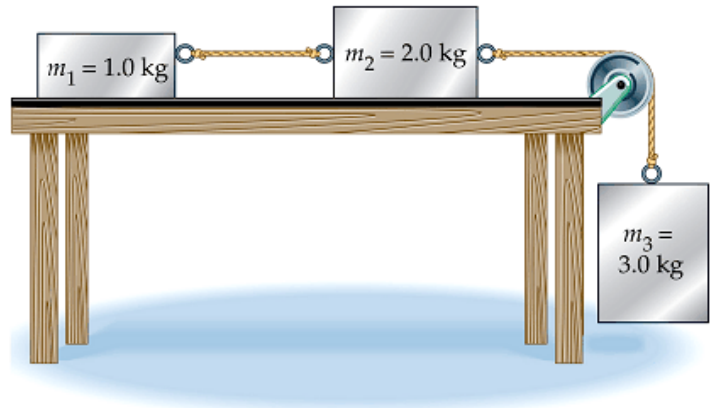
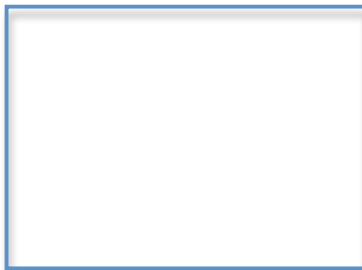


I. Blocks, Strings, and Pulleys [20 pts]

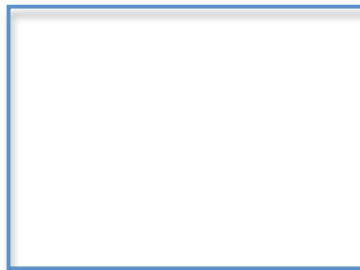
Blocks with masses of $m_1 = 1.0 \text{ kg}$ and $m_2 = 2.0 \text{ kg}$ are connected by a string, supported on a frictionless table, and connected by a string and pulley to a hanging block with a mass $m_3 = 3.0 \text{ kg}$, as shown, and released from rest.



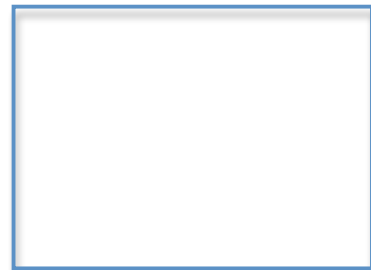
- A. [3 pts] In the space below draw a free-body-diagram for each of the blocks and label force accordingly. Identify the third law pairs on your diagram by connecting the two forces by a dash line.



Block m_1



Block m_2



Block m_3

- B. [3 pts] Write Newton second law for each of the blocks 1, 2, and 3 in terms of specific forces.

Block m_1

Block m_2

Block m_3

- C. [5 pts] What is the acceleration of the system?

Name _____ Student ID _____ Score _____
last first

D. [5 pts] What is the tension T_{12} (in N) in the string connecting blocks 1 and 2?

E. [4 pts] Now suppose that the surface is NOT frictionless. If the coefficient of static friction between the blocks and the surface was $\mu_s = 0.2$, will the blocks move or not? Show your work and explain your reasoning.