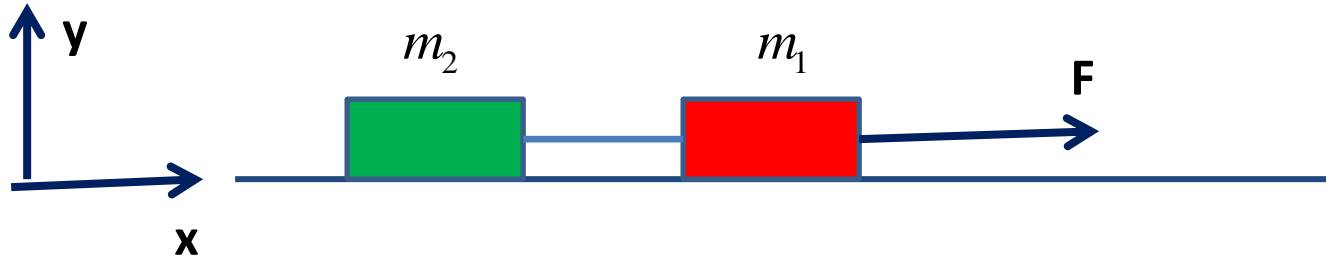
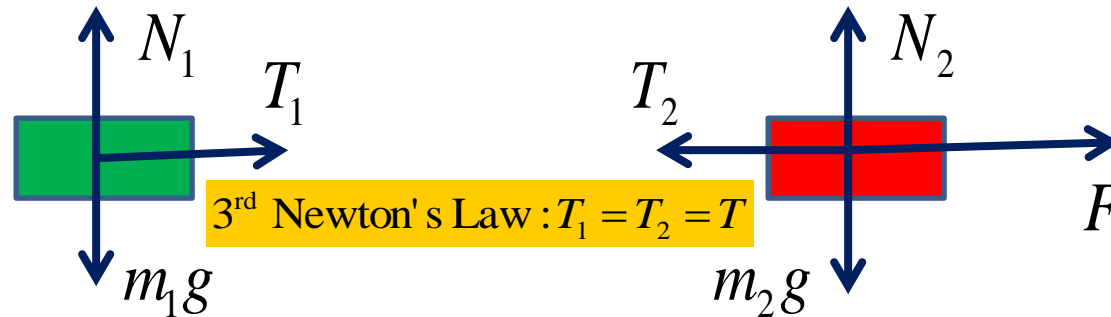


# Free Body Diagram



1. Choose the coordinate system (for each object).
2. Show all forces applied to each object.
3. Write 2<sup>nd</sup> Newton's Law for each object, and each axis.
4. Solve equations to find acceleration.



$x$ -axis:	$T = m_1 a$	$F - T = m_2 a$
$y$ -axis:	$N_1 - m_1 g = 0$	$N_2 - m_2 g = 0$

$$a = \frac{F}{m_1 + m_2}$$

# Homework

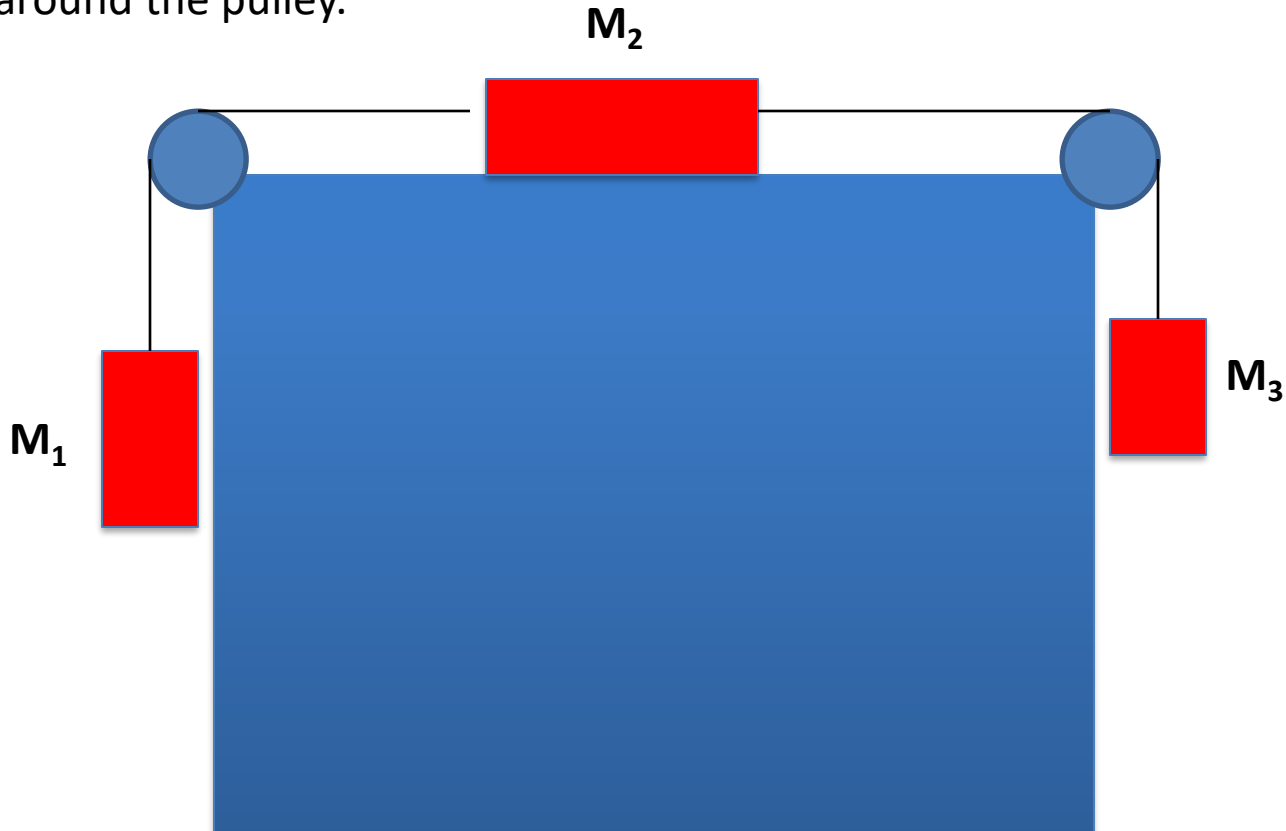
## Problem 0.

Think of a question (about anything) that you would like to get answered in class!

## Problem 1.

Construct free body diagrams, and find accelerations of the blocks in the figure. Masses of the blocks are  $M_1=0.8\text{kg}$ ;  $M_2=1\text{kg}$  and  $M_3=0.5\text{kg}$ .

Note that the tension is different between the two strings, but it does not change as a string goes around the pulley.



## Problem2.

Find acceleration of block “1” in both cases in the Figure. All pulleys are weightless and rotate without friction.

**Important hint:** the accelerations of two blocks in the case (b) are not the same! Imagine that you move block “2” by distance  $x$  upward. How much did the block “1” moved? This consideration will allow you to find the relationship between the two accelerations.

