PROJECT 3

Assigned 11/06/25

Due 11/25/25, end of day (11:59 PM).

Overview:

For this project you are responsible for converting Project 2 into a stress-strain problem.

Components:

- Multiple DOF per node.
- Tiling within shape functions and gather matrices.

Overall Tasks:

- Generate the geometry of interest. This ideally should be taken directly from Project 2. Requirements on the geometry include:
  - Must roughly approximate a structure of interest.
  - Must not be taken directly from past assignments or examples.
  - Should contain at least one skewed edges (not rectangular).
- Develop new shape functions and the weak form to support two DOF per node (displacement in x and displacement in y). Use this to convert your second project into a stress-strain problem in linear elasticity.
  - Convert the flux across the surfaces into pressure directed normal to the surfaces.
  - This pressure should be applied across a skewed edge, where the edge is not parallel to the x or y axis.
- Using a modified APDL script, compare your results for nodal displacements

Deliverables:

Upload the following files to ELC

- PDF file containing the following items:
  - Clearly defined geometry and conditions. This includes:
    - All nodal and elemental numbering schemes.
    - Selected boundary conditions (location and values)
    - Material properties and loading assumptions (E, ν, plane stress or plane strain).
  - Results:
    - **Nodal displacements (both MATLAB and APDL). This should be contained within your report.**
- Original MATLAB scripts used to produce the results.
- APDL script (.txt) used for comparison.

6350 Assignment:

- Generate a contour plot of the von mises stress (σ_{vm}) within the geometry.

Grading:

Goal	Points
MATLAB script exactly matches APDL predictions for nodal displacements for four node elements.	**--/70**
MATLAB script also supports 9 node elements.	**--/15**
Plot of the deformed shape.	**--/15**