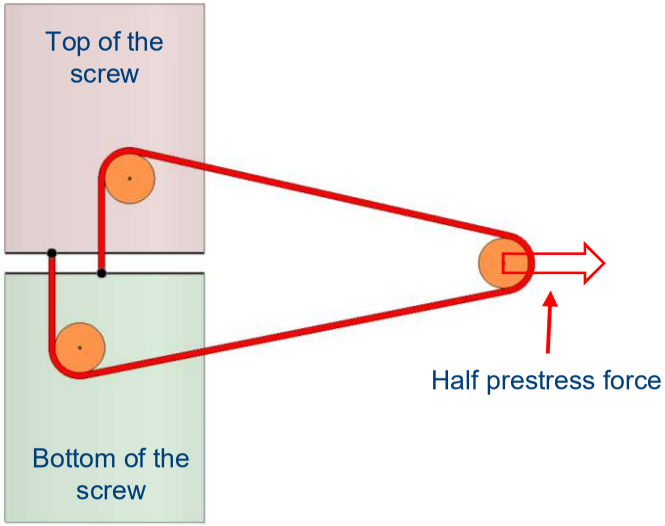
Bolt pretension / Background knowledge

- Simplified representation of the bolt pretension:

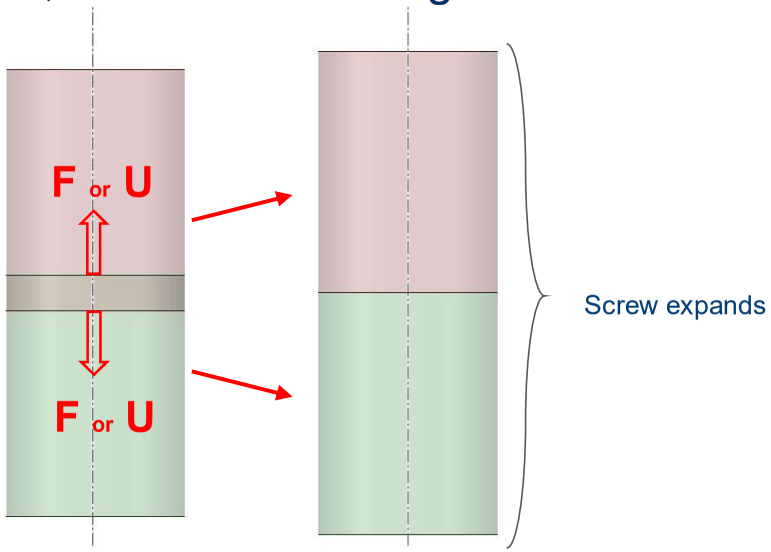


- In Ansys…
  - a force can be applied.
  - a displacement can be applied.
  - the resulting displacement can be locked
  - all can be deleted.
  - a displacement increment can be added to the current displacement.

Bolt pretension / Background knowledge

- The preload force causes a lengthening of the screw, even if it seems as if the opposite is happening by pushing it into each other.
- Since the two sides are held at the top and bottom (typically by bonded contact) and the other two sides are pushed into each other, each side is elongated.

- It's easy to explain, when you have both parts side by side.



Bolt pretension / Background knowledge

CADFEM

- The mesh of the screw is cut and meshed with so-called "pretension elements" on the cut surface. These elements (179s) ensure by means of coupling equations that the screw is shortend and finally takes the desired force.