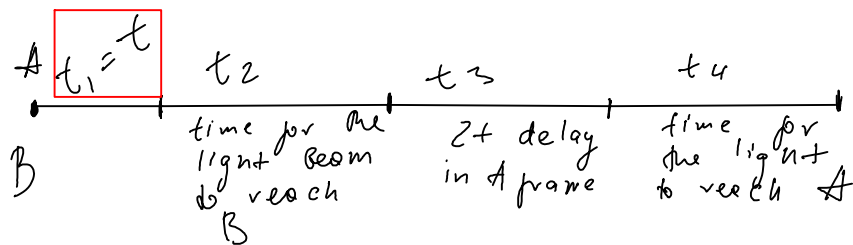


3.



B was travelling at  $v = 0.5c$  for  $t$  seconds, going through a distance

$D = 0.5ct$ , when A flashed the light

$$x_B = 0.5c(t + t_2)$$

$$x_L = ct_2$$

$$\therefore x_L = 0.5c(t + t_2)$$

$$t_2 = t$$

$$\tau' = 2t \quad (\tau' \text{ is } 2t \text{ in B frame})$$

$$\tau' = \frac{t_3 - 0}{\sqrt{3/2}} \Rightarrow 2t = \frac{2t_3}{\sqrt{3}} \Rightarrow t_3 = \frac{t}{\sqrt{3}}$$

$x_B$  when B flashed the light is therefore

$$x_B = 0.5c\left(t + t + \frac{t}{\sqrt{3}}\right)$$

$$\text{The light travels } c \cdot t_4 = 0.5c\left(2t + \frac{t}{\sqrt{3}}\right)$$

$$\therefore t_4 = 0.5\left(2t + \frac{t}{\sqrt{3}}\right)$$

$$\begin{aligned} \therefore \text{Total time} &= t + t + \frac{t}{\sqrt{3}} + t + \frac{t}{2\sqrt{3}} = \\ &= 3t + \frac{3t}{2\sqrt{3}} = t\left(3 + \frac{\sqrt{3}}{2}\right) \end{aligned}$$