LAB 4: FUNDAMENTALS OF DYNAMICS
Due at the end of the lab session.

NAMES:
____________________________________

Check for each task completed:

- **PART 1: DETERMINE STRUCTURAL PROPERTIES**
  
  **VERIFY STIFFNESS: PSEUDO-STATIC LOADING**
  - q Calculated displacement for frame with lateral load of 10 kips.

  - q Lateral displacement for 10 kip load calculated by Arcade _______________

  **VERIFY PERIOD OF VIBRATION: IMPULSE LOADING**
  - q Set impulse load with scale factor of 100 over 2 milliseconds.
  - q Determined time required for three cycles of motion
    - o Value ____________________
  - q Calculated corresponding period of vibration.
    - o Value ____________________
  - q Compared with period of vibration calculated in pre lab
    - o Value ____________________

  **DETERMINE CRITICAL DAMPING: IMPULSE LOADING**
  - q Analyzed model with Heavy damping.
  - q Used systematic trial and error to determine critical damping.
    - o Value (include units) ____________________

- **PART 2: RESPONSE TO IMPULSE LOADING**
  
  **THE EFFECT OF DAMPING**
  - q Set the damping to 1% critical.
  - q Ran the simulation for about 5 seconds.
  - q Determined the number of cycles to reduce the amplitude to less than 50% of the initial peak.
    - o Value ____________________
  
  Set the damping to 5% critical.
  - q Ran the simulation for about 5 seconds.
  - q Determined the number of cycles to reduce the amplitude to less than 50% of the initial peak.
    - o Value ____________________

  **THE EFFECT OF STIFFNESS**
  - q Set the damping to 5% critical for this structure.
  - q Ran the simulation for about 2 seconds.
q  Used the graphs to determine the maximum displacement.
   o  Value ______________________
q  Used the graphs to determine the maximum base shear
   o  Value ______________________
q  Used the Beam-2 table to double the moment of inertia for all the structural members.
q  Ran the simulation for about 2 seconds.
q  Used the graphs to determine the maximum displacement.
   o  Value ______________________
q  Used the graphs to determine the maximum base shear
   o  Value ______________________

THE EFFECT OF MASS
q  Used the Beam-2 table to set the moment of inertia for all the structural members back to their original values.
q  Used the Node table to double the superimposed mass representing the slab.
q  Ran the simulation for about 2 seconds.
q  Used the graphs to determine the maximum displacement.
   o  Value ______________________
q  Used the graphs to determine the maximum base shear
   o  Value ______________________

PART 3: RESPONSE TO PERIODIC LOADING
THE EFFECT OF DAMPING
q  Set the control spec for the load pattern to a sine wave with a period of 0.3 seconds, and a duration of 10 seconds.
q  Set the damping to zero.
q  Ran the simulation for about 12 seconds.
q  Used the graphs to determine the maximum base shear
   o  Value ______________________
q  Set the damping to 5% critical.
q  Ran the simulation for about 12 seconds.
q  Used the graphs to determine the maximum base shear
   o  Value ______________________

THE EFFECT OF MASS AND STIFFNESS
q  Briefly described the expected changes in response to the periodic load when the stiffness of the structure is changed.
q  Briefly described the expected changes in response to the periodic load when the mass of the structure is changed.