Answer on Question #40897, Physics, Mechanics
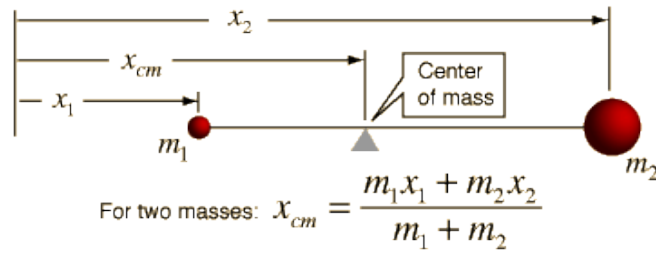
Two persons A and B having masses 50kg and 60kg respectively are sitting at the two extreme to a 4m and long platform of mass 40kg kept on a smooth ice . If they come to middle of the boat then how far does the move the boat move on the ice during the process? (*in cm*)

Solution:

Since there is no external force center of mass of the system should remain in the same point

For two masses: $X_{cm} = \dfrac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$

$$x_{cm} = \frac{50 \cdot (-2) + 60 \cdot 2 + 40 \cdot 0}{50 + 60 + 40} = \frac{2}{15} = 0.1333 \text{ m from centre of boat}$$

If center of mass has not moved then boat must have moved 2/15 m towards 60 kg person.

Answer. 13.33 cm.