Announcements

- Morning Office Hours: Mon/Wed, 10–11am in 220H MEB
- Quiz 1 starts tomorrow

Upcoming deadlines:
- Friday (9/14)
  - WA#2
- Tuesday (9/18)
  - PL HW3
Chapter 4: Force System Resultants
Goals and Objectives

• Discuss the concept of the moment of a force and show how to calculate it in two and three dimensions
Carpenters often use a hammer in this way to pull a stubborn nail. Through what sort of action does the force $F_H$ at the handle pull the nail? How can you mathematically model the effect of force $F_H$ at point $O$?

**Moment** 1. a very brief period of time. An Exact point in time. 2. importance. 3. A turning Effect produced by a force acting at a distance on An object.
Which force(s) have NO turning effect?
Moment of a force – scalar formulation

The moment of a force about a point provides a measure of the tendency for rotation (sometimes called a torque).
Example – Scalar Formulation

Determine the moment of this force about the point $A$ as a function of $F$. 
The moment of a force $\mathbf{F}$ about point $\mathbf{O}$, or actually about the moment axis passing through $\mathbf{O}$ and perpendicular to the plane containing $\mathbf{O}$ and $\mathbf{F}$, can be expressed using the cross (vector) product, namely:

$$d' = d \sin \theta$$
Example – Vector Formulation

Given: The angle $\theta = 30^\circ$ and $x = 10\,\text{m}$.

Find: The moment by $\mathbf{P}$ about point $O$. 
Example – Vector Formulation

**Given:** \( F = \{600\mathbf{i} + 800\mathbf{j} - 500\mathbf{k}\} \) N

**Find:** Moment of the force about point \( B \).