Welcome to Code Crunch!

C12 | Crunch 3D: CAD & Modeling

[Tues 4-5PM] Weekly | Spring 2025

Attendance

Earn a Certificate of Completion by attending at least 70% of the workshops

CODECRUNCH.CS.FIU



Unit #5

Topic: Final Project

C12 | Crunch 3D: CAD & Modeling

Key Dates and Structure
C12 - Crunch 3D: CAD & Modeling

- **Week 1: Introduction to OnShape, Sketching Fundamentals, & 2D Constraints**

  Learning what On-Shape is and how to properly sketch on OnShape.

- **Week 2: 3D Part Modeling**

  Learning how to use extrude, remove, fillet, chamfer, revolve, shell, and loft functions for 3D models.

- **Week 3: 3D Part Modeling Continued**

  Learning how to use draft, mirror, and sweep functions for 3D models.

- **Week 4: Assemblies & Mating Constraints**

  Learning how to create assemblies through mates and constraints.

- **Week 5: Final Project - Real-World Design Challenge**

  Applying all concepts to design a functional product.

- **Week 6: Final Project Showcase**

  Presenting your final project, sharing your experience, and receiving feedback.

Session Overview

In this session we will be working on our **final project**!
We will be putting all the skills we have learned to use.

You can create **anything** that you desire. Here are a few ideas:

- Drone frame
- Robotic arm component
- Phone holder
- 4-cylinder piston
- Mini windmill
- Handcar
- Toy car



You can follow along with use as we create a **mini windmill**!

Time for…

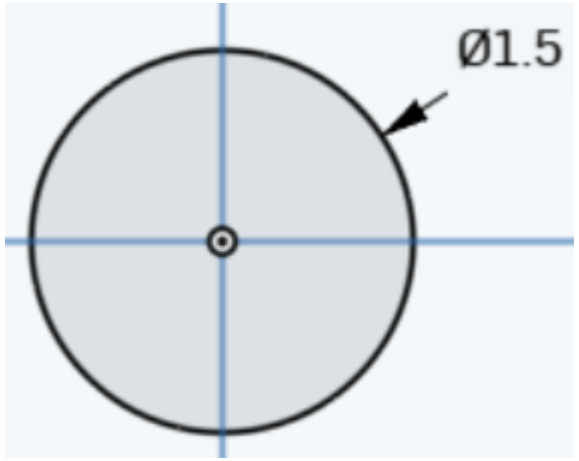


Part 1 – The Pole!

Part 1: Loft Set Up

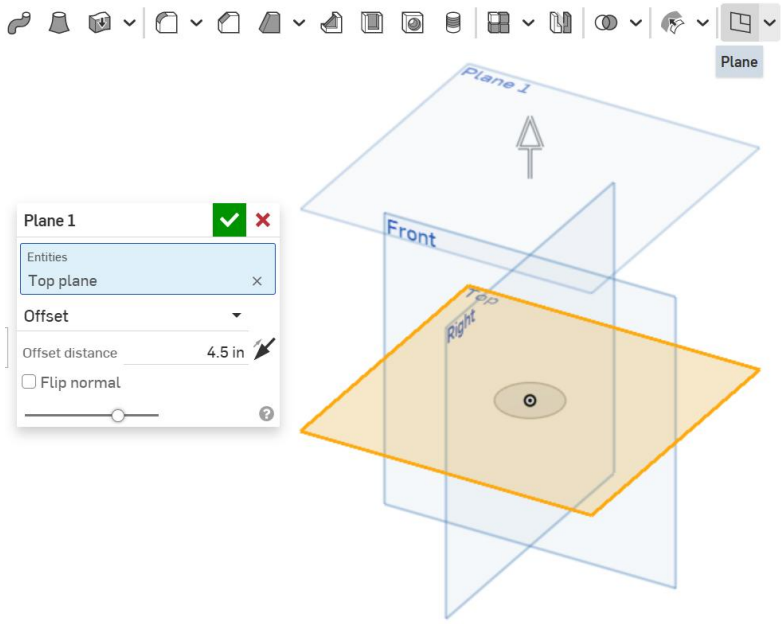
Step 1:

Make a **sketch** on the **Top Plane** with a **Center Point Circle** of diameter 1.5 in.



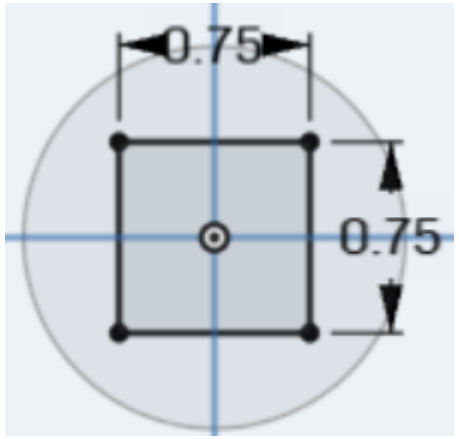
Step 2:

Make an offset **Plane** of the **Top Plane** with a distance of 4.5 in.



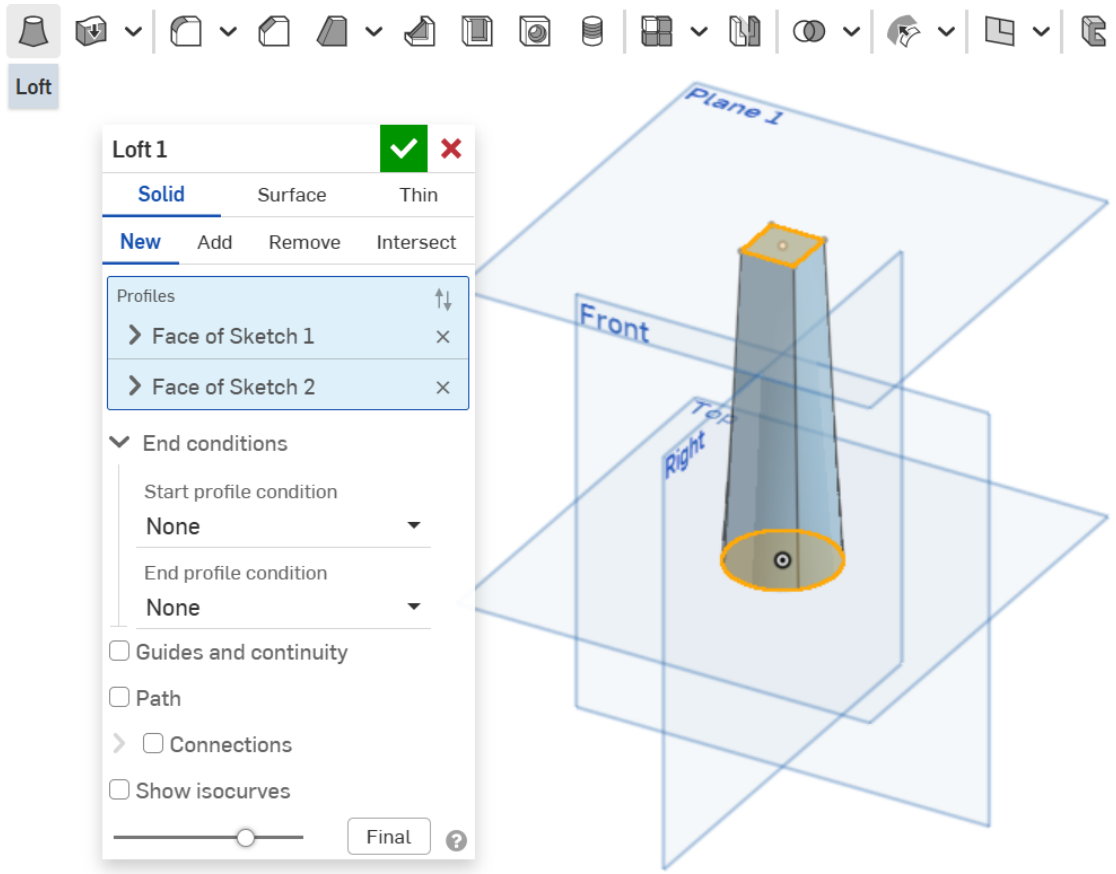
Step 3:

Make a **sketch** on the **Plane 1** with a **Center Point Rectangle** that is 0.75 in by 0.75 in.



Part 1: Loft

Make a **Loft** using **Sketch 1** and **Sketch 2**.

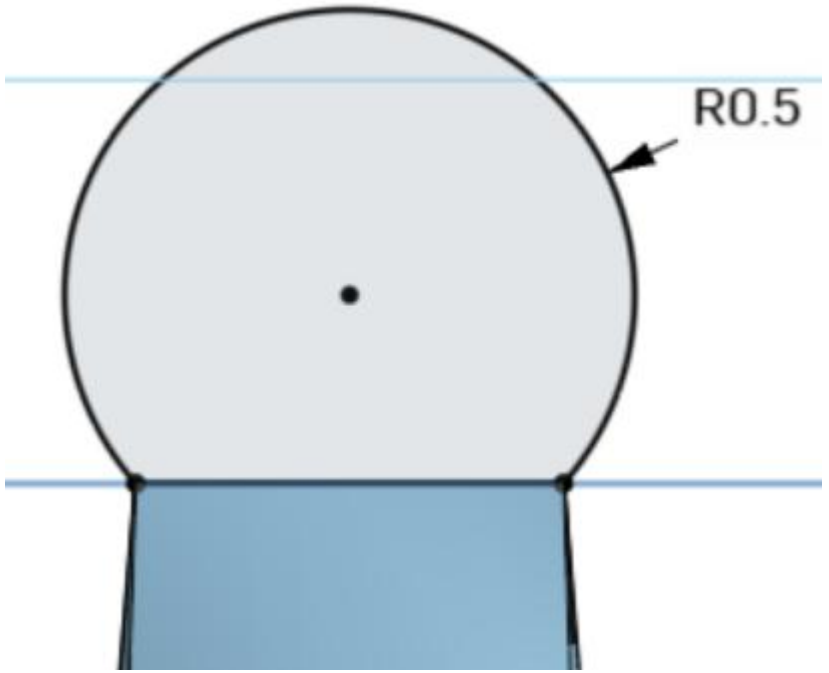


Part 1: Sketch 3

Make **Sketch 3** on the **Front Plane**.

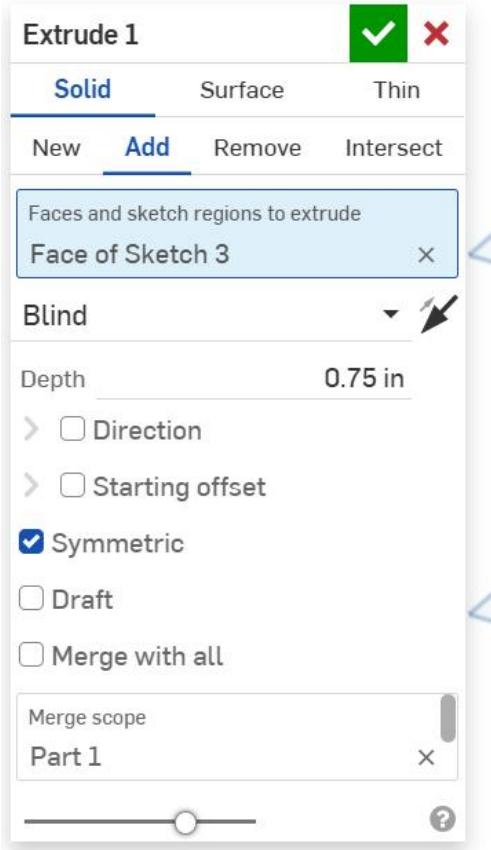
Click to **Use** the top line of the pole base in this sketch.

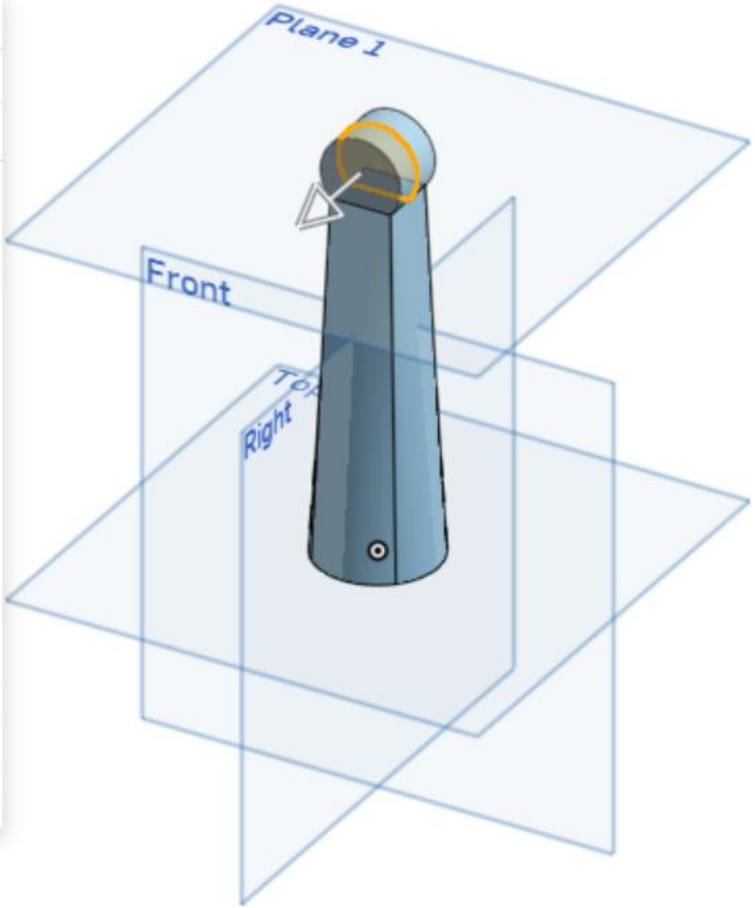
Then draw a **3 Point Arc** – the first 2 points touching the ends of the line and the 3rd point being placed somewhere above the line. Then change the **radius** of the arc to be 0.5 in.



Part 1: Extrude

Make a **Symmetric Extrude** of **Sketch 3** with a depth of 0.75 in.

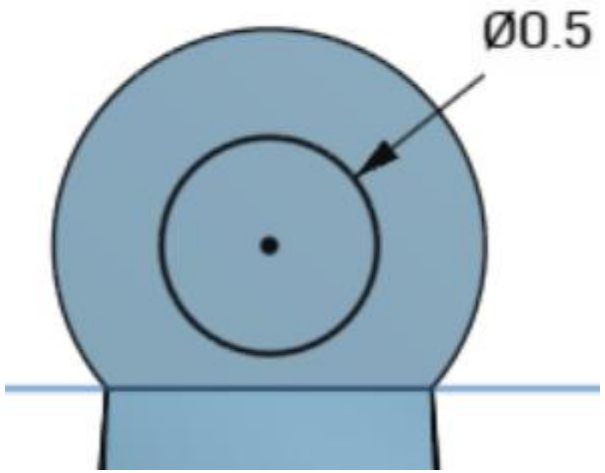




Part 1: Sketch 4

Make **Sketch 4** on the **Front Face** of the part that was just extruded.

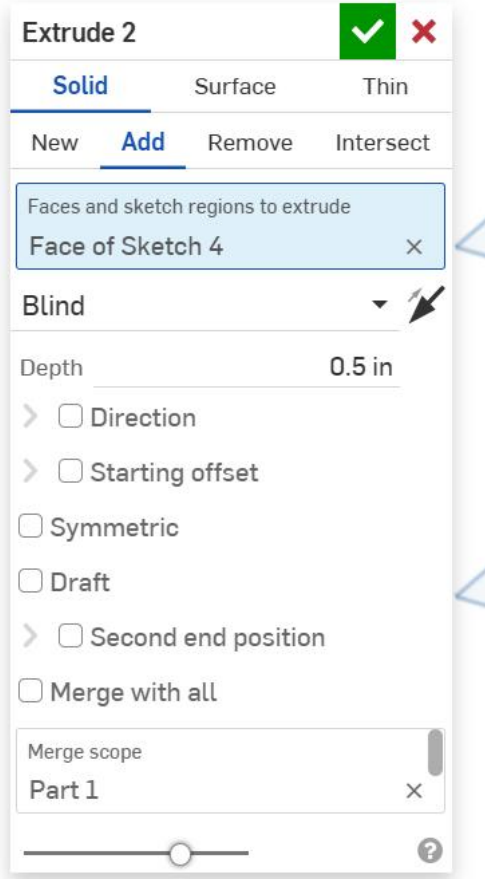
Draw a **Center Point Circle** on the center of the arc of the model, with a **diameter** of 0.5 in.

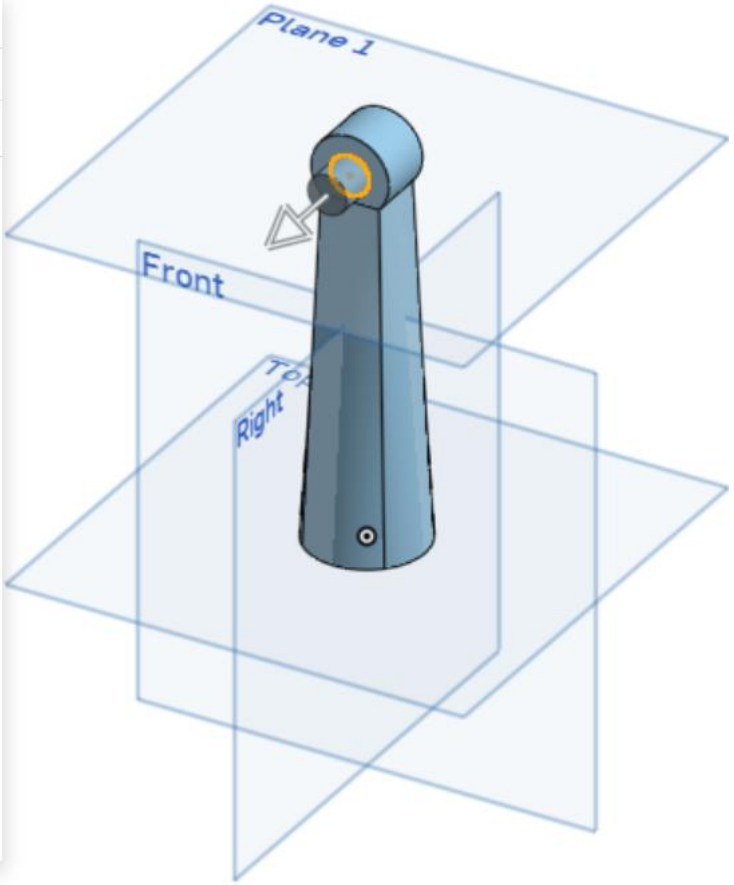


Part 1: Extrude

Make an **Extrude** of **Sketch 4** with a **depth** of 0.5 in.

The pole is now finished!





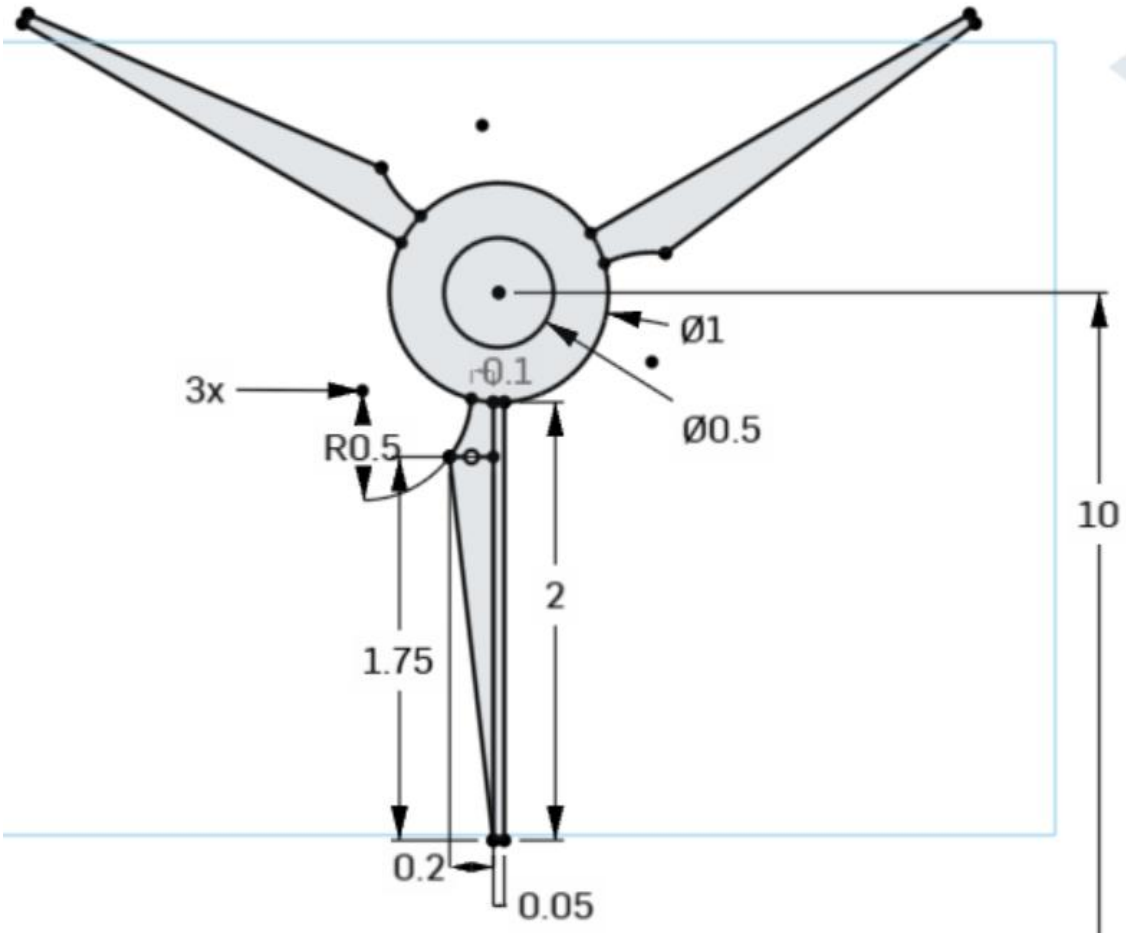
Time for…



Part 2 – The Blades!

Part 2: Sketch 5

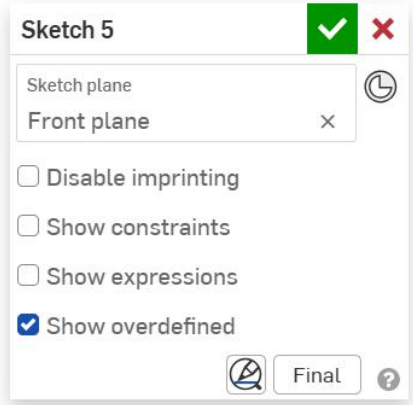
1. Make **Sketch 5** on the **Front Plane**.
2. Start with a **Center Point Circle** with a **diameter** of 0.5 in. Place the center of this circle 10 in away from the origin. Make another **Center Point Circle** of **diameter** of 1 in that shares the same center.
3. Next create a blade using a **Corner Rectangle** of 0.05 in by 2 in, whose ends **coincide** with the larger circle. Then create a **Triangle** at the end of the blade with a base of 0.2 in and height of 1.75 in. Then create a **3 Point Arc** with a **radius** of 0.5 in to connect the triangle to the larger circle. Make the **distance** between the points on the larger circle of the arc and of the left corner of the rectangle to be 0.1 in apart.
4. Use a **Circular Pattern** to replicate the blade 3x around the center of the circles.

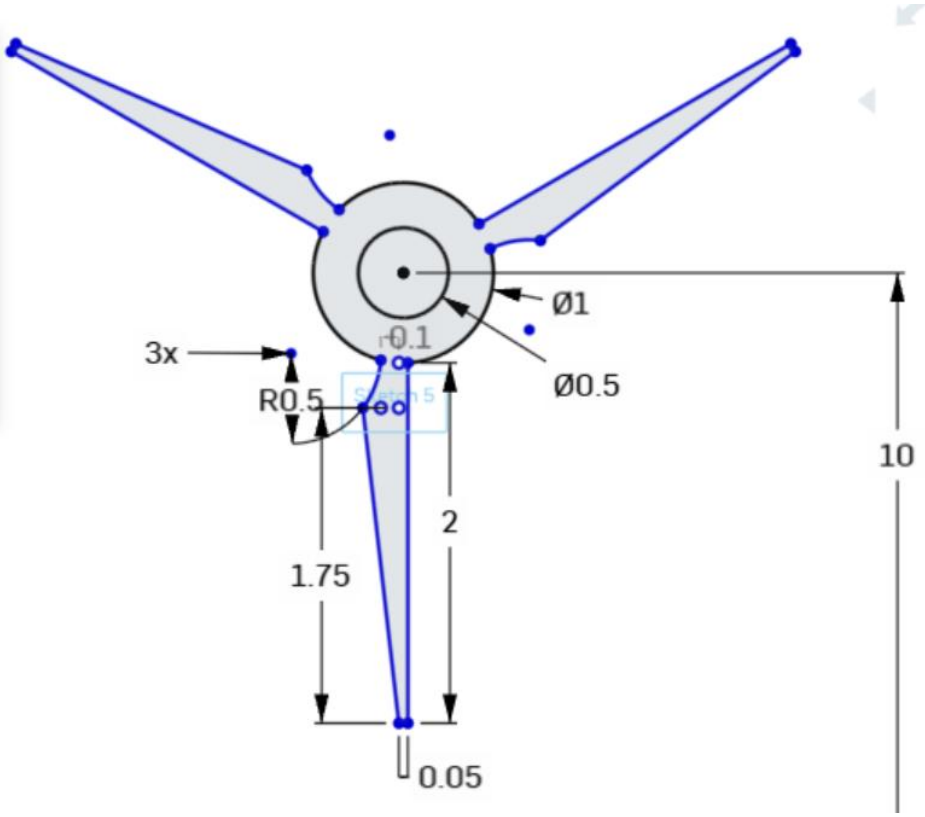


Part 2: Trim

Trim all the lines in the sketch that are unnecessary. This will ensure that when we extrude, the extrusion will produce one part.

Note: This will make the sketch not appear as fully defined anymore. If you wish, you can add the dimensions again.

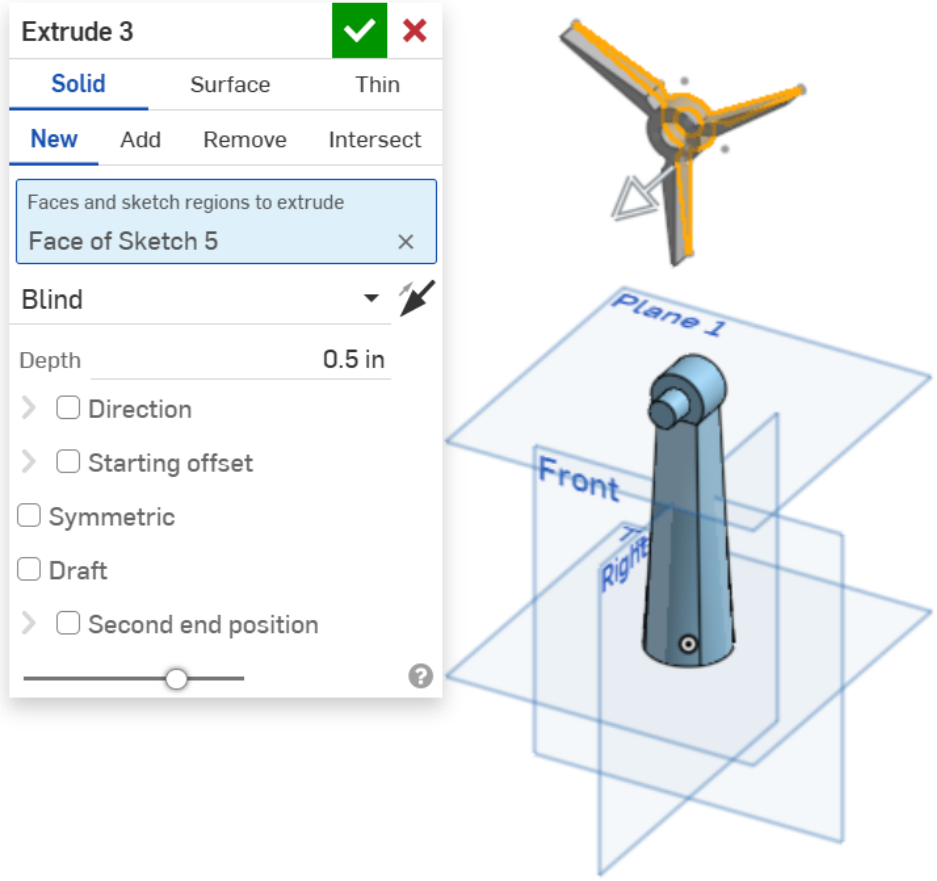




Part 2: Extrude

Make an **Extrude** of **Sketch 5** with a **depth** of 0.5 in.

The blades are now finished!

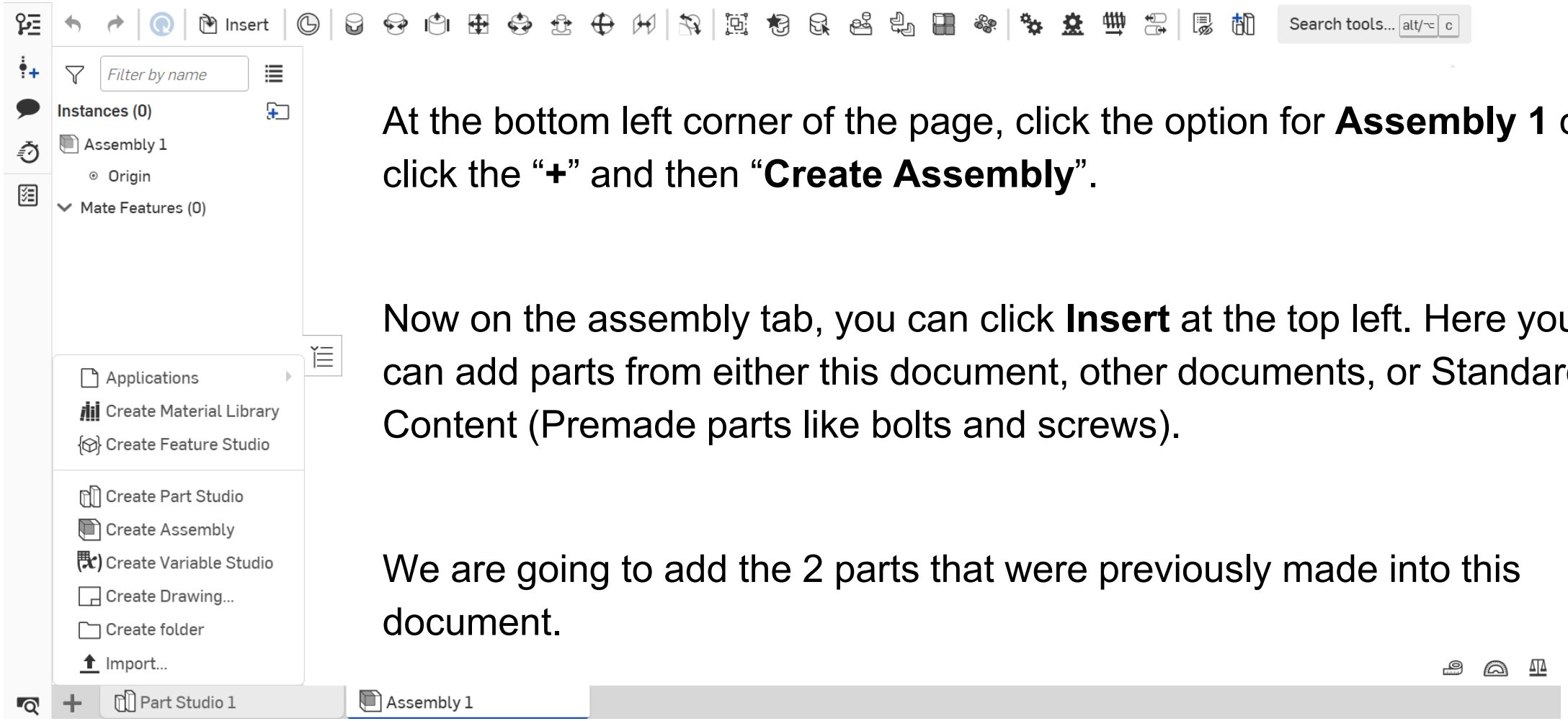


Time for the…



Windmill Assembly!

Assembly



At the bottom left corner of the page, click the option for **Assembly 1** or click the "**+**" and then "**Create Assembly**".

Now on the assembly tab, you can click **Insert** at the top left. Here you can add parts from either this document, other documents, or Standard Content (Premade parts like bolts and screws).

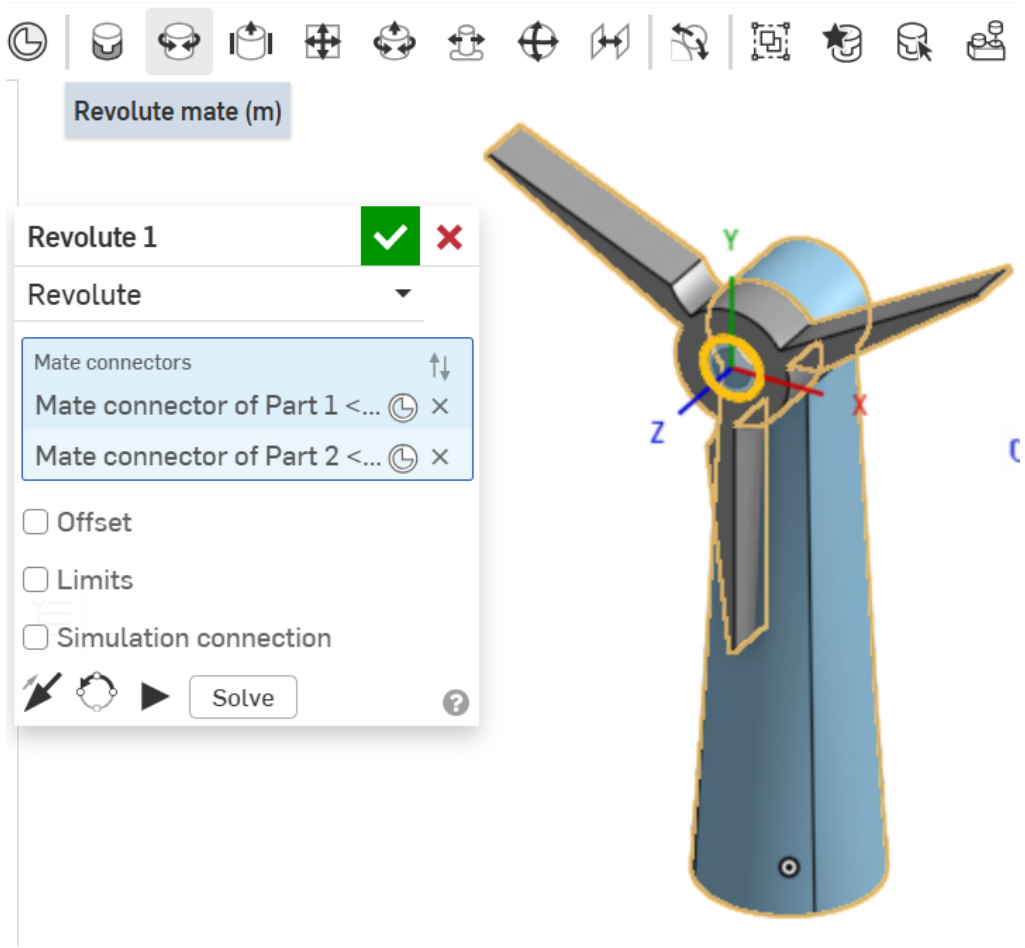
We are going to add the 2 parts that were previously made into this document.

Windmill: Assembly

To create the assembly, start off by making **Part 1** the “**base**”. To do so, right click **Part 1** and select **Fix.** 

To **combine** the parts, we are going to use a **Revolute Mate**, allowing the blades to **connect and rotate** on the pole. Combine the **Mate Connector** of the hole of **Part 2** with the **Mate Connector** of the stick of **Part 1**.

The **windmill** is now completed!



Q&A Session

Attendance

Join us for the upcoming weekly sessions this Spring 2025!
(Jan 6 - Apr 4, 2025)

Monday: C5 1PM
Tuesdays: C7 1PM / **C11** 3PM
Wednesdays: C5 12:30 PM / **C9** 1:30 PM (Varies)
C1 2:30PM / **C2** 3:30PM / **C13** 5:30PM
Thursdays: C6 1PM / **C8** 3PM
Friday: C9 2PM (Varies) / **C10** 3PM/ **C11** 4PM

RSVP LU.MA/CODECRUNCH

Your feedback helps us improve. Share your thoughts!
Go to our website: CODECRUNCH.CS.FIU