

Solidworks tutorial



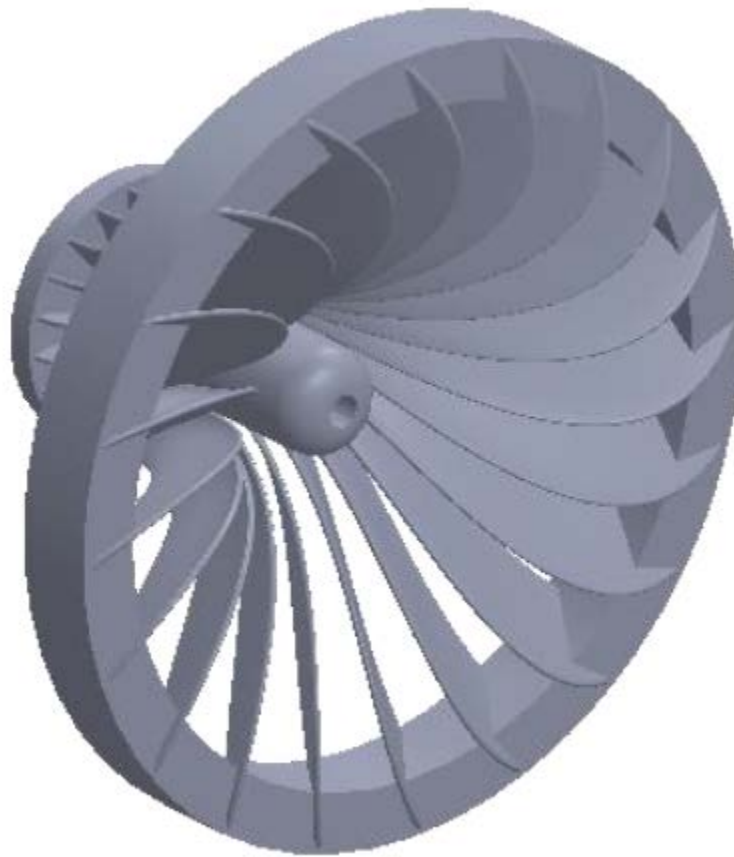
Advanced loft

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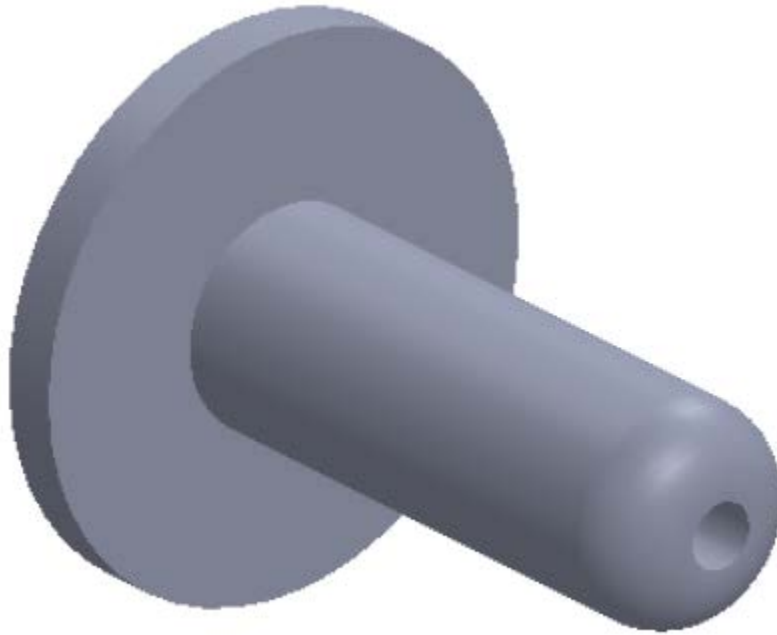
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In this book we are going to design below part. This is a turbine runner, Francis type.

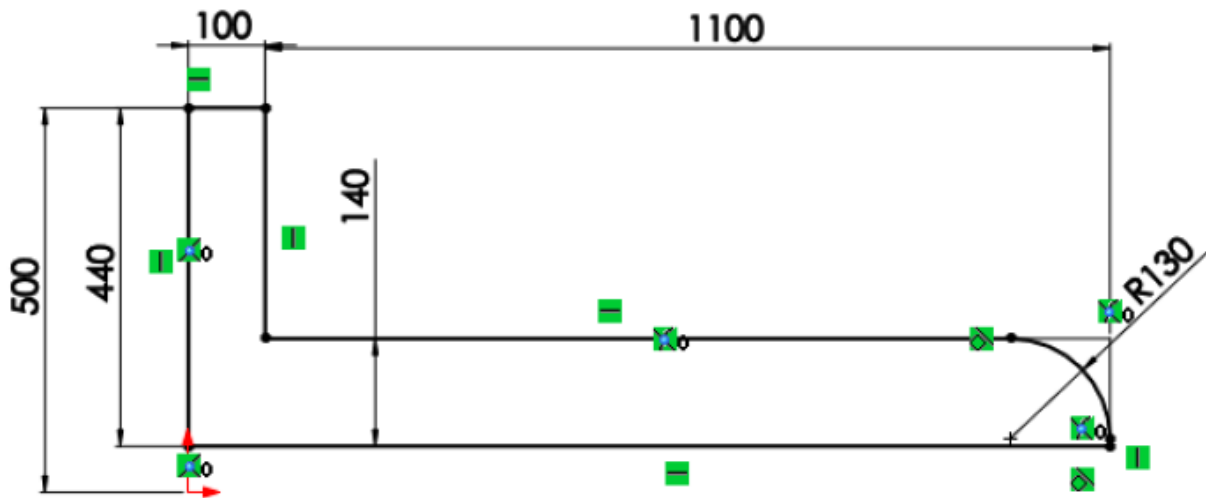


Please note that this is for advanced users and I won't cover basic design issues here so if you don't know how to create a sketch or define a plane or things like these I recommend you to visit the [beginner tutorials on solidworksadvisor.com](http://www.solidworksadvisor.com) and when you feel that you know the basics you can come back to this tutorial and I hope you like it.

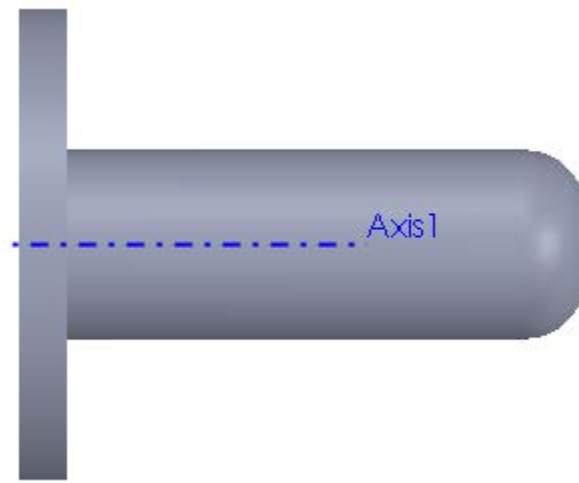
First we need this basic shape.



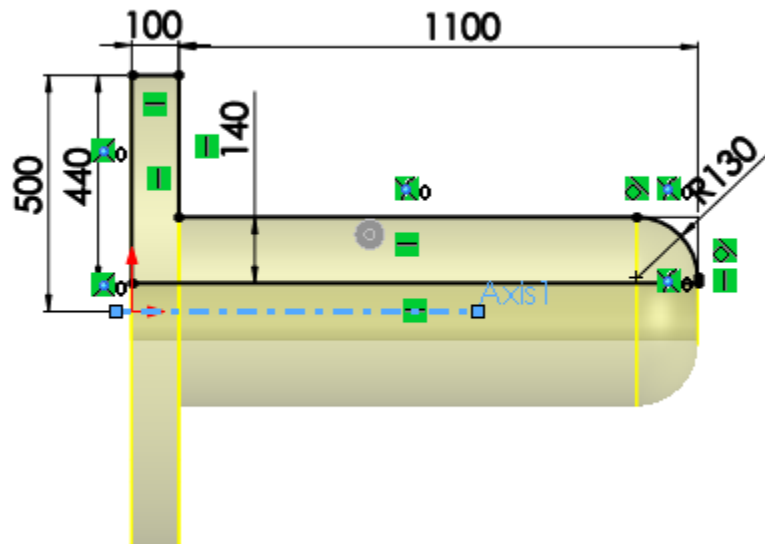
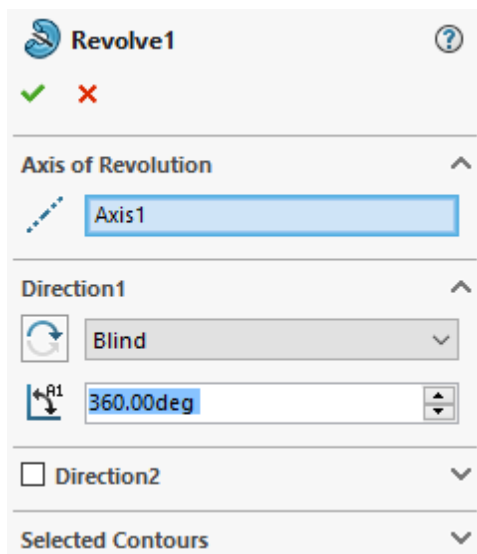
So open a new sketch on the top plane and sketch like this:



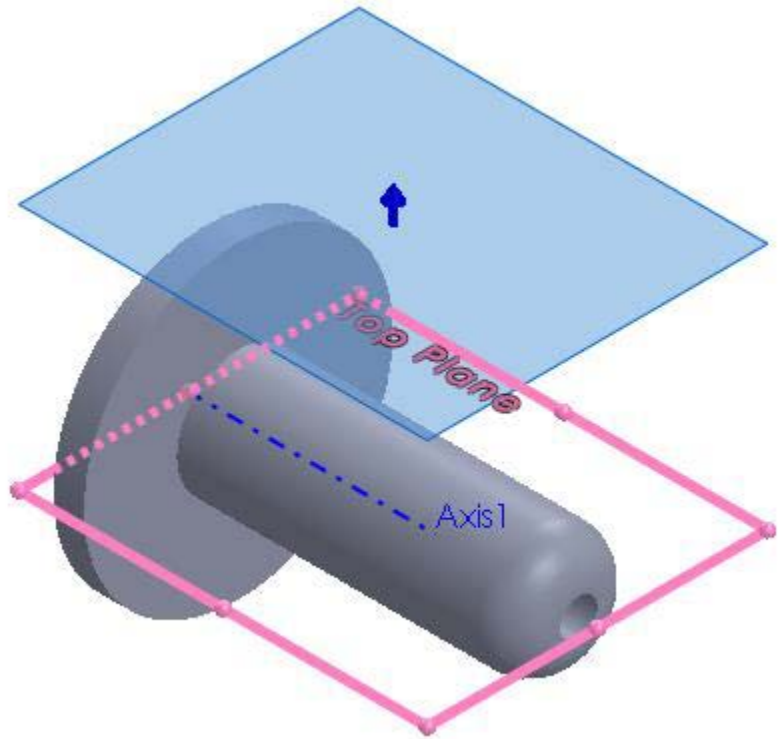
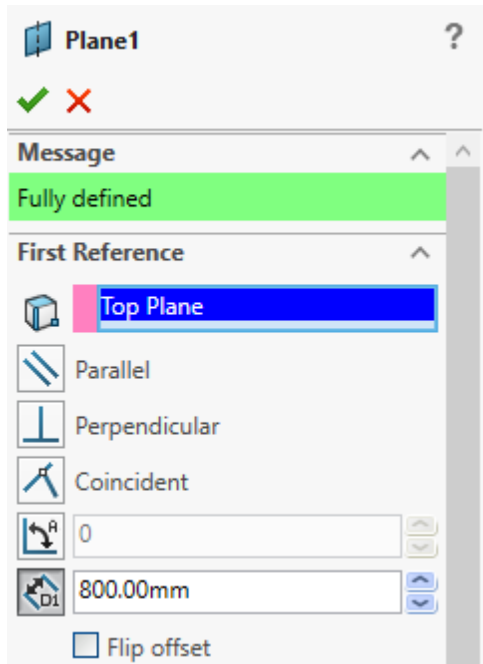
Define an axis to revolve the sketch around it:



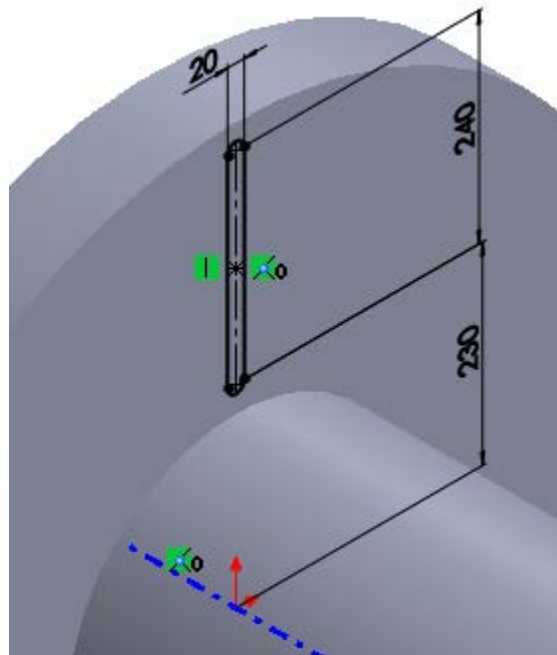
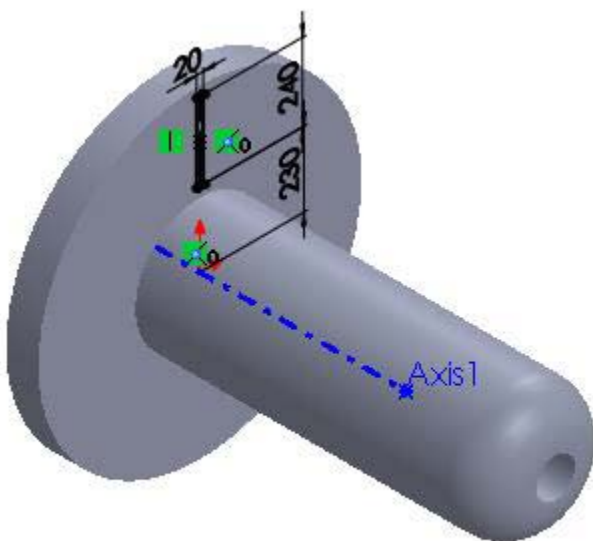
Now revolve the sketch around the axis :



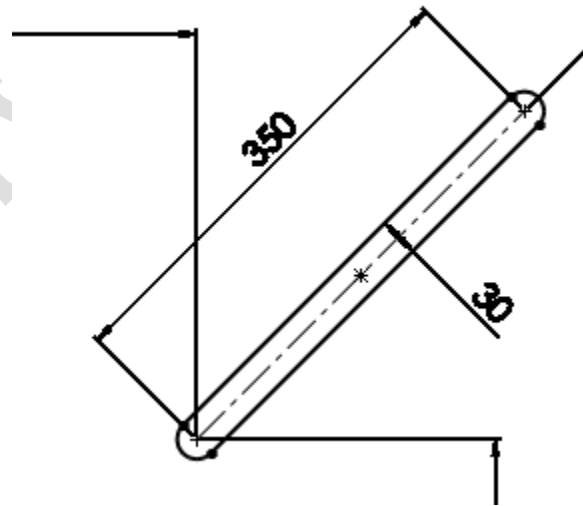
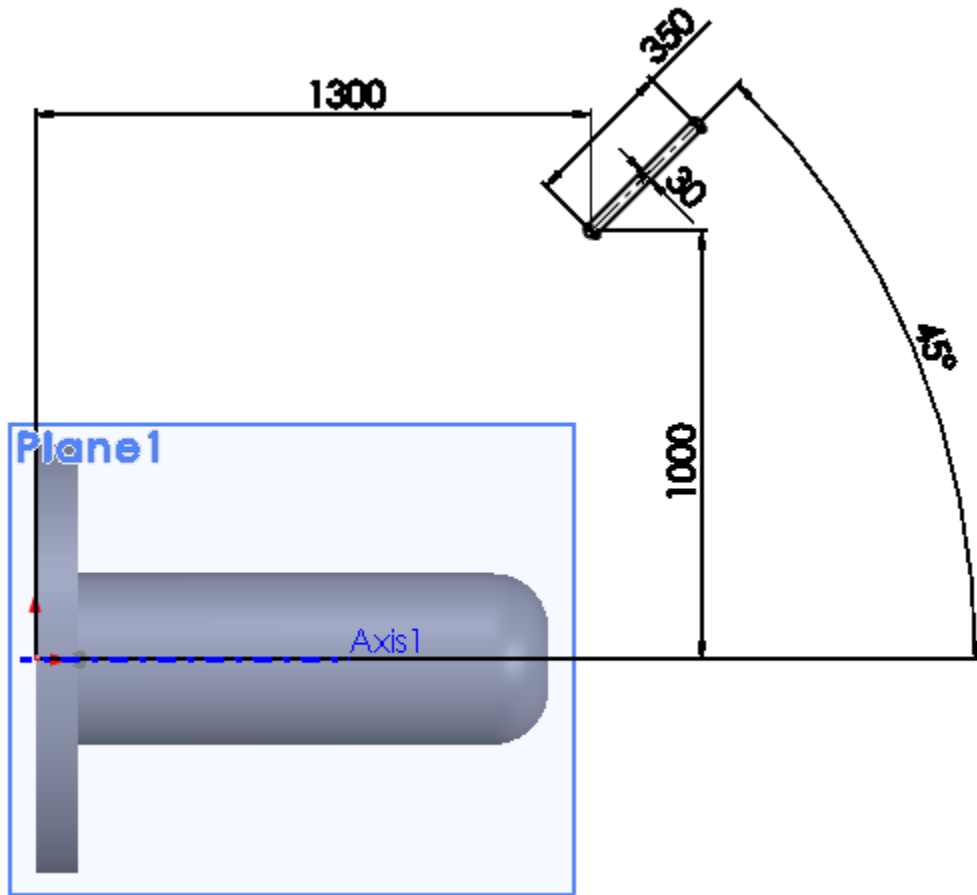
Save your work and define a new plane using the top plane as the reference.



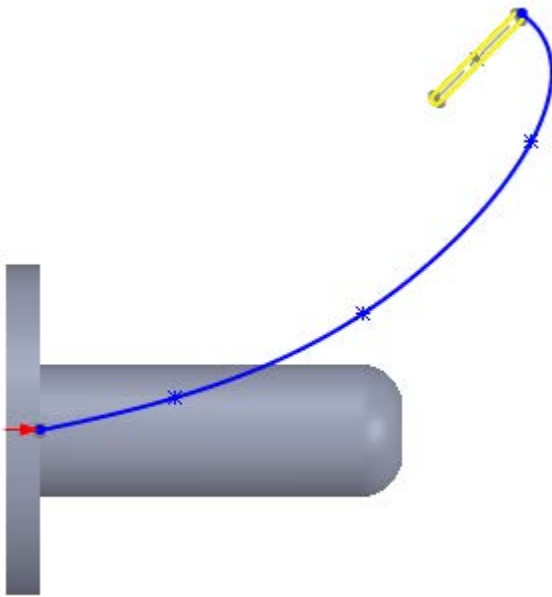
Ok here is the tricky part cause we are going to design the blade which needs a complicated loft. Let's get it done. first sketch the below slot on the face the existing part.



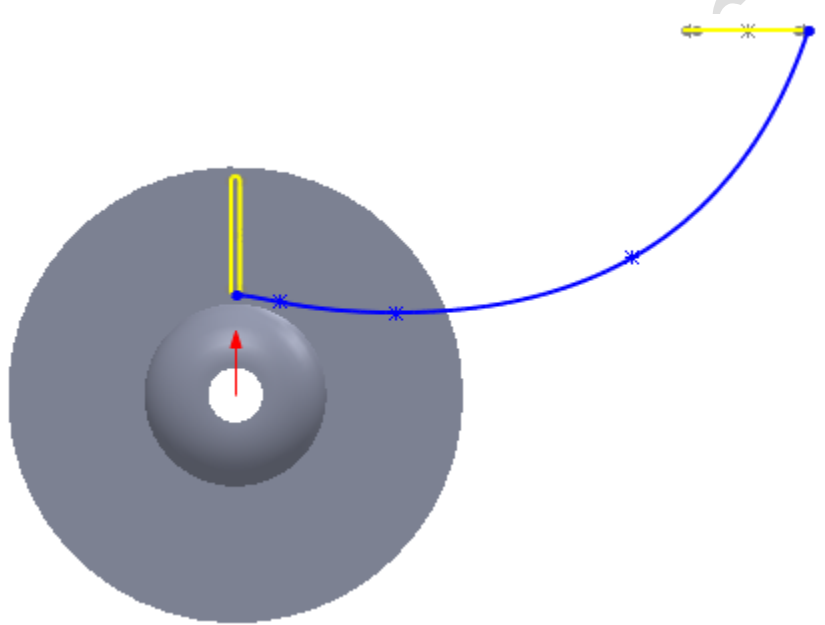
now sketch another slot on the plane 1 which you defined earlier:



Right click on the axis1 and plane1 and select hide. Click on the little arrow under the sketch button and select 3D sketch. Now choose spline from sketch tools and sketch the blow line. Note that we are not engineering the turbine blade so you don't need to be exact we only want to figure the blade's edge profile so first of all sketch a spline then drag the points to get a curve like below :

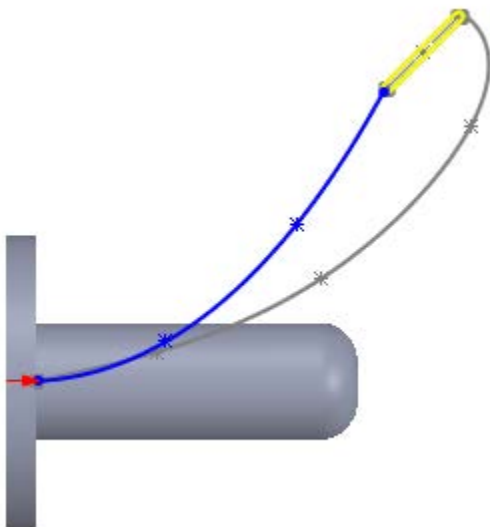


Spline from top view

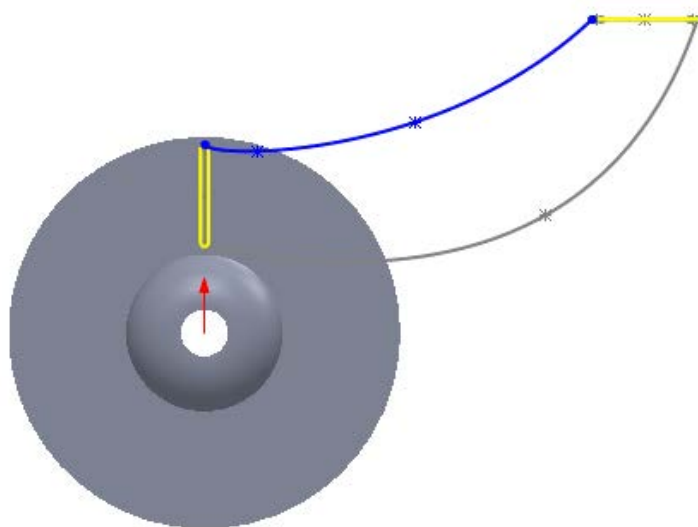


spline from front view

Important tip: please note that the endpoints of the spline must be pierced on the slot's sketches. Sketch the second spline with the same strategy:

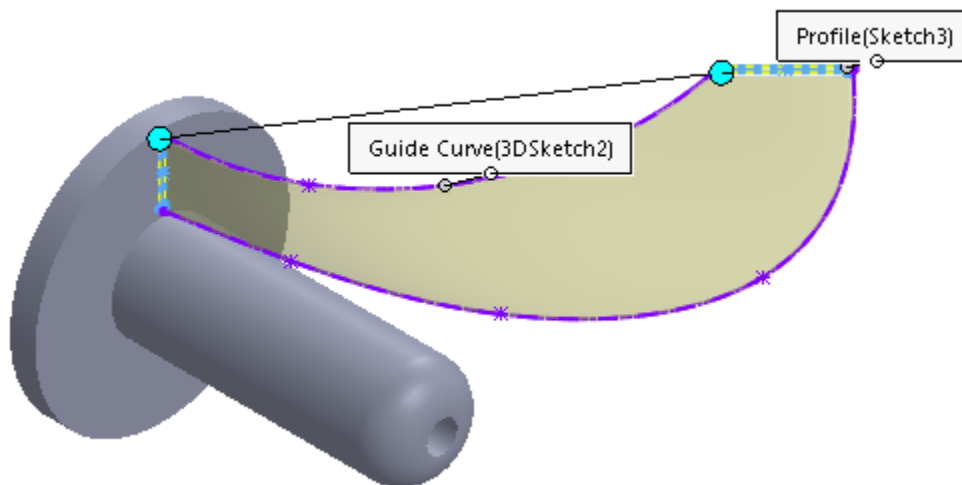
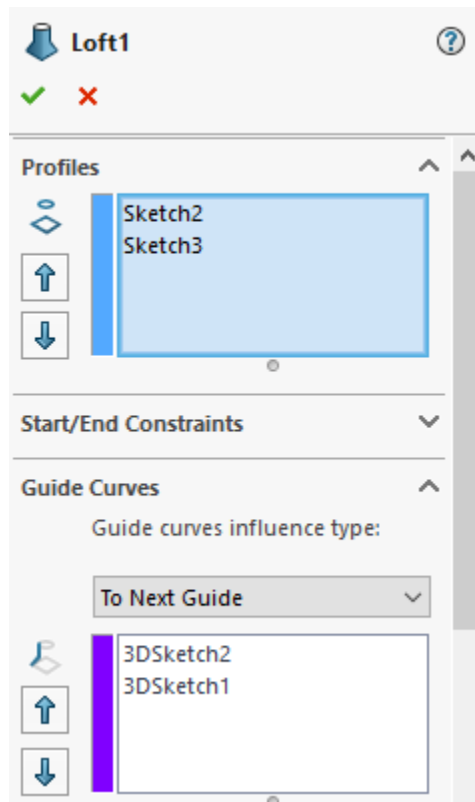


Spline from top view



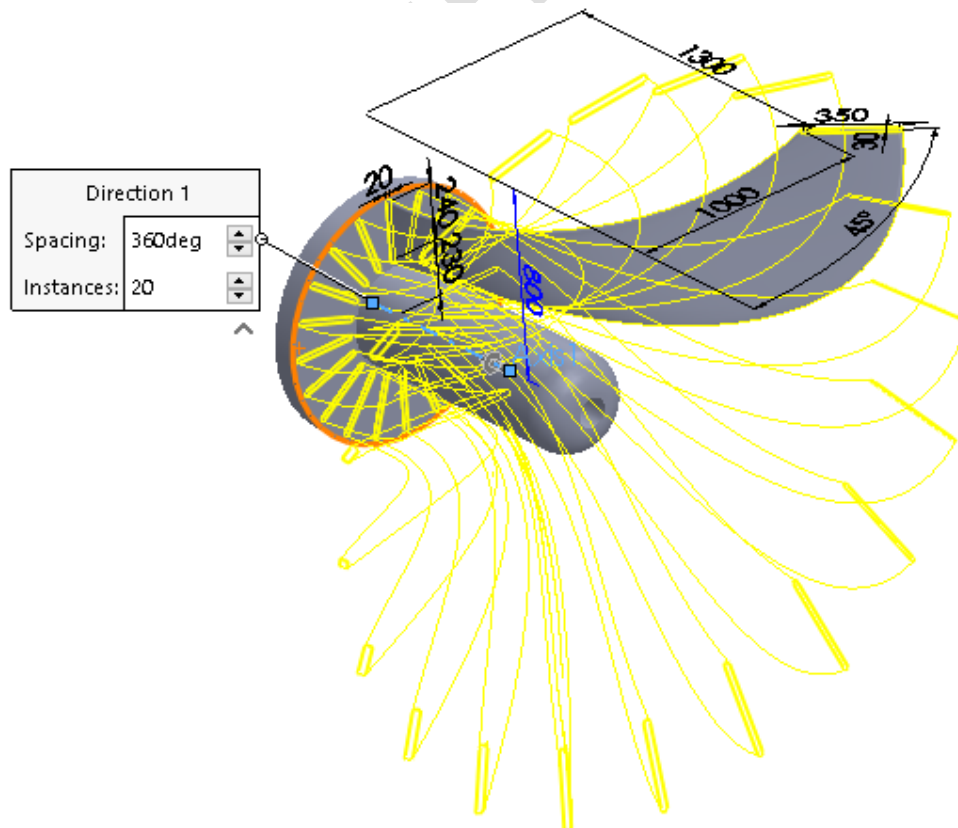
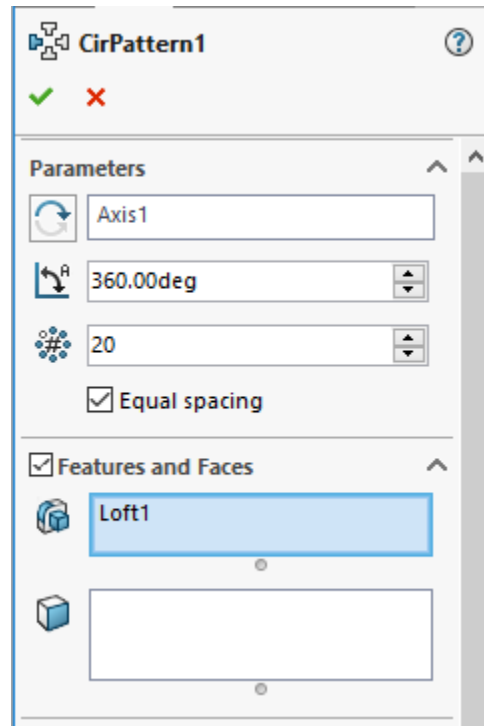
spline from front view

Now loft the first slot to the second one with guide of splines:

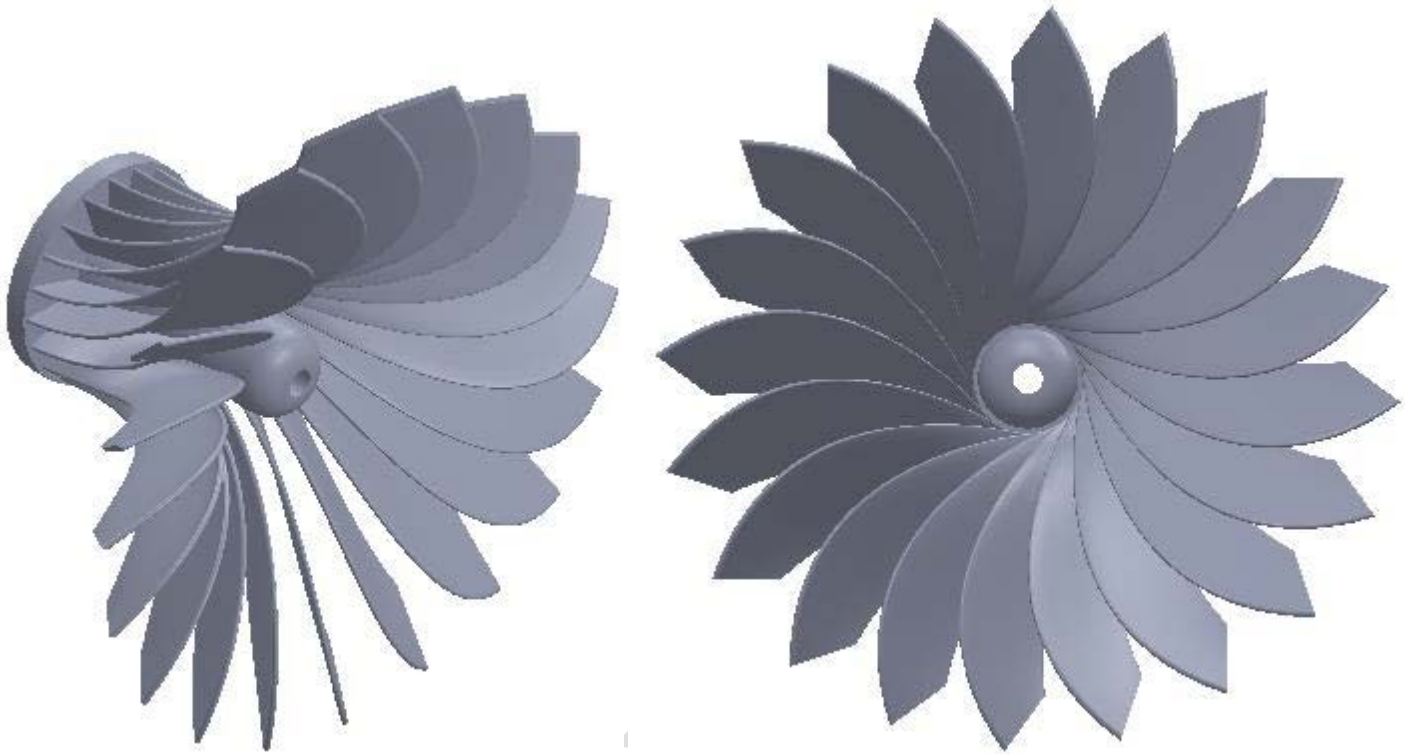


Click ok and save your work.

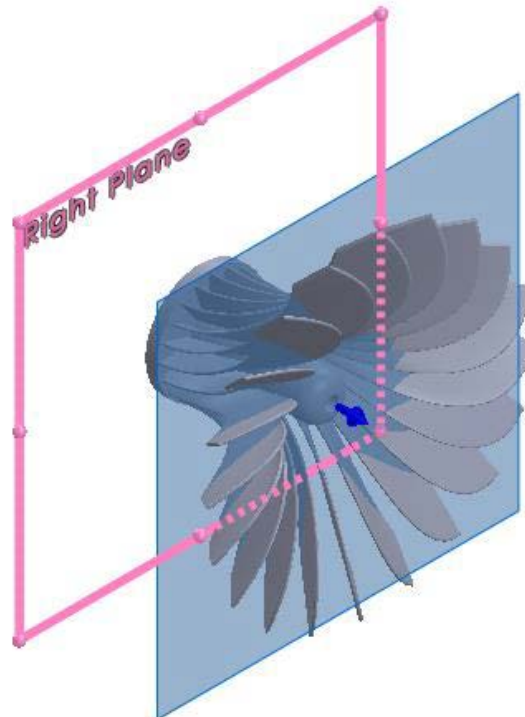
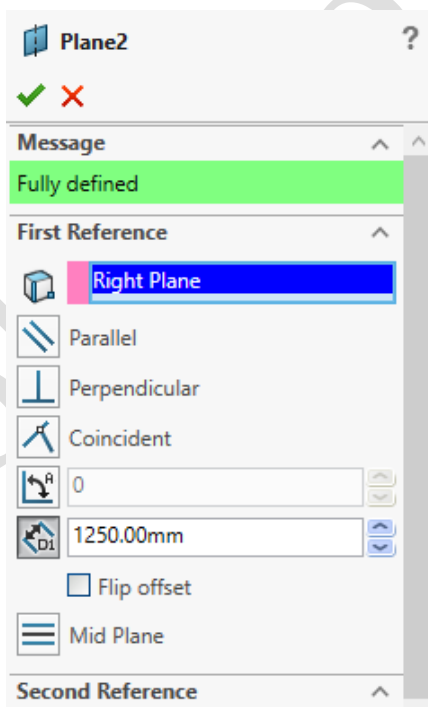
Now we need more blades and we use circular pattern to get them. Click on circular pattern button on features tab and set the parameters as below picture:



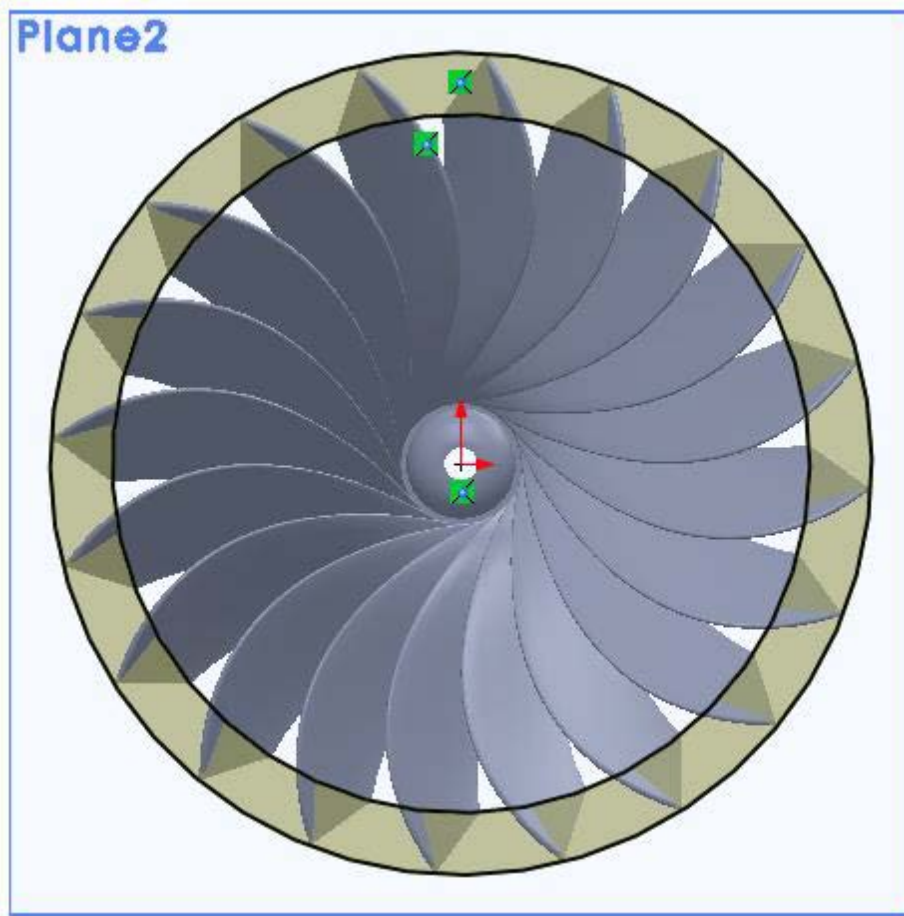
Click ok and see the result. Pretty much like a flower isn't it? Well it is but we are not done yet.



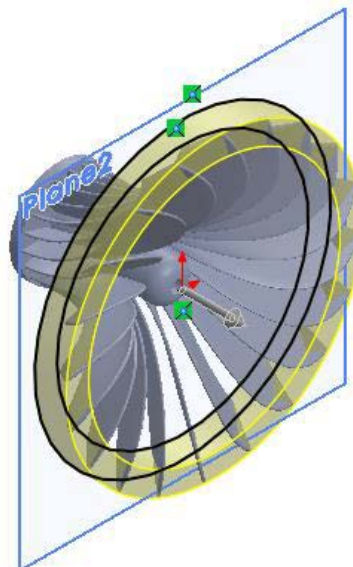
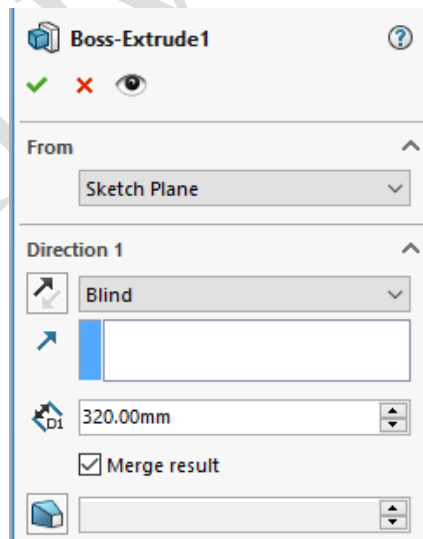
Use the right plane to define a new plane like this:



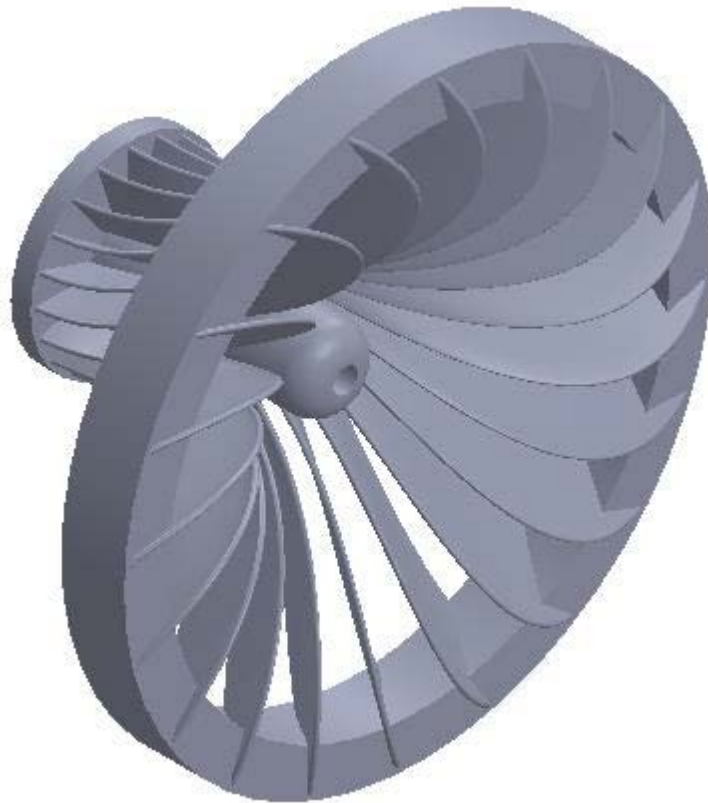
Sketch two circles on plane2. Note that the circles must be coincident with the endpoints of the blades:



Extrude the sketch:



Click ok and see the result. Now you have designed a turbine runner:



Designed by M.Ghasemi

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