# Homework 1

- **Read Chapters 1- 4 in Fortran 95/2003**

- **Try out your accounts on WOPR**
  - Try logging on using Secure Shell (ssh at www.ssh.org) or Putty (www.putty.org)
  - Learn various Linux/Unix commands to navigate, etc.
    - See BasicLinuxCommands.pdf in Additional Material folder on smartsite
  - Set up directories for your homework and projects

- **Problems**
  - Problems Below Due Friday, Oct. 4
    - You can develop and execute these on the WOPR front-end computer or on the cluster nodes by using the serial job submit procedure

# Problem 1

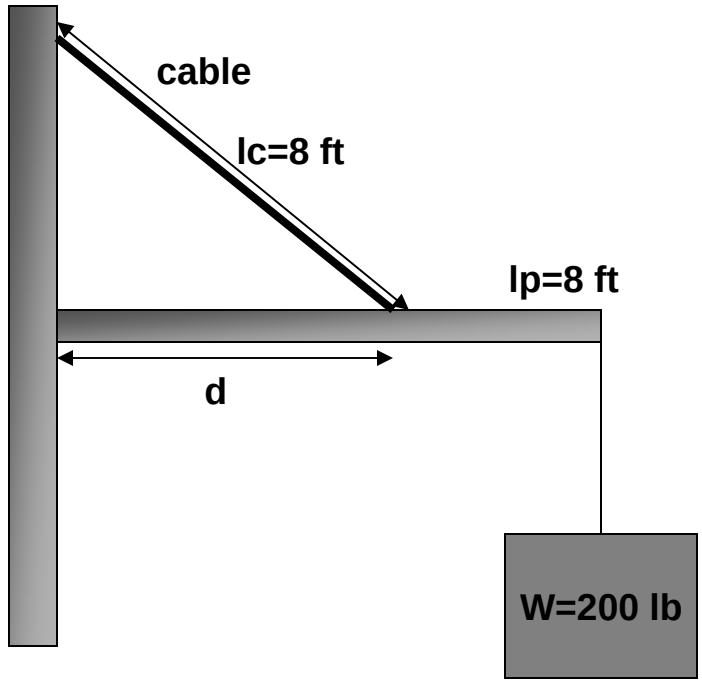
- **Period of a Pendulum**
  - The period of an oscillating pendulum T (in seconds) is given by the equation

$$T = 2\pi\sqrt{\frac{L}{g}}$$

where L is the length of the pendulum in meters and g is the acceleration due to gravity in meters per second squared. Write a Fortran program to calculate the period of a pendulum of length L. The user will specify the length of the pendulum when the program is run. Use good programming practices in your program. (The acceleration due to gravity at the Earth's surface is 9.81 m/sec$^2$.)

# Problem 2

- **Tension on a Cable**
  - A 200 pound object is to be hung from the end of a rigid 8-foot horizontal pole of negligible weight, as shown below:



# Problem 2 (cont)

The pole is attached to a wall by a pivot and is supported by an 8-foot cable that is attached to the wall at a higher point. The tension on this cable is given by the equation:

$$T = \frac{W(lc)(lp)}{d\sqrt{lp^2 - d^2}}$$

where T is the tension on the cable, W is the weight of the object, lc is the length of the cable, lp is the length of the pole, and d is the distance along the pole at which the cable is attached. Write a program to determine the distance d at which to attach the cable to the pole in order to minimize the tension on the cable. The program should calculate the tension on the cable at 0.1 foot intervals from d=1 foot to d=7 feet and should locate the position d that produces the minimum tension.