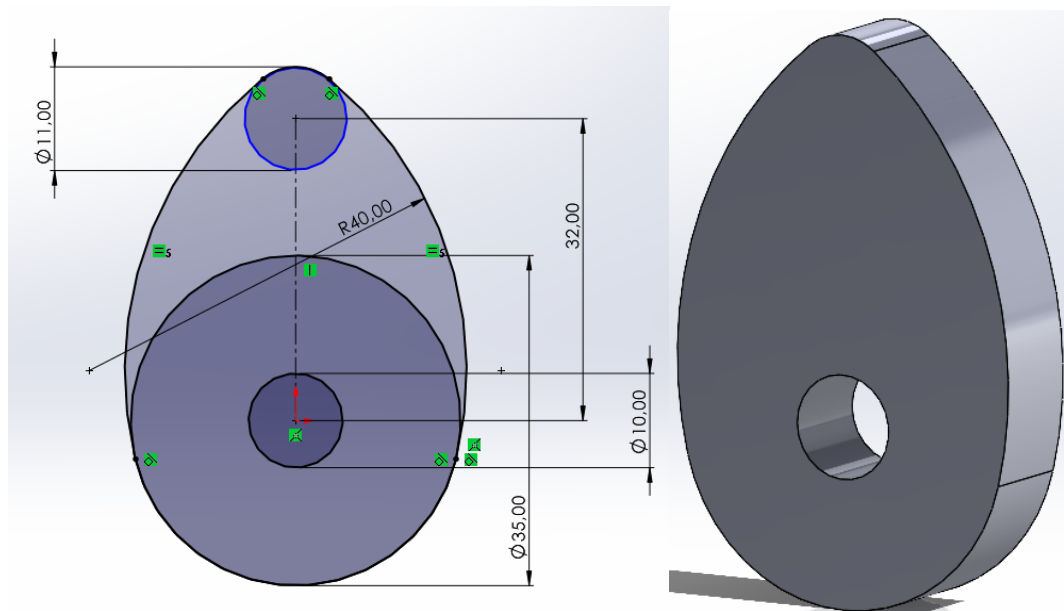
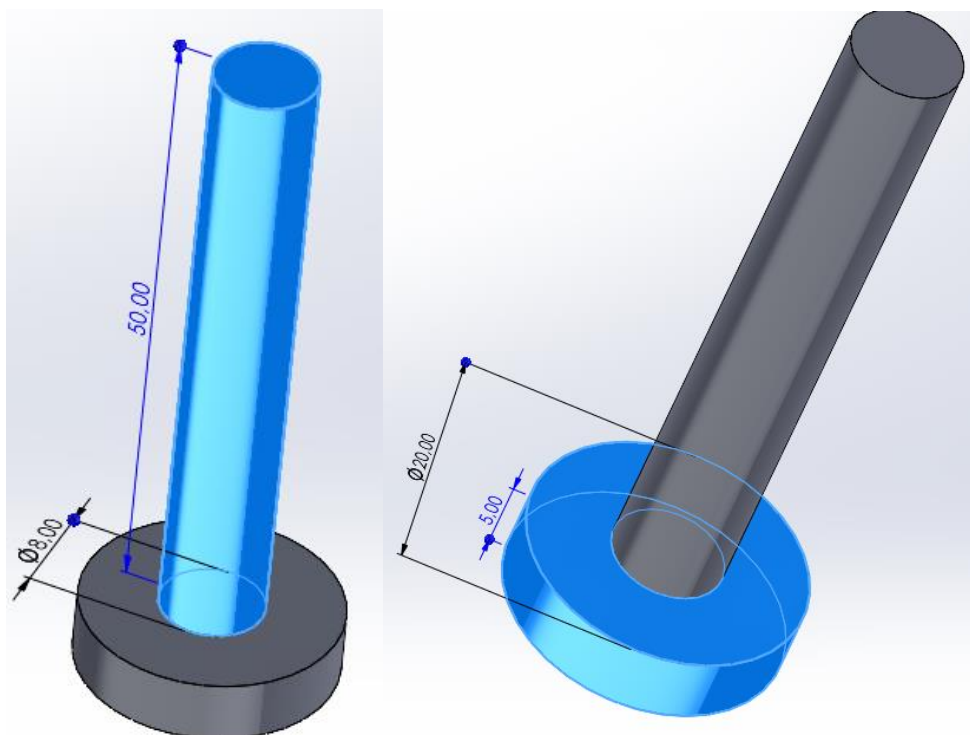


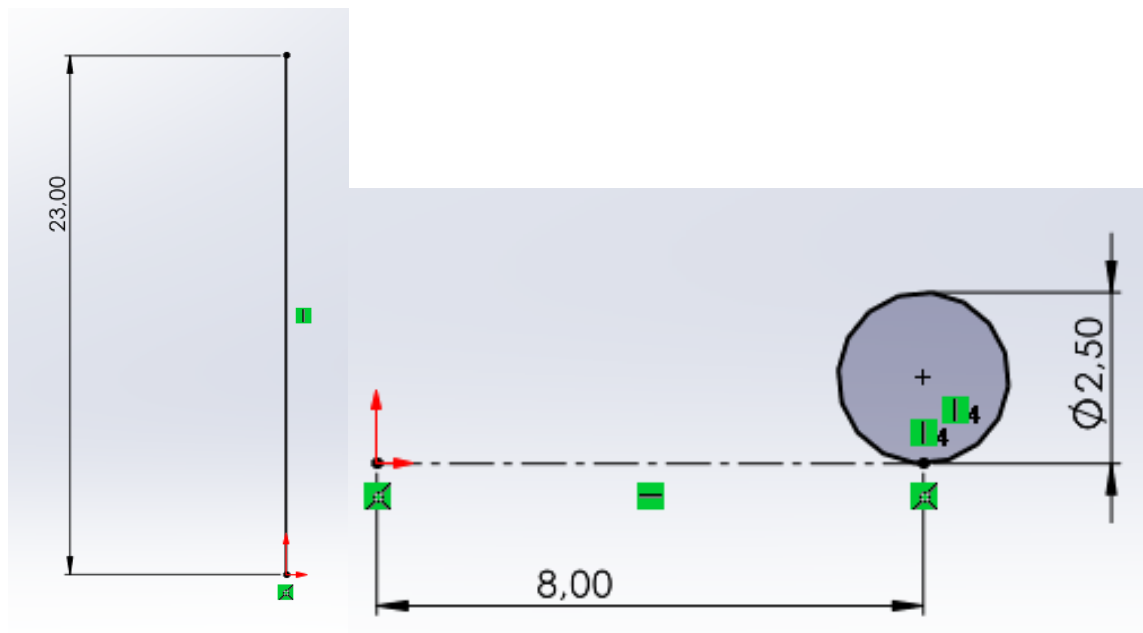
1. Create sketch 1 by the following figure: The arcs are connected to circles with tangent relation. Inner parts of circles are trimmed with “Trim entities” function. Extrude symmetrically by 10 mm.



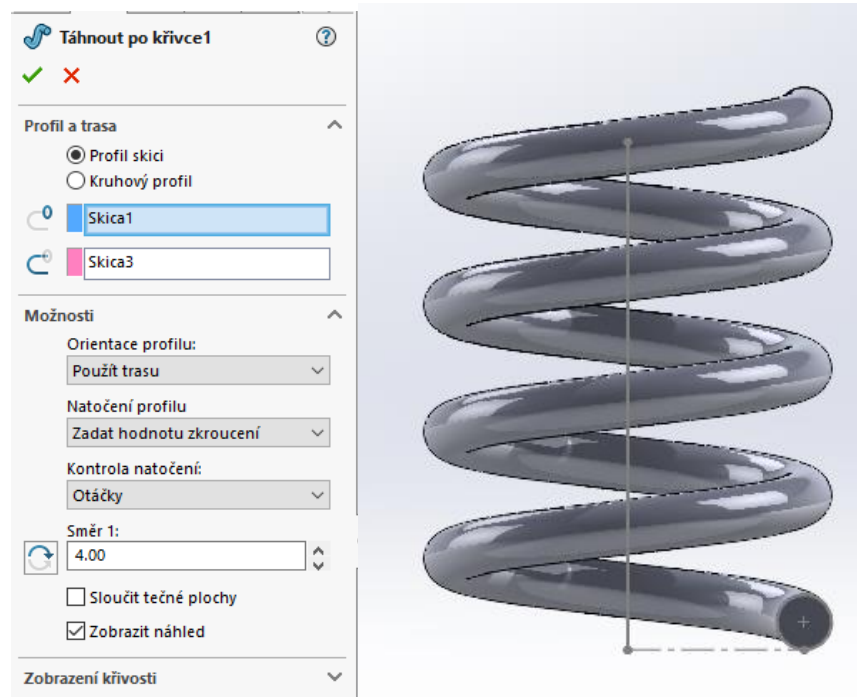
2. Create a piston part by the following sketches:



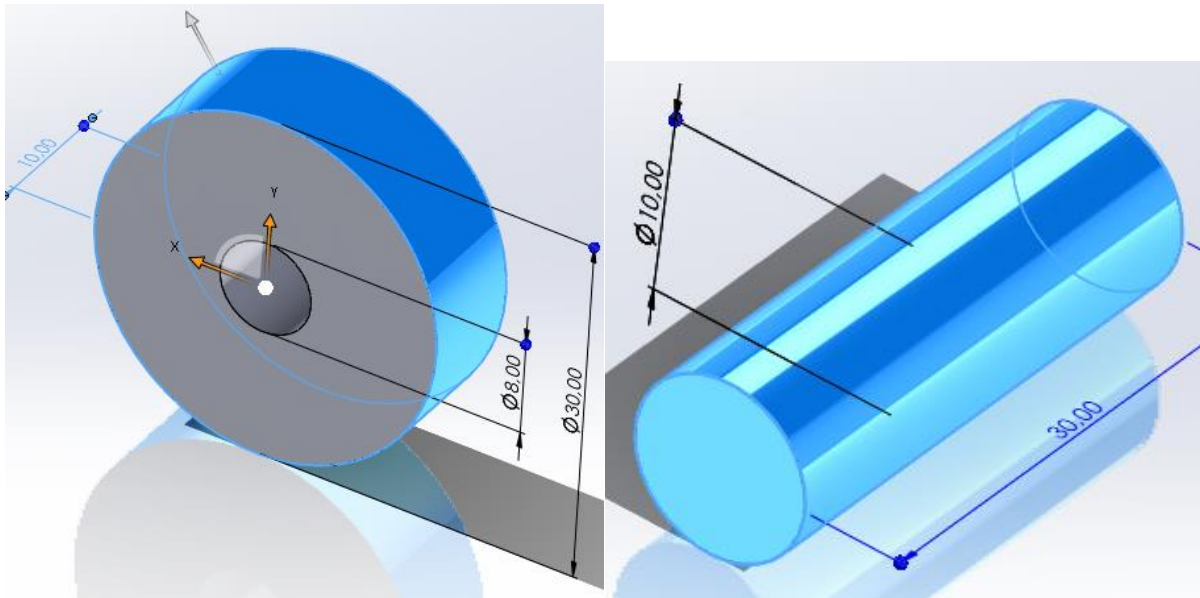
3. Create the spring part, first create two separate sketches:



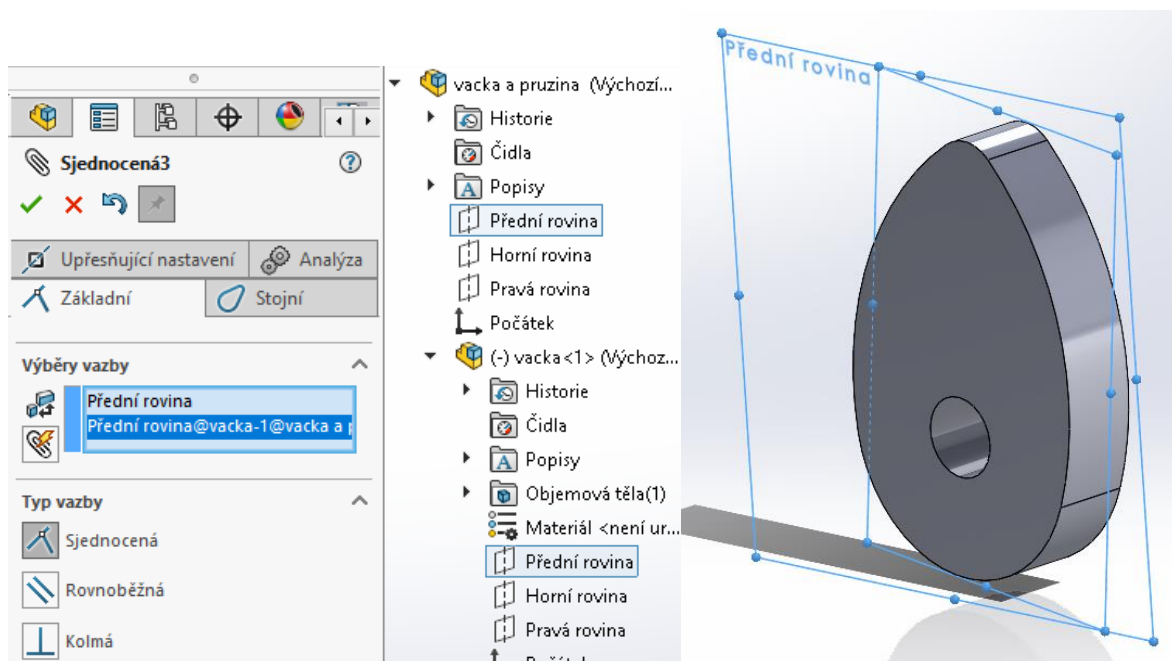
4. With the help of swept boss/base create the spring. In options select „Use route“ and set it to 4 turns.



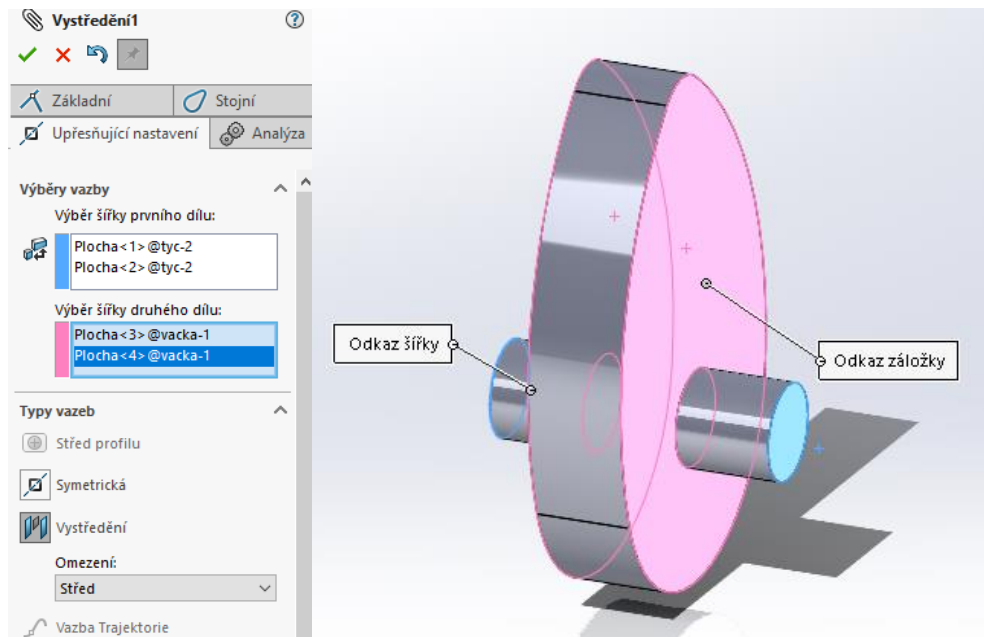
5. Create the 2 remaining parts: center of the cam and the base of piston. Extrude the longer part symmetrically.



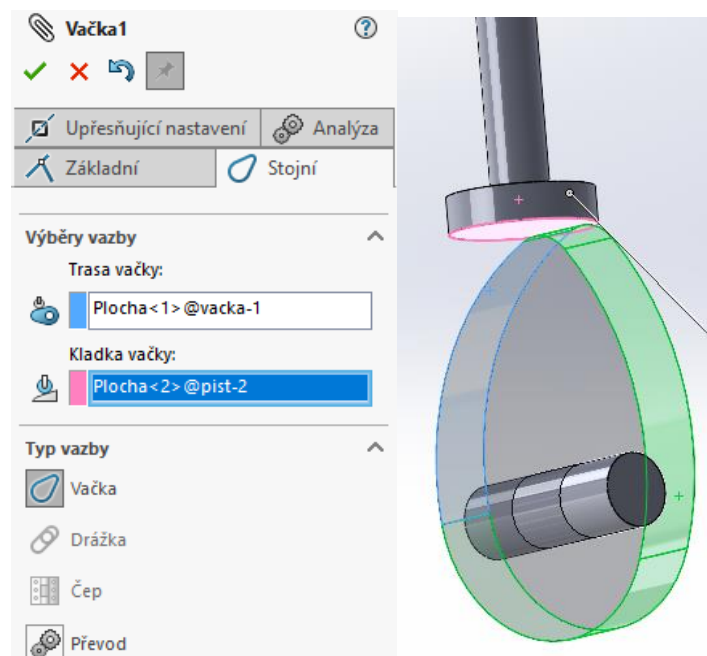
6. Create a new assembly. At first without the spring.
 - a. Insert the cam. Create a coincident bond between the front plane of the cam nad front plane of the assembly.



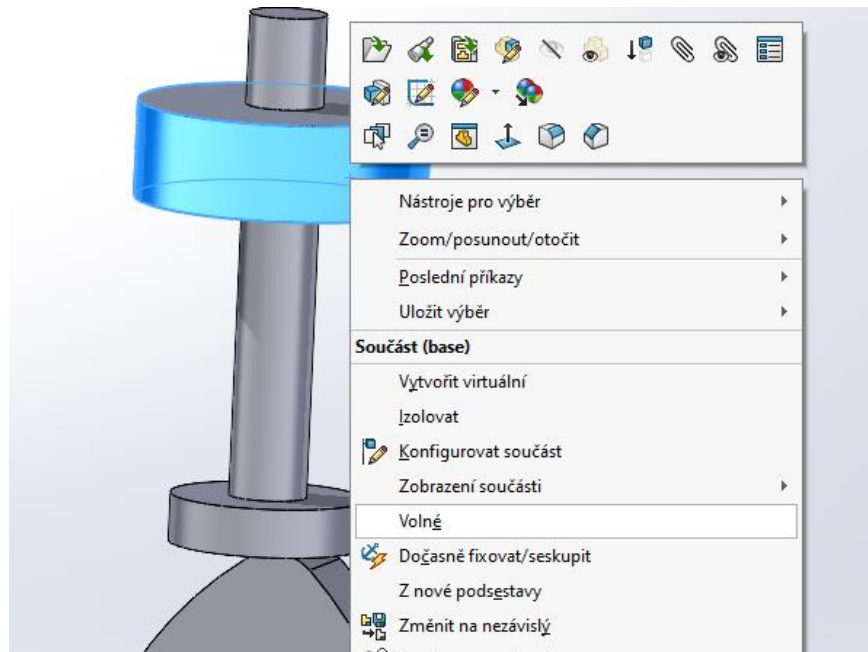
- b. Insert the cam center part. Create concentric bond between the cylinder shell and the cam hole. Next, create “centered” bond, select end planes of each part for this bond.



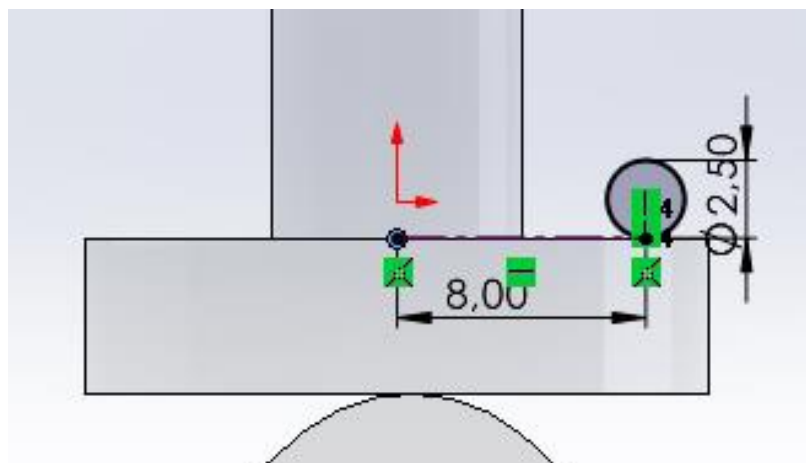
- c. Add the piston part and again align its front plane with the front plane of the assembly. Add the cam mate from mechanical mates. As the cam path select the cam's rim plane and as the cam follower select the end part of the piston.



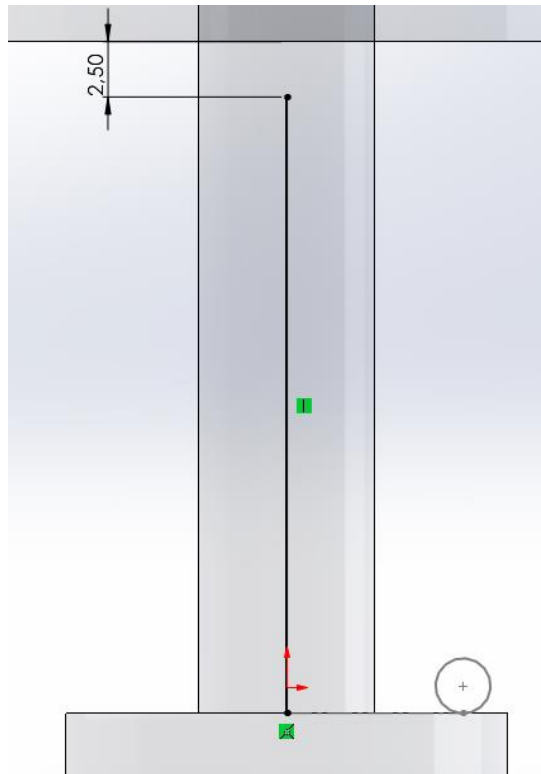
7. Add the piston base part. This part will be set as fixed in the assembly. Other parts must be set as free. Make coincident mate between the right plane of the bond and the plane of the center of the cam. Then delete this mate, it only helped us to align our parts. Set the center part of cam to also be fixed (careful, active is always the opposite to what the selection offers). Now only the cam and the piston should be moving.



8. Add the spring part. Add concentric mate to the axis sketch of the spring and the cylinder of the piston.
9. Edit sketches of the spring. Remove coincident relation to origin and attach this to the end part of the piston.



10. Remove the dimension of the axis and instead define the distance to the piston base. Make the lower endpoint of the sketch coincide with the lower end of the piston.



11. Create a motion study. Leave the type of motion study to Animation. Add a rotary motor to the cam with constant RPM of 20. Raise the number of frames per second to 100. During animation you should now see the spring stretching.

