

# Announcements

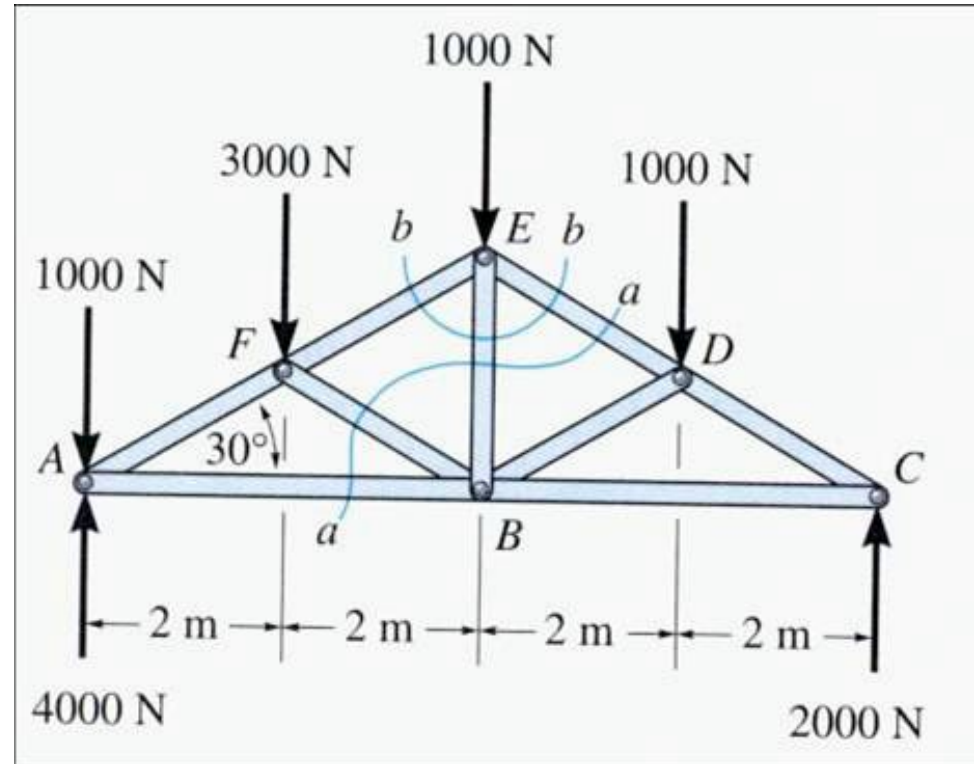
- Quiz 3 retry continues through Saturday.

## □ Upcoming deadlines:

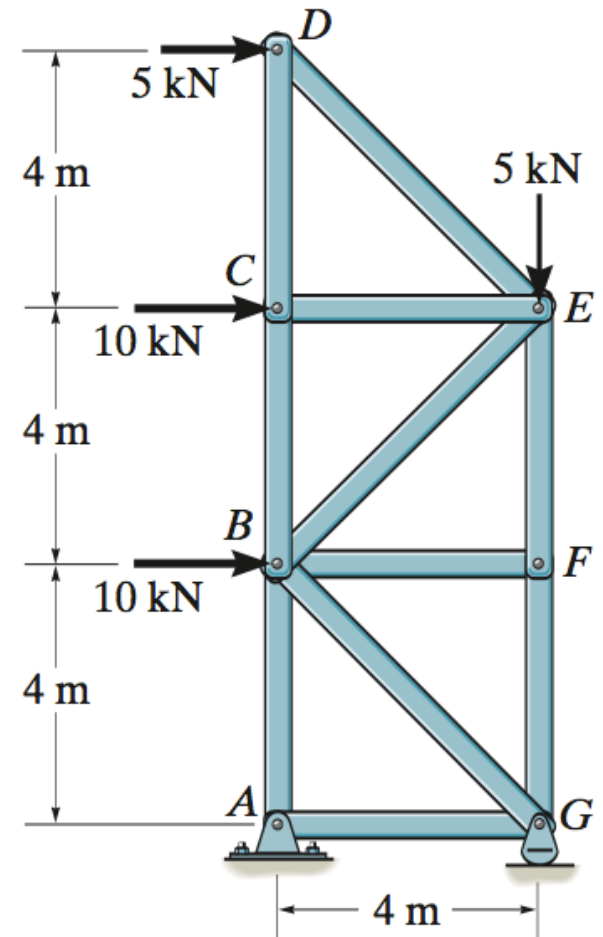
- Friday (3/1) – TODAY!
  - Written Assignment
- Tuesday (3/5)
  - PL HW

# Example

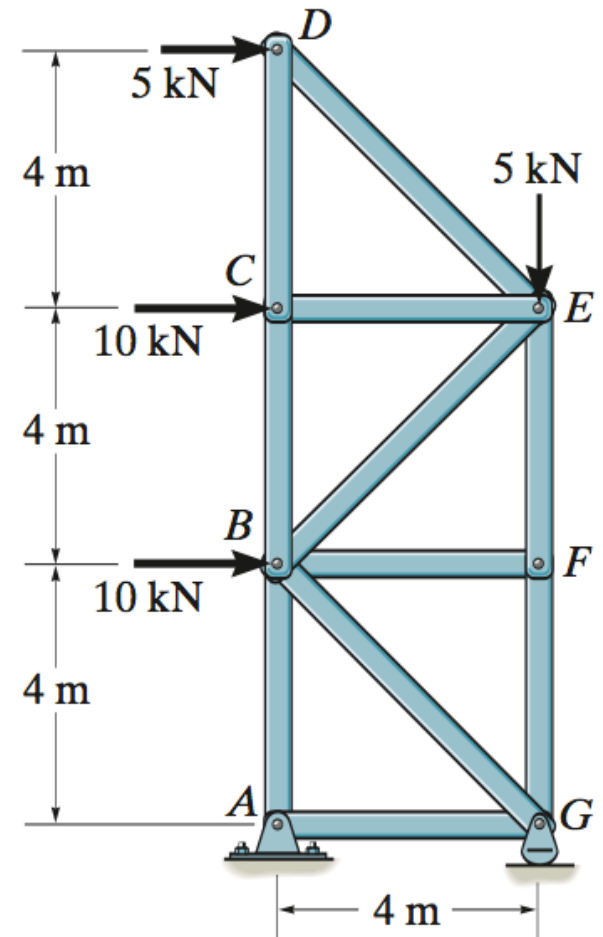
$F_{ED} = 3000 \text{ N}$  in compression, determine  $F_{EB}$ .



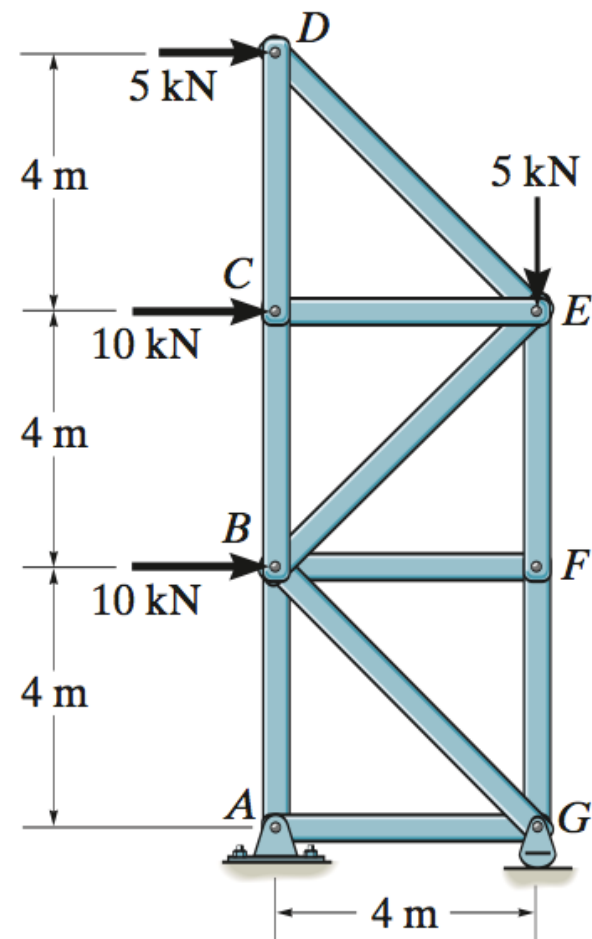
Determine the force in members  $BG$ , and state if the members are in tension or compression.



Determine the force in members  $DE$ , and state if the members are in tension or compression.



Determine the force in members  $BF$ , and state if the members are in tension or compression.



# Frames and machines

Frames and machines are two common types of structures that have at least **one multi-force member** (Recall that trusses have nothing but two-force members).



**Frames** are generally **stationary** and used to support various external loads.

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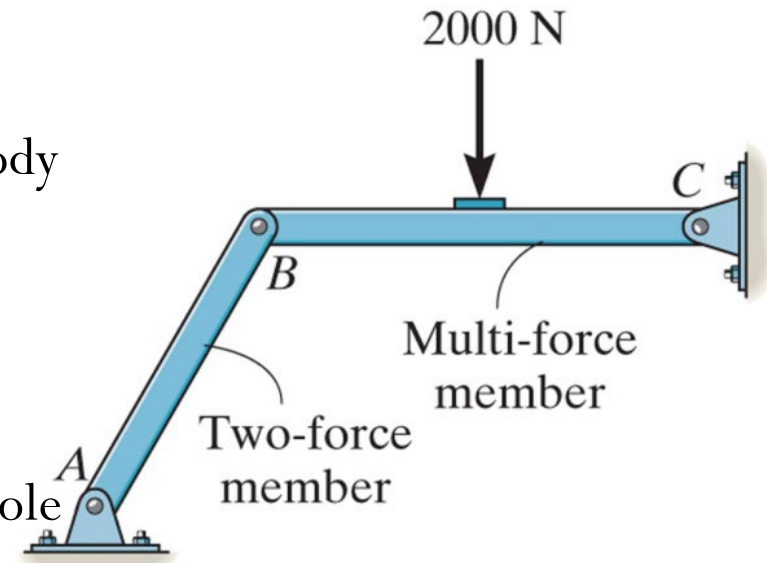
**Machines** contain **moving parts** and are designed to alter the effect of forces.



# Frames and machines

The members can be truss elements, beams, pulleys, cables, and other components. The general solution method is similar to rigid body at equilibrium analysis:

1. Identify the structure member with force/moment of interest loading on it.
2. Perform equilibrium analysis on the whole structure to find support reactions if necessary.
3. Perform equilibrium analysis on identified member of the structure.

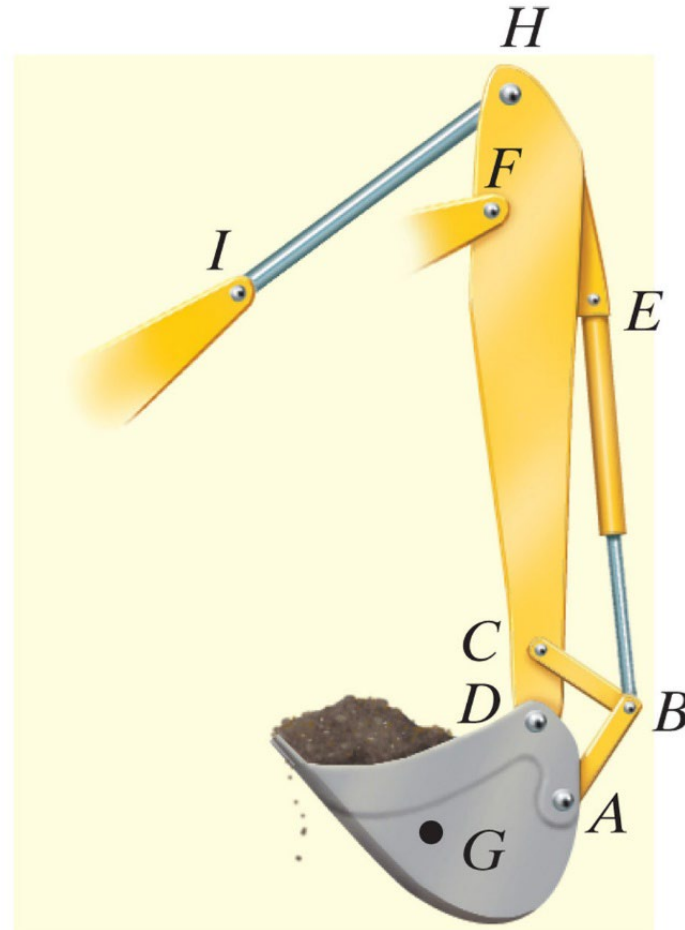


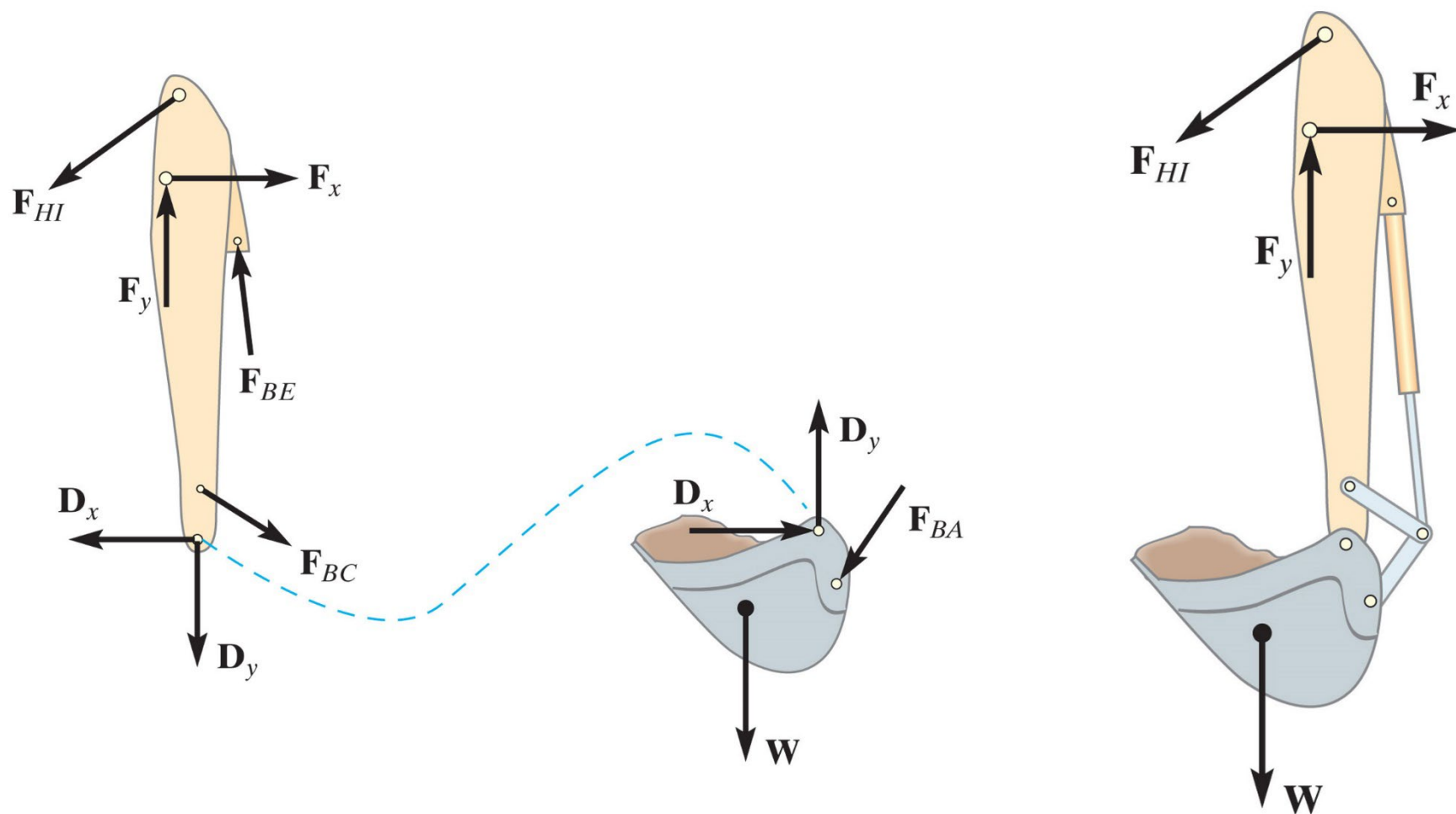
Example:

Find the force acting at  $B$  on member  $BC$ .



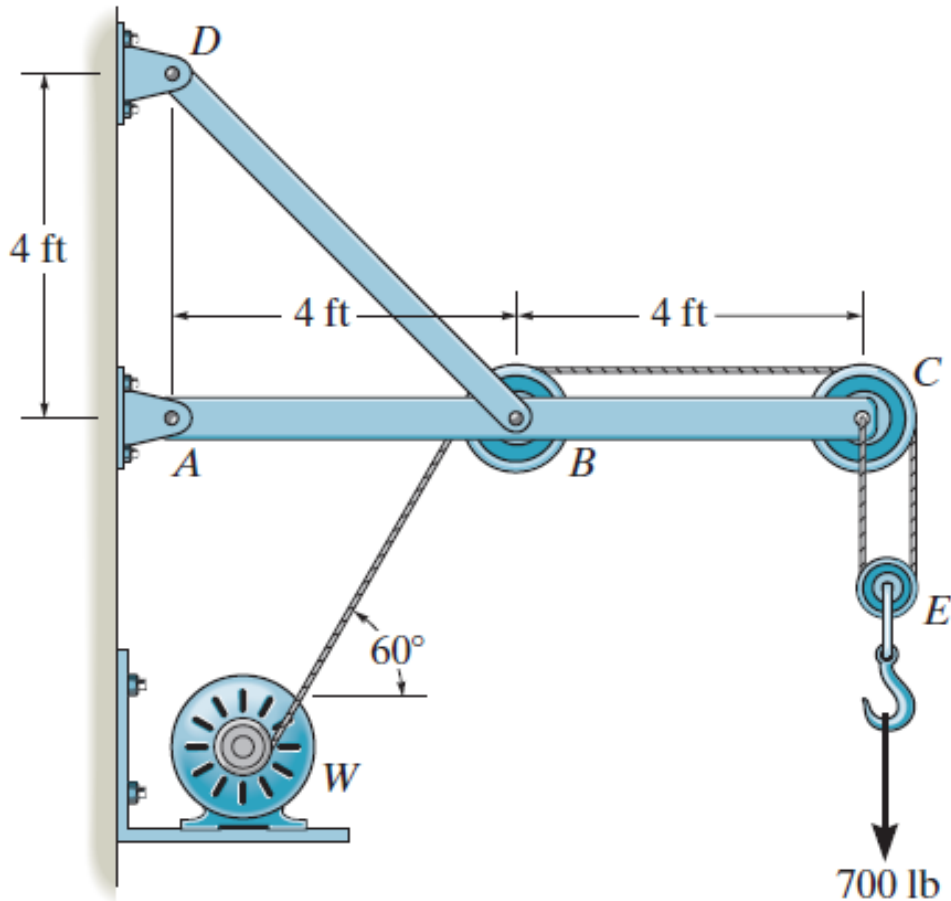
Draw the FBD of the members of the backhoe. The bucket and its contents have a weight  $W$ .



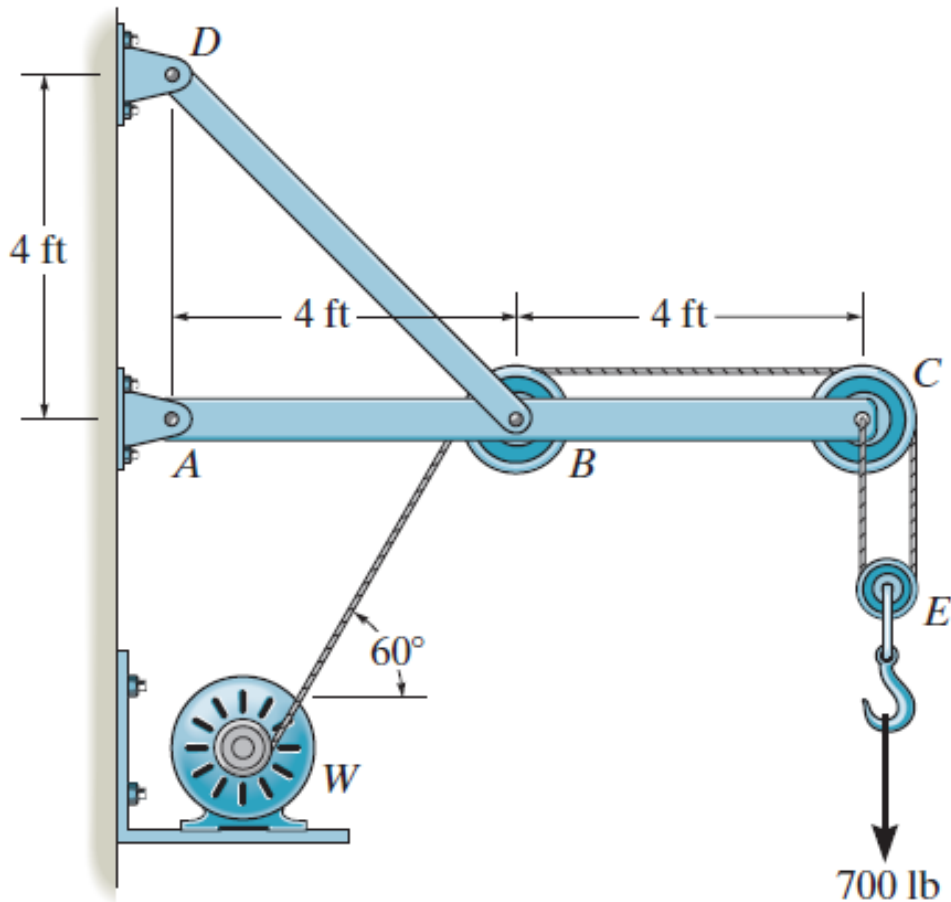


# Example

Determine the force in the cable at winch motor  $W$ .



Determine the force acting at  $A$ ,  $B$ , and  $C$  on member  $ABC$ .



Find support force at  $E$ .

