

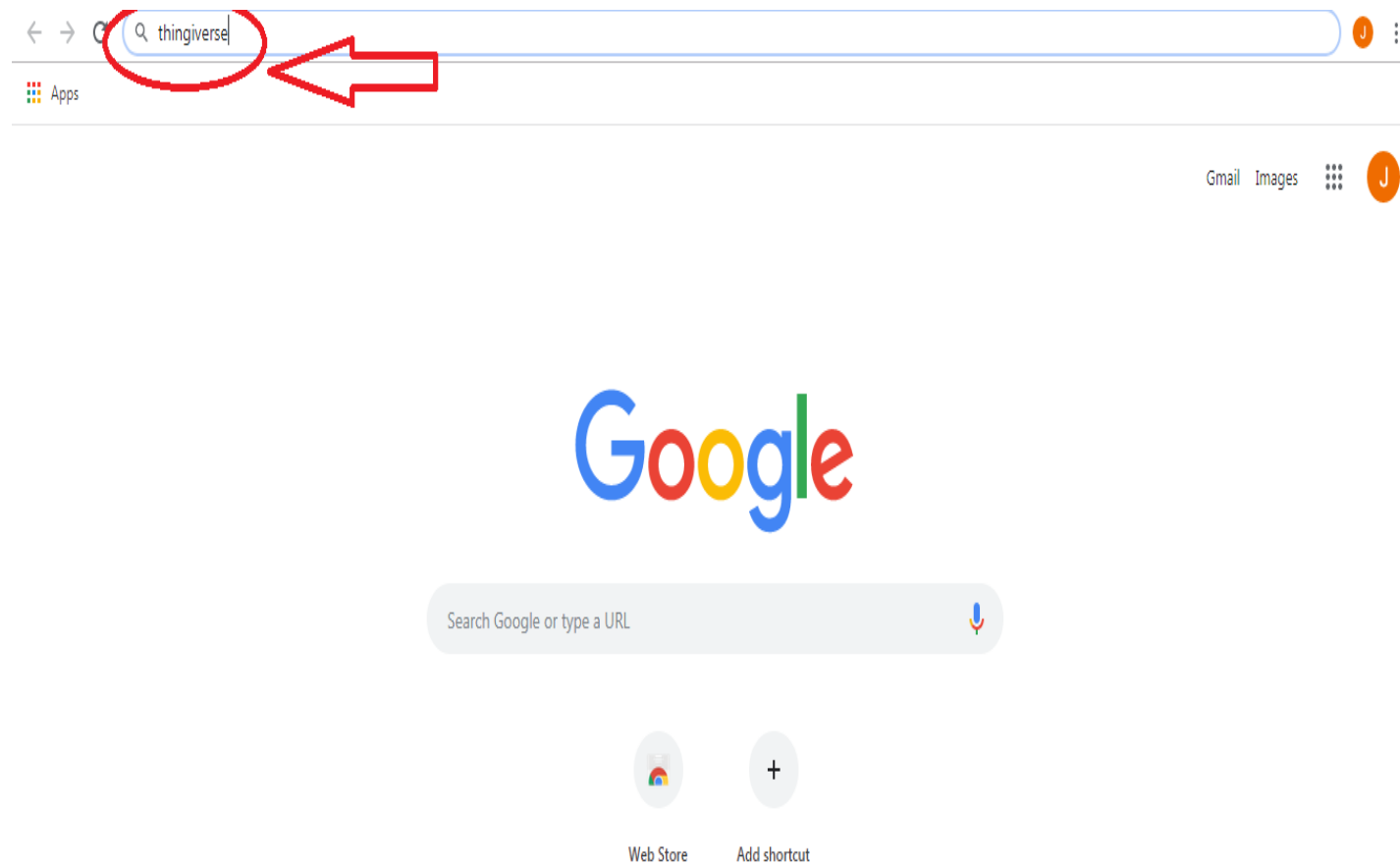
# 3D printing of a gear knee

Before making a model in 3D printer first we have to make a design in suitable software.

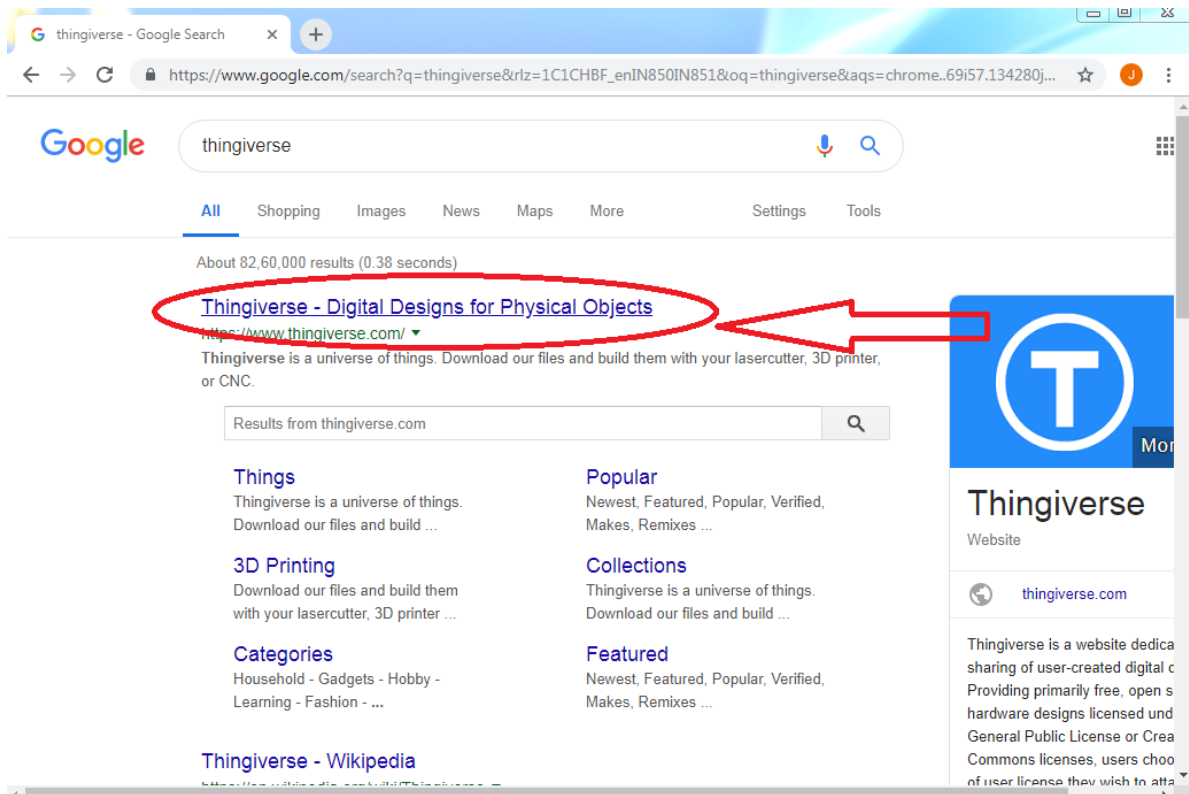
Or one can download the design from the online community called THINGIVERSE. Here I downloaded the gear design from thingiverse.

## PROCESS TO DOWNLOAD THE DESIGN

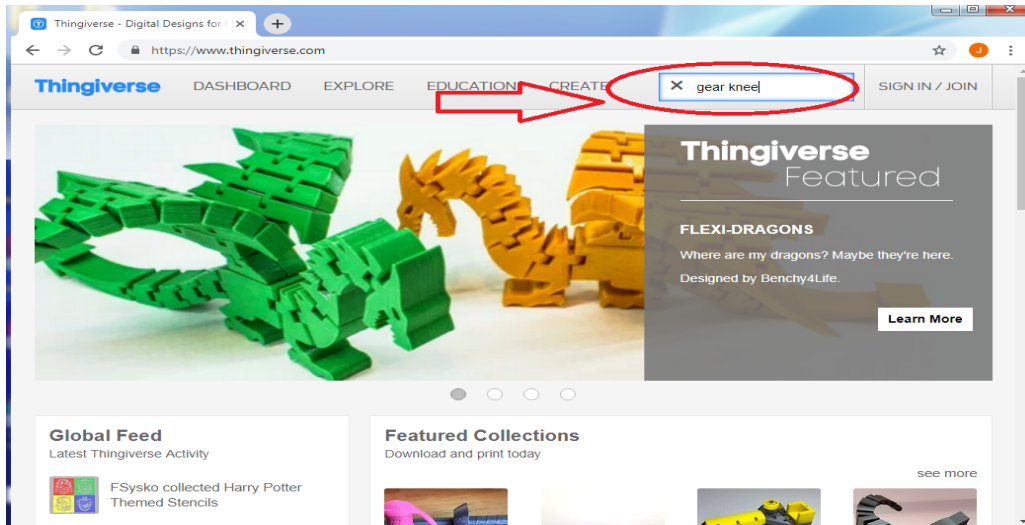
First typed thingiverse .



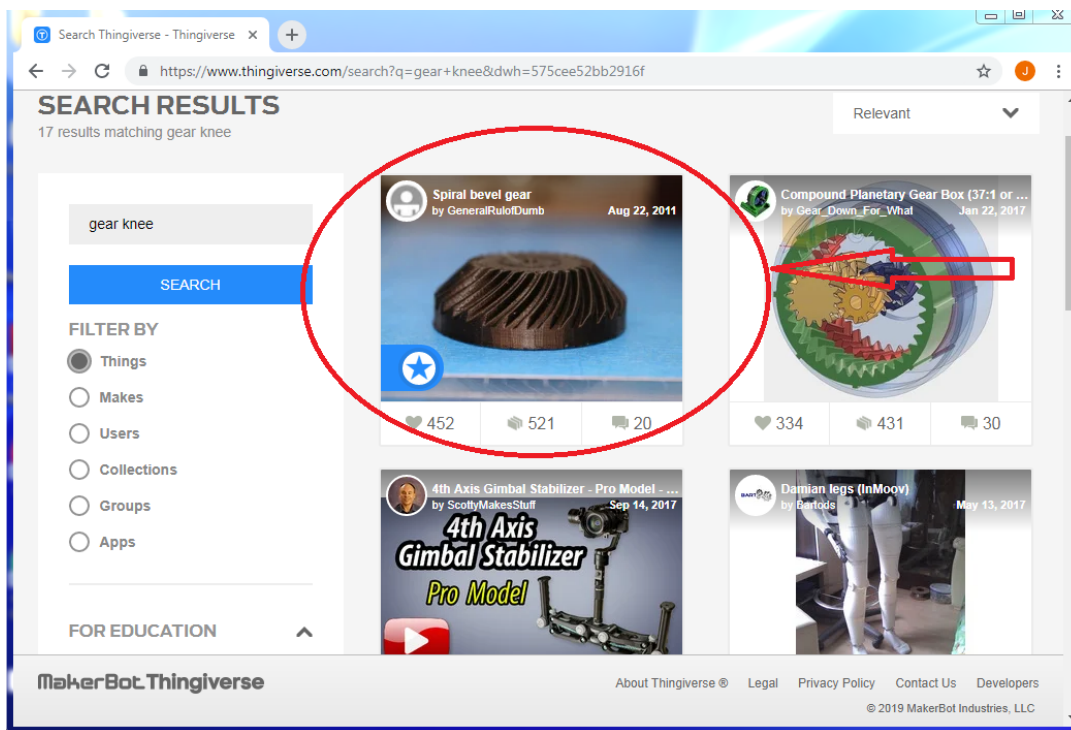
After entered we get digital design and then double click at encircle option.



In search option we can search our desired product that we want to model .As I searched here gear knee.

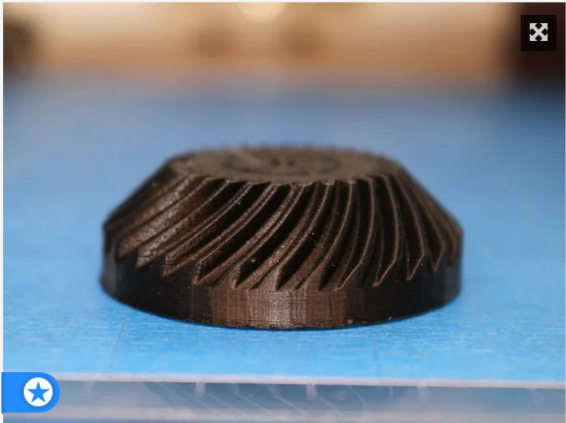


I got the gear design.



Scroll down and I got different designs. Went to the thing file and chose smallest kb file.

Spiral bevel gear by GeneralRuleDumb Aug 22, 2011



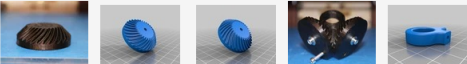
**DOWNLOAD ALL FILES**

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Collect	521
Comments	20
Post a Make	22
Watch	9
Remix It	3
Share	0

Thing Apps Enabled

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**TIP DESIGNER**

**REPORT THING**

Tags

Bevel gear featured Gear Ultimade

License

Summary

Spiral bevel gears (conical, helical), proof of concept

Look at : [http://en.wikipedia.org/wiki/Spiral\\_bevel\\_gear](http://en.wikipedia.org/wiki/Spiral_bevel_gear) for some theory.

Actually my naming of these files is wrong, the gears are not hypoid ! This means that the rotational axes of these two gears do cross through one point in space.

Gcode generated with netfabb-Ultimaker edition, Martijn's build-style, 0.15mm layer height. Printed on my (standard) Ultimaker, speed 250%, fan on (great machine !)

NB: the teeth were decreased in size somewhat to account for the fact that Ultimaker/netfabb produces parts that are almost exactly 0.3mm too big in x- and y-direction (z-direction is fine). Simply scaling the parts up or down (too much) would render the teeth too small or too big, respectively.

NB 2: due to the nature of the ProE module I used the default Csys got rotated by the same angle that the teeth are pivoted. 45°. Rotate the STL (back) by the same angle and you should be fine.




Spiral bevel gear by GeneralRulofDumb

https://www.thingiverse.com/thing:10955/files

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File Name	Downloads	Size
 <b>gear_hypoid_left.stl</b> Last updated: 08-22-11	13140	1mb
 <b>gear_hypoid_right.stl</b> Last updated: 08-22-11	12217	1mb
 <b>gear_knee.stl</b> Last updated: 08-22-11	11470	569kb

CC BY SA

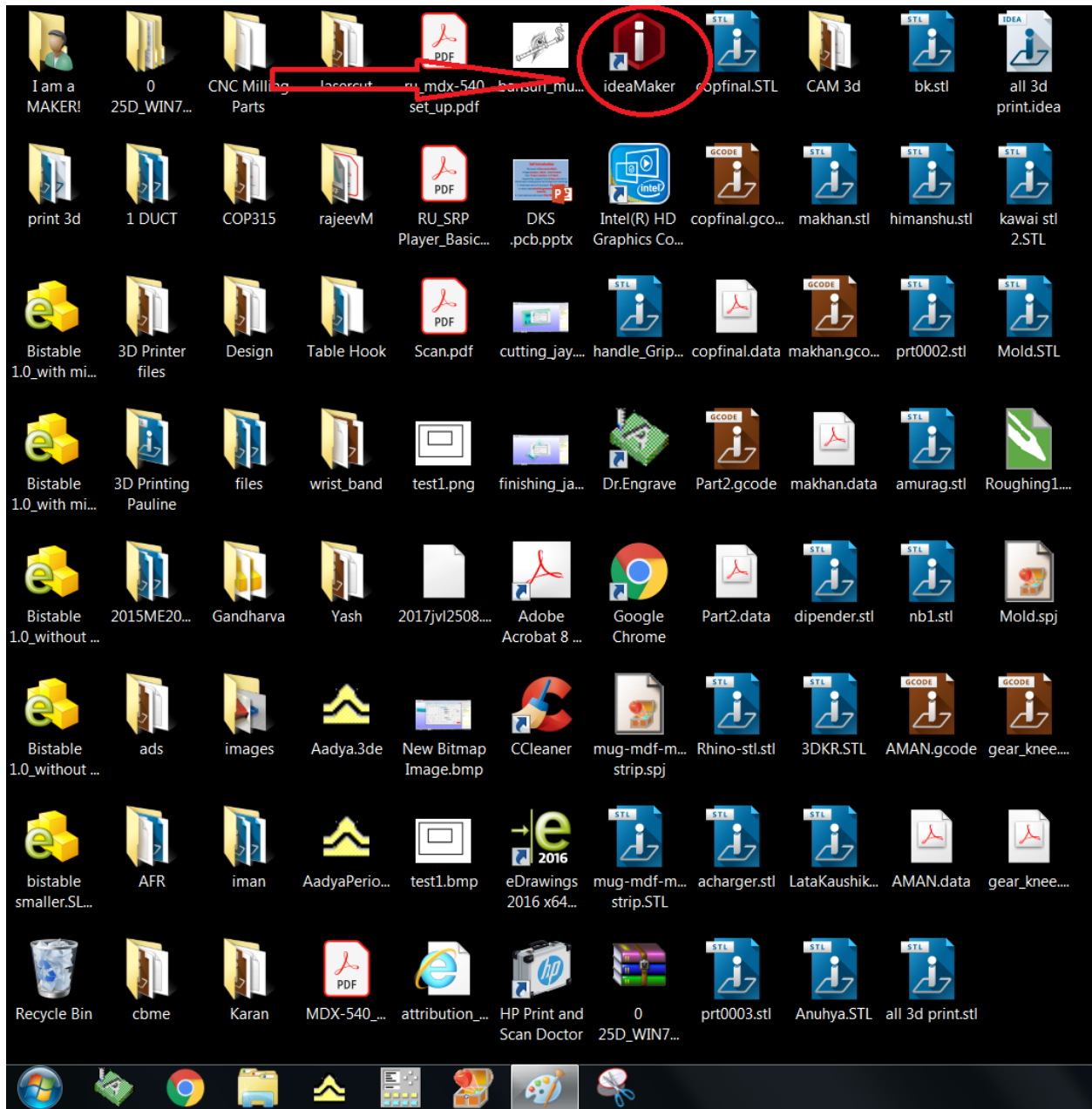
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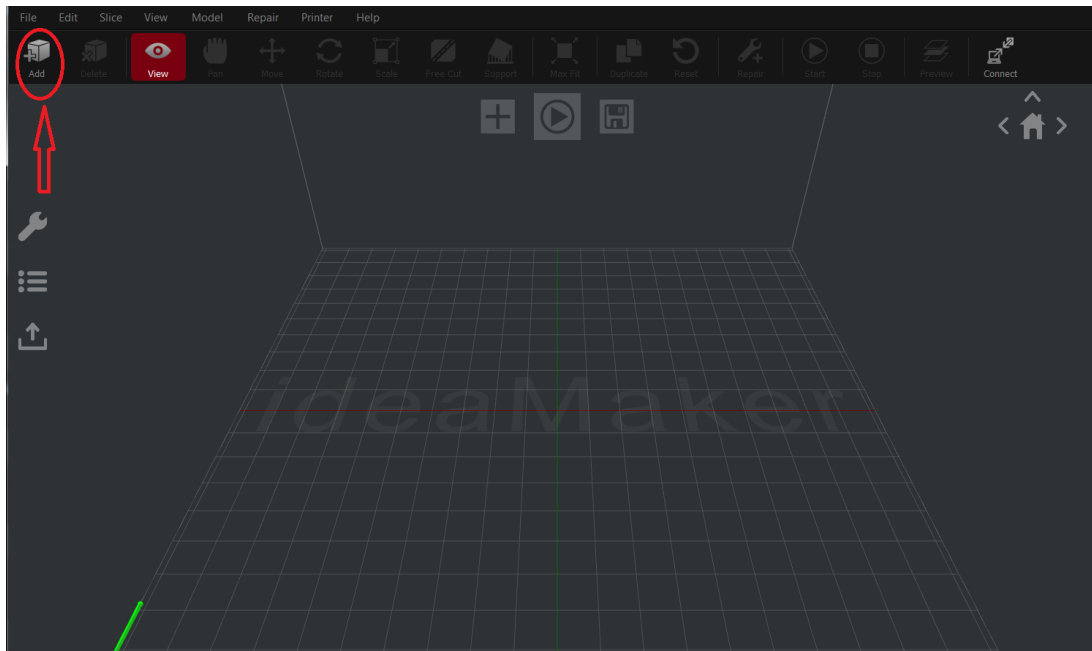
**AGREE & DOWNLOAD**  
(with zip file)

## CONVERSION OF FILE INTO Gcode FILE

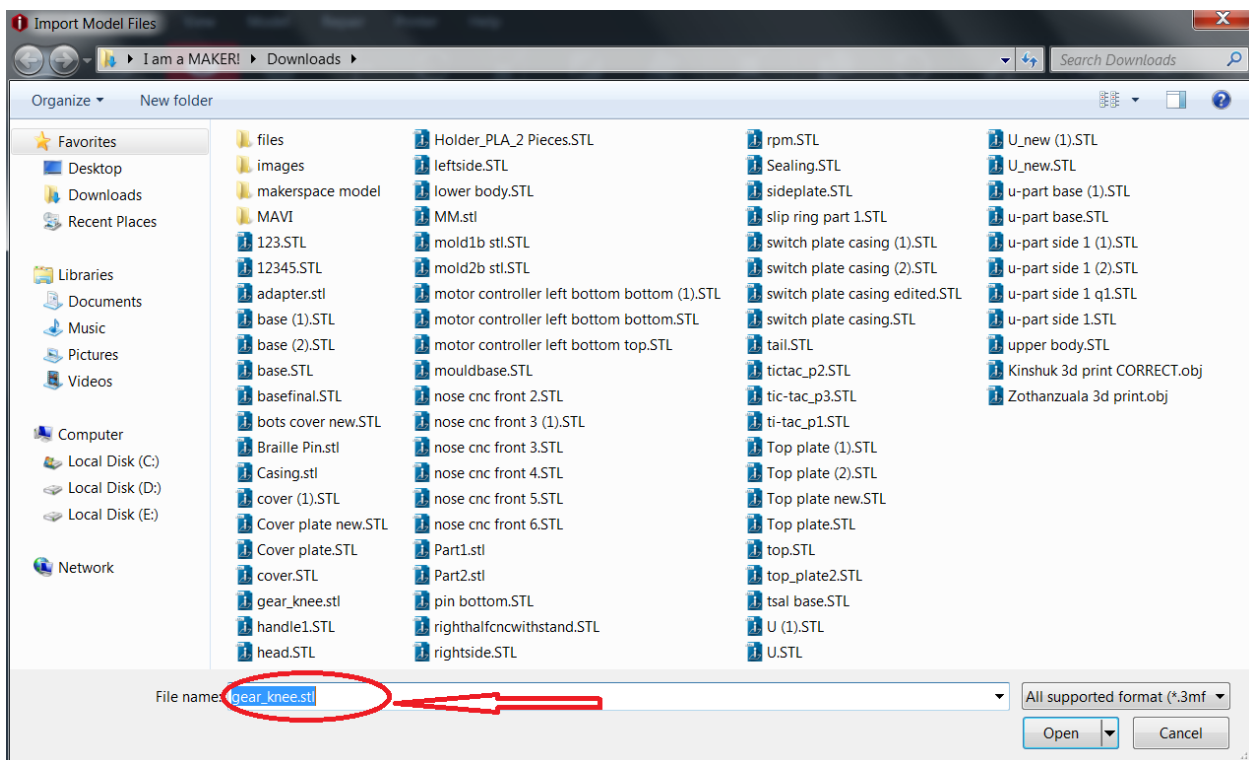
After download is completed open that file in idea maker software. Idea maker software provides the G code file through which the 3D printer works.



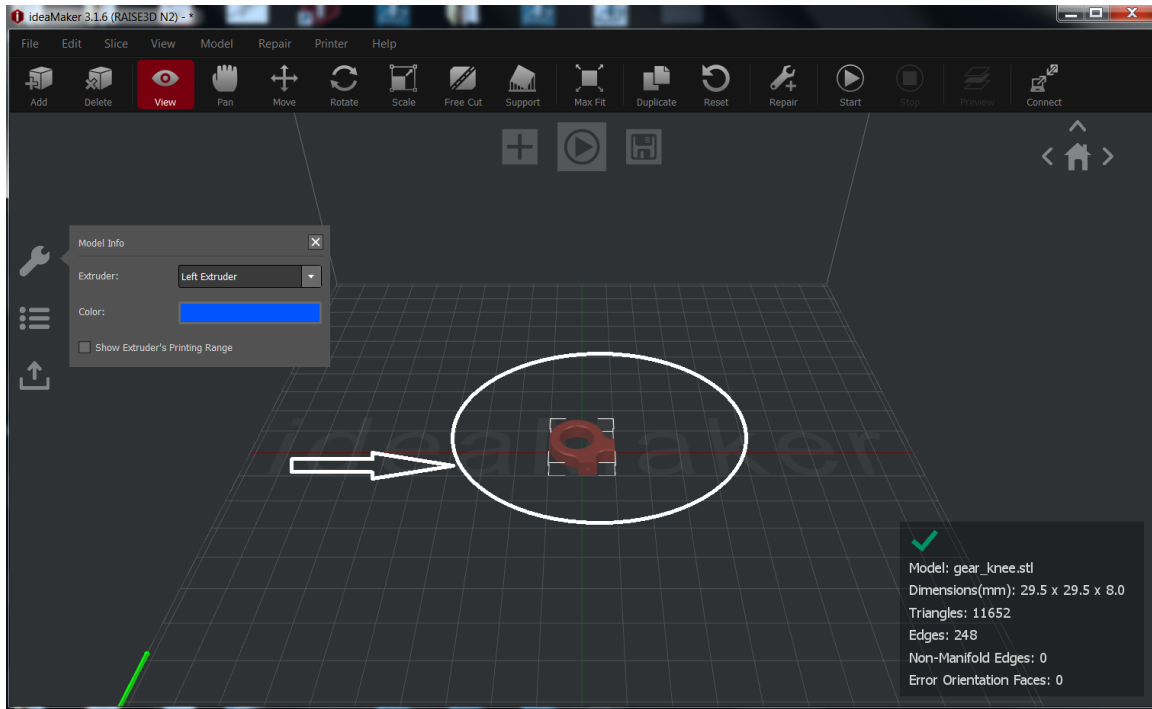
Opened the idea maker and click on add icon.



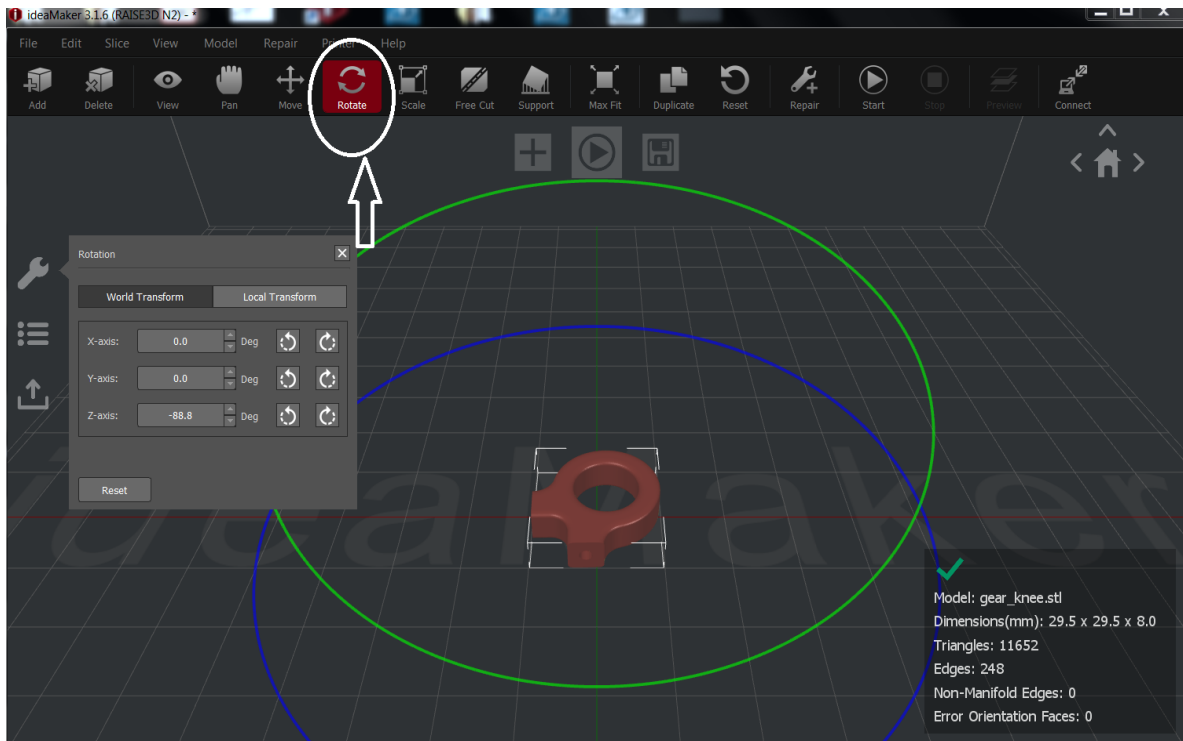
Search the downloaded file, as I searched gear knee here and then open.



After opening I got my file in idea maker software.

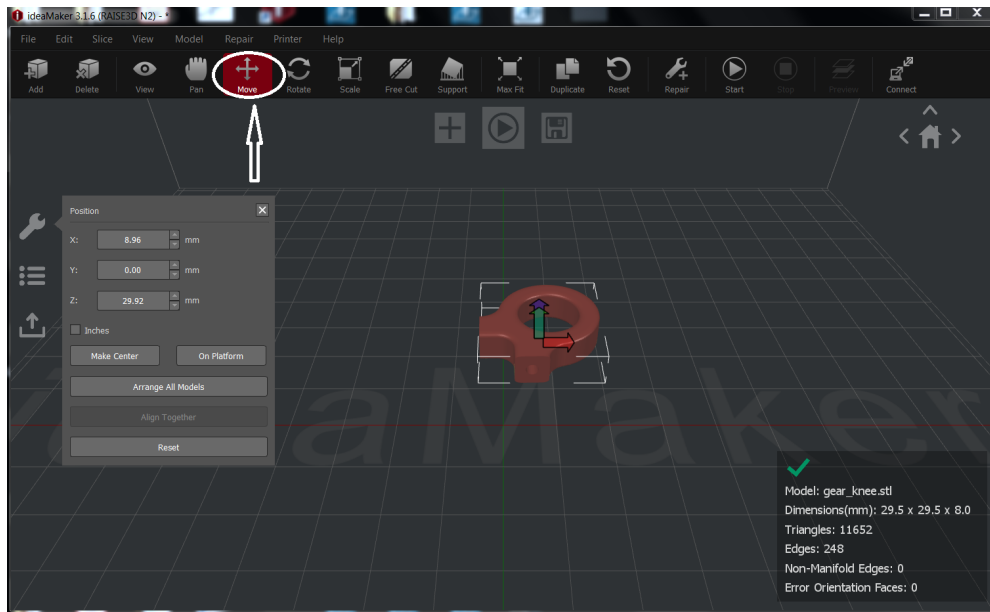


We can rotate our design in x axis, y axis and z axis .

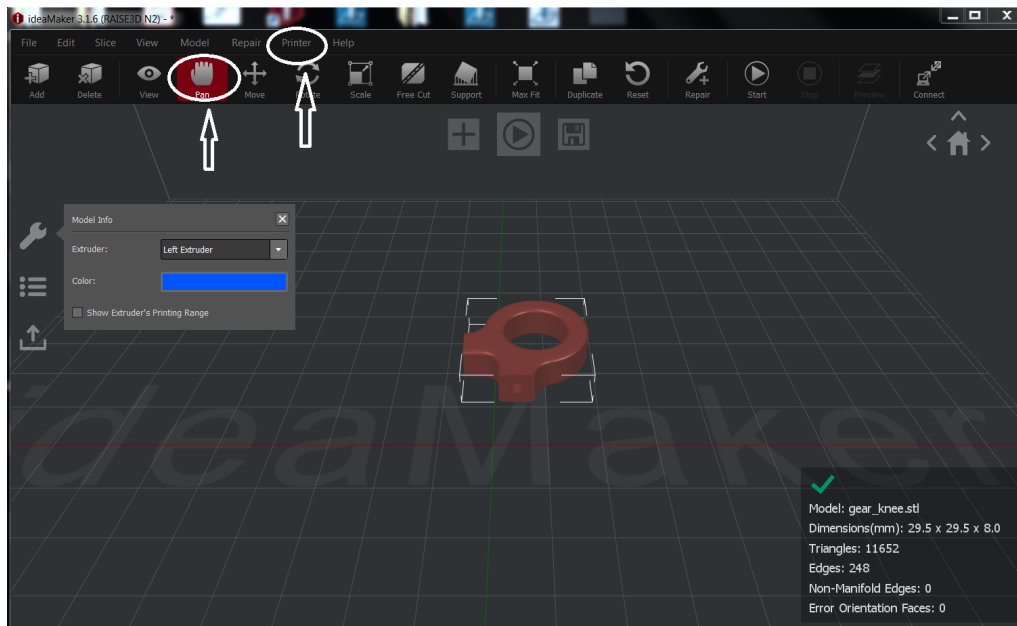


We can shift towards x axis, y axis and z axis.

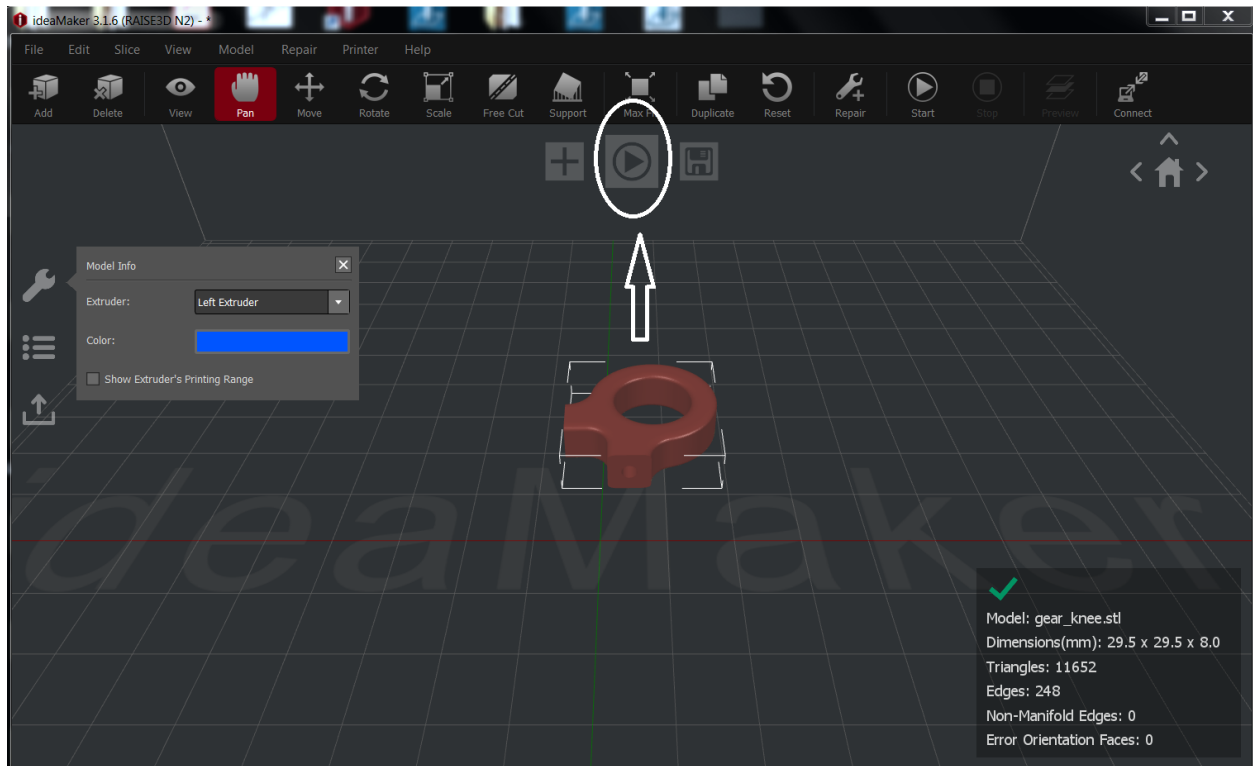




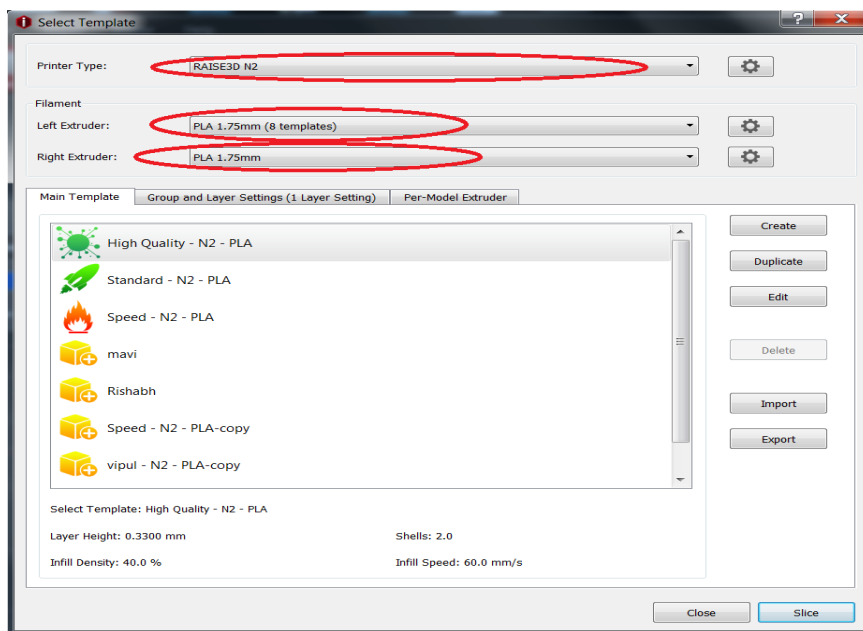
Through pan we can move the screen .And through printer we can set the right type printer.



Went to pause icon , which is shown below for slicing.

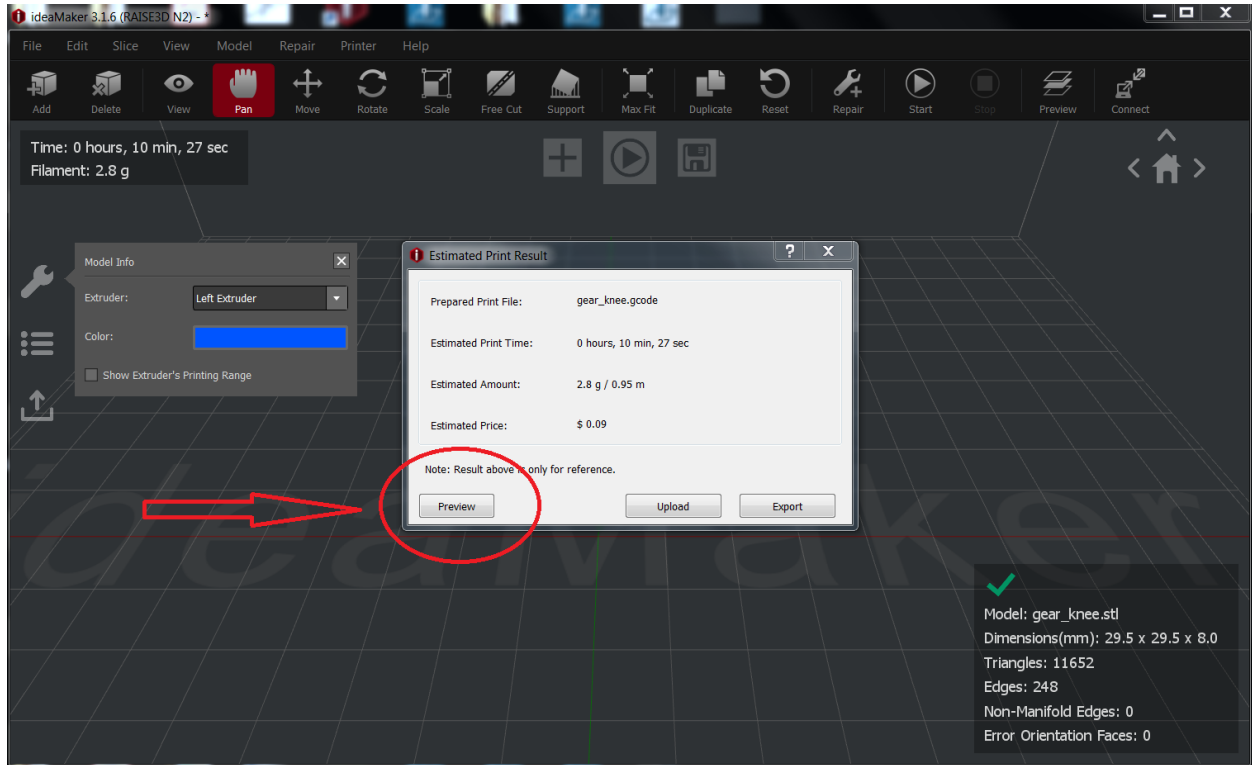


After clicked to pause icon I got the slice option in the down and also get Setting of material, I selected PLA .And then went to slice.

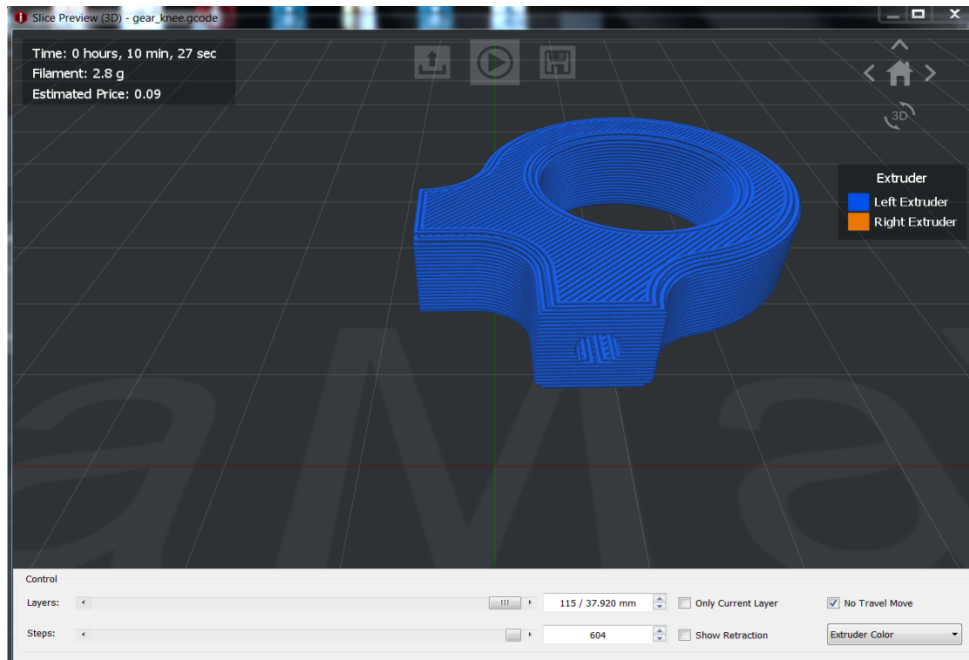


Slicing is the layer by layer addition of material to make the gear

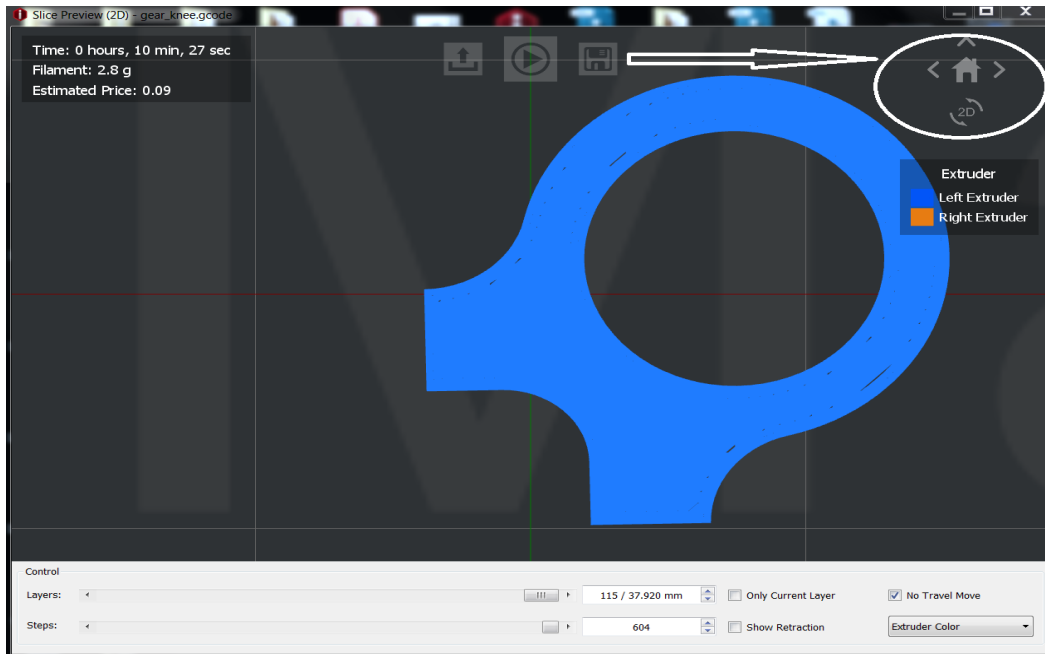
knee model. For slicing went to preview.



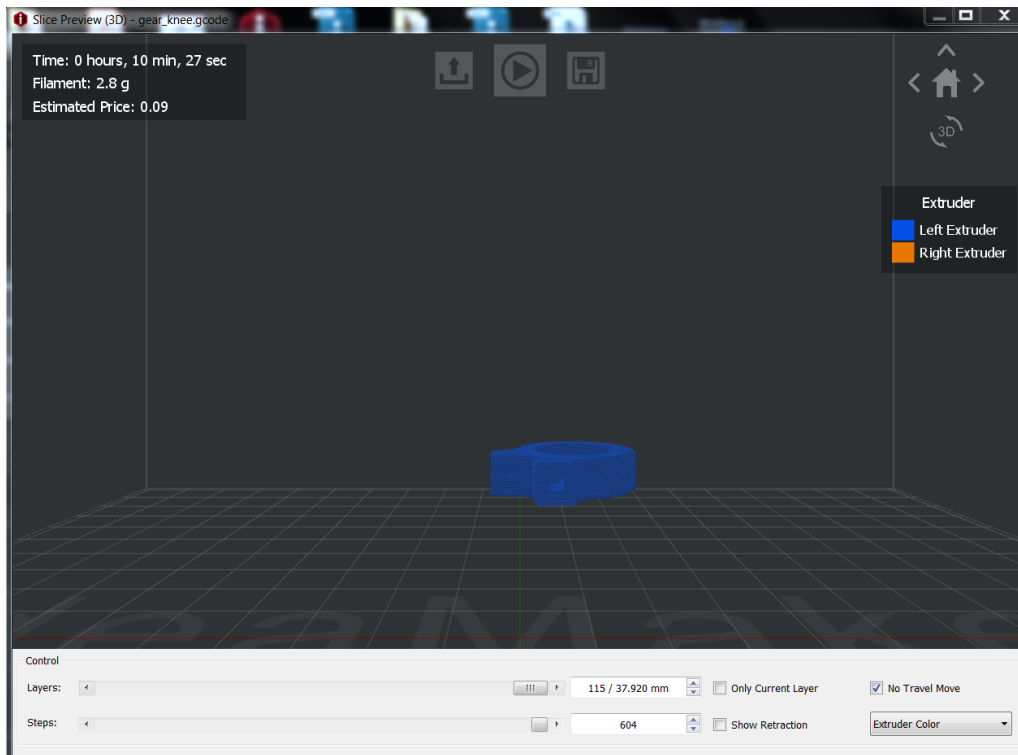
This provides the slicing of gear knee.



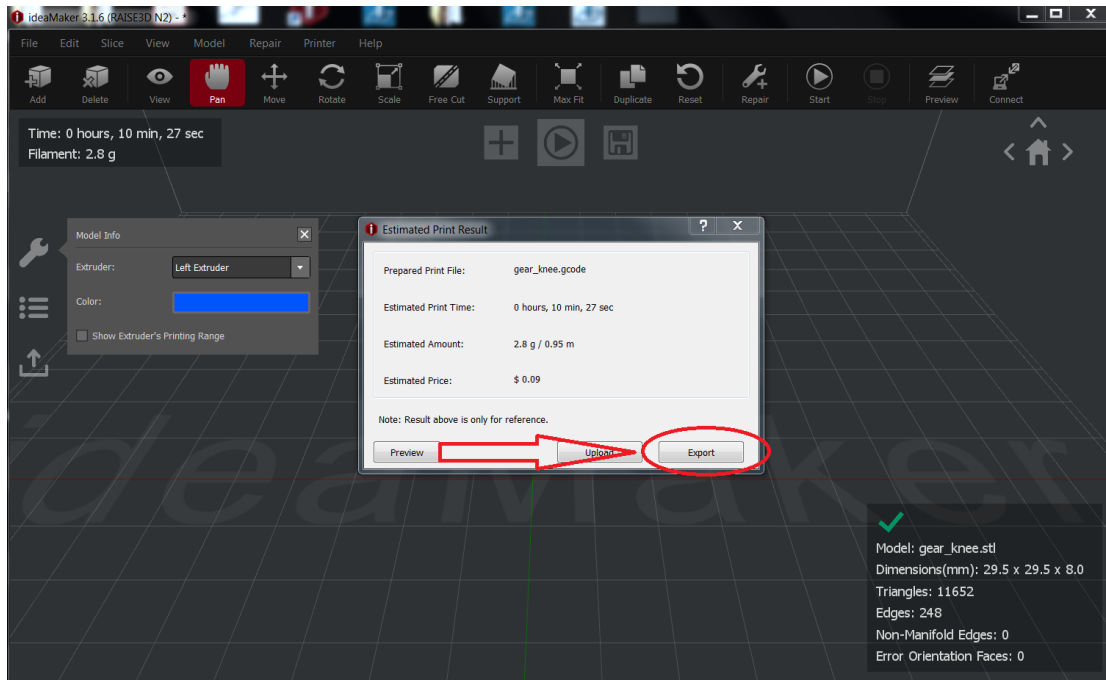
From the encircled one we can look our design 3D, 2D, side view, top view, front view.



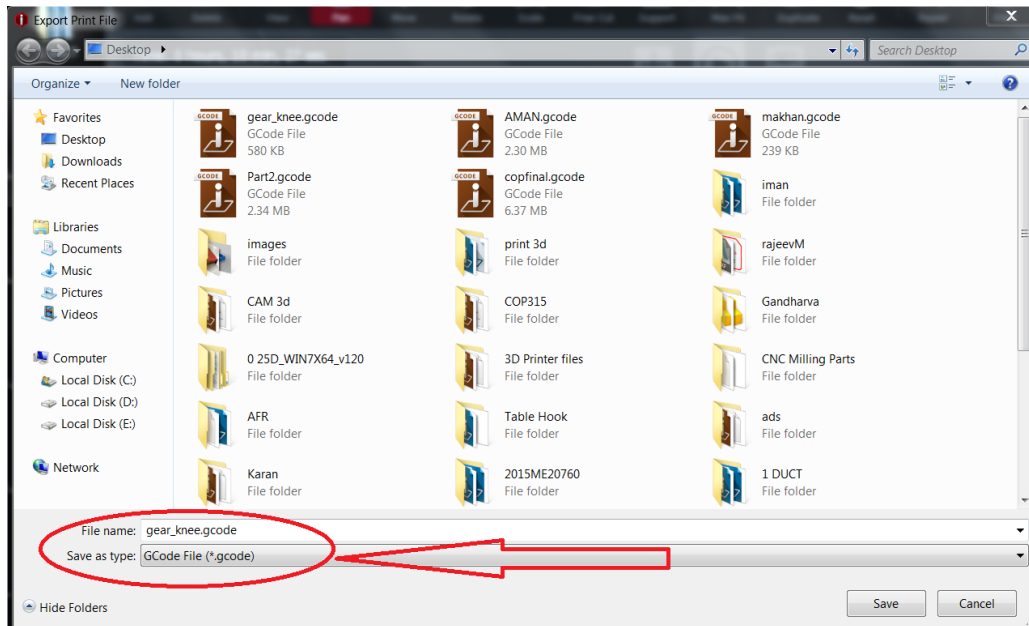
Front view.



After slicing went to back and clicked on export to make the G code file.

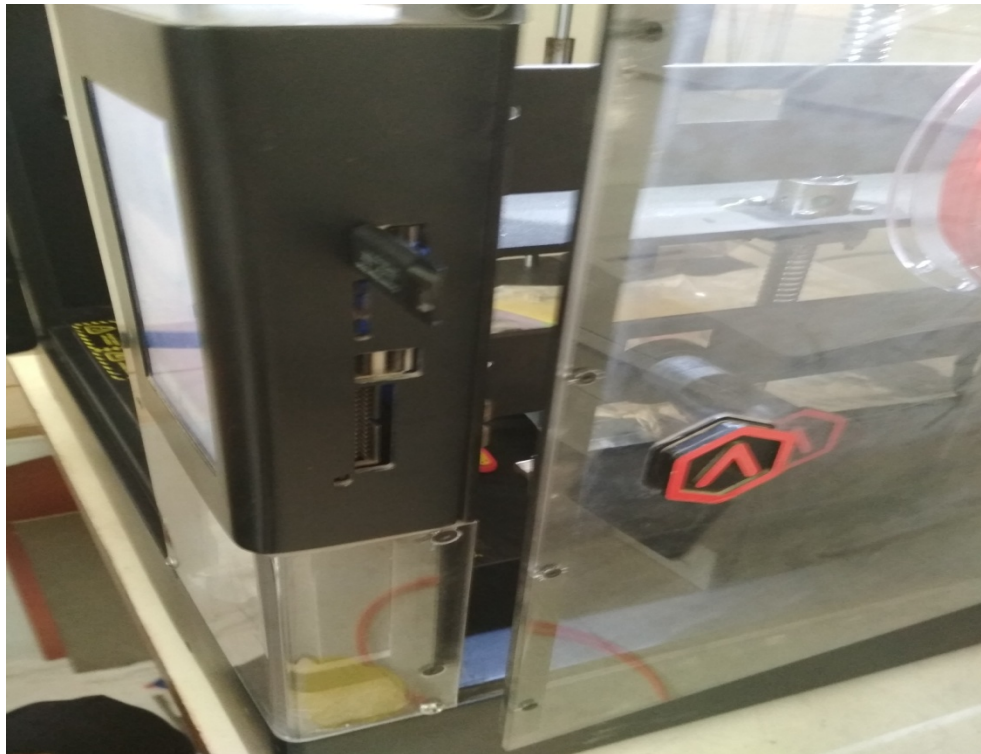


I got file with Gcode and saved it, and then the file is transferred to pendrive or we can direct opt for printer also.



## MANUFACTURING

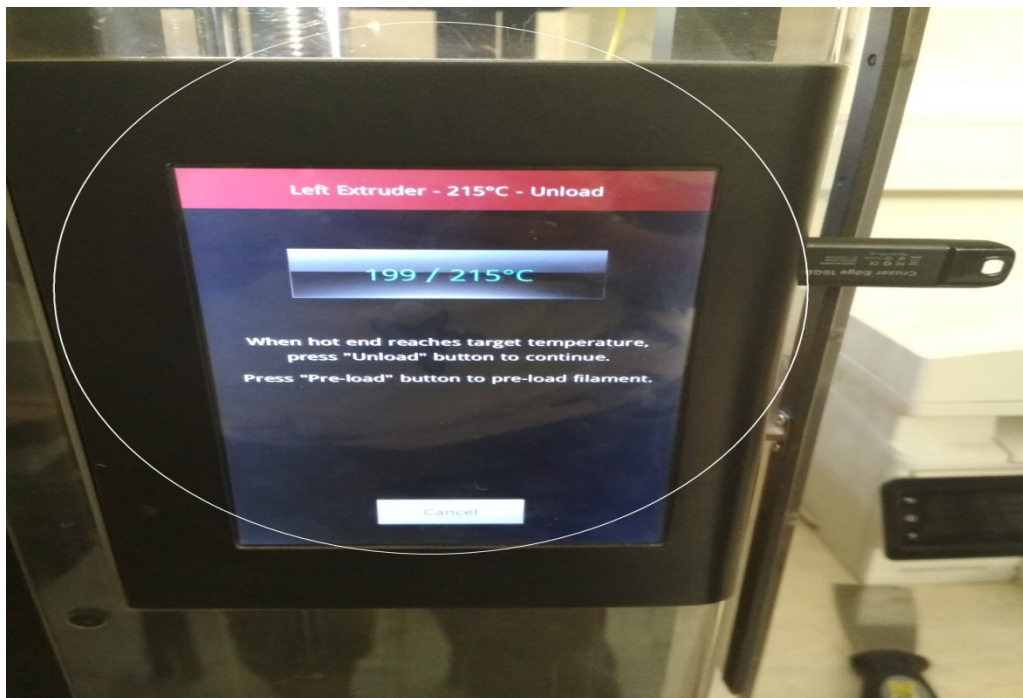
Now set the pendrive in the 3Dprinter USB slot.



This is the 3Dprinter.



While fixing pendrive it showed temperature, after maintaining the temperature it will show the design in the display.

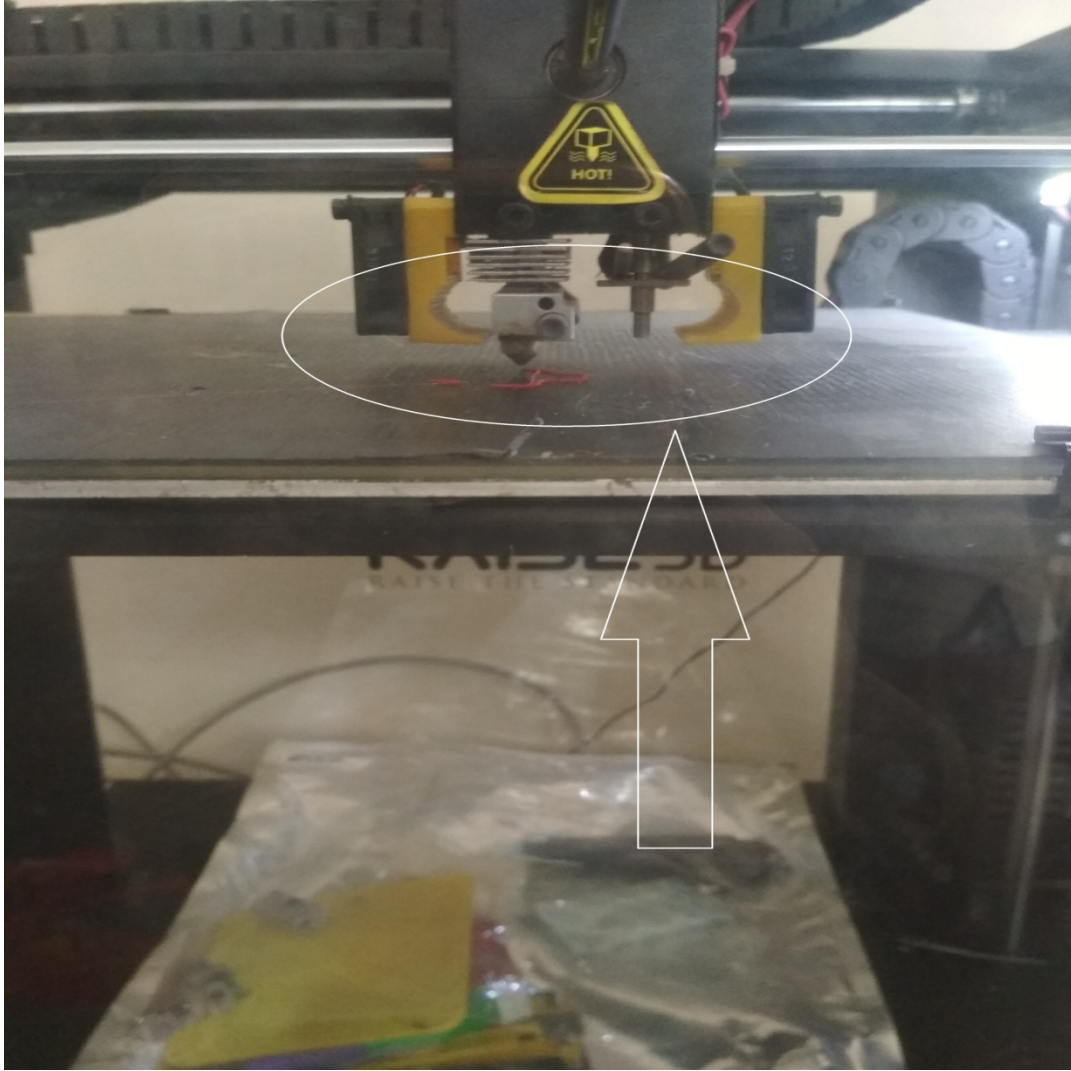


The design is showed in the display along with time required to complete the design, temperature, and percentage of completion.

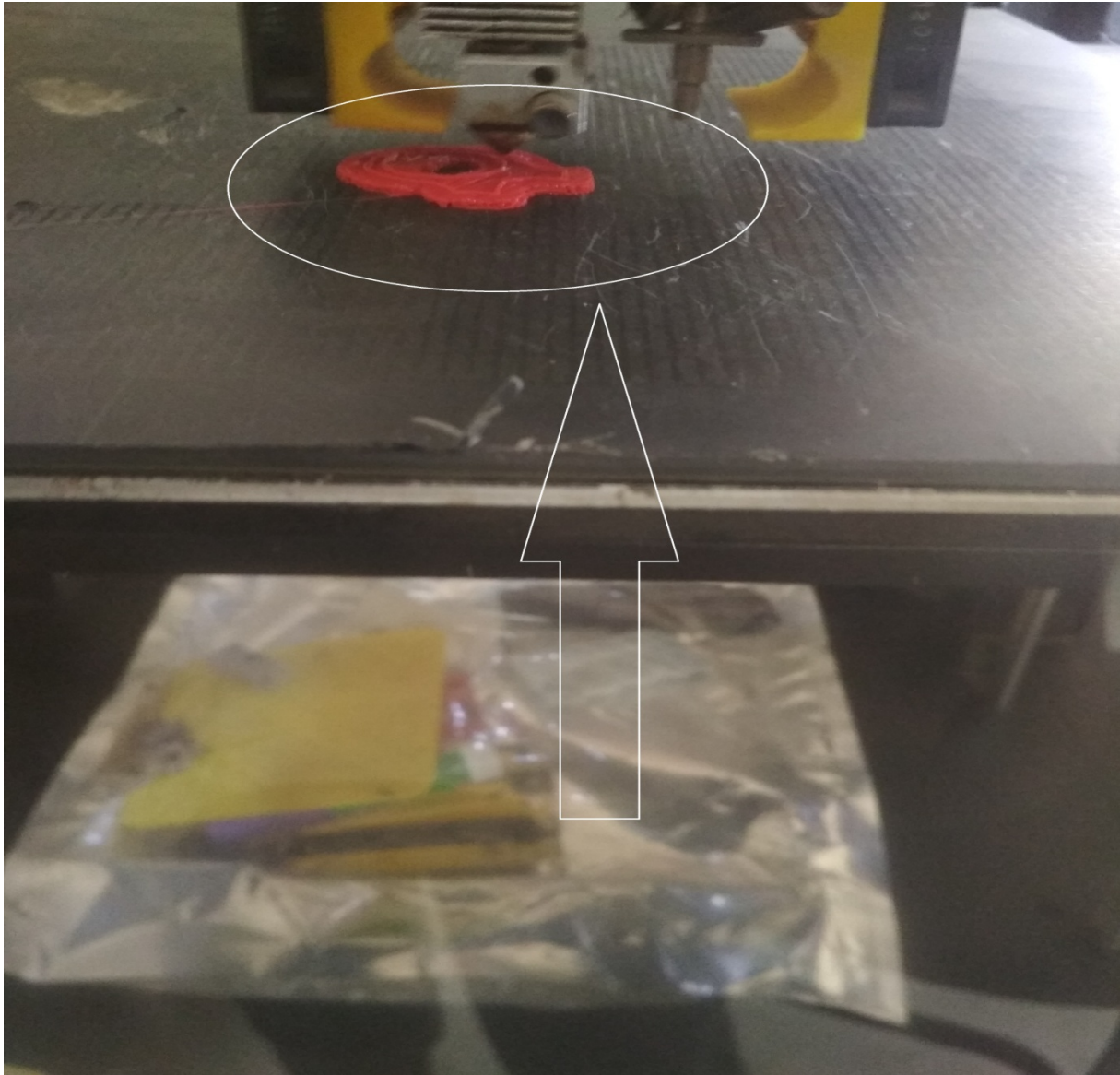


After sometime the printing starts automatically. The input material is PLA and the output is in the molten form of the same. Melting is done under the extruder which is shown in the circle.

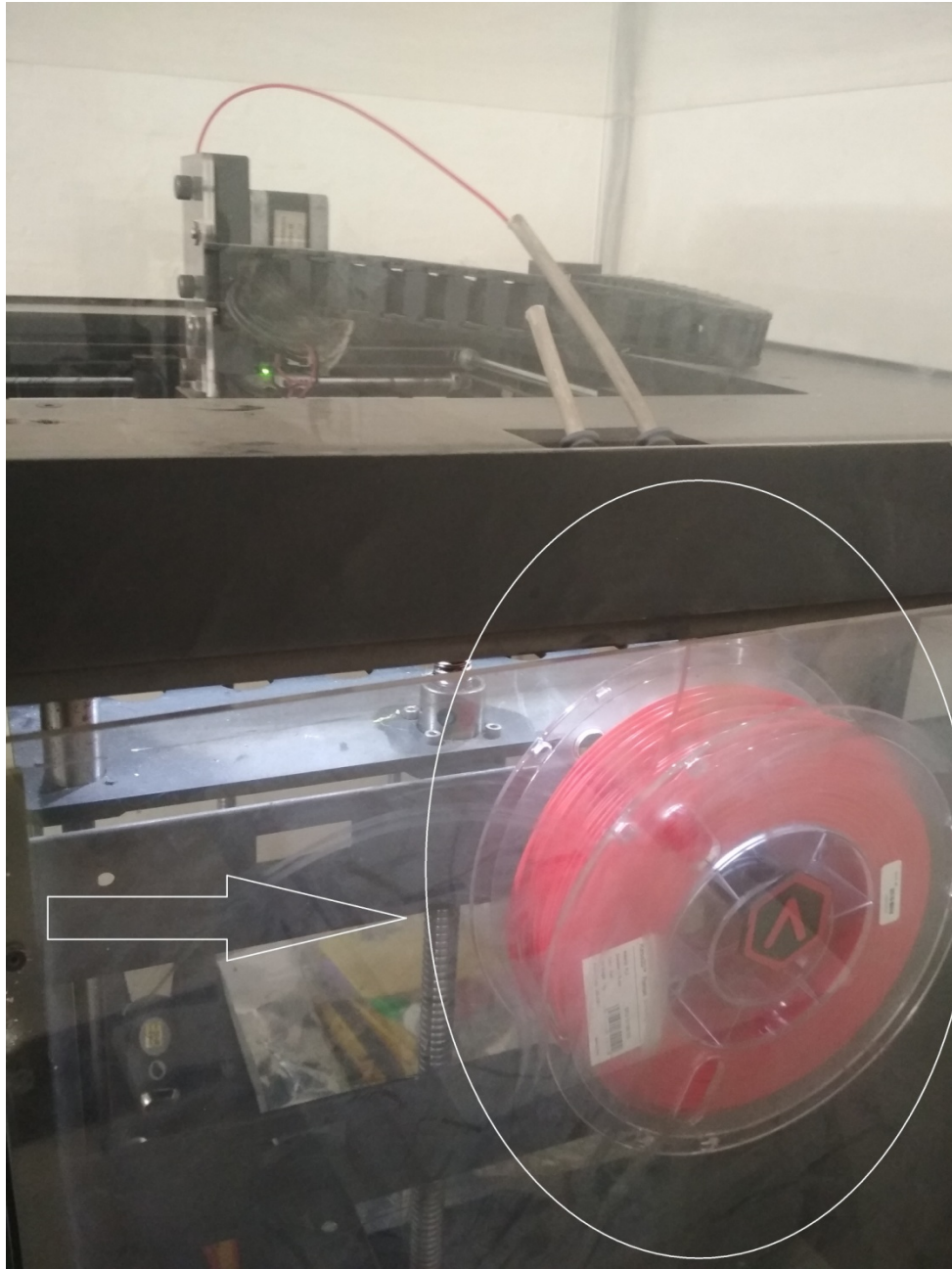




Printing Under process.



The material PLA is feed in the extruder through the roller.



Printing was about to complete.



The gear knee model.



Separated the base material (raft), and the product looked like this.



#### IMPORTANT NOTE:

1. Sometimes the molten material doesn't come out from the extruder or nozzle because of improper loading. So always take care about that the extruder is working properly.

2. We can fix this above problem

- Go to utilities(shown on the display)
- Click on load
- Wait for some time until it shows 'OK'
- Press ok

- Then the PLA wire goes into extruder and the molten material come out.

But it's better to inform the lab incharge regarding this issue or any other.