**P5.9-1)** A clamp holds three identical weights (W = 10 lb) with a force of N_C = 30 lb. What is the maximum upward clamp acceleration which may be attained without the blocks slipping relative to the clamp or each other? Also determine the frictional force between all surfaces at this acceleration. The coefficients of static friction between the blocks and between the blocks and clamp are μ_{sb} = 0.9 and μ_{sc} = 0.6, respectively.
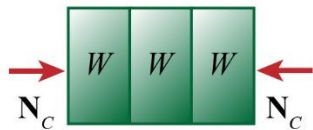

P5.9-1
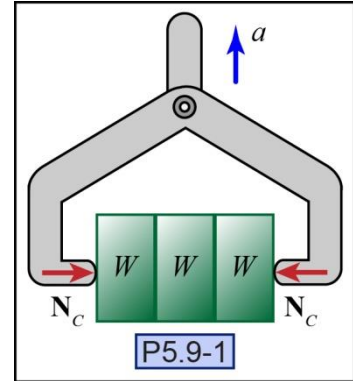
Given:

Find:

Solution:

Draw a free-body diagram of the system as a whole and then for each particle of the system.

Determine the maximum upward static friction force that can occur before the outer blocks slip relative to the clamp.

$F_{fs,max}$ (outer) = _____

Determine the maximum upward static friction force that can occur before the inner block slip relative to the outer blocks.

$F_{fs,max}$ (inner) = _____

Which of the above friction forces control how much acceleration the system can withstand?

Outer   Inner

Calculate the maximum upward acceleration that the system can withstand before the block(s) slip.

Write down the system's or inner block's equation of motion depending on which controls the acceleration.

a = _____