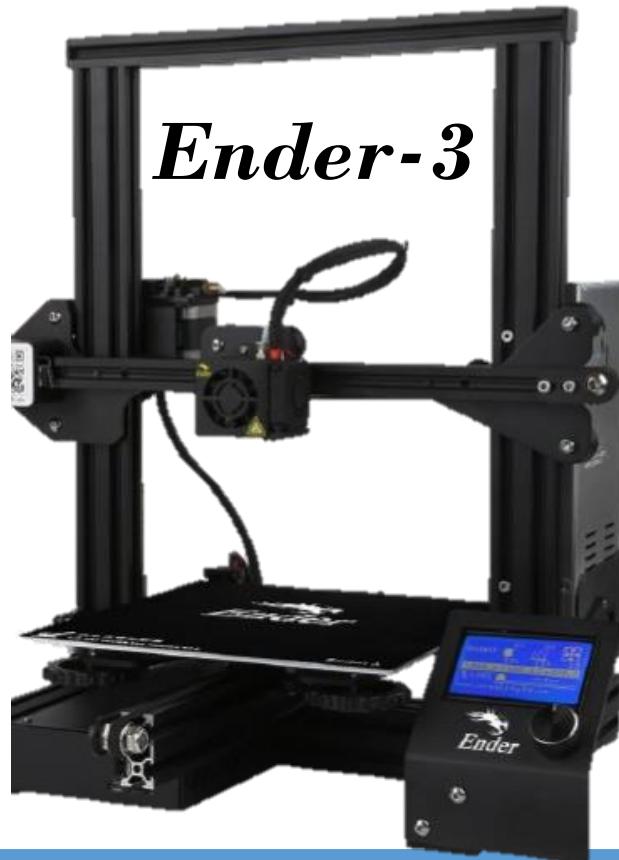


3D Printer & Fusion360



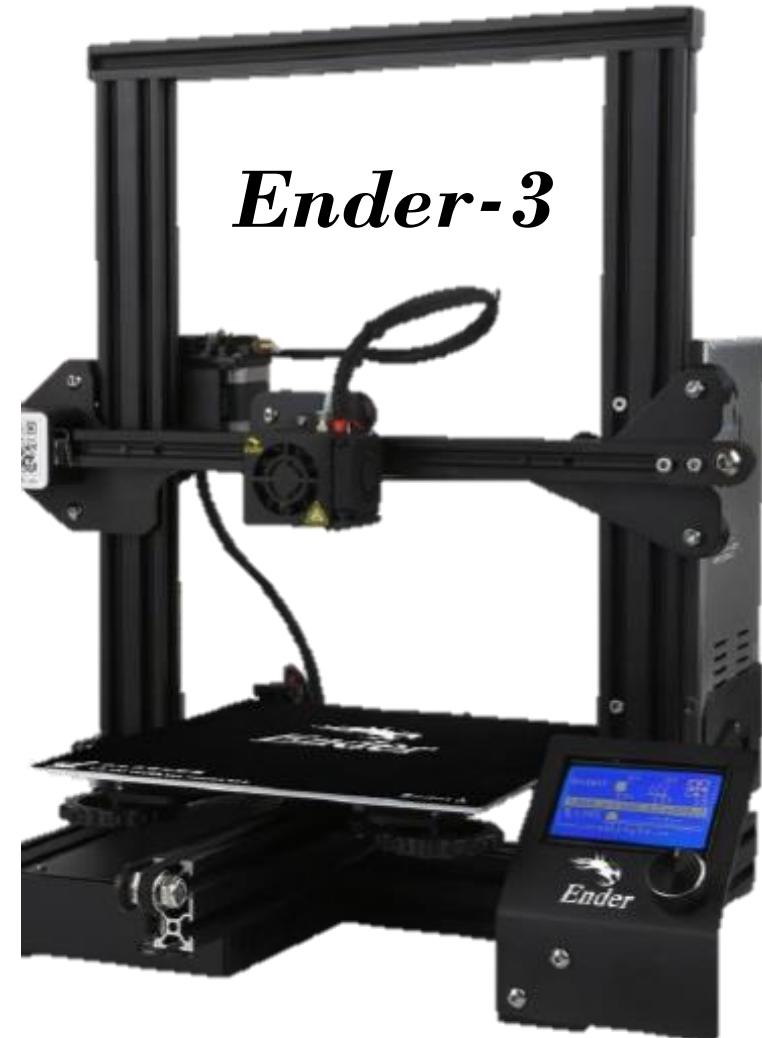
AUTODESK® FUSION 360™

Contents

- Introduction of 3D printer
 - Fusion 360 – Creating Account
 - Fusion 360 – Basic Tool explain
 - Saving files – .stl files / cloud
 - Build-up 3D Printer – ‘ENDER 3’

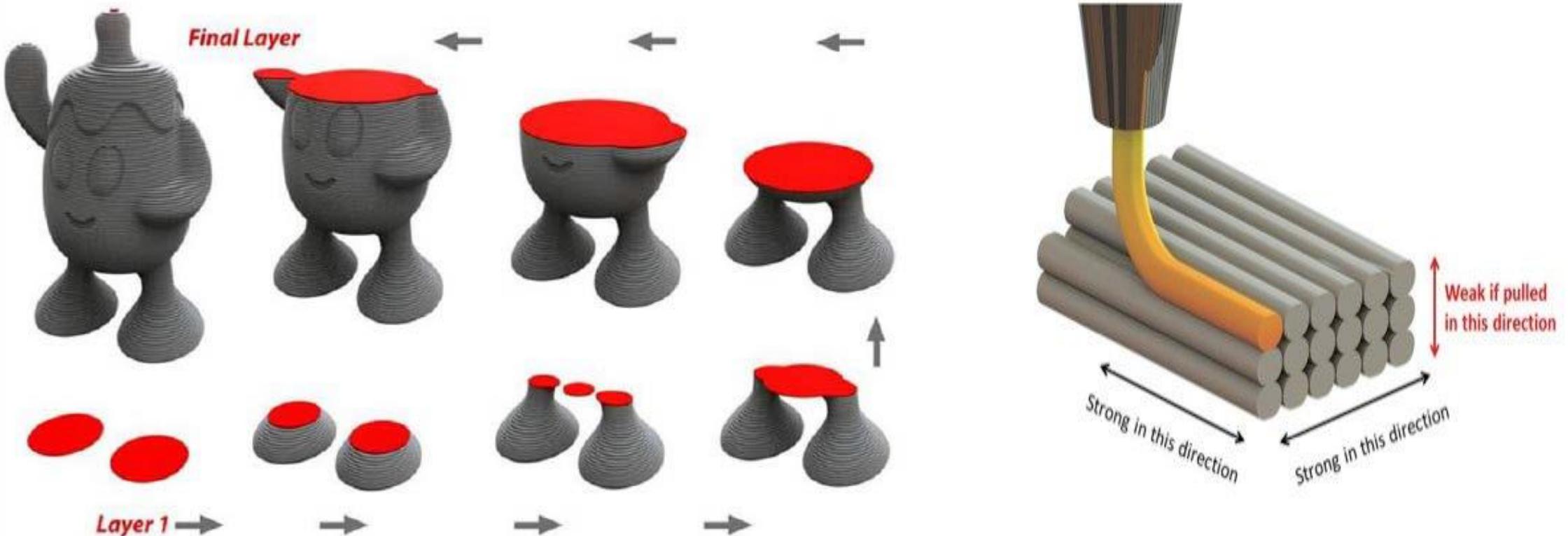
Introduction – Advantages of 3D Printer

- ✓ Can easily simulate / make what we want to make (what we have modeled).
 - ✓ Rapid prototyping – designers can quickly turn their concepts into 3D modeling.
 - ✓ Low cost of production.
 - ✓ Easy to use.



Output method for 3D printers

- ✓ Stacking method – making layers from the bottom to the top.
- ✓ Also called as 2.5-dimension method.



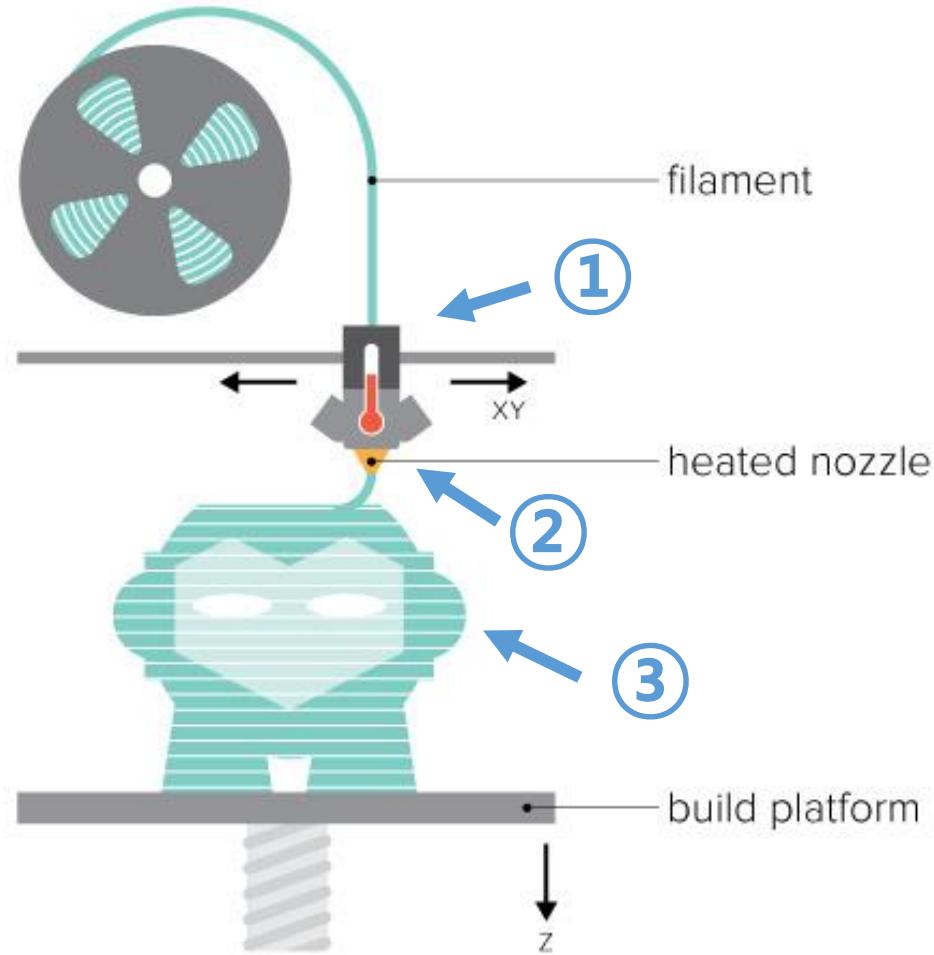
Types of 3D printing machines

Lots of different technologies called 3D printing !



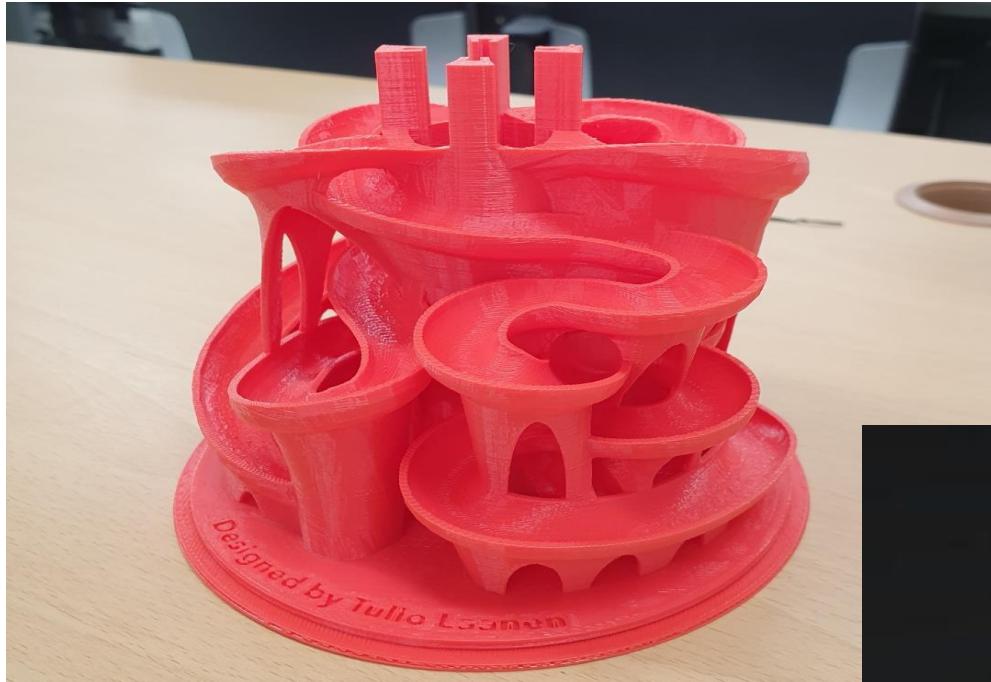
1. Stereolithography (SLA)
 2. Digital Light Processing (DLP)
 3. Fused Deposition Modeling (FDM) 
 4. Selective Laser Sintering (SLS)
 5. Selective Laser Melting (SLM)
 6. Electronic Beam Melting (EBM)
 7. Laminated Object Manufacturing (LOM)
 8. Binder Jetting (BJ)
 9. Material Jetting (MJ)

FDM(Fused Deposition Modeling) type 3D printer



- ① The filament (PLA) is loaded to 3D printer and fed through to a printer nozzle.
- ② A motor pushes the filament through the heated nozzle -> melts the filament !
- ③ Printer then moves , laying down the molten material onto the build plate where it cools down and solidifies.
➤ Repeats this layering process until the object is fully formed !

Example of output using 3D printing

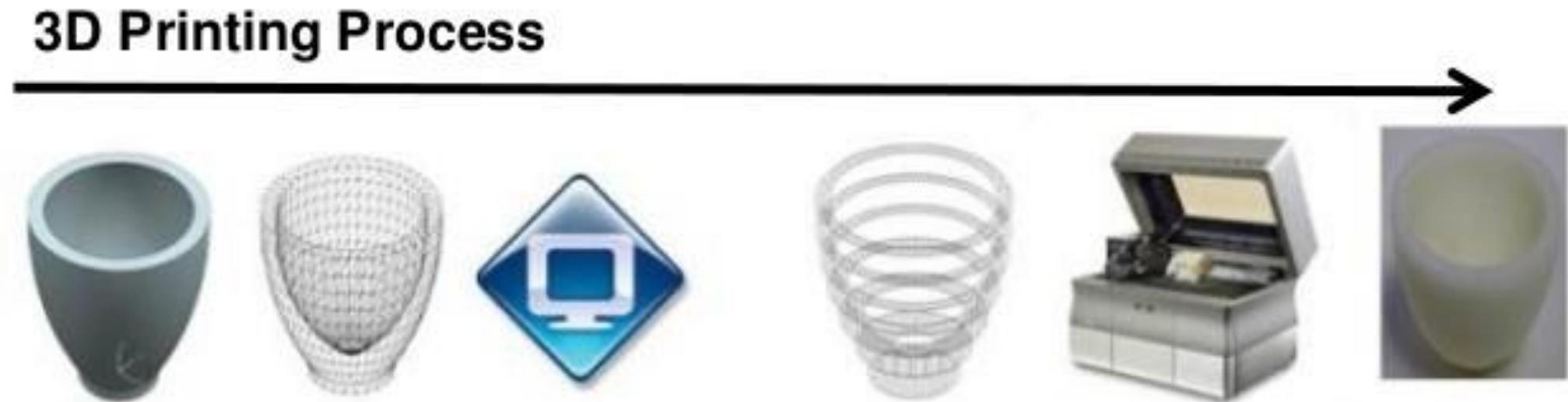


Layering types of 3D printing has less limitations in printing out structures.

→ We can print out complex / curved forms !



Steps for 3D printing



3D Cad Model

- Fusion 360
 - Thingivers
 - Scanning

.STL File

Slicing Software

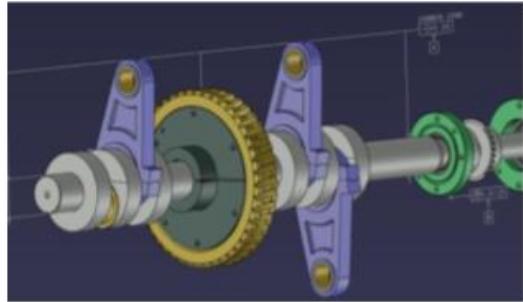
Layer Slices & Tool Path

3D Printer

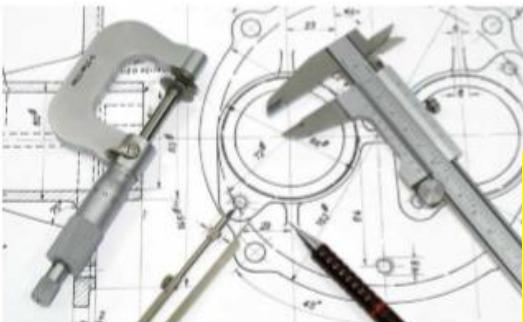
3D Object



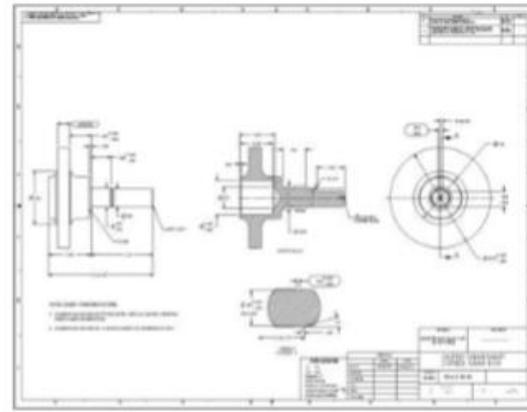
Product Manufacturing Process Prior to 3D Printer



Modeling



System



Floor plan

A problem

- Need professional knowledge related to processing
- Process plan required before processing
- It's a lot of money and time.
- Equipment required for each process
- Waste of material due to cutting



Milling



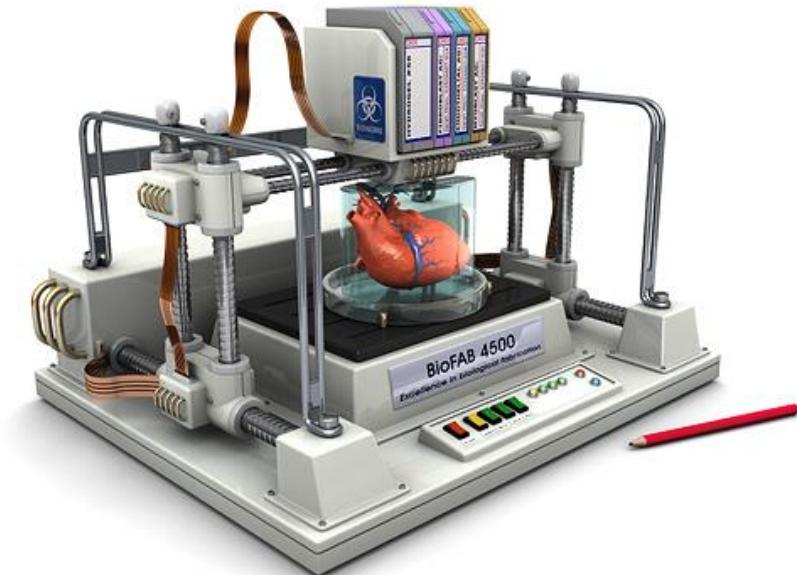
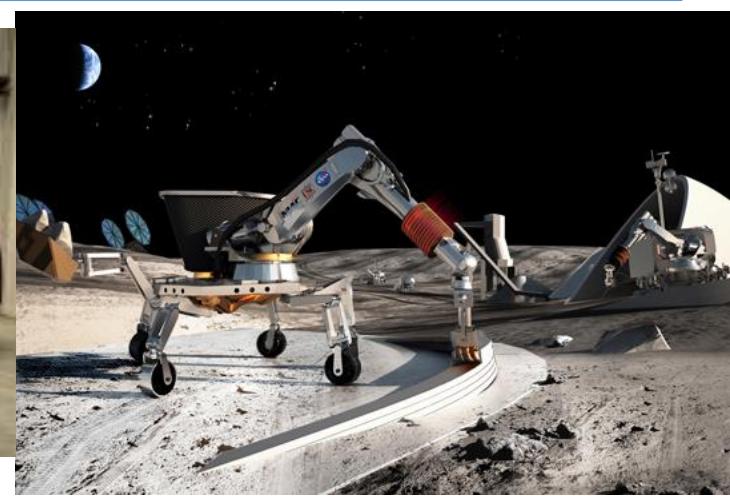
Casting



Mold

Importance of 3D printing in the future





Fusion360 - Create Account



Video-viewed 3D modeling concepts



Fusion360 Create Account

The screenshot shows a web browser window for Autodesk's sign-in page at <https://accounts.autodesk.com>. The page has a "Sign in" header and a logo. A blue bar contains a "NEXT" button. Below it, a red box highlights a "CREATE ACCOUNT" link. The number "3" is placed over this red box. At the bottom, there is a note about Autodesk accounts.

Sign in 

Email
name@example.com

NEXT

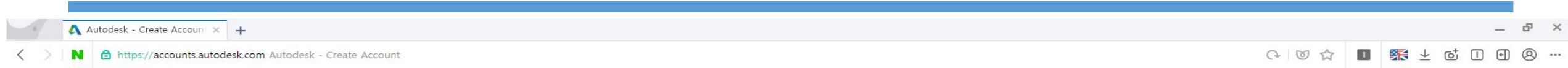
NEW TO AUTODESK? [CREATE ACCOUNT](#)

3

Your account for everything Autodesk
[LEARN MORE](#)

<https://accounts.autodesk.com/register?viewmode=iframe&ReturnUrl=%2Fauthorize%3Fviewmode%3Diframe%26lang%3Den%26realm%3Ddownload-ca.autodesk.com%26ctx%3Dadsk-download-ca%26AuthKey%3D7a878c57-8455-459e-af06-f79cdd52979b>

Fusion360 Create Account



Create account 

First name Last name

Email

Confirm email

Password

I agree to the [Autodesk Terms of Use](#) and acknowledge the [Privacy Statement](#).

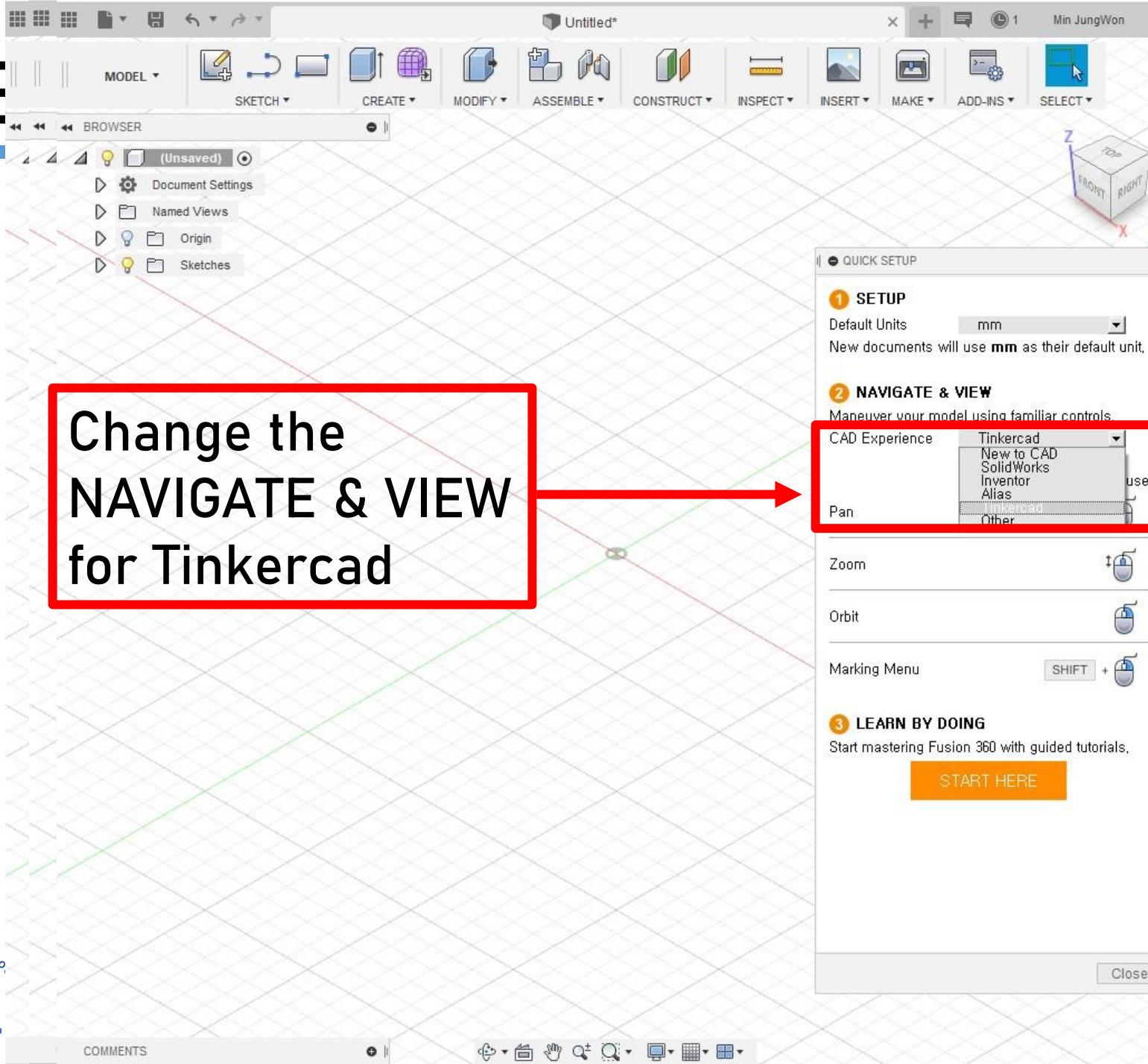
CREATE ACCOUNT

ALREADY HAVE AN ACCOUNT? [SIGN IN](#)

Your account for everything Autodesk
[LEARN MORE](#)

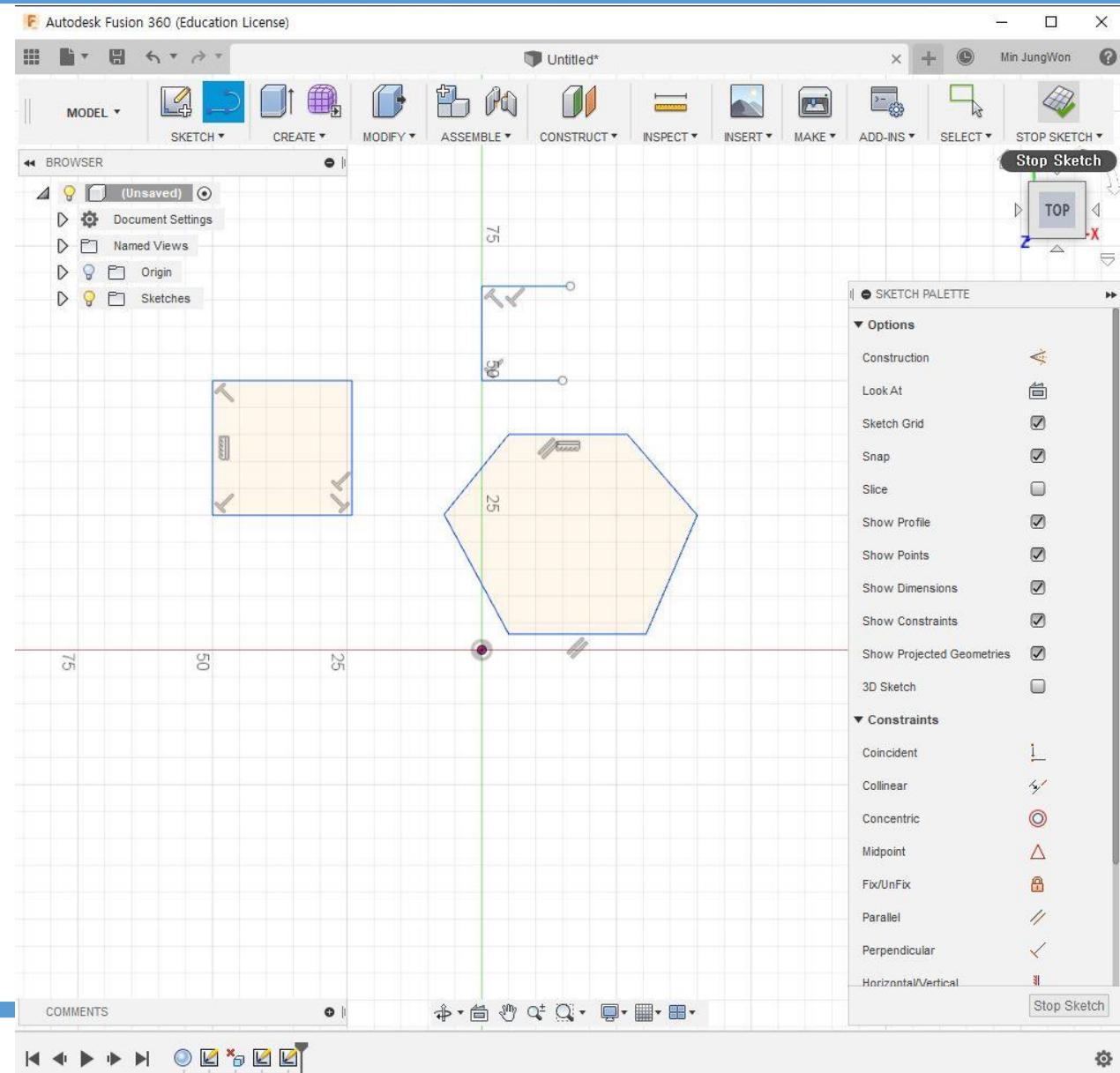
Basic Tool Explain

- Sketch - Select Dimension
 - [L]Line – Free Draw
 - [R]Rectangle – 2Point – 3Point – Center Point
 - [C]Circle – Center Point – 2Point – 3Point – Tangent
 - Arc /Polygon
- Create
 - Box/Cylinder/Sphere/[E]Extrude/[Q]Press Pull
- Modify
 - Fillet/Chamfer

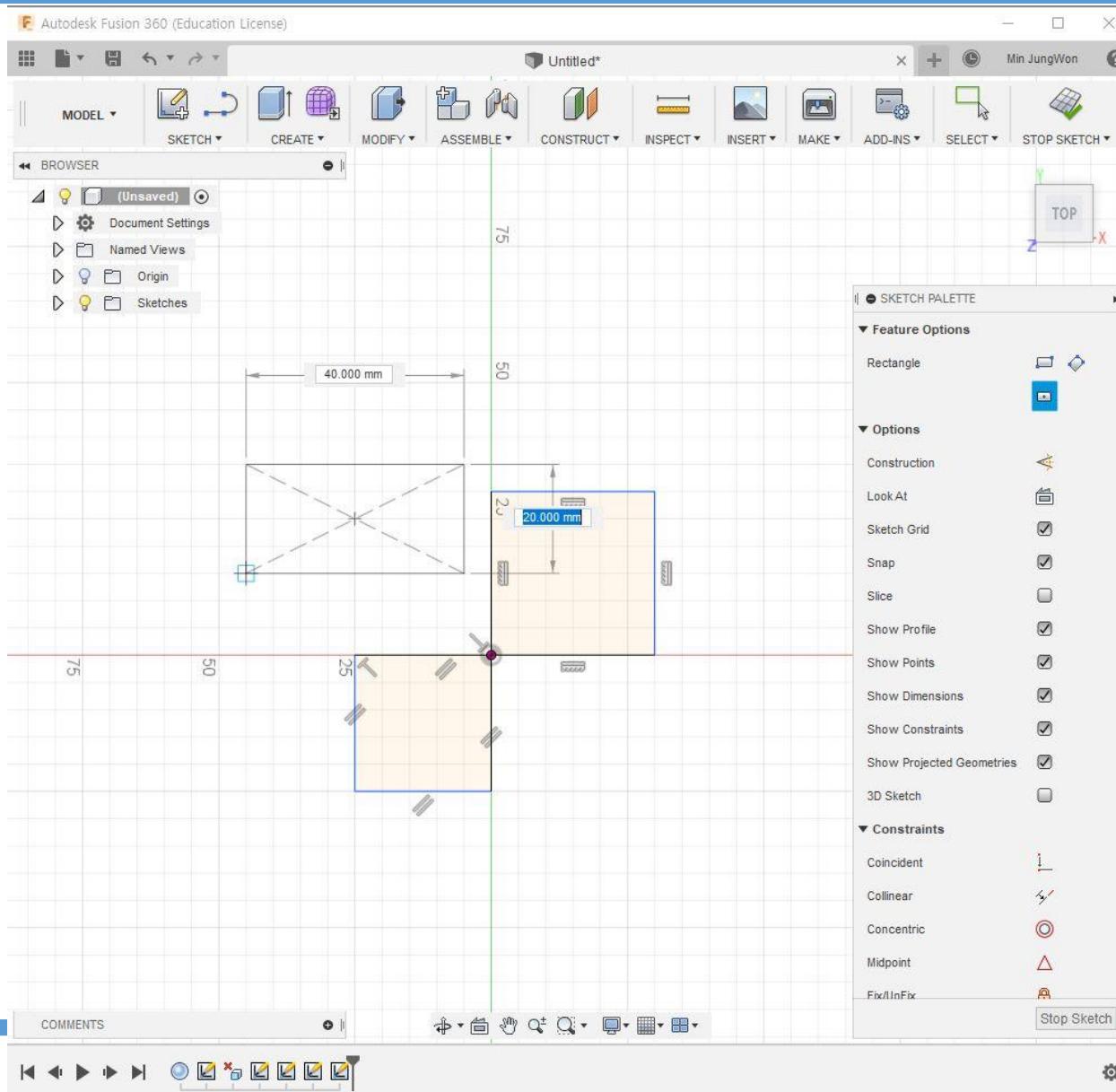


VS

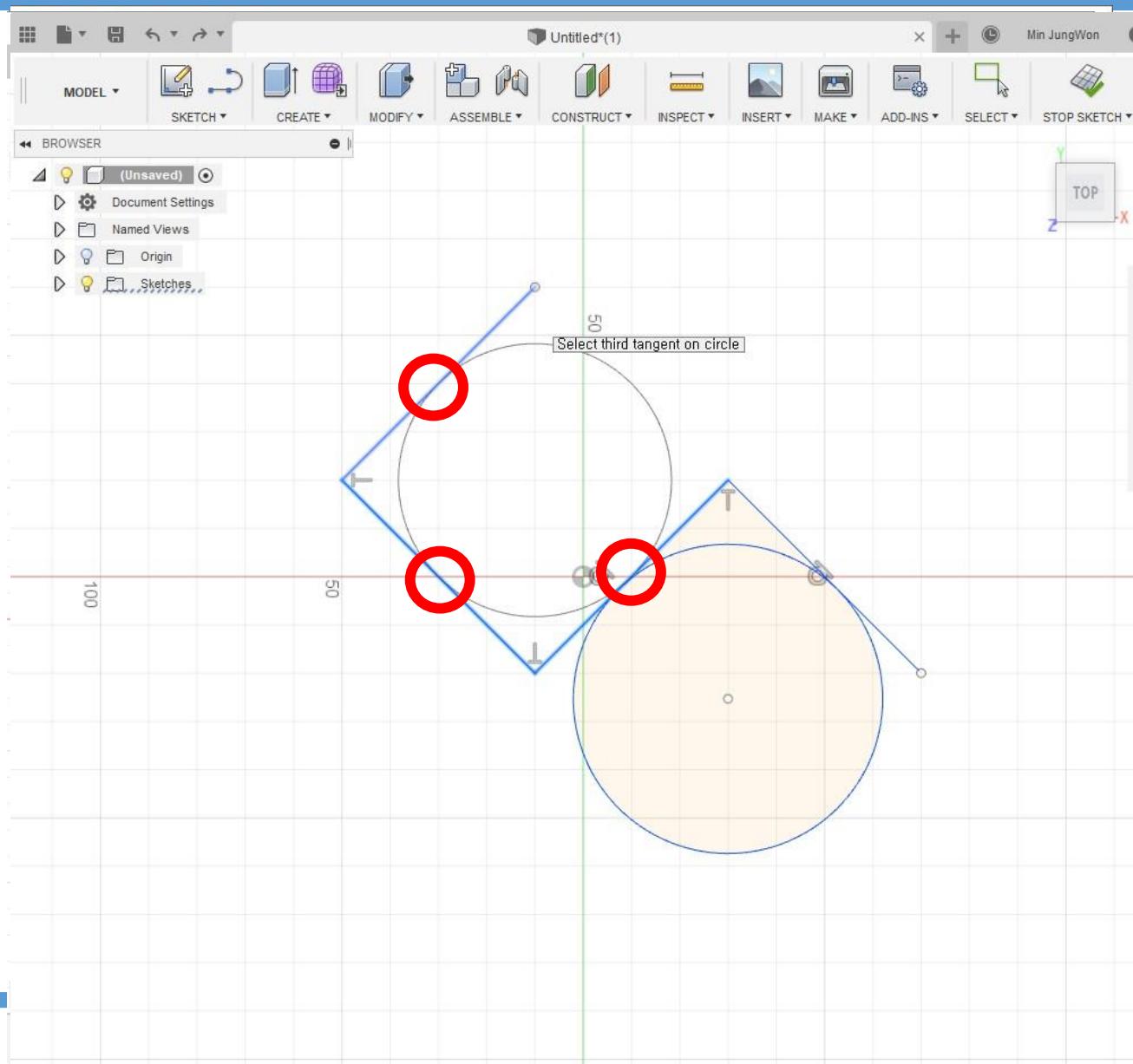
Basic Tool - Sketch - Line [L]



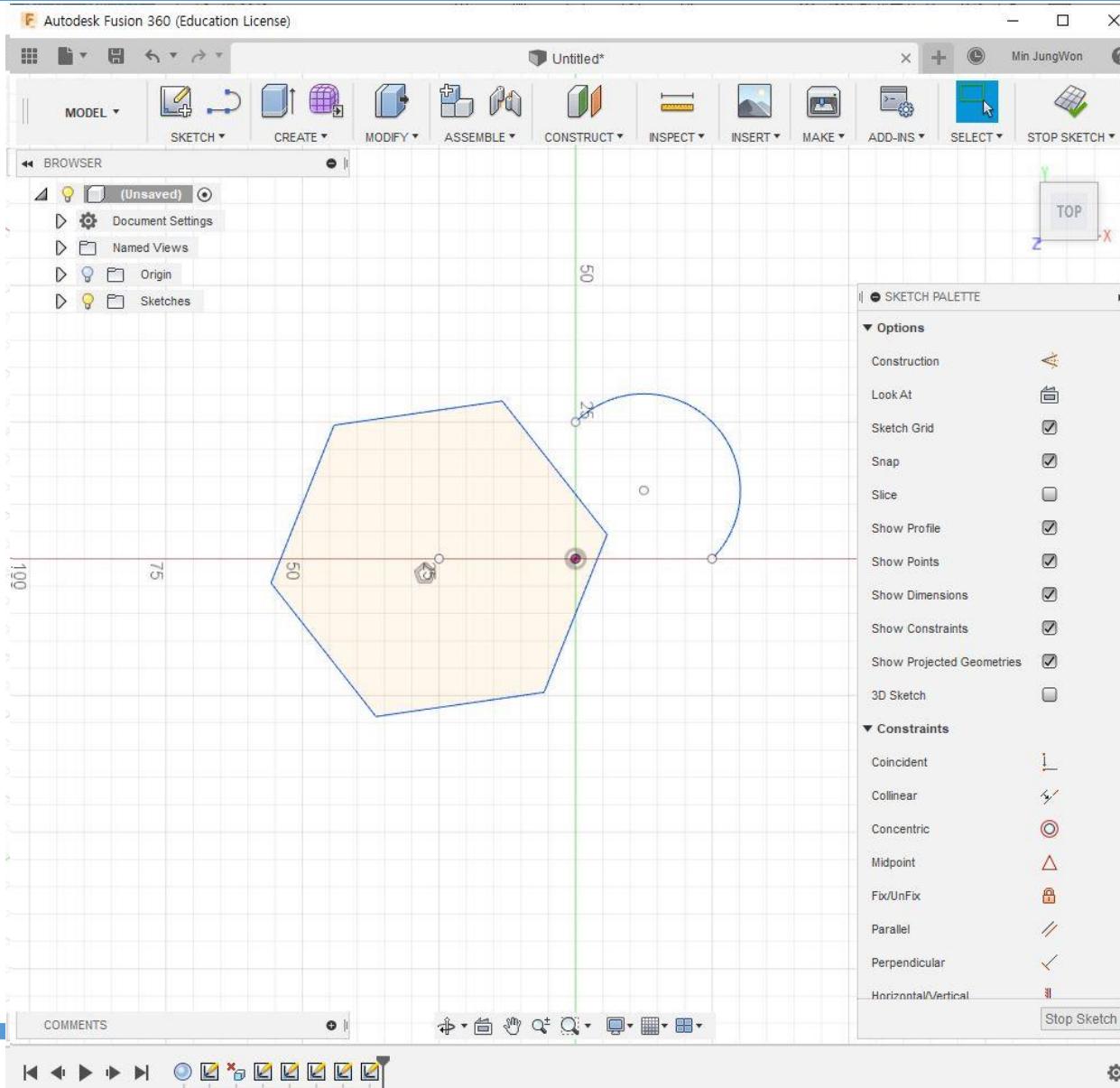
Basic Tool - Sketch - Rectangle [R]



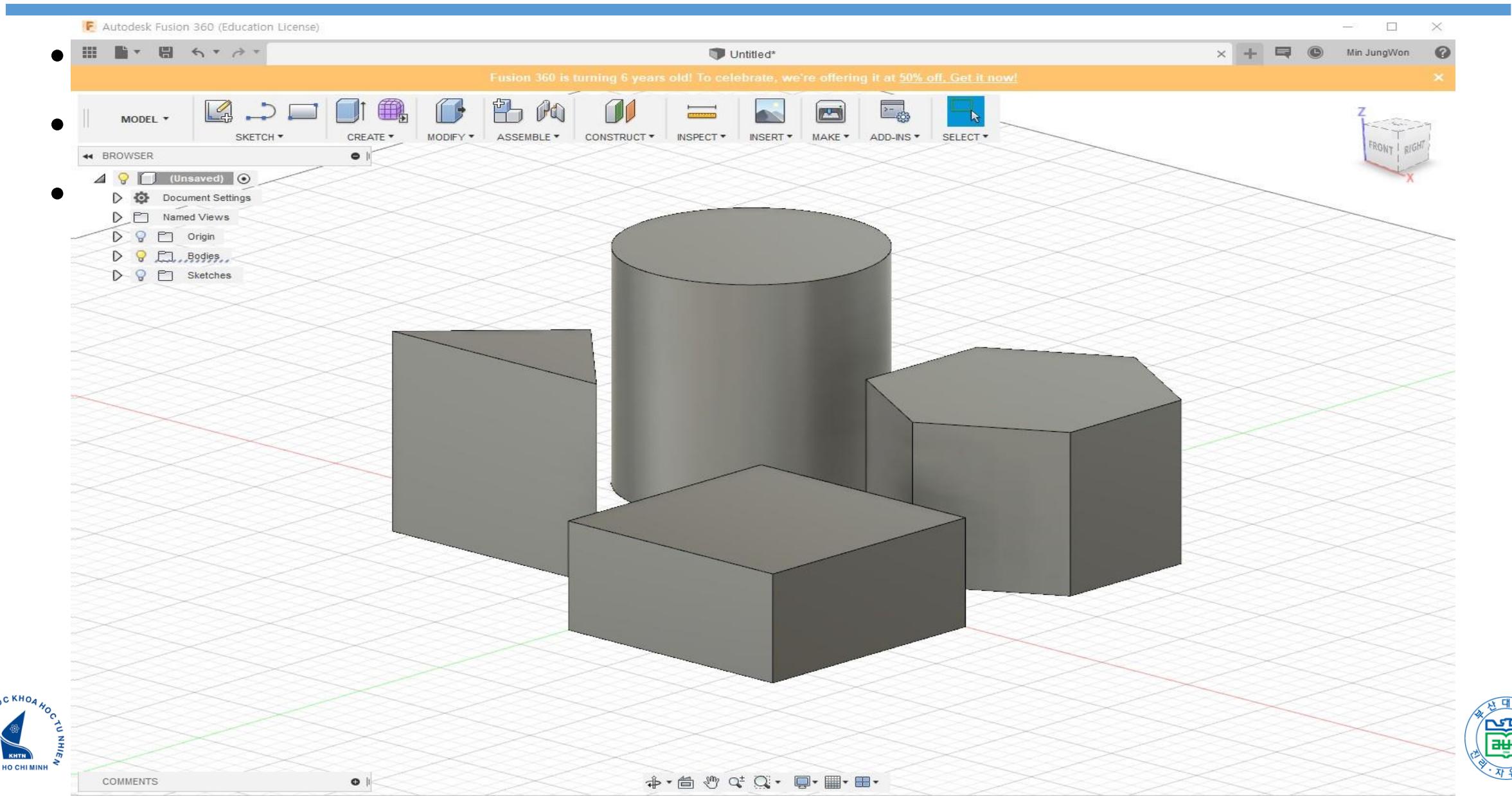
Basic Tool - Sketch - Circle [C]



Basic Tool - Sketch - Arc/Polygon



2D → 3D

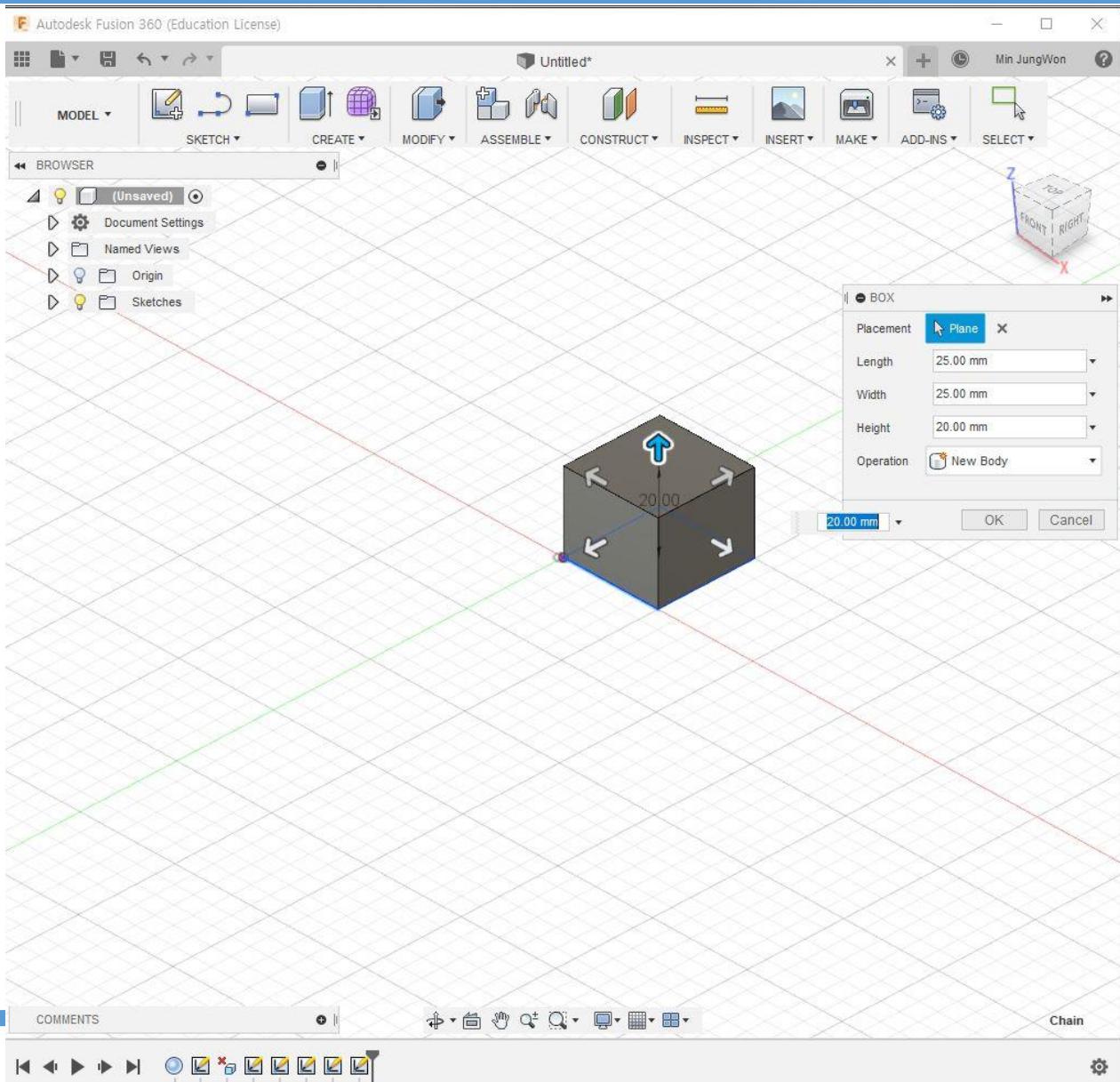


Quiz

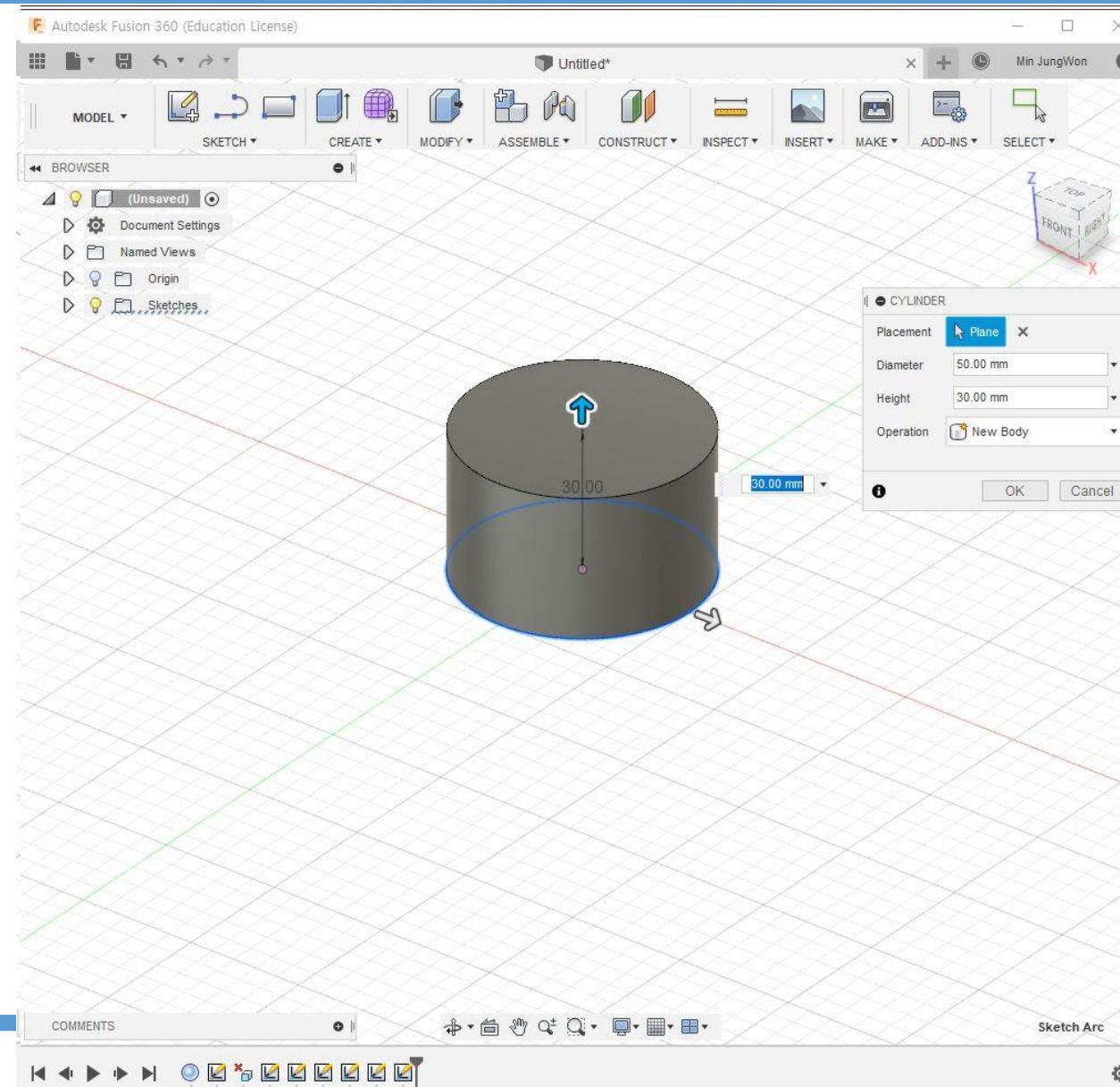
What is the first thing you do before you draw something?

- ## - Select Sketch Plane

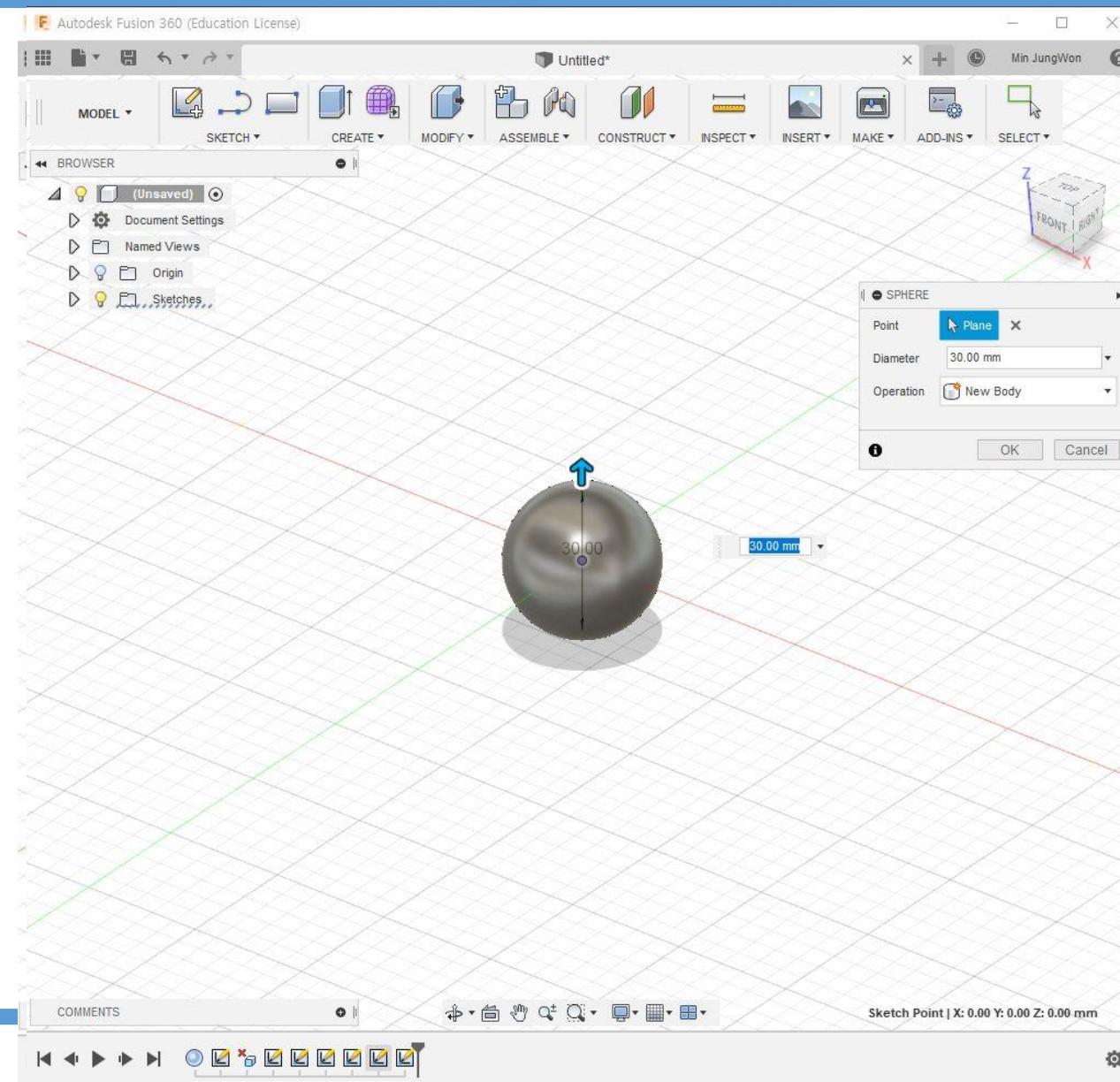
Basic Tool - Create - Box



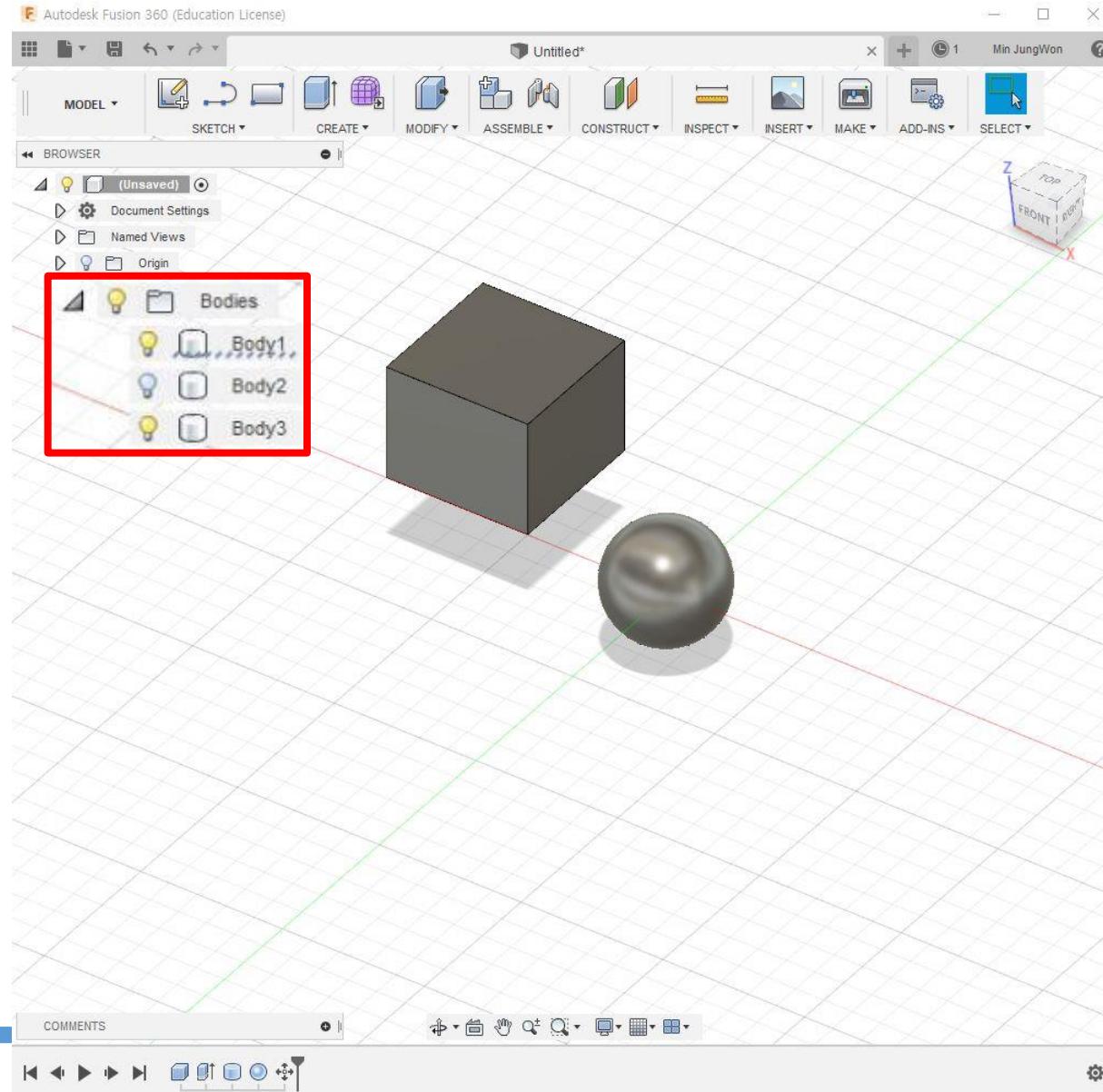
Basic Tool - Create - Cylinder



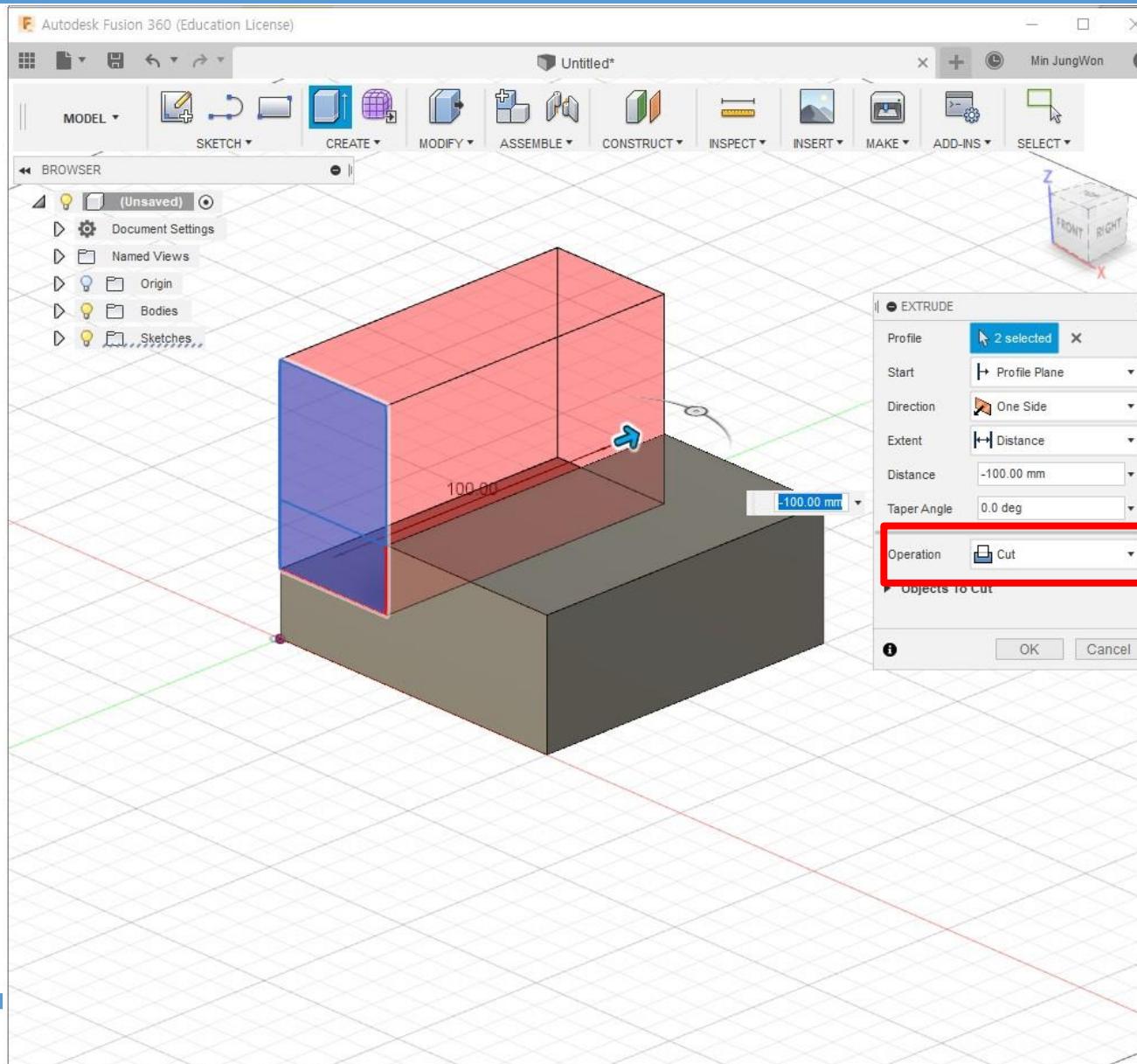
Basic Tool - Create - Sphere



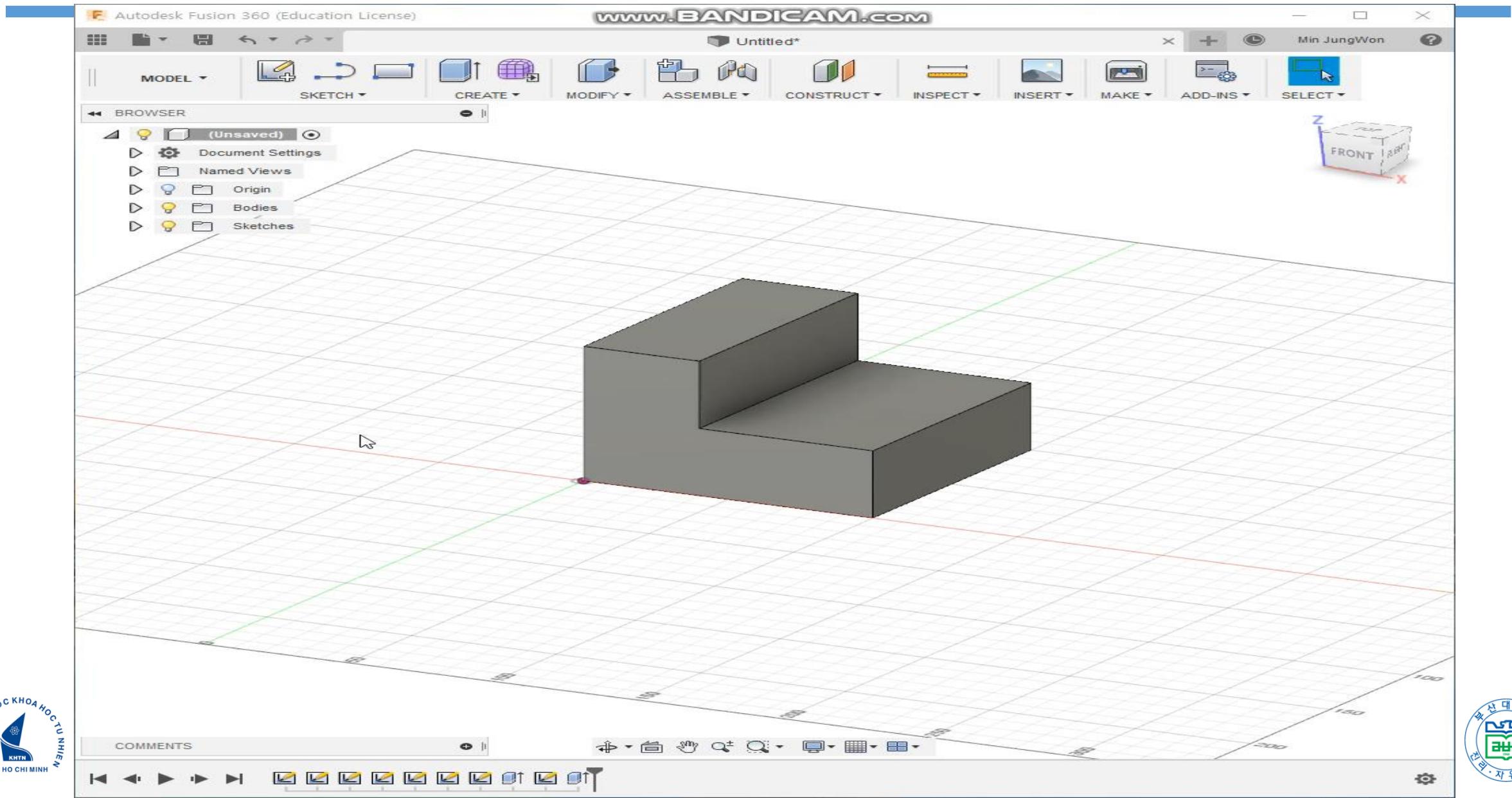
Basic Tool - Bulb



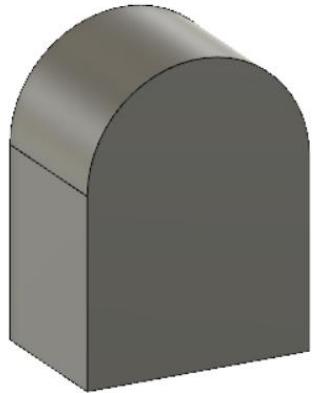
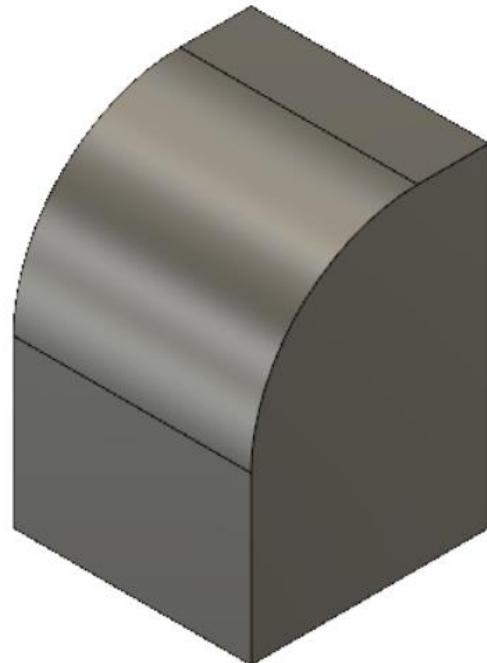
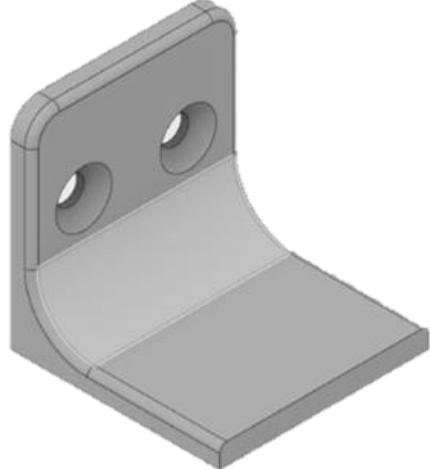
Basic Tool - Create - [E]Extrude



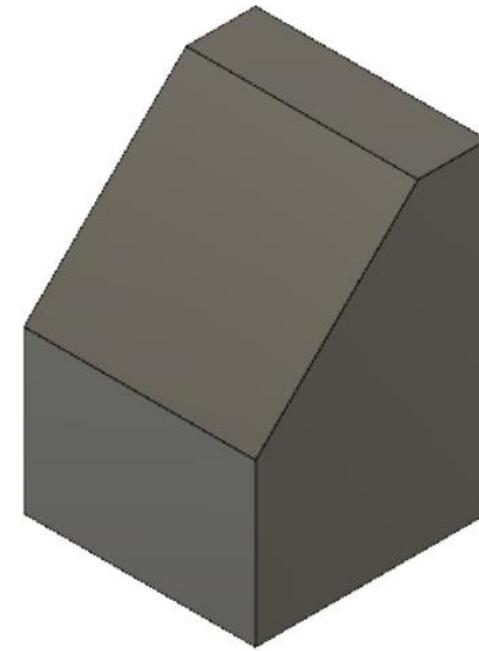
Basic Tool - Create - Press Pull[Q]



Basic Tool - Modify - Fillet[F]/Chamfer



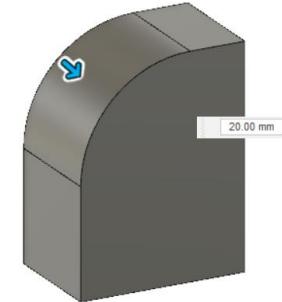
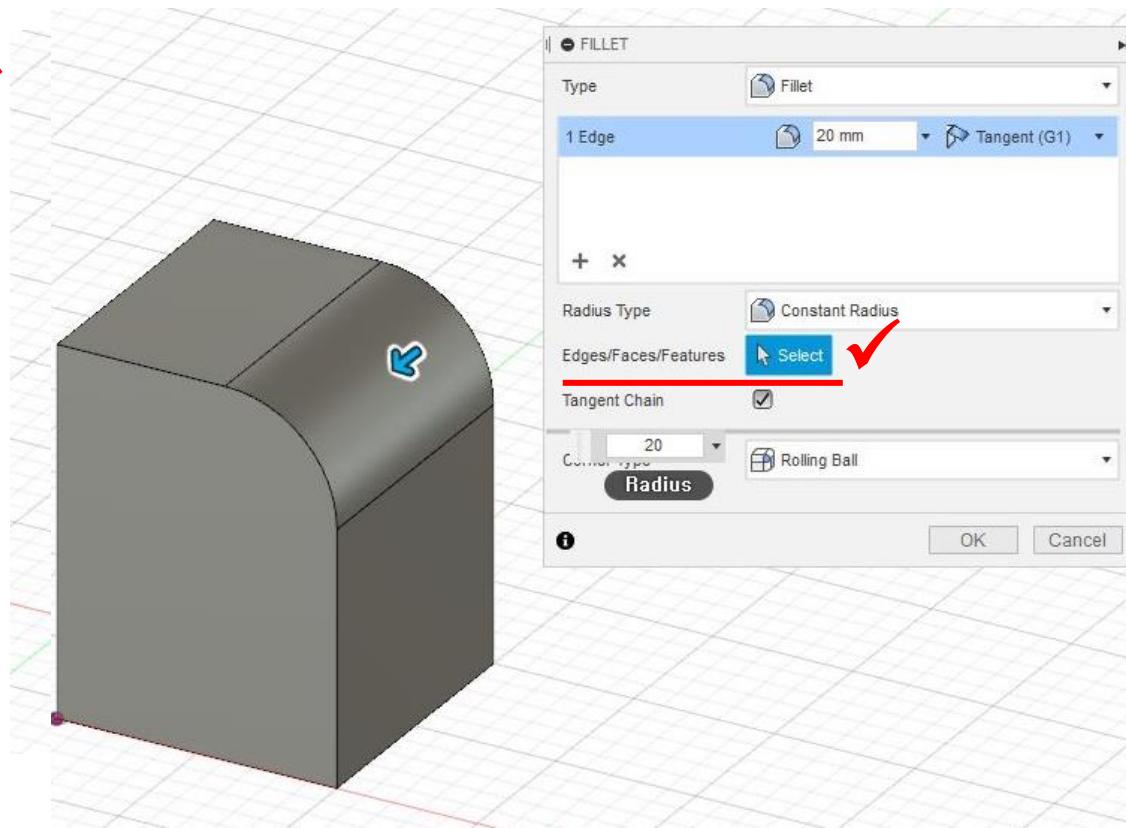
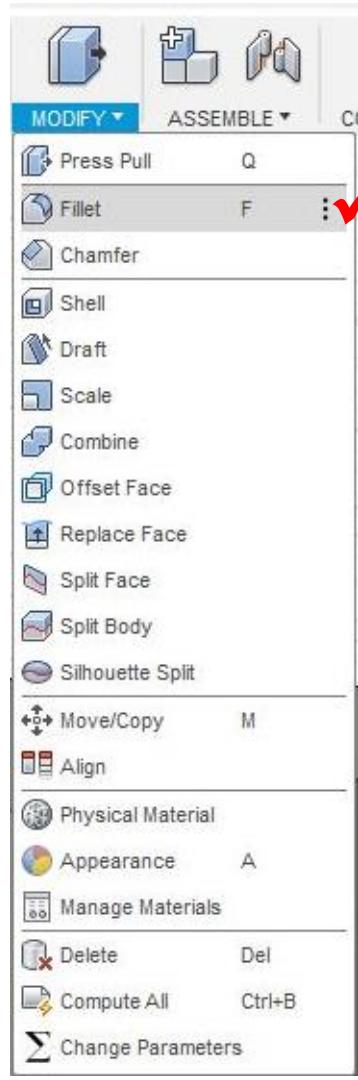
Fillet [F]



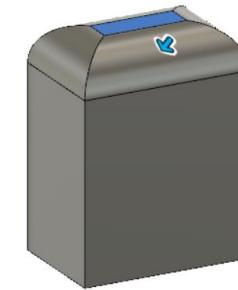
Chamfer

- Equal distance
- Two distances
- Distance and angle

Fillet[F]



edges

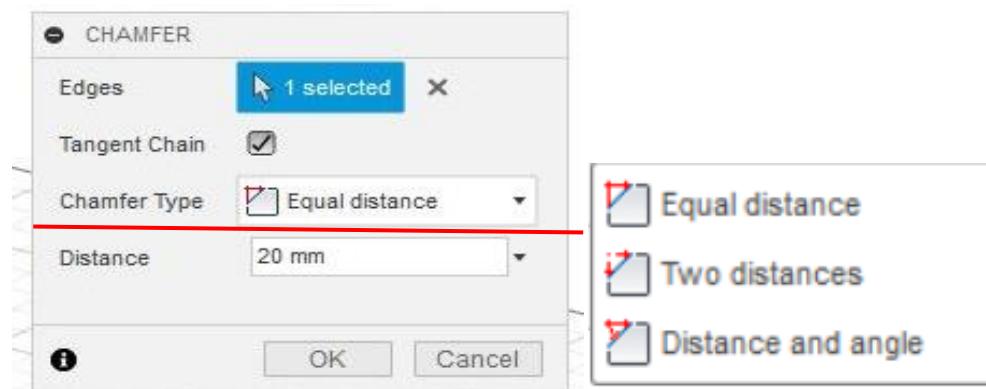
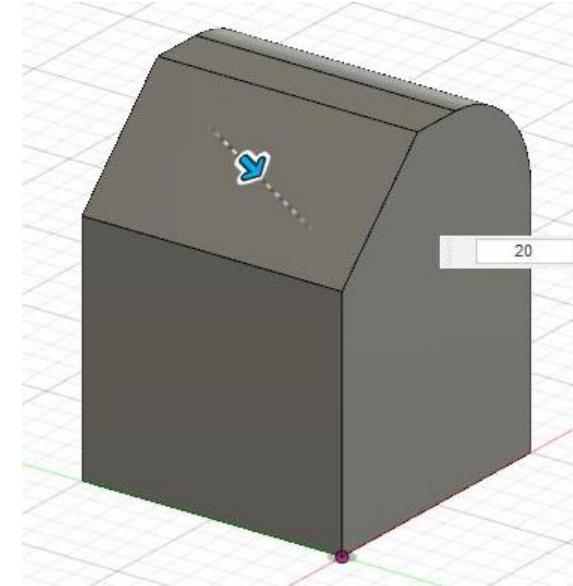
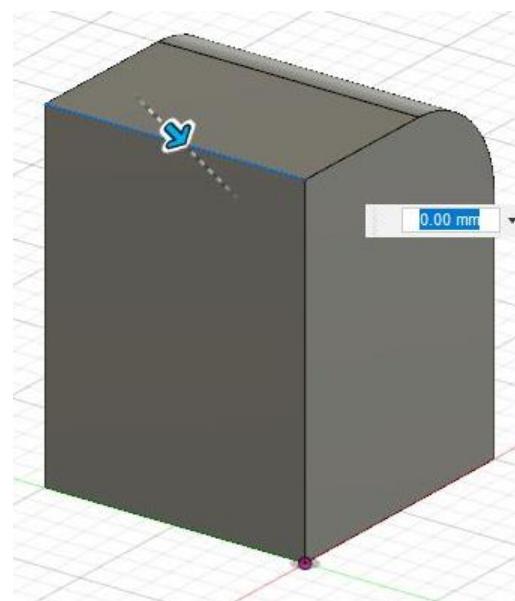


faces

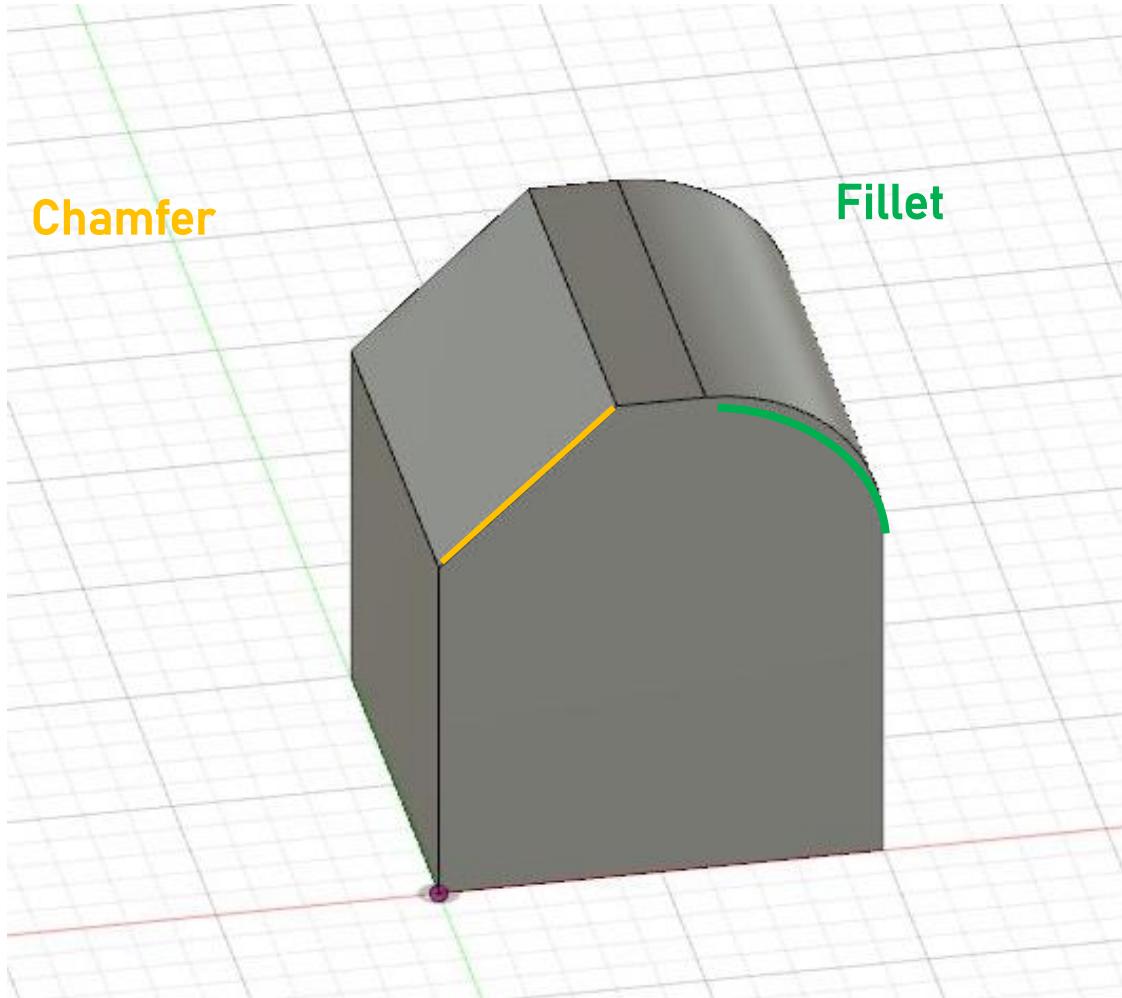


features

Chamfer

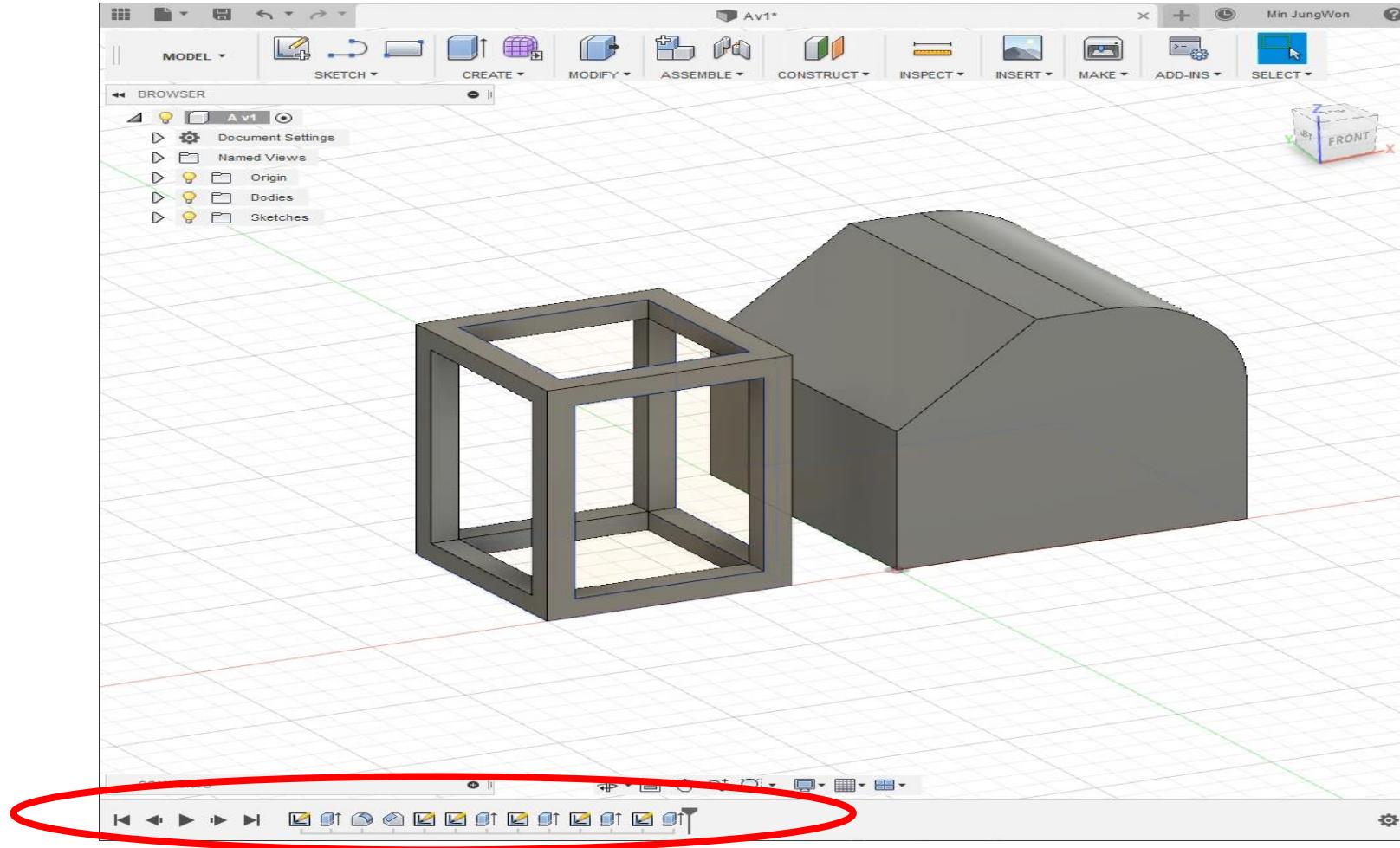


Chamfer



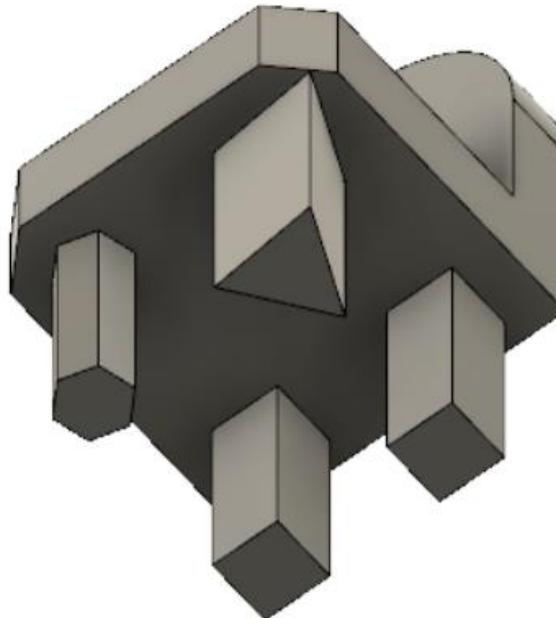
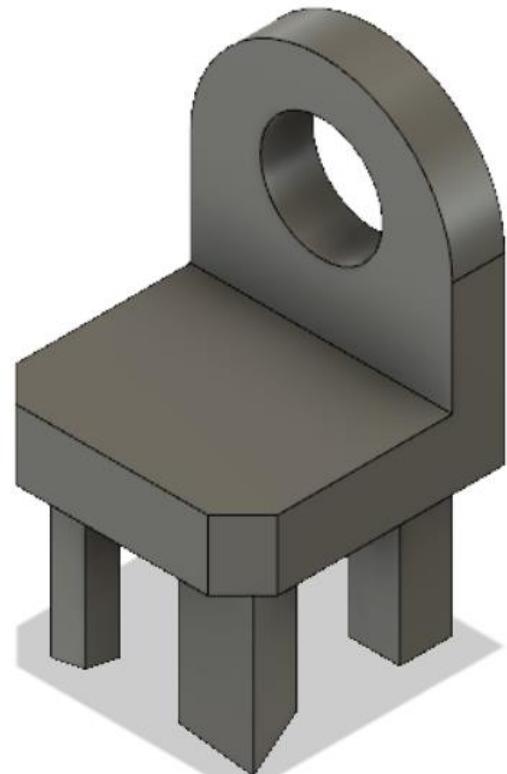
Basic Tool - History

You can see the process of your work that you have done so far.

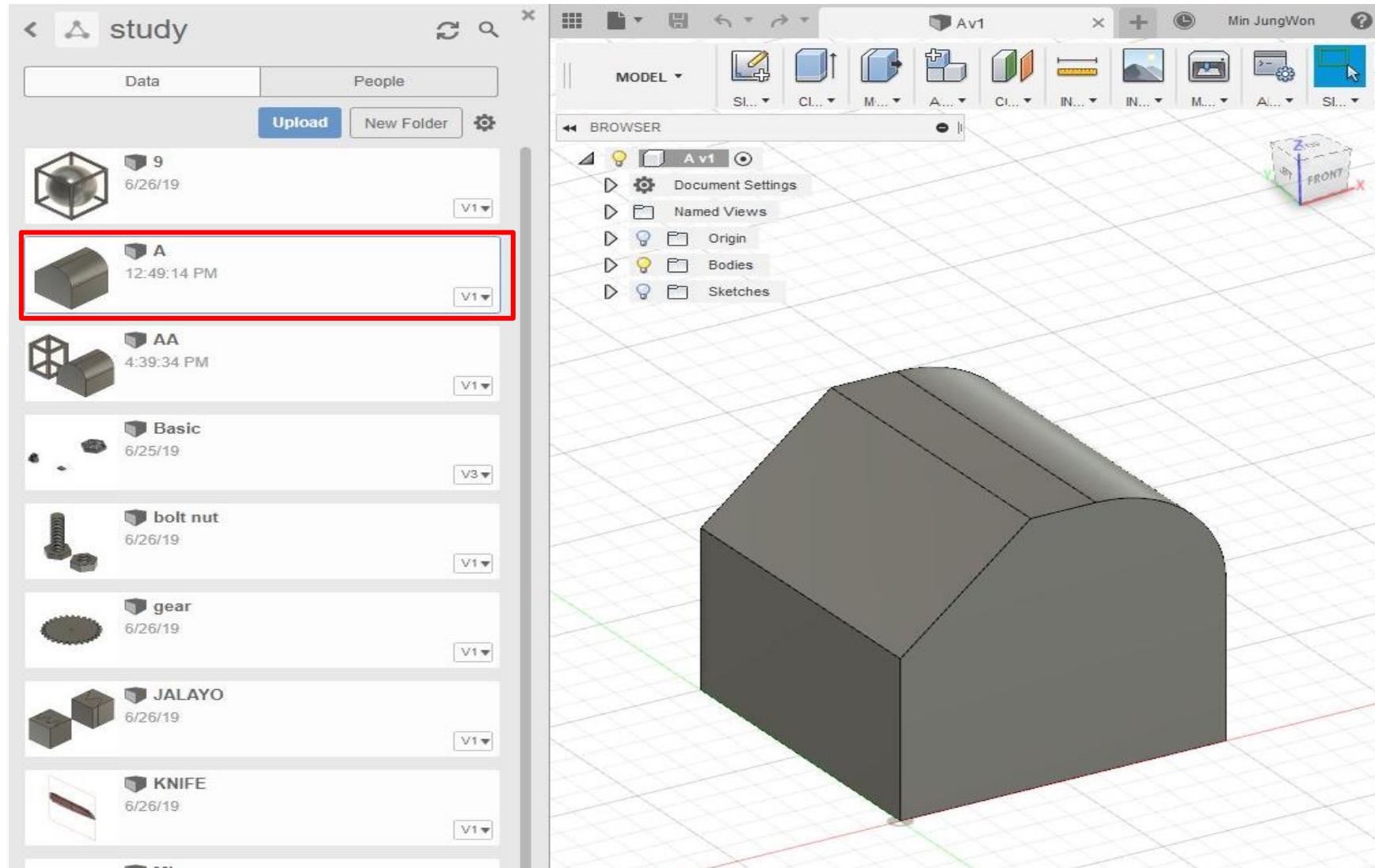


Let's Make a Chair!

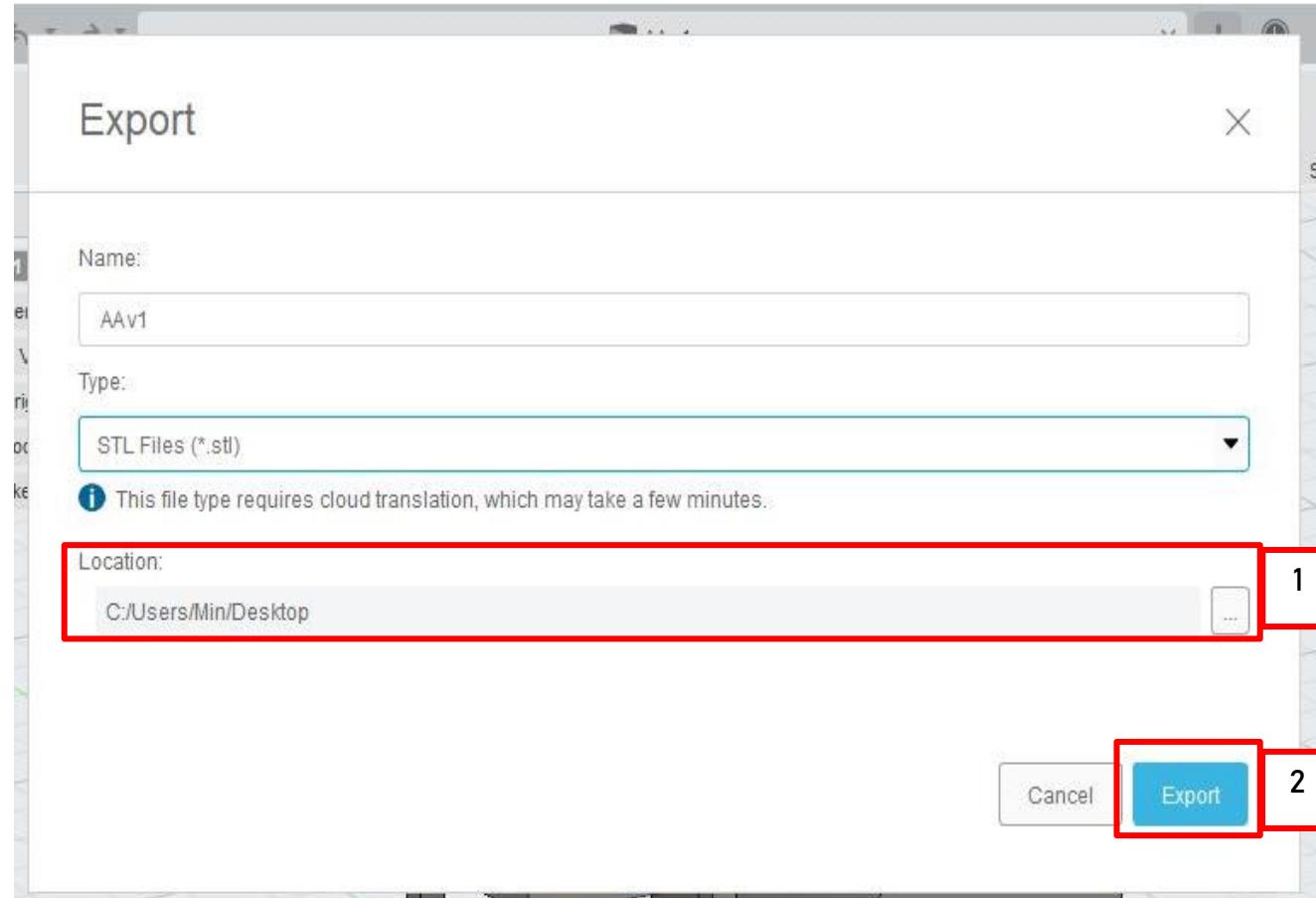
By using the tools we learned, let's make a chair!



Save - Cloud/.STL



Save – Cloud/.STL



Build-up Ender-3 3D Printer

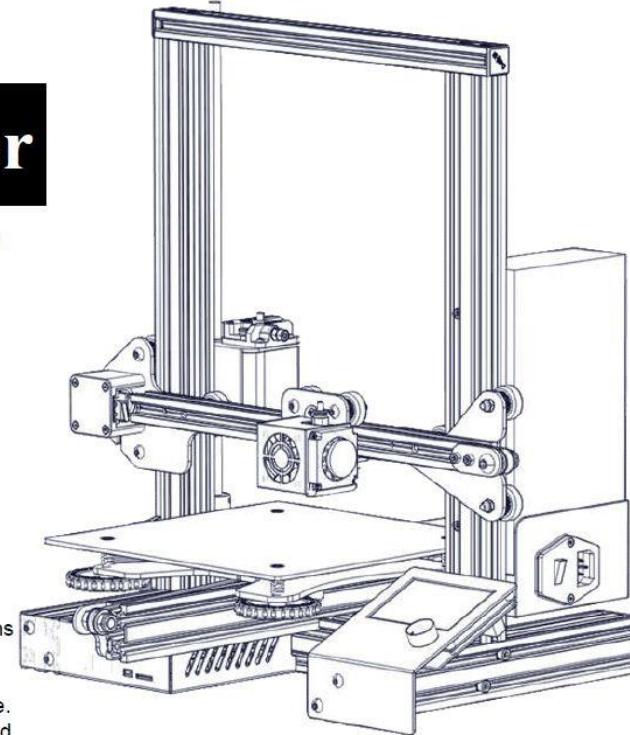
OPEN
Ender-3 PDF
or
Read Manual



Ender 3 3D Printer

Instructions for assembly

- ◆ This guide is for the Ender 3 3D printer.
- ◆ Select the correct input voltage to match your local mains (220V or 110V)
- ◆ Because of software/hardware upgrades and model differences, new revisions may not be listed in this guide.
- ◆ Detailed instructions for use are available on the SD card.



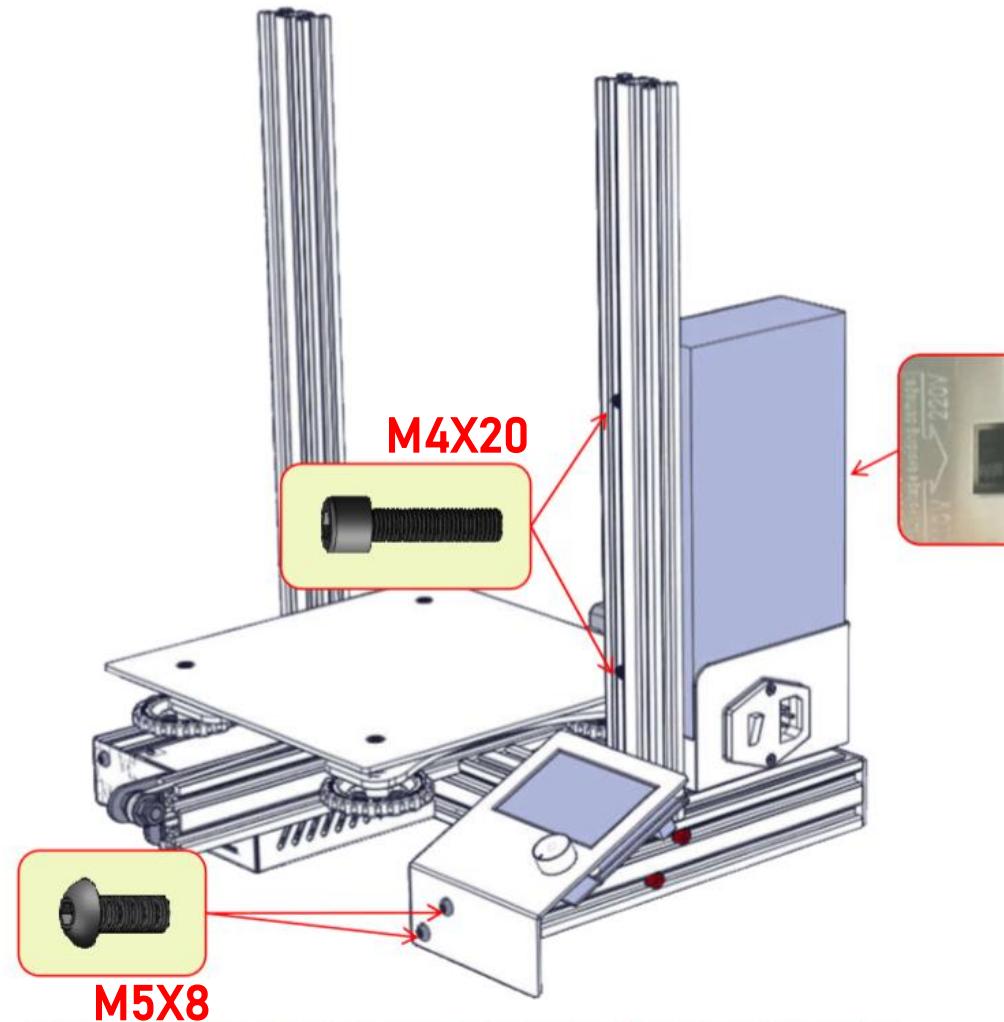
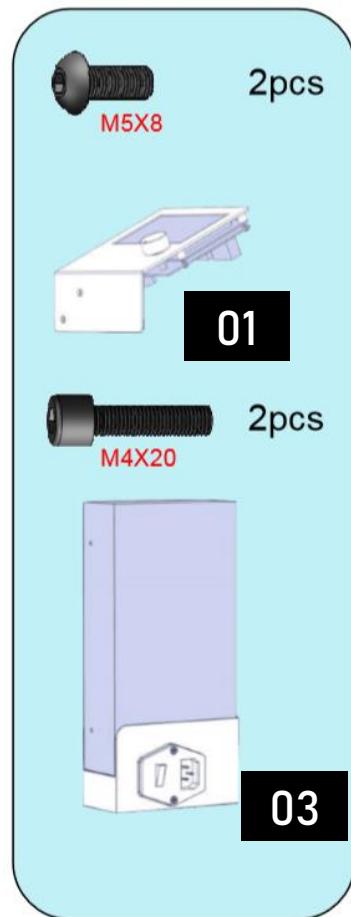
Let's assemble Ender-3!

Two printers will be given to each team.

When assembling , refer to Instructions for assembly manual.

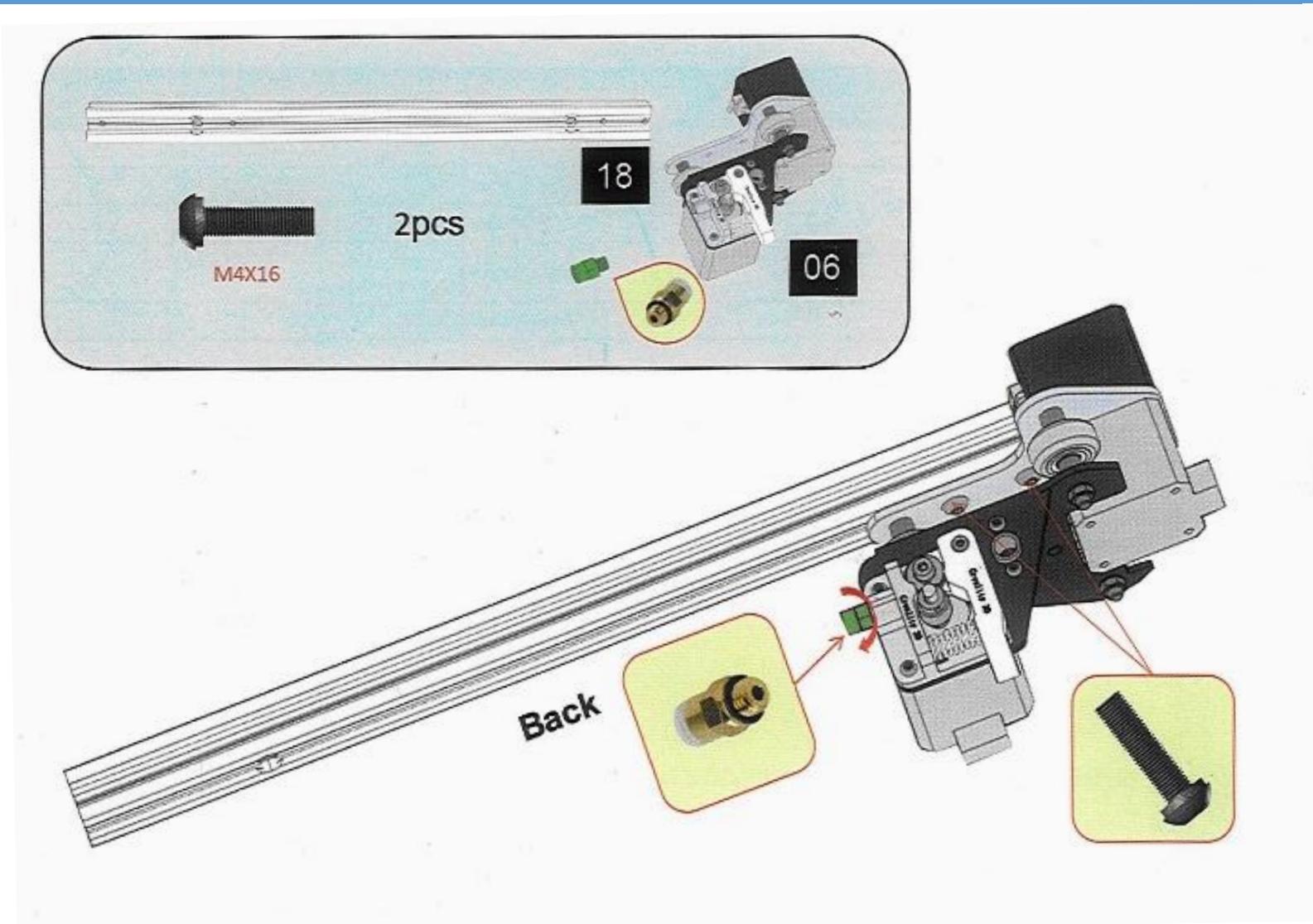
[1]

Step 2



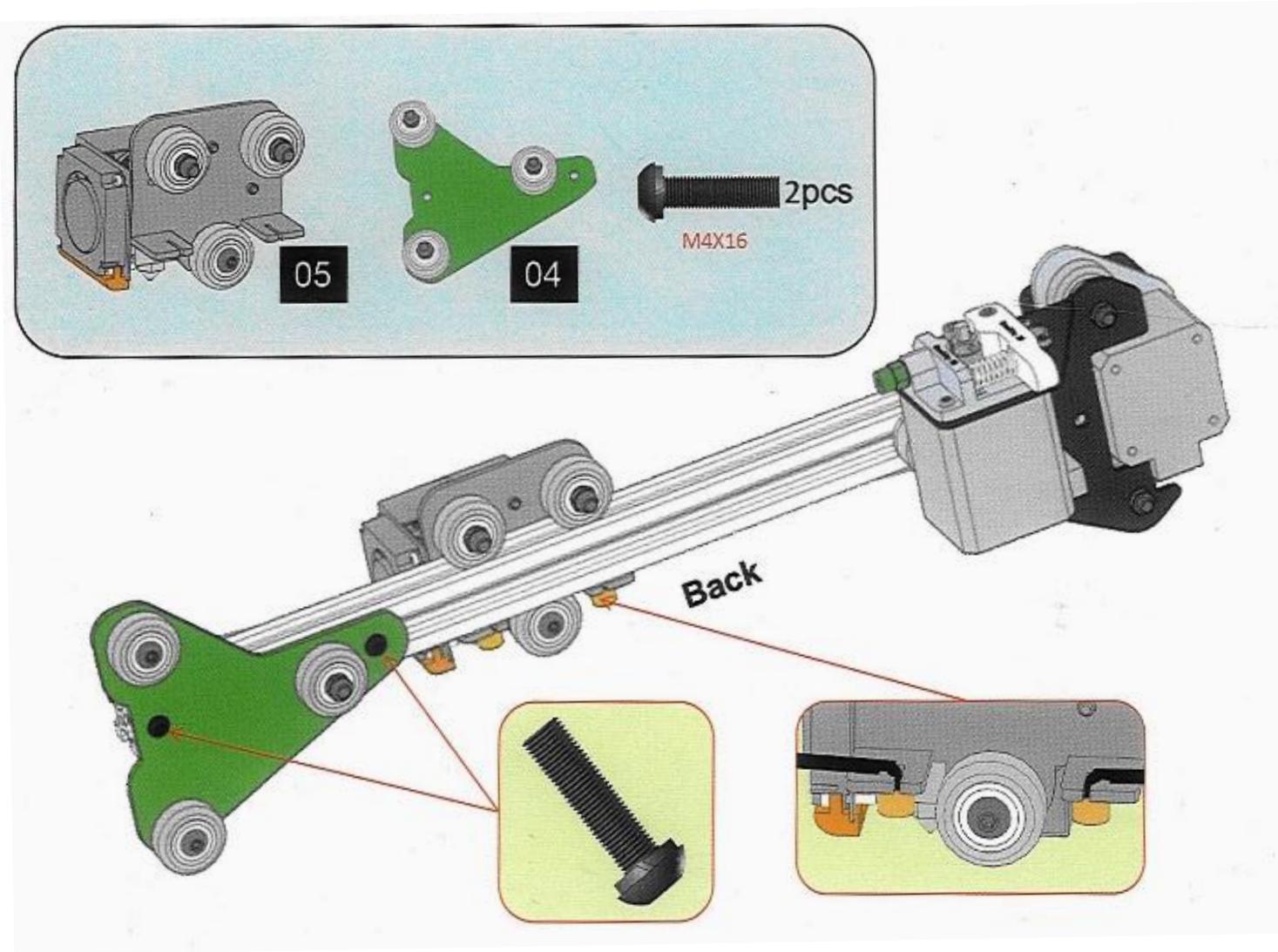
[2]

Step 5



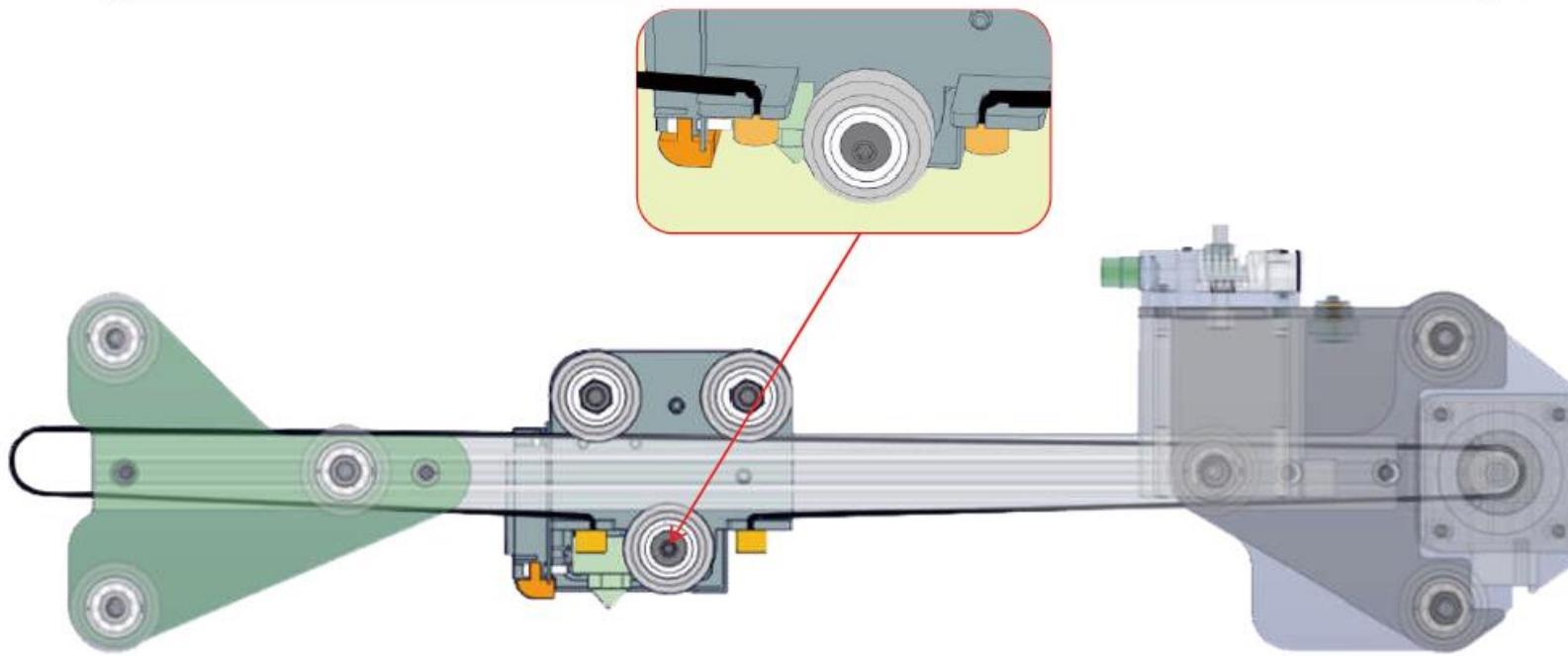
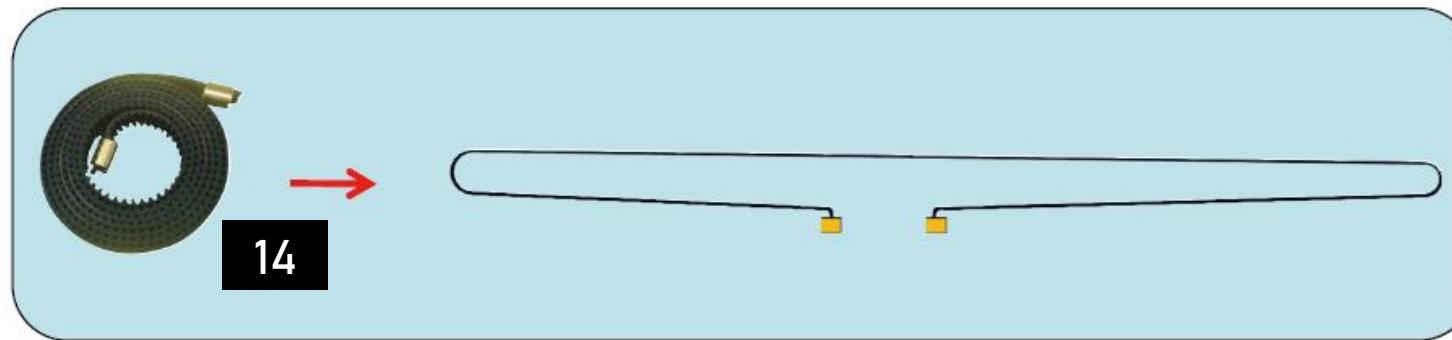
[3]

Step 7



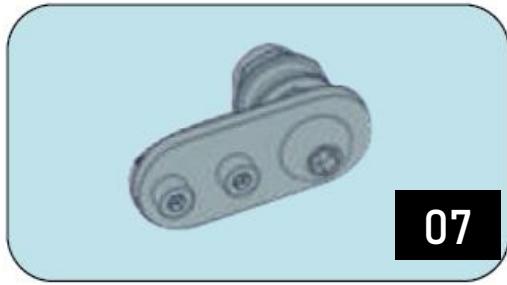
[4]

Step 6

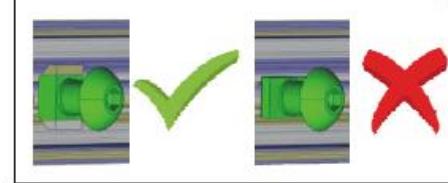
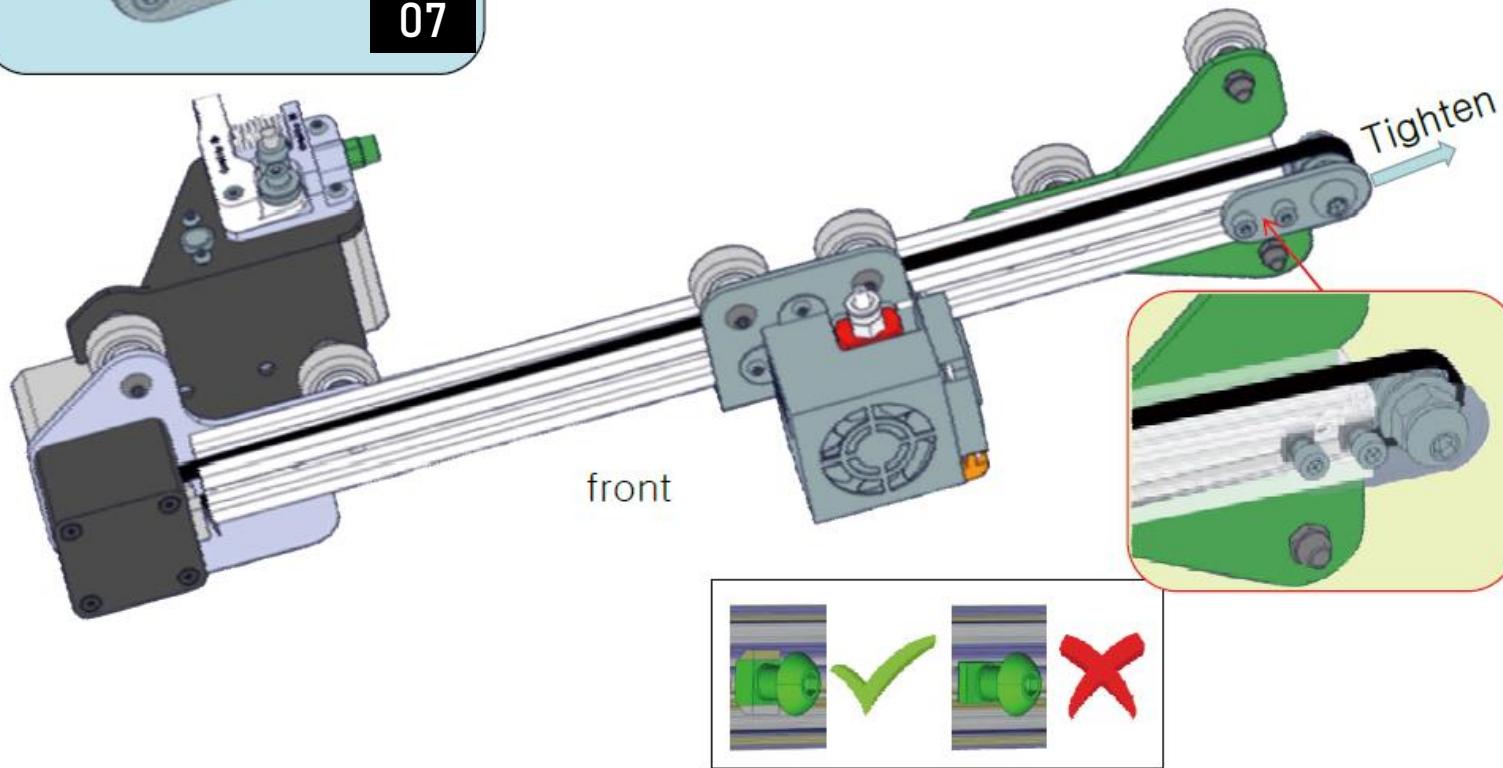


[5]

Step 8

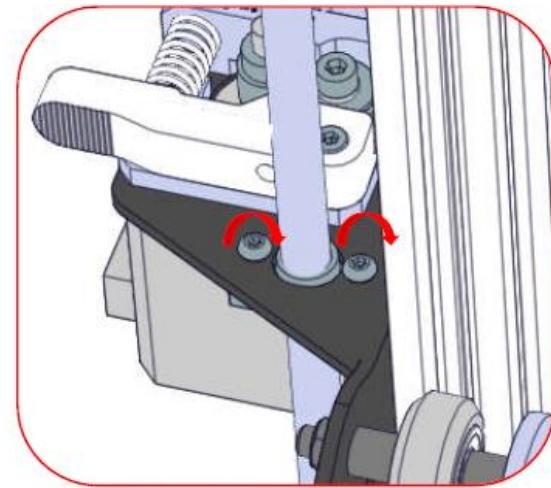
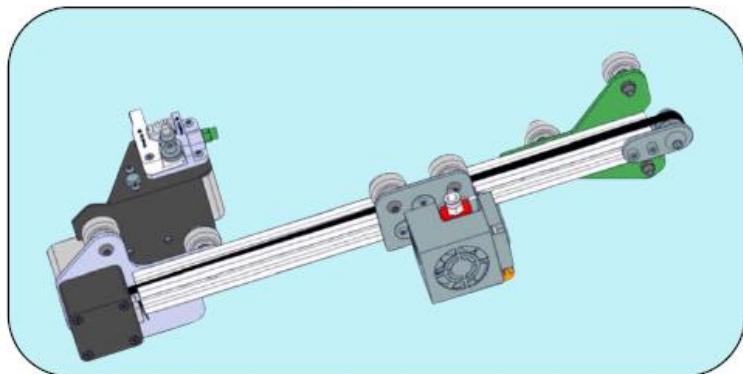


07

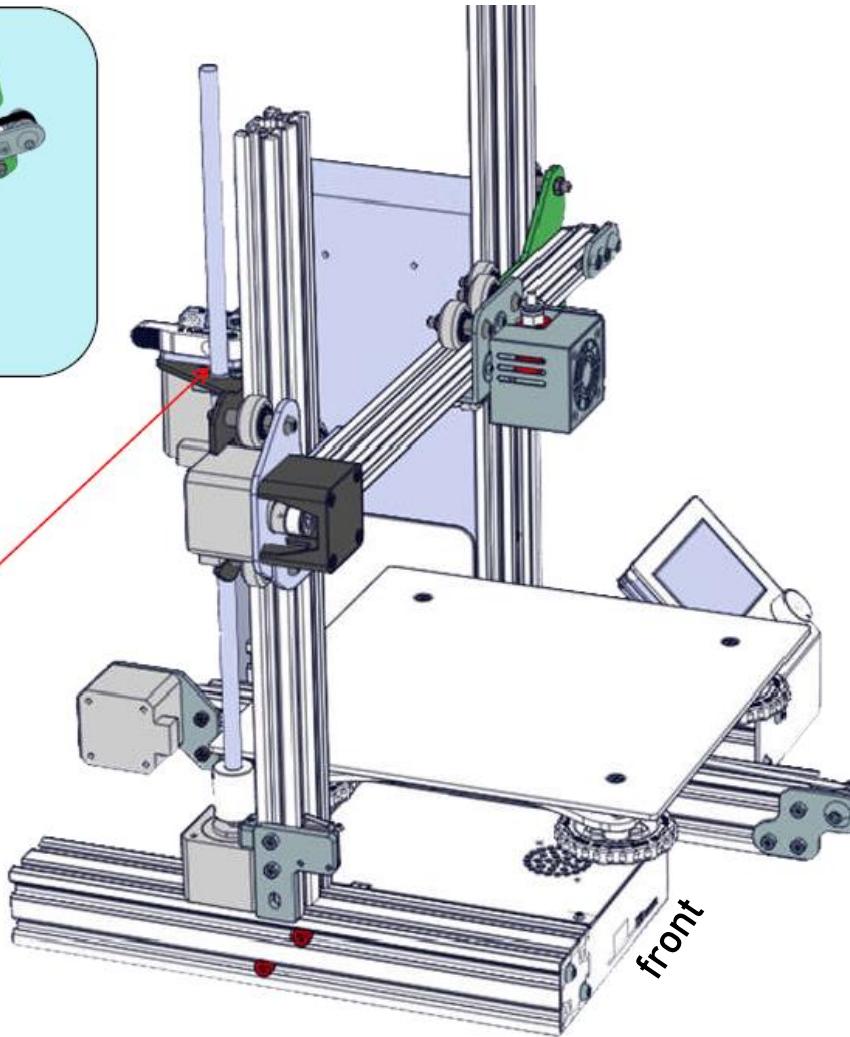


[6]

Step 9

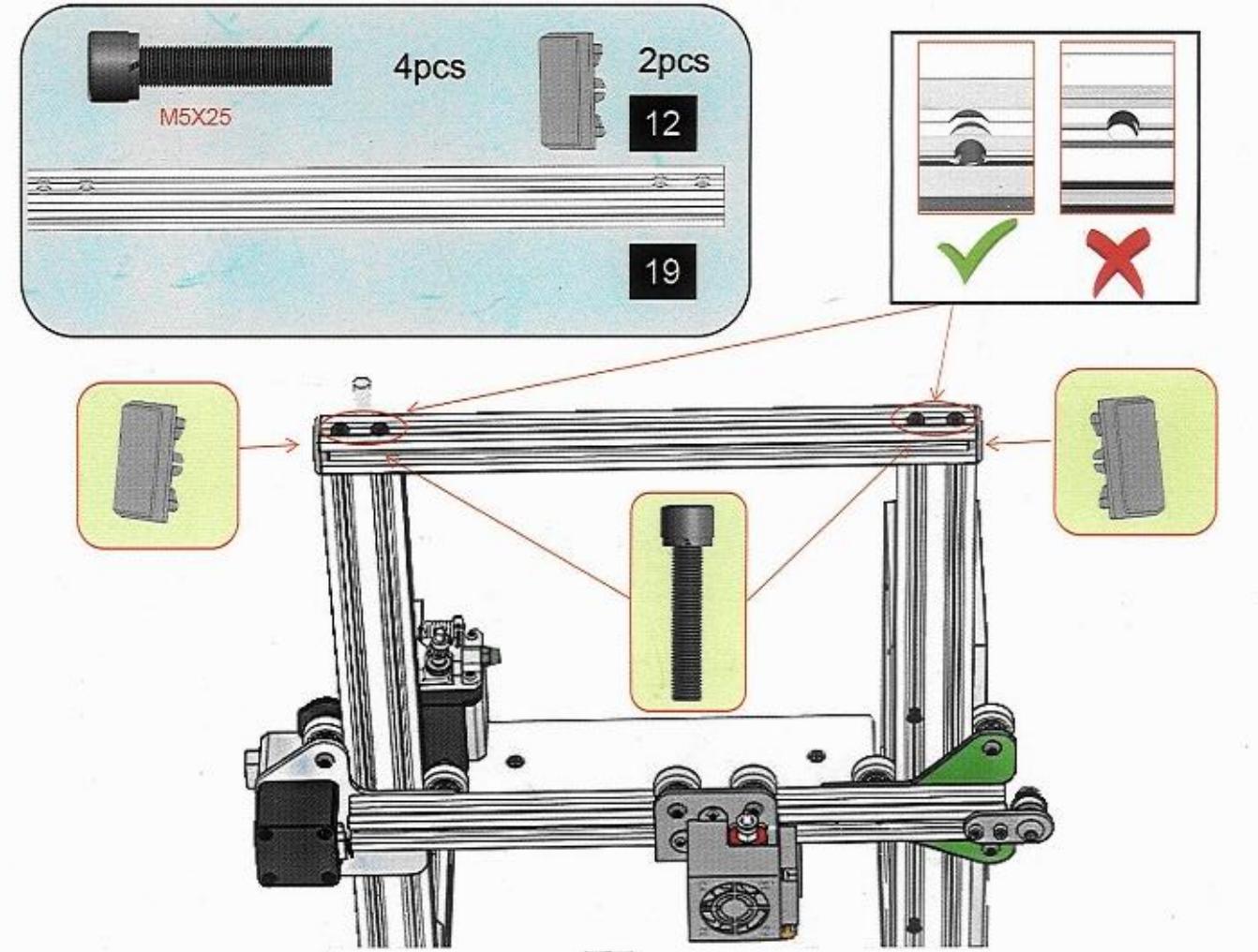


*Don't tighten it too tight



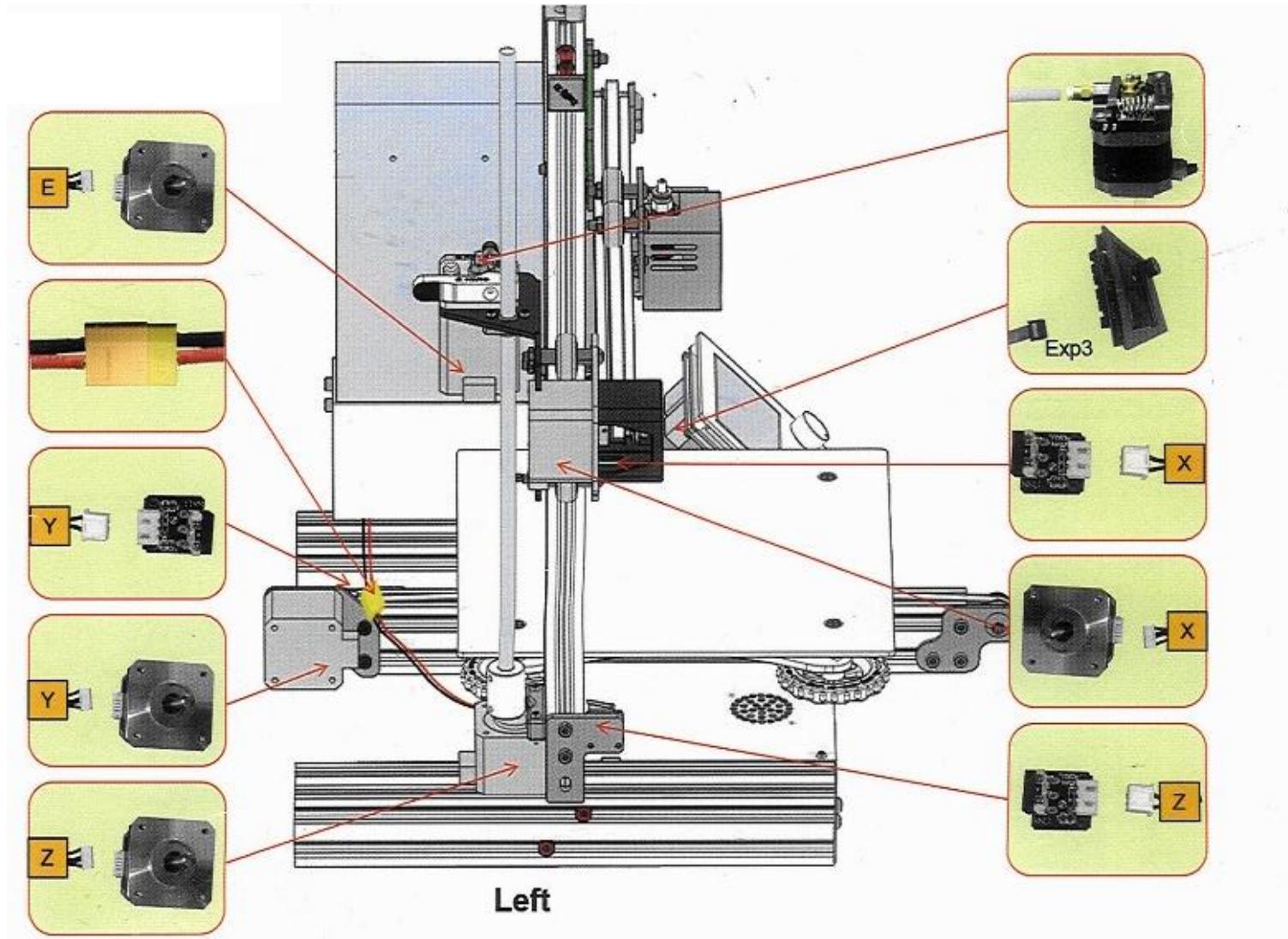
[7]

Step 10



[8]

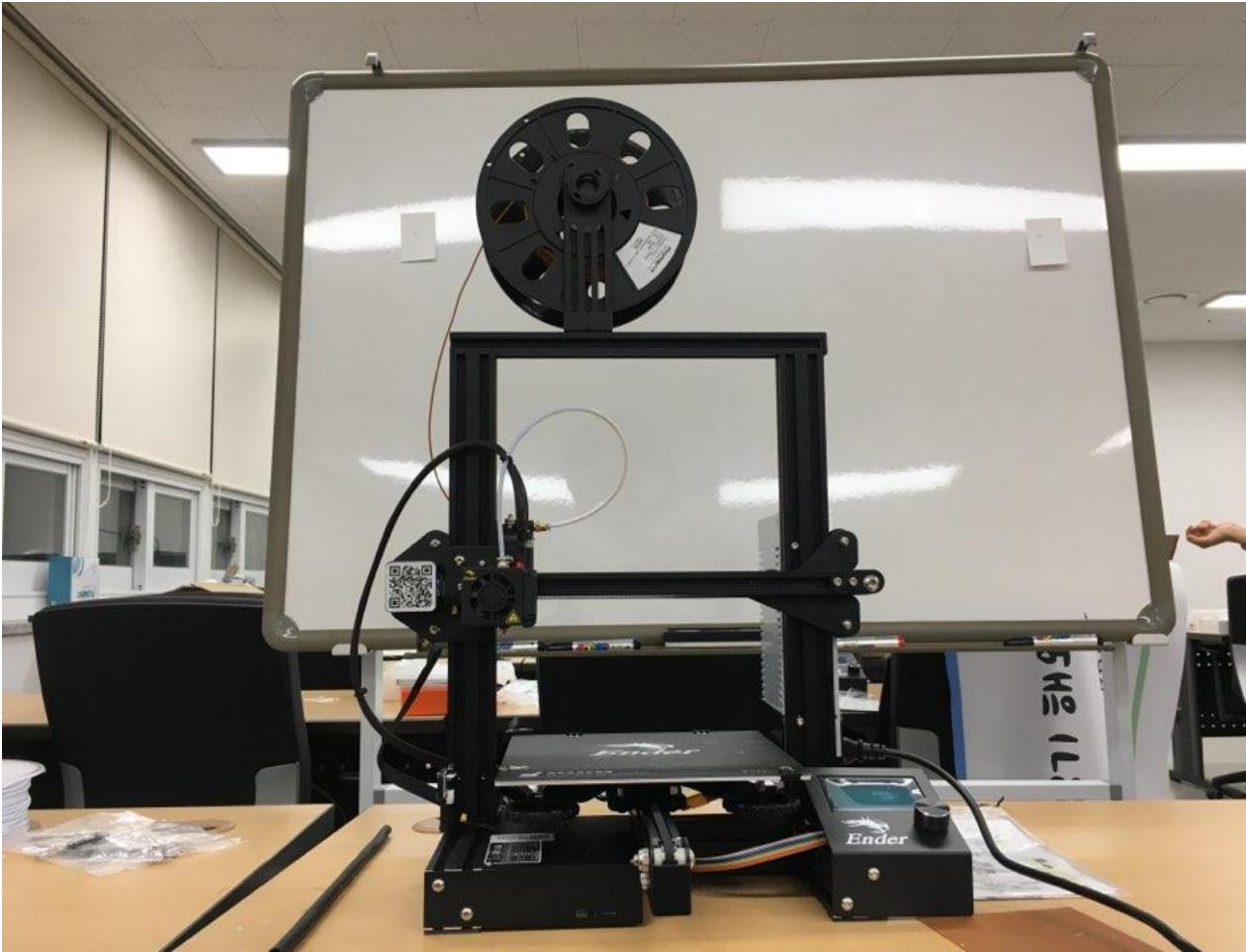
Step 12



If you finish, let's check !!

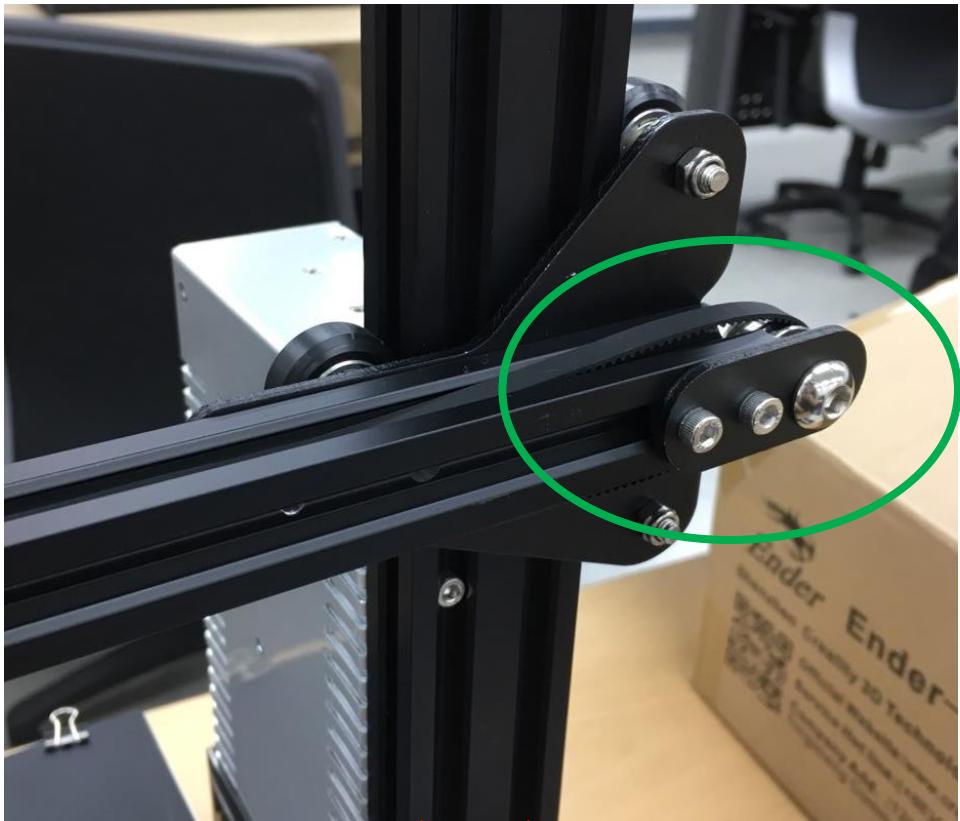
checklist

1. Plate and column must be *vertical & horizontal*.



checklist

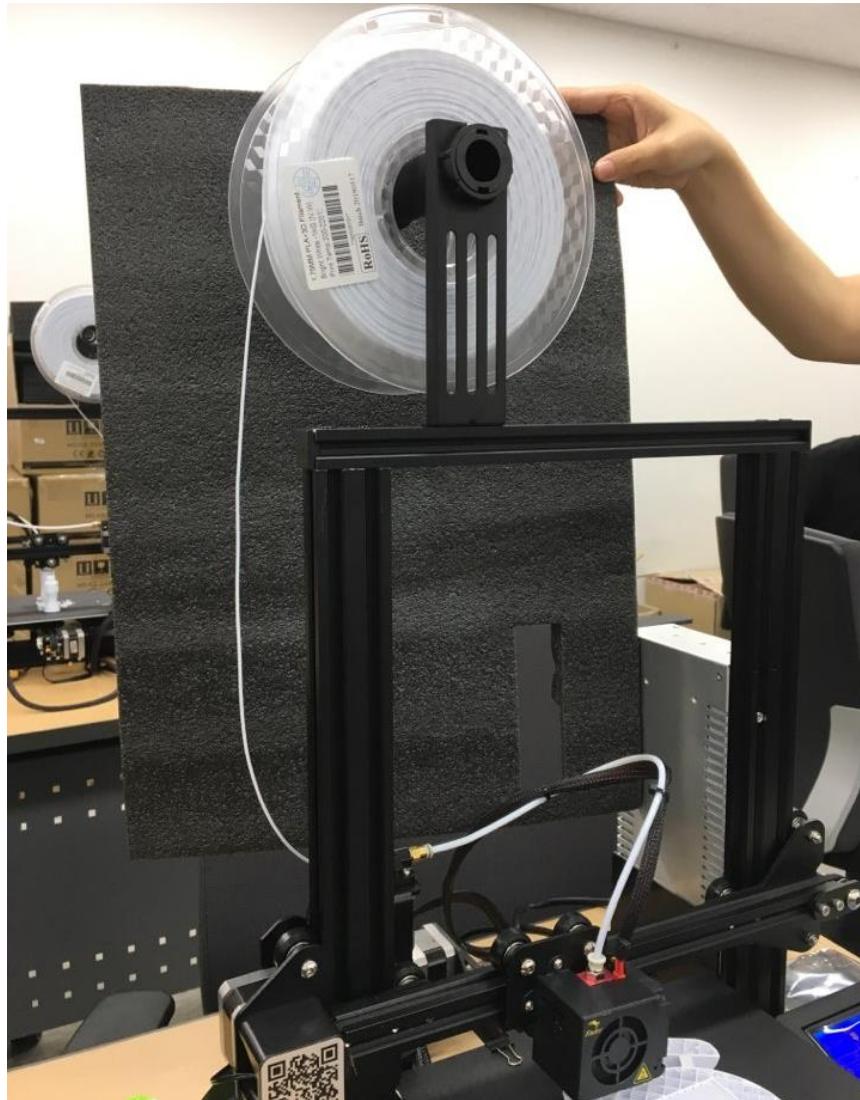
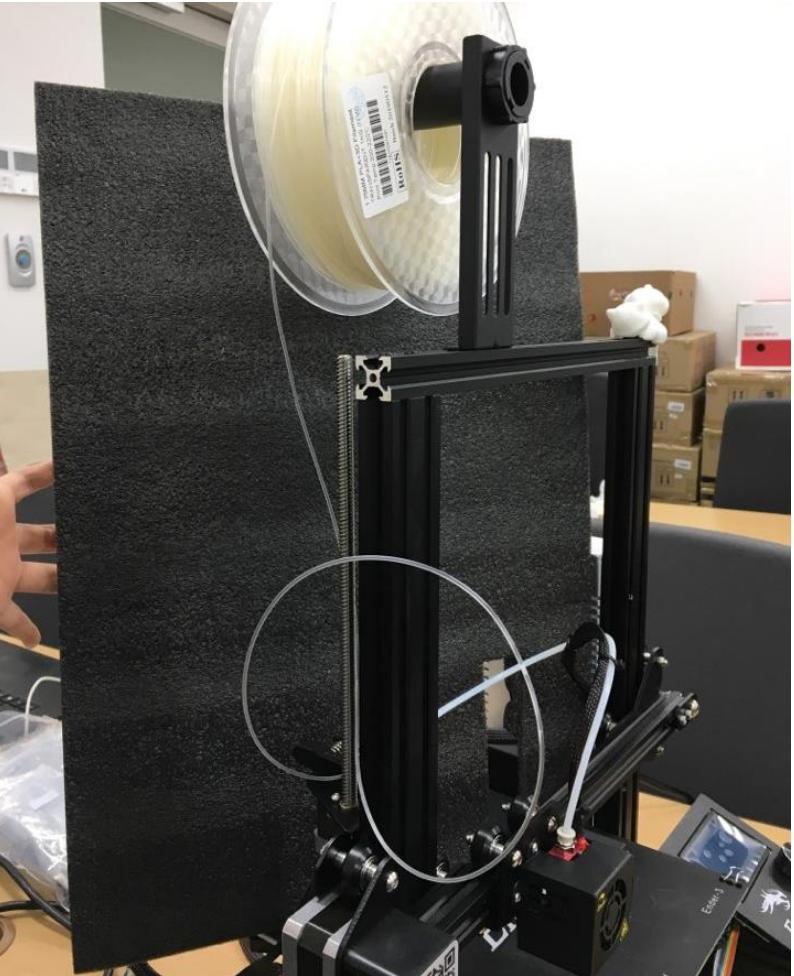
2. Belt must be *tighten*.



(0)

checklist

3. Filament must *not be twisted*.



(0)

checklist

4. position of clip

**Do not place 4 clips
on these positions !!!!!!!**



Build-up Ender-3 3D Printer

Let's print out from Ender-3

Print with Ender-3

- Auto Home



Print with Ender-3

- Auto Home

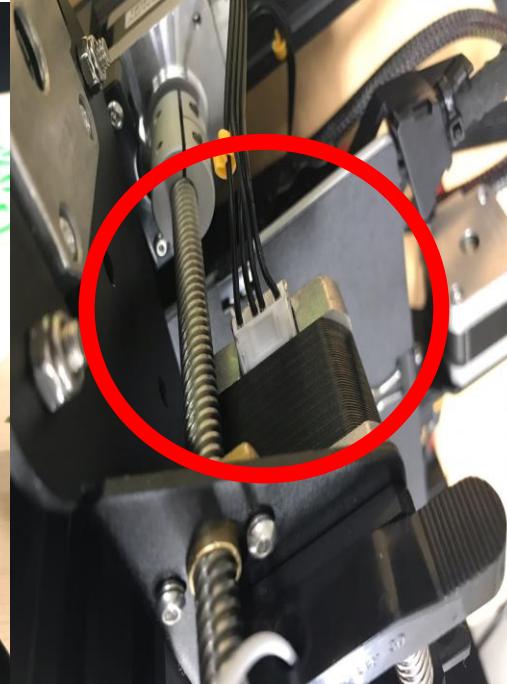
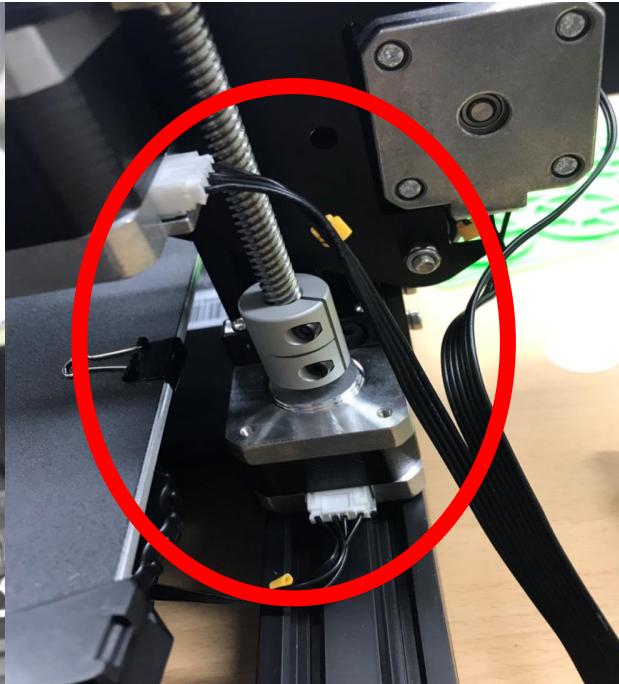
This is Auto
Home state →



Print with Ender-3

Assembly check

- The case that Motor doesn't move → Check cable connection



Print with Ender-3

Assembly check

- The case that X-axis, Y-axis movement is strange → Lack of belt tension

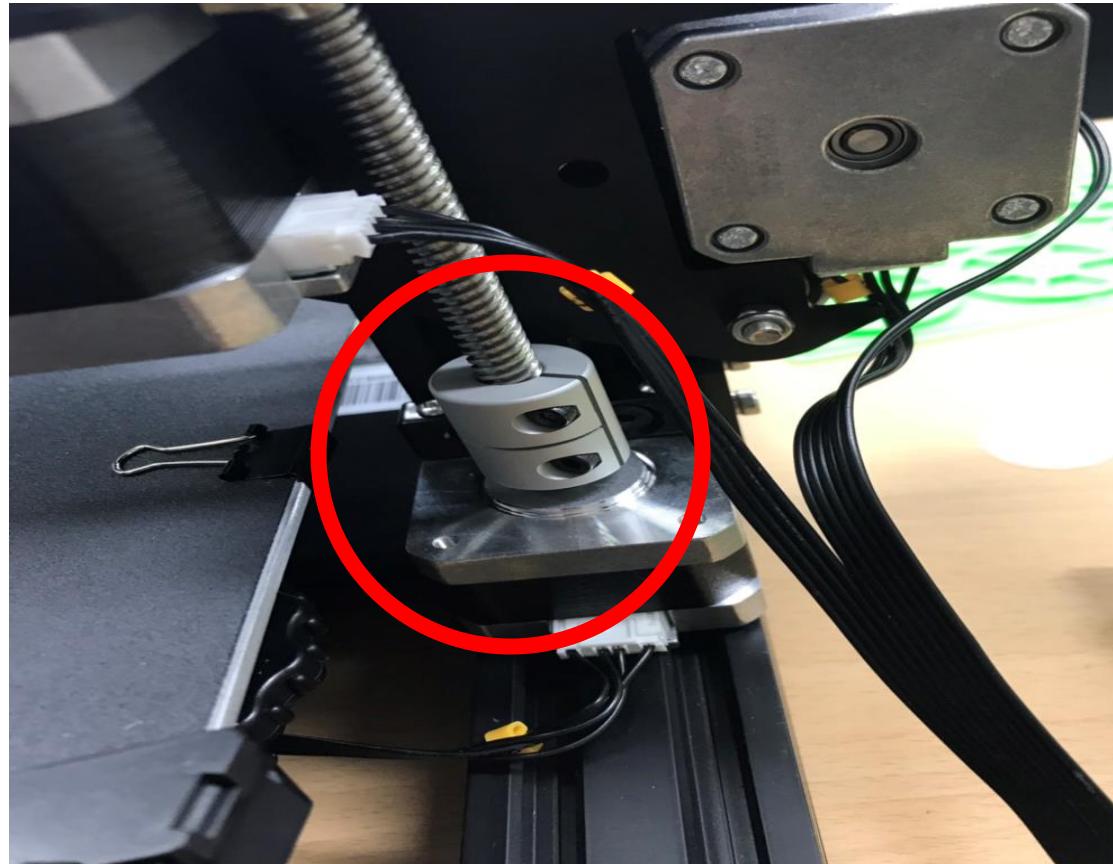
Be sure to
TIGHTEN the
belt



Print with Ender-3

Assembly check

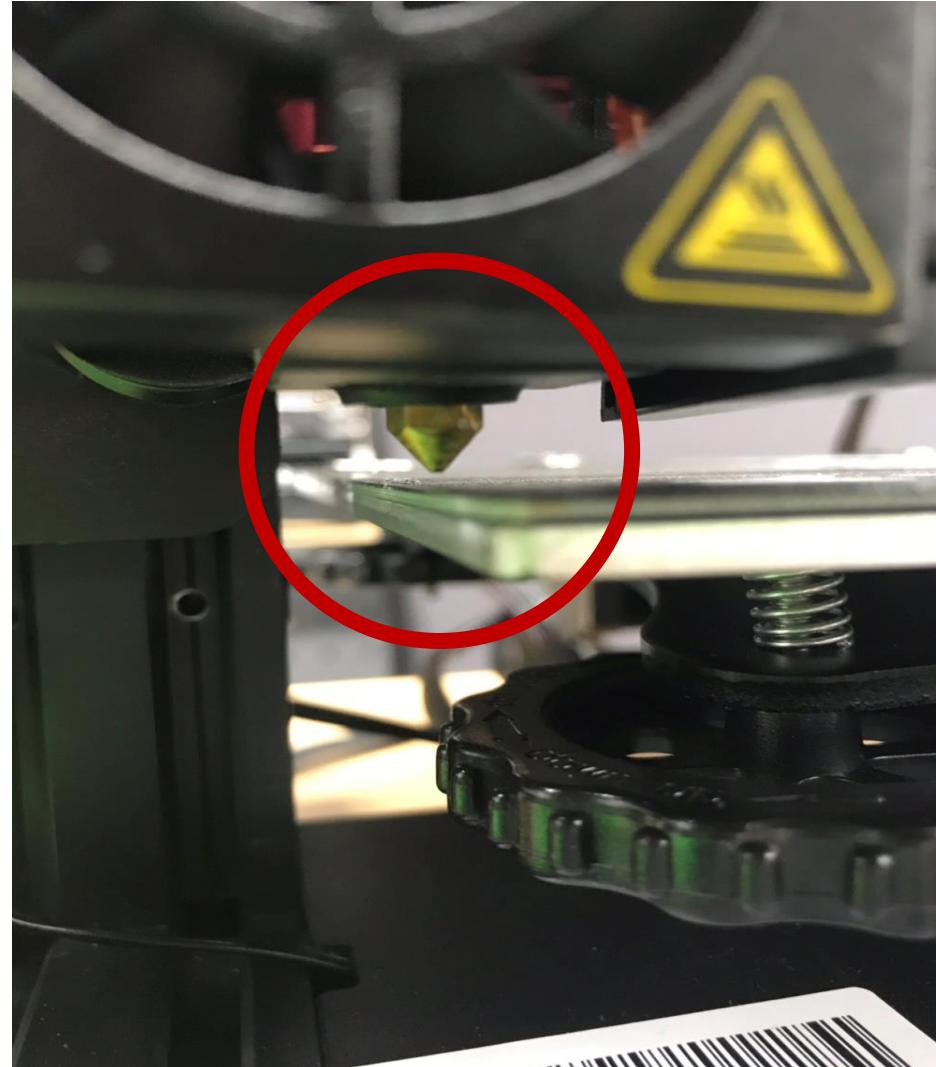
- The case that Z-axis motor rotates in vain or doesn't move
→ problem in Z-axis



Print with Ender-3

✓ Leveling

Distances between
Nozzle and Plate are
0.2mm



Print with Ender-3

✓ Leveling

Counterclockwise : the distance between the nozzle and the plate get far away

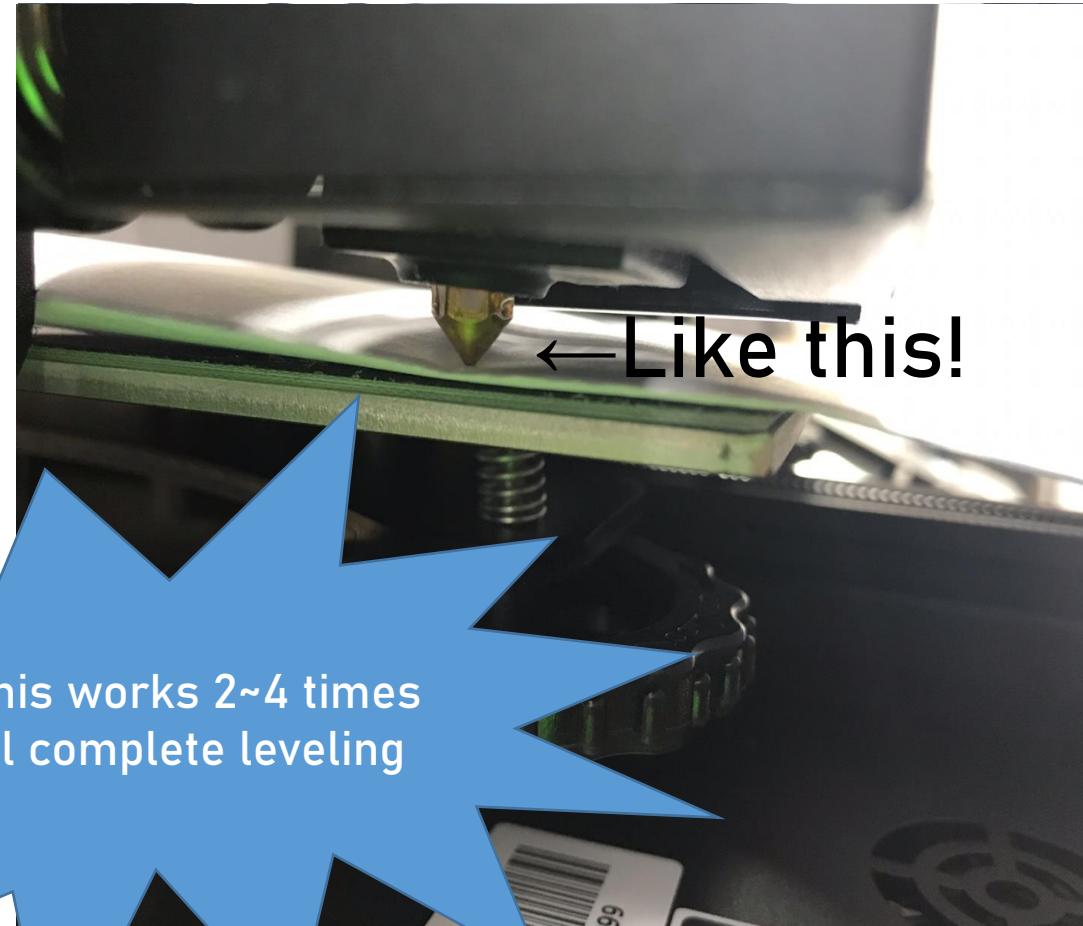
Clockwise : the distance between the nozzle and the plate get close



Print with Ender-3

✓ Leveling

1. Turn the gear ①~④ to the end of the clock
2. Turn the gear ①~④ clockwise until 0.2mm
 - Use folded paper(folded paper's Thickness is 0.2mm)



Print with Ender-3

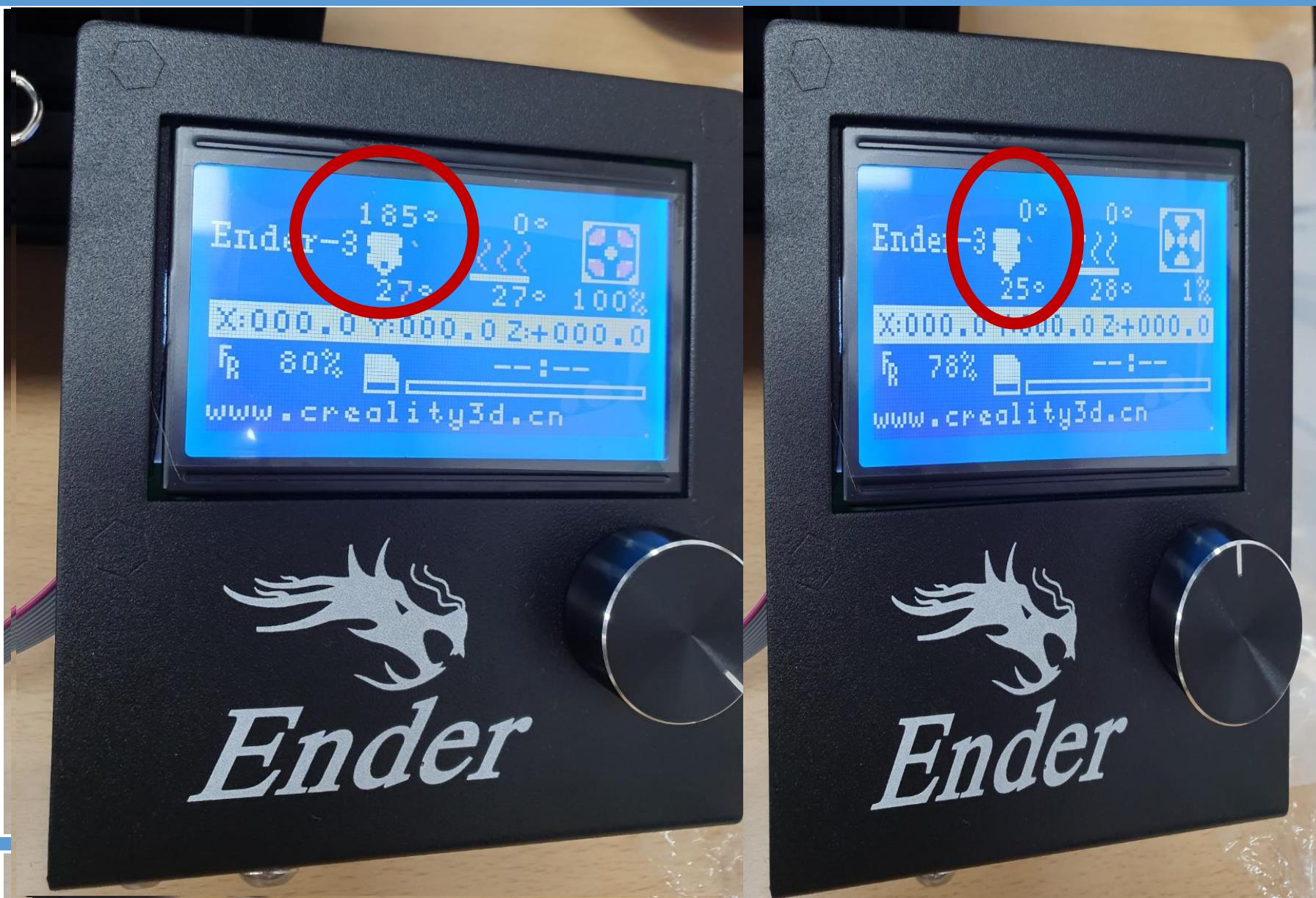
Leveling Failure Cases -

A filament that looks like a spaghetti noodle.



Print with Ender-3

- Preheat PLA Filament



Print with Ender-3

- Loading or Unloading



Print with Ender-3

- How to Print
in Ender-3

