Computational Fabrication
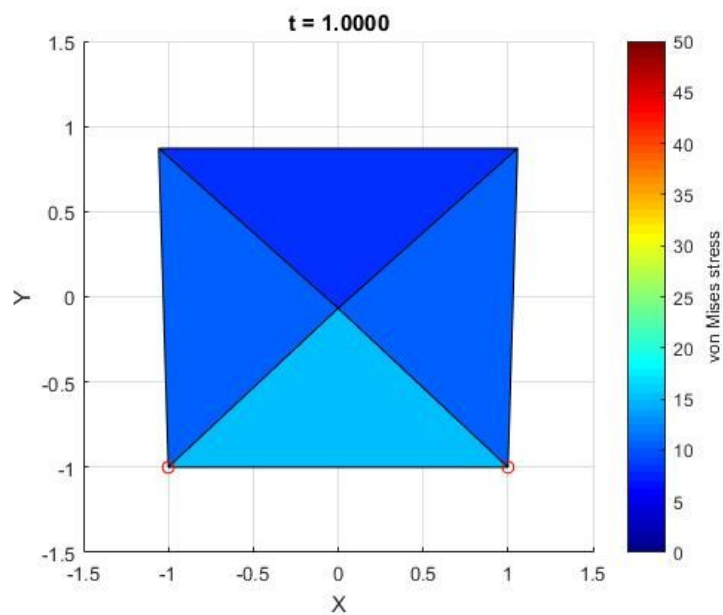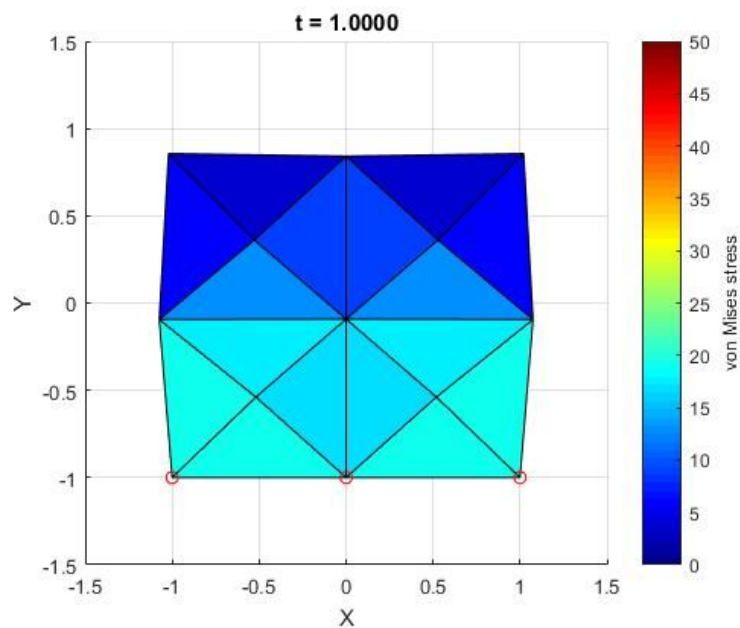## Assignment 6 Report

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Scene 1: Pin bottom nodes.

```
dt = 1e-3;
grav = [0 -9.81]';
rho = 1e0;
damping = 2.0;
E = 1e2;
nu = 0.4;
```
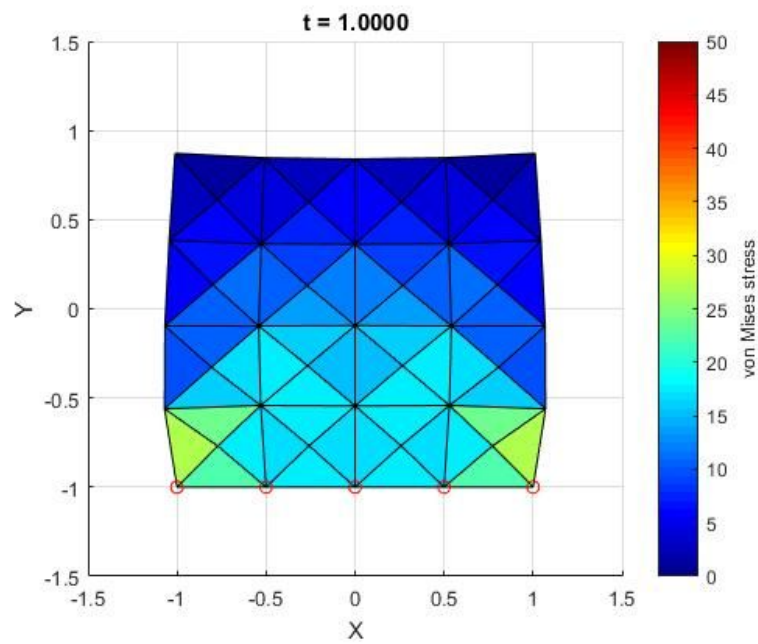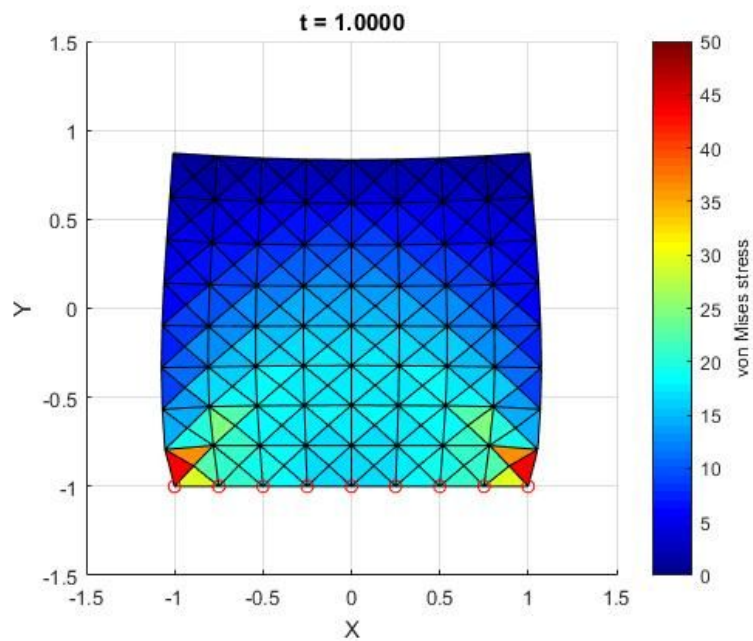
- **1x1**

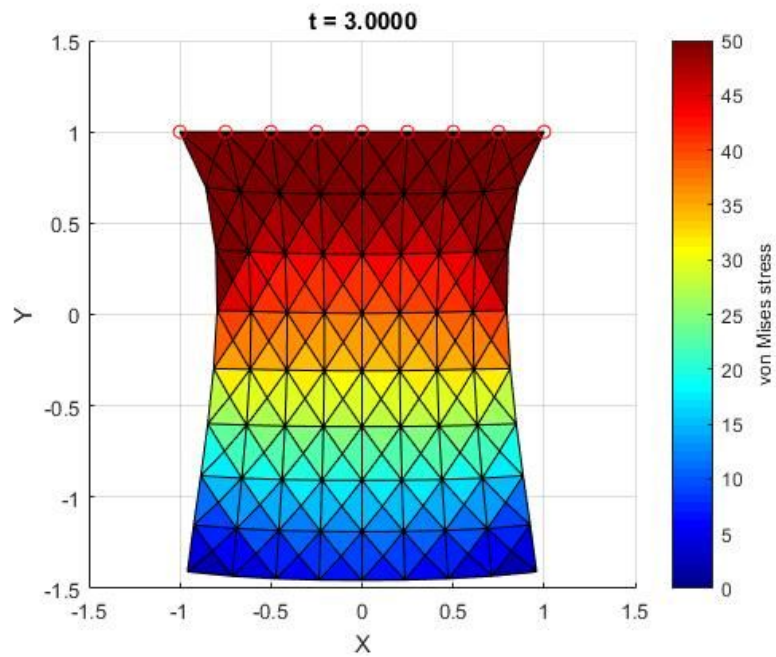- **2x2**

- **4x4**

- **8x8**

Scene 2: Pin top nodes. STVK.

---

dt = 1e-3;
tEnd = 3.0;
grav = [0 -9.81]';
rho = 3.5e0;
damping = 4.0;

t = 3.0000

Scene 3: Pin top nodes. Use two different values of Poisson's ratio.

- **nu = 0.2**

- **nu = 0.3**
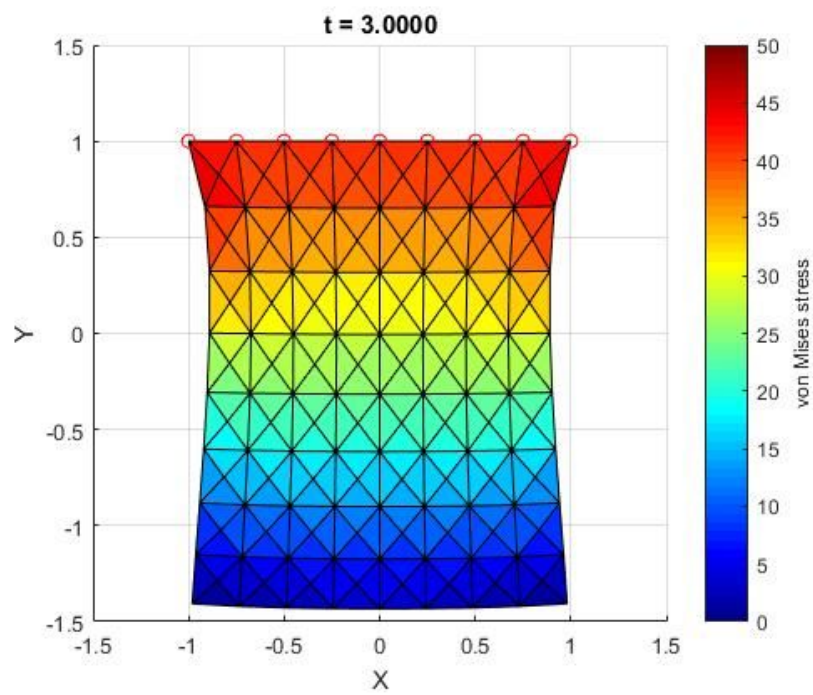
- **nu = 0.4**

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- Difference in the behavior:
  As the value of Poisson's ratio increases, we can see the ability to preserve the area of mesh grows up at the same time.

Scene 4: Pin left nodes.

```
dt = 1e-3;
tEnd = 3.0;
grav = [0 -9.81]';
rho = 0.3e0;
damping =4.0;
E = 1e2;
nu = 0.4;
model = 0;
```
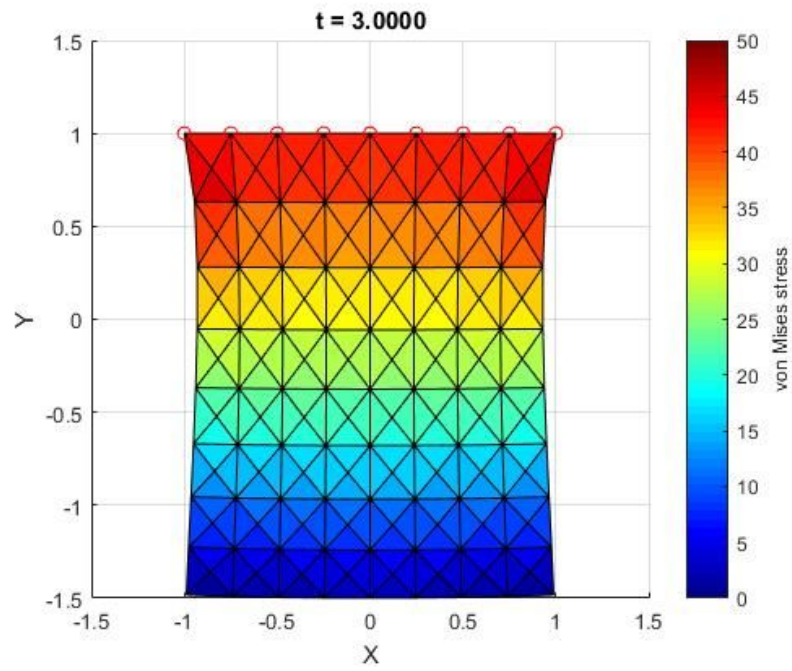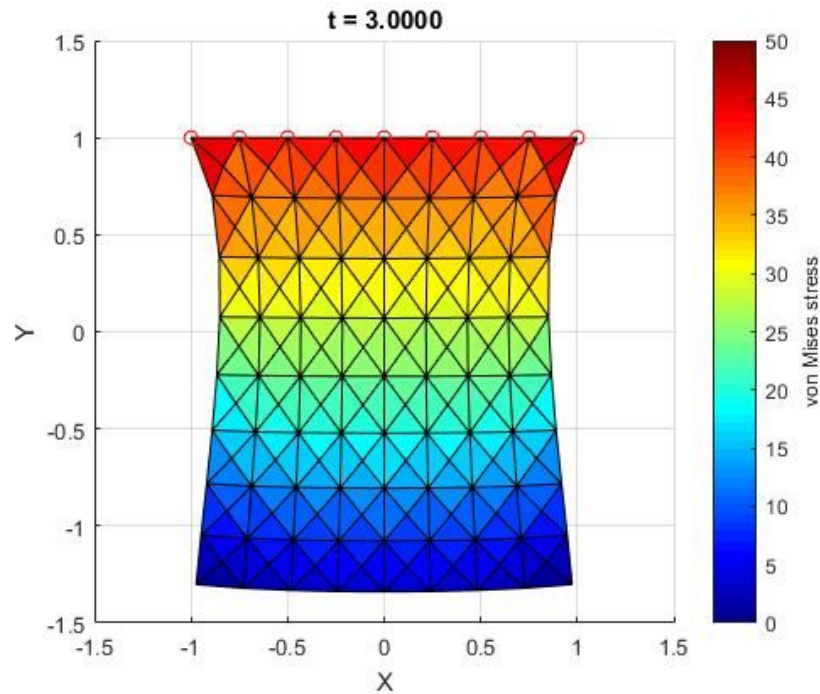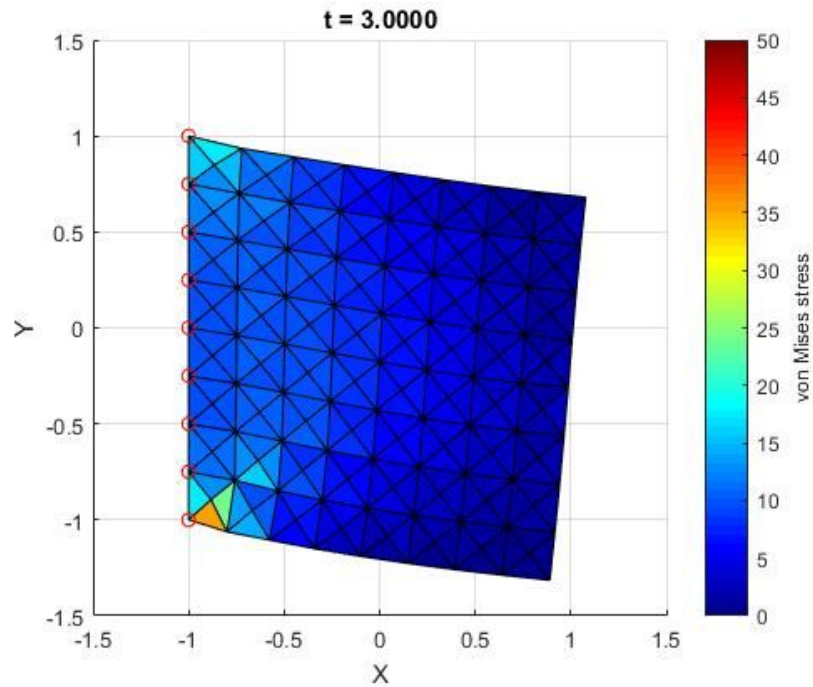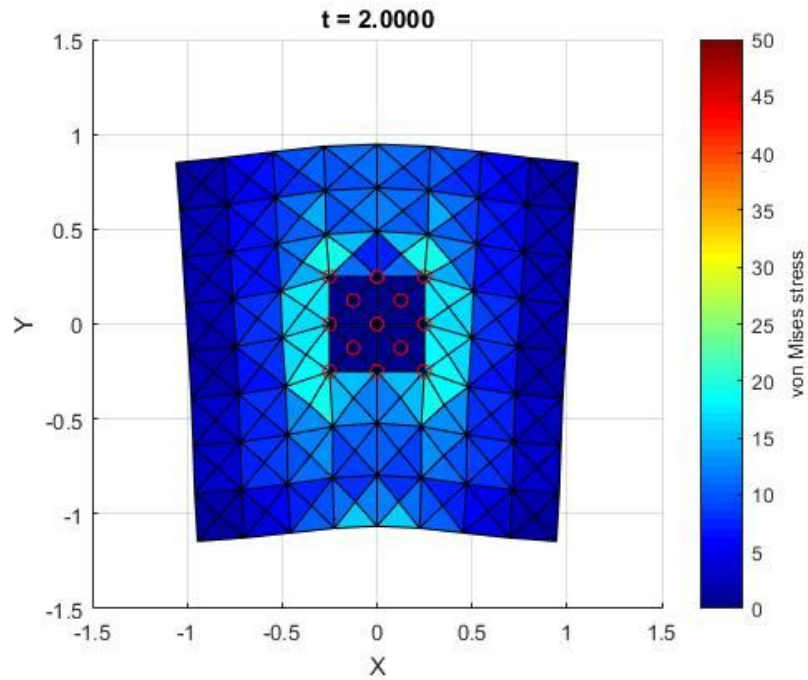
In this scene, I have to set the density to be smaller. Otherwise the scene will blow up because the left bottom triangles would suffer too much stress.
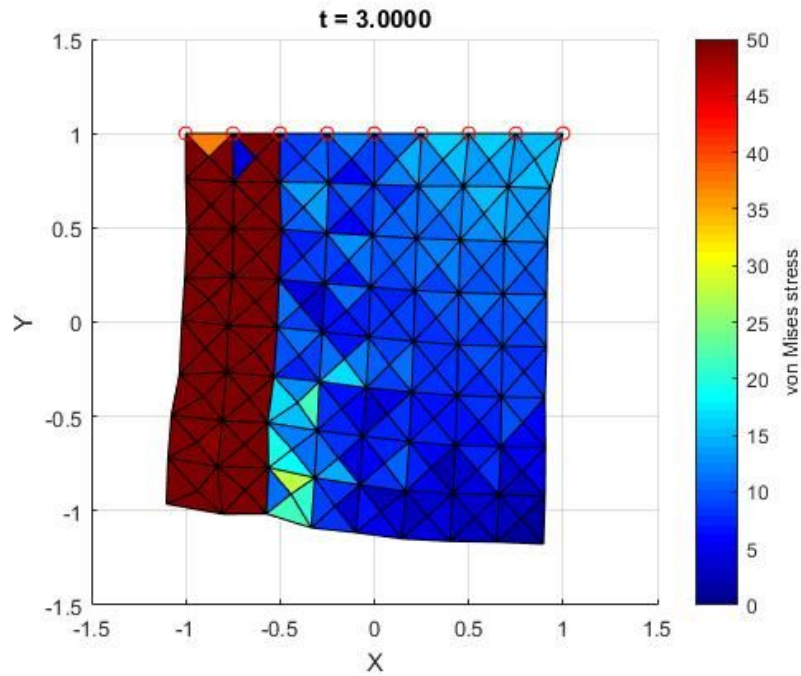
Scene 5: a) Pin some other nodes.

```
dt = 1e-3;
tEnd =2.0;
grav = [0 -9.81]';
rho = 1e0;
damping = 4.0;
E = 1e2;
nu=0.4;
model = 0;
```

t = 2.0000

In this scene, I set the middle part to be fixed. As a result, the mesh oscillated for a while under the gravity force.

Scene 5: b) Store material parameters per triangle.

```
dt = 1e-3;
tEnd =3.0;
grav = [0 -9.81]';
rho = 1e0;
damping = 4.0;
E = 1e2;
E2 = 2e3;
nu = 0.4;
nu2 = 0.4;
model = 0;
```
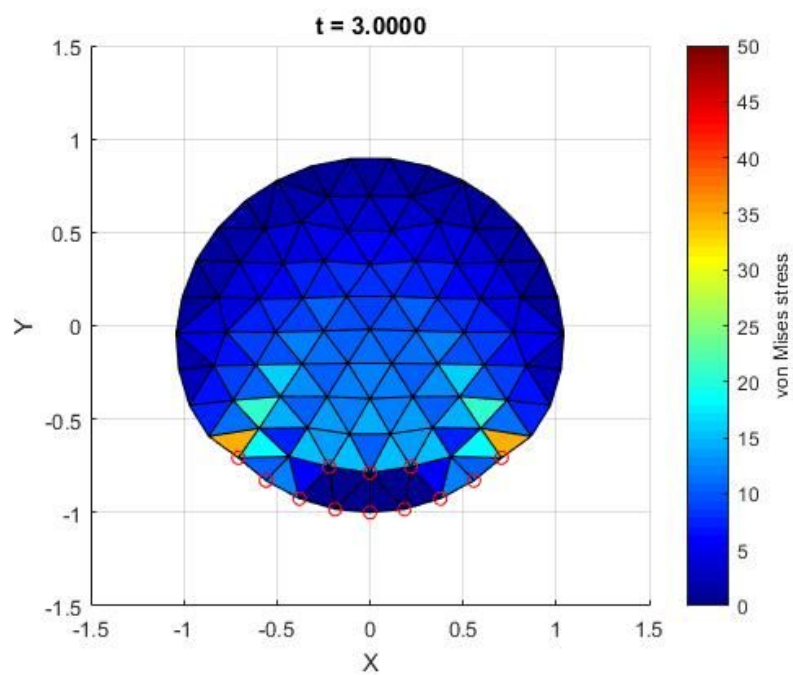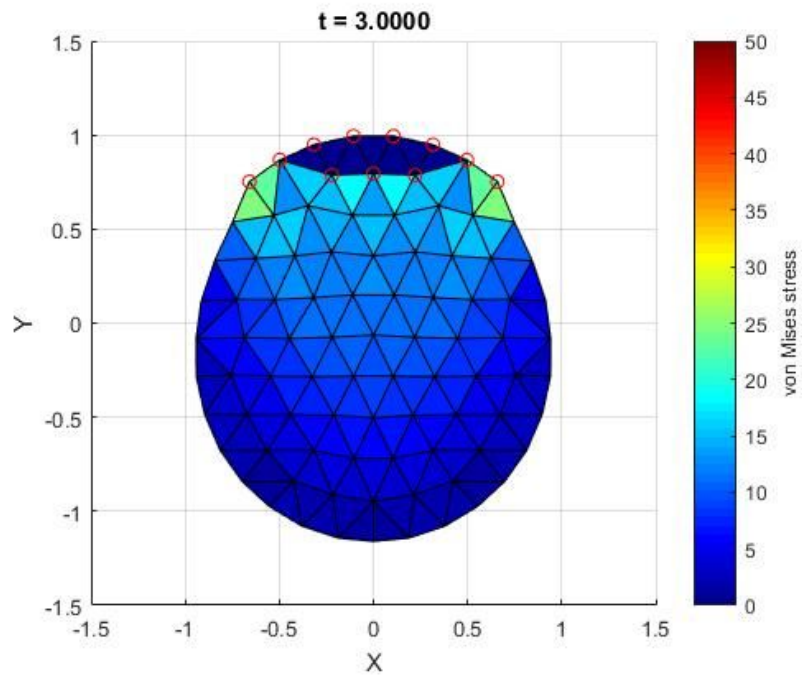
t = 3.0000

In this scene, I set the triangles on the left two columns stiffer than others in the mesh. As a result, the other triangles are more flexible than the left part and their deformation is larger than the left side too.

Scene 6: Extra credit (Other 2D mesh):

```
dt = 1e-3;
tEnd =3.0;
grav = [0 -9.81]';
rho = 1e0;
damping = 4.0;
E = 1e2;
nu=0.4;
model = 0;
```
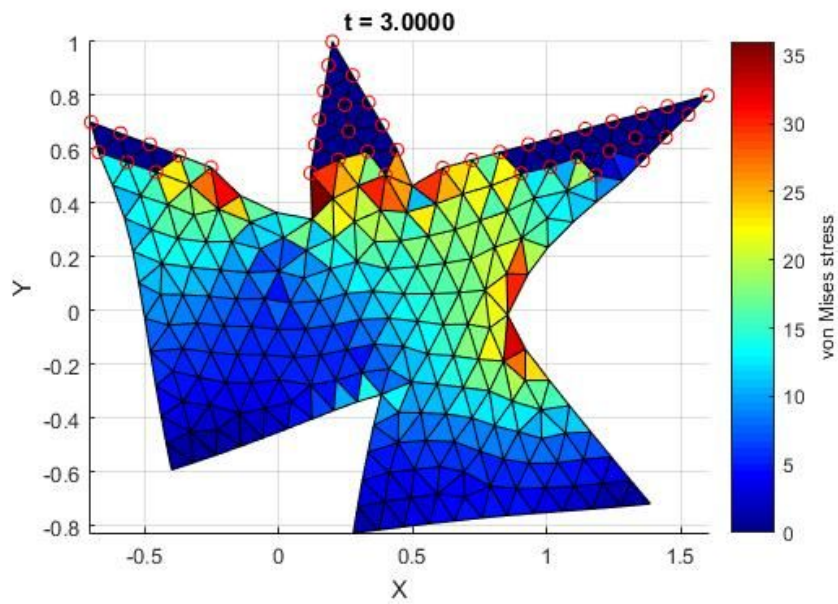
t = 3.0000

t = 3.0000

dt = 1e-3;
tEnd =3.0;
grav = [0 -9.81]';
rho = 2e0;
damping = 2.0;
E = 1e2;
nu=0.4;
model = 0;

I used distmesh library in MATLAB. The distmesh2d command returned the values[p,t], which included the coordinates of nodes and list of nodes for each triangle. Then, I used the two values to create the nodes and triangles structure which we used in this assignment. The rest part are just the same as the previous.

Reference:
- distMesh
  http://persson.berkeley.edu/distmesh/