TAM 210/211 - Worksheet 6

Objectives:

- Obtain resultant forces and moments for equivalent systems.
- Evaluate distributed loadings intensities.

Team Building Exercise

What are your teammates’ favorite animals?

Equivalent systems

1) The overhanging beam is supported by a pin at A and the strut BC. Show that the loading conditions below are equivalent by replacing the loadings by a single resultant force and a moment at A.
2) Is the loading condition in System II equivalent to the ones above? Explain.

3) Replace the force system acting on the left frame below by a single resultant force acting on member AB. Sketch your equivalent system on the right frame.
Work space for Problem 3.

**Reduction of distributed loads**

4) Determine the resultant force and specify where it acts on the beam measured from end A.
Group Challenge

5) Given the piping system below, design a loading system by placing two 10-lb forces and one 20-lb-in couple moment in either \( \pm i \), \( \pm j \), or \( \pm k \) direction. Choose the locations where these forces/couple moment are applied from the following list: \( O \), \( A \) (half way between \( O \) and \( B \)), \( B \), \( C \), \( D \), \( E \) (half way between \( D \) and \( F \)) and \( F \).

(A) Create an answer key for finding the resultant force and moment at \( O \) on the back.

(B) Trade your design with another group and try to find the equivalent resultant force and moment at \( O \) for their design. Check your answer with their answer key.