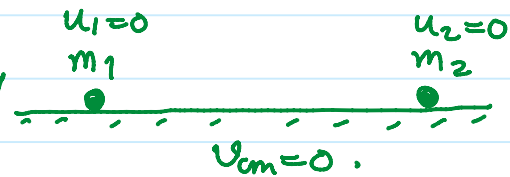


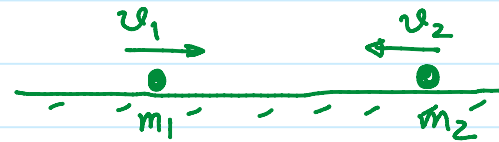
the final value of $\vec{v}_{cm} = 0 \Rightarrow$ cm of the system remains at rest.

Ex:

$m_1 = 2\text{ kg}$ and $m_2 = 3\text{ kg}$ Initially 

$$v_1 = 6\text{ m/s}, v_2 = ?$$

$$\because F^{\text{ext}} = 0, (v_{cm})_{\text{finally}} = 0$$



$$(v_{cm})_{\text{finally}} = \frac{m_1 v_1 + m_2 v_2}{m_1 + m_2}$$

$$0 = \frac{2 \times 6 + 3 \times v_2}{2 + 3} \Rightarrow 0 = \frac{12 + 3v_2}{5}$$

$$0 = 12 + 3v_2 \Rightarrow 3v_2 = -12$$

$$\boxed{v_2 = -4\text{ m/s}}$$