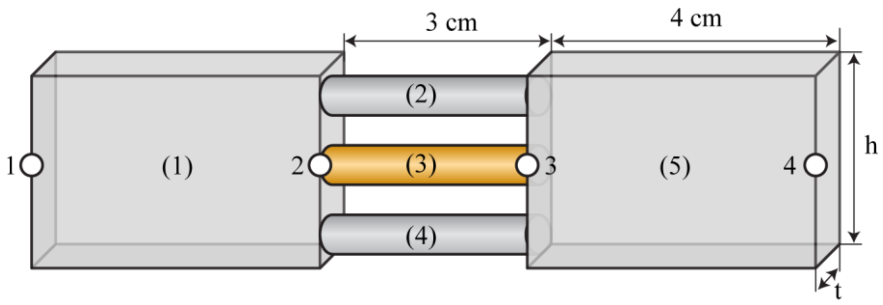
MAE 404/598 Finite Elements in Engineering
Programming assignment #2

Write a MATLAB function that returns the **connectivity matrix** and **global stiffness matrix** for a 3D specimen shown below. The 3D specimen is composed of three equally-sized cylinders and two equally-sized blocks. Assume that the stress within each component is uniform and uniaxial.



Instructions for programming and assignment submission:

- For this assignment, you will submit only a single file (MATLAB code).
- The file name **must** be in the format "**asurite_hw2.m**" where asurite is your ASURITE. Note that the separator must be an underscore (not a hypen).
- The file **must** define a function of the same name as the file name (but without the ".m") , e.g.

```
function [conn, K] = asurite_hw2(h, t, D, E1, E2)
    % Code goes here to define connectivity and global stiffness matrix.
end
```

- The order of the input variables and output variables must not be changed.
- **The input variables are:**
  - ***h*:** height of blocks, given in meters.
  - ***t*:** thickness of blocks, given in meters.
  - ***D:*** diameter of cylinders, given in meters.
  - ***E_1*:** Young's modulus of elements {1,2,4,5}, given in Pa.
  - ***E_2*:** Young's modulus of element 3, given in Pa.
- **The output variables are:**
  - ***conn:*** The connectivity matrix for the mesh with node and element orderings as shown.
  - ***K:*** The stiffness matrix for the model.
- The units of the stiffness matrix should be returned in Pa.
- The size of the returned connectivity matrix must be 2x5.

Hint: the stiffness matrix of each element is: $$\mathbf{K}^e = \frac{E^e A^e}{l^e}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

Your submission will be graded electronically. Failure to comply with the above instructions may result in zero credit.

Submit your assignment to http://sparky.fulton.asu.edu/fe/index.php

Can be resubmitted daily until Thursday Jan 28 at 12 midnight.