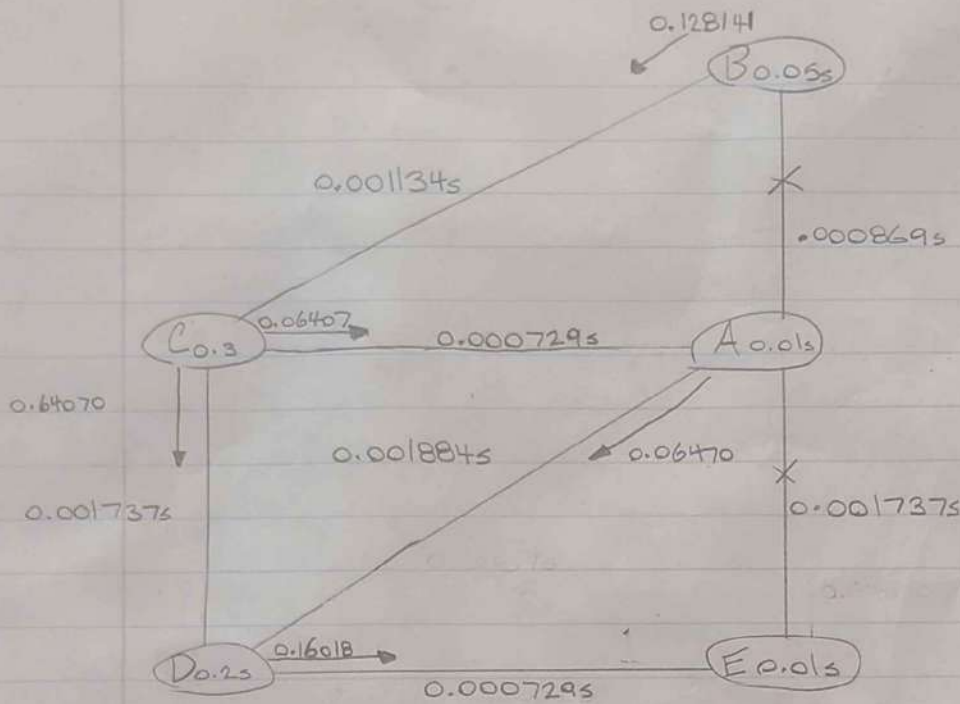
$$c = 0.3 \quad d = 0.2 \text{ s} \quad e = 0.01 \text{ s}$$

$$16 \times 8 \times 200,20 = 2,562,560 \text{ bits}$$

<sup>128</sup> total message size → / max packet length

Need 4 packets to sent

New detailed graph



$T=0$   
all active routes  
are pathed

Total B-C = 0.179275s

Total C-D = 0.942437s

Total D-E = 0.360909s

total packet 1 time = 1.482621s  $\approx 1.5s$

$T=12$

send p1

$T \approx 13.5$

send p2

total same as p1 = 1.482621  $\approx 1.5s$

$T=14$

A activates

New shortest path

Total B-C = 0.179275s

Total C-A = 0.364799s

Total A-D = 0.016584s

Total D-E = 0.360909s

0.981567s  $\approx 1s$

$T=15$   
exchange tables  
send p3

$T=16$

send p4

total same as p3 = 0.981567s  $\approx 1s$

$T=17$

all packets have reached router E.

$\therefore$  At  $T=20$  the last packet that E has received is packet 4. To be exact it was received at  $t=16.928376s$ .