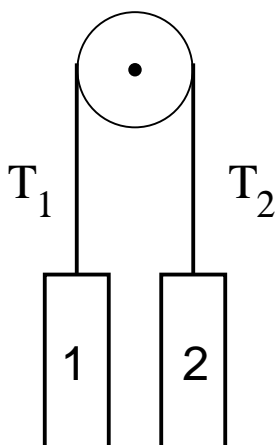


Ex : Case #2 : “Atwood Machine”



Assume: Frictionless pulley,
Massless rope,
 $m_2 < m_1$

Find : a, T

1). Draw “free-body” diagrams to identify the forces.

$$T_1 = T_2 = T$$

$$a_1 = a_2 = a$$

2). Write ΣF components using Newton’s second law.

$$T - m_2g = m_2a \qquad m_1g - T = m_1a$$

○ Add equations to find a :

$$(m_1 - m_2)g = (m_1 + m_2)a, \quad \text{or} \quad a = \frac{m_1 - m_2}{m_1 + m_2}g$$

○ Now, find T :

$$T = m_2(g + a) = m_2g \left(\frac{2m_1}{m_1 + m_2} \right)$$