MECH 311: Design Intent Exercise 1

Create a stepped (multi-diameter) shaft per the following instructions

- Name your document **FerrisID M11 Design Intent 1**, i.e. *bradyb M11 Design Intent 1*
- All dimensions are given in millimeters (mm) and the workspace units should be set to reflect that
- Orient the shaft axis horizontal with the larger diameter facing the left and smaller diameter facing the right
- Place the origin coincident with the axis of the shaft at the larger diameter end of the shaft
- Overall length: 200
- Smaller diameter: Ø30
- Larger diameter: Ø45
- Larger diameter portion of the shaft is 120mm long
- Add the following features after creating the primary shape of the shaft
    - Two circular grooves (for external snap rings) on the smaller diameter portion of the shaft
        - Ø27.5 by 2 wide
        - One groove located 6 from the end of the shaft to the inboard (further from the end of the shaft) edge of the groove
        - Second groove spaced 10 from the first such that a 10 wide bearing or spacer could be placed between the grooves
    - One circular groove (for an external snap ring) on the larger diameter portion of the shaft
        - Ø42 by 3 wide
        - Located 10 from the end of the shaft to the inboard edge of the groove
    - A semi-circular undercut at the step
        - R2
        - Tangent to the shoulder (the face where the diameters change)
        - Center of the arc coincident with the outer surface of the smaller diameter portion of the shaft
    - Two M8x1.25 tapped holes
        - Aligned with the axis on both ends of the shaft
        - Thread depth of 15, hole depth of 18.75
        - Ø12 by 90˚ included angle countersink
        - Note: the tap information will disappear and the hole will become custom after changing the countersink information so edit the countersink after your tap information is correct
    - Chamfer the outer edges on both ends of the shaft and the edge at the outer diameter at the step: 1 by 45˚
- Rename the part and tab as "**Shaft**"
- Assign the material as Steel
- Check mass/volume properties: 1.915 kg and 243,997 mm^3
- Create a version named **Grade Me**
- Share your document with the instructor before leaving the lab