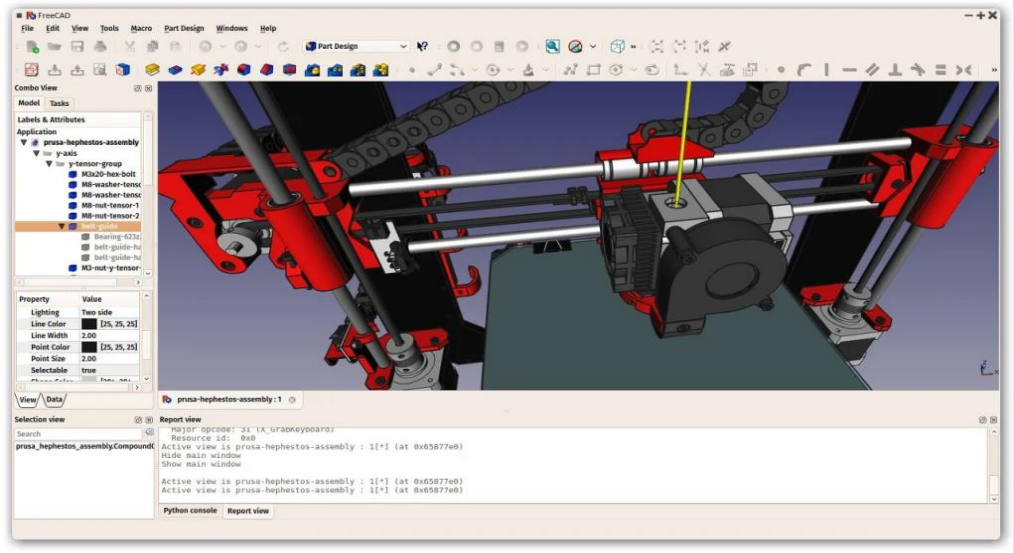
REPORT FOR "CAD AND 3D PRINTING MODULE"



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SECTION- 10

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ABSTRACT

- The project offered us with a heavy load of opportunities to work in a technology-driven environment lead with a amicable leadership of 3D-modelling and designing.
- We learnt new and inquisitive manners of developing new package of our innovative ideas by implementing them on “FreeCad” and printing out not a piece of paper or hardcopy of it but an actual multi-dimensional design of it.
- We also collected the concepts of printing various designs in the “CURA 3D-Modelling” by not only changing the dimensions such as length, breadth, height of the object but also by manipulating with the intrinsic properties of the printer.
- The new designs that we were given to execute gave us a thorough over-view of the functions , build-ups, attributes of the softwares – “FreeCad” and ”Cura 3D Modelling” that we can bring into our use for the overall securement of our goals and inventions.

INTRODUCTION

FREE CAD-

This software platform is a cost-efficient and a user -friendly workspace where a person will find what all is needed for a creative ,sustainable development of a masterpiece in the world of technology that too in a very organised manner. The attributes that the platform is providing are new in the world of technology and really imperative for the growth of our creativity and productions faculty.

3D printing gives a live experience of what the person imagines in his mind by printing his visualisation. Otherwise, the study proves that studying live on any subject is much better than to wonder about it. So ,the software very well knows how to serve the consumer in the most elite manner.

Cura 3D Modelling software:

This software is yet another example of the impeccable invention in the ease of the human needs. The software improves the manner in which humans were accustomed to learn by substituting it with a more efficient and prosperous manner by helping us in learning the art and creativity in a live spectation manner. We can touch, feel, study and judge the device of our interest by the means of this machine in a very descriptive manner.

The device's settings can be customised as per the users needs in terms of fluid discharge rate, boundary transmission, base thickening level and many more specifications can be adjusted and the model of our work can be justified to the finesse of its league.

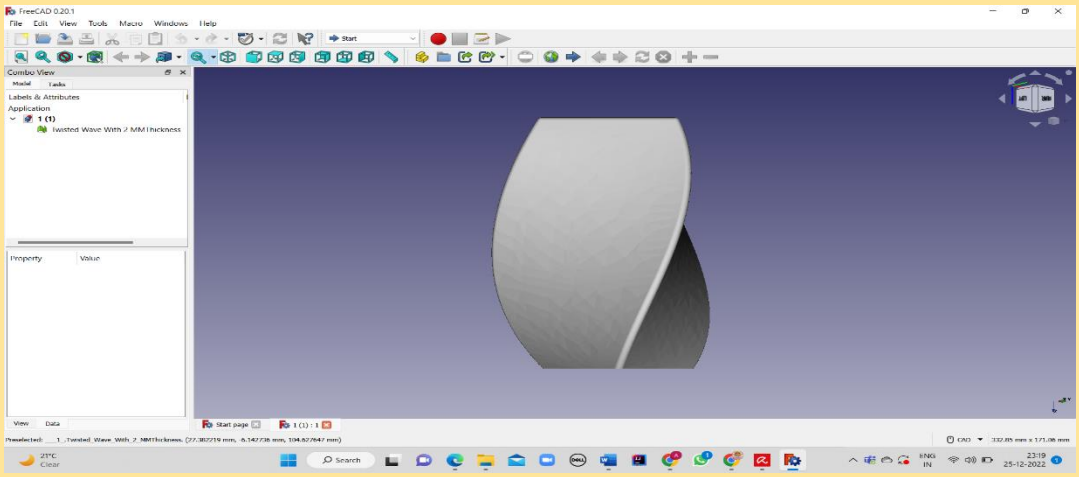
FREECAD

Creations in cad:

1. Twisted Vase: Using Loft Option

The major steps involved in making a twisted vase are:

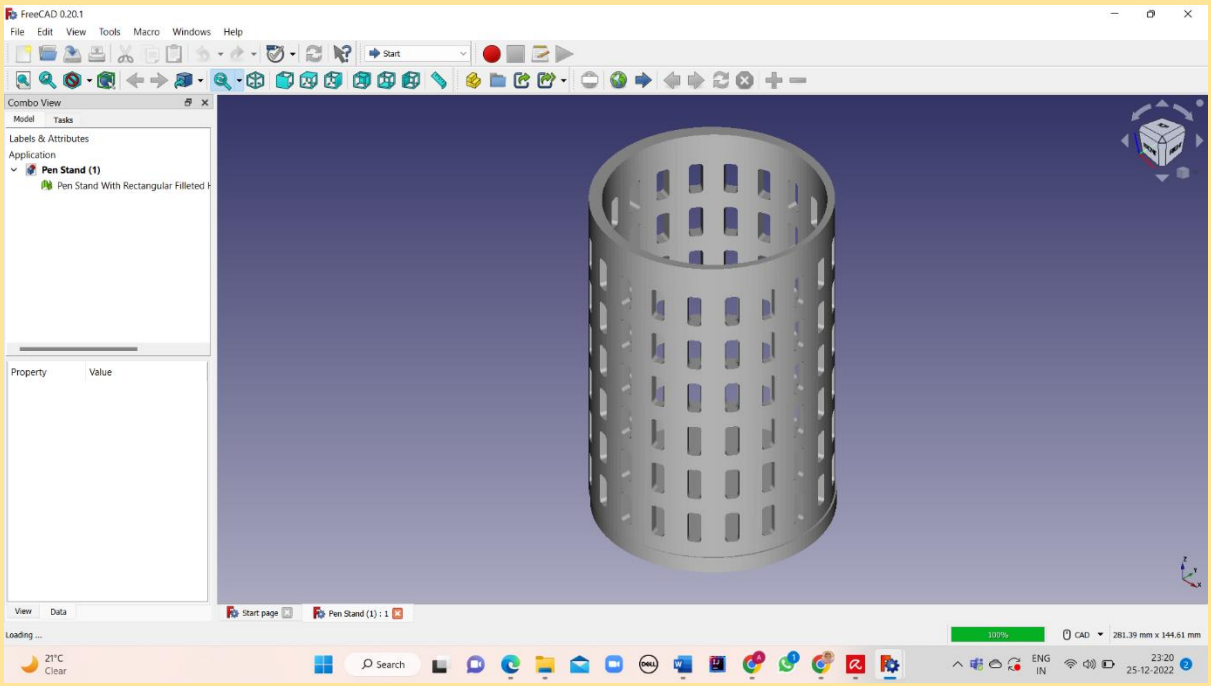
Firstly creating a new port and choosing the plane then creating some 2d sketches of triangle with some datum line. Later , creating a circumscribed circle with required radius and making the base of the triangle horizontal to the axis ,Then again creating the same thing at a height of 50 mm from the base. Now making the second triangle a bit bigger and rotating by angle of 15° using Angle constrain. Now repeating the same second process by at a height of 85mm and then repeating the first process at a height of 100mm.Now the important is that to join all the four objects with “loft” option , then assigned the thickness to the object by using the option make a tick solid.



2.Pen Stand : Using Pad and part option

The major steps involved in making a pen stand are:
Firstly making a circle with desired radius and extruding it using the “pad” option to a height of 5mm.Now make two concentric circles for thickness and pad it up to a

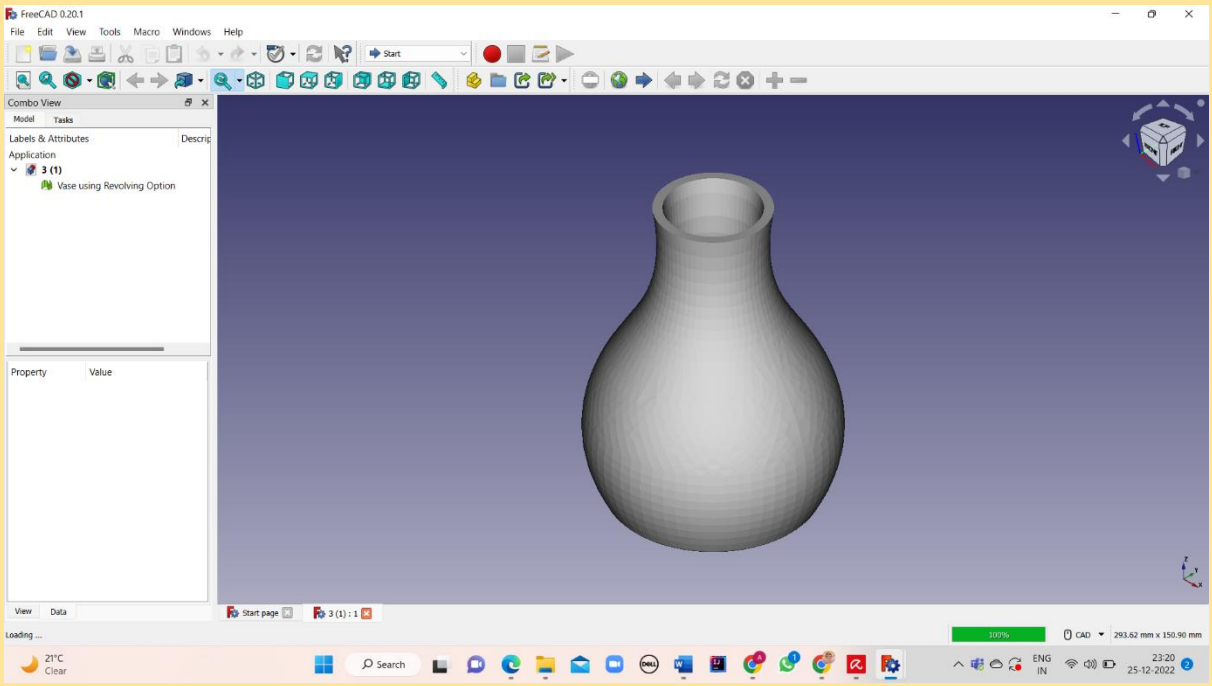
height of 100mm.Now to create cut outs in the sides create a cube with desired measurement and make the edges smooth by using the “fillet” option. Now to create more of them along the curve using the option “Polar Array”. Now repeat the same at different heights or simply use the “Ortho array”. Now select the whole object and array and use the option “Boolean operation” to make cut outs of the cude in the object.



3.Revolving Vase: Using the revolve option:

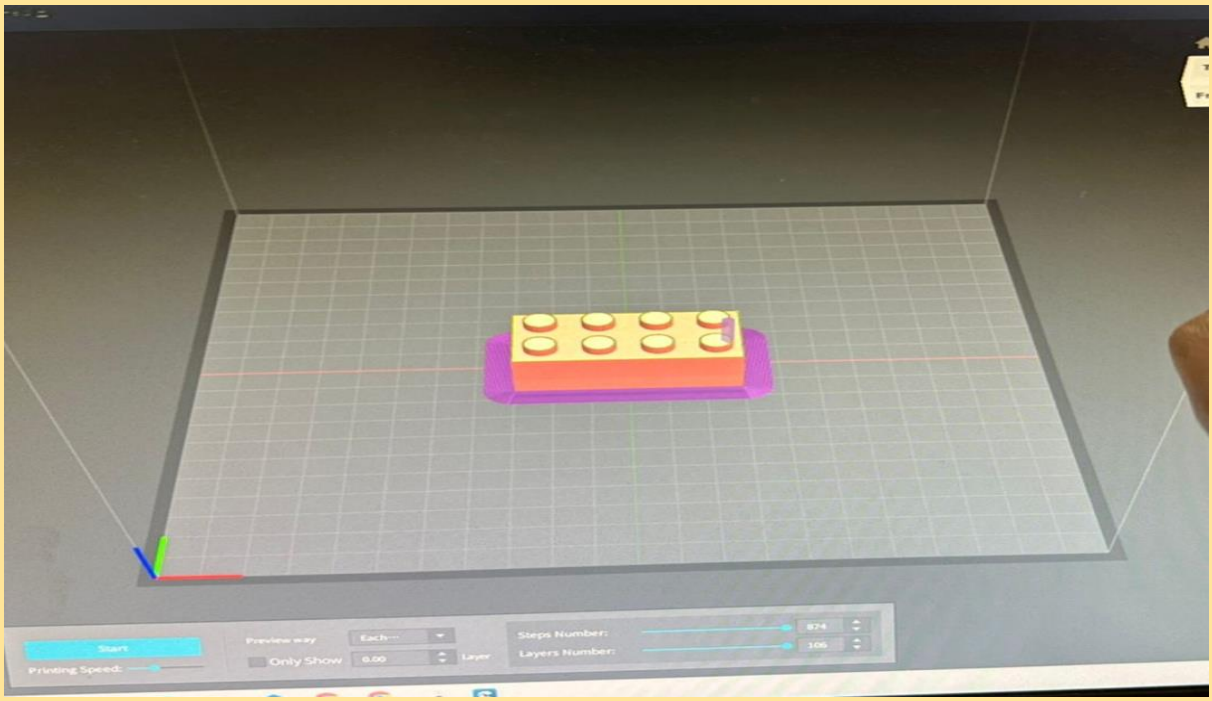
The major steps involved in making a Vase are:

Firstly create a 2d base and align it with axis then use the “B-spline curve” to create a smooth curve for the shape of the vase. Now change the radius of curvature at different areas as desired. Now select the complete sketch and use the option “Revolve selected sketch” to make it as a vase. Now add thickness to the vase by using the option make a tick solid.



4 Lego Blocked Brick: Using Cylinder option:

The main steps involved in the creation of this creations is taking the dimension of the blocks as a square + cylinder+ rectangle shape and the very cautiously take the use of tools in the software and form squared boundaries with cylinders in the centre. It gives the look of a roof chamber covering the chimney.



Important learning from CAD

1. It develops spatial reasoning and creative thinking skills

CAD serves as an aid to shape and communicate an abstract idea in your imagination, into a 3D or 2D model for others to understand. It further helps a user to make sense of the spatial aspects in terms of area, volume, and magnitude of objects around them.

2. CAD helps one to pursue passion projects.

Using FreeCad kind of direct modelling 3D apps you can design and 3D print a custom designed object in a matter of few hours.

Software Used:

The software used for 3d printing is CURA. This software helps us to set the various dimensions to the model according to our need, estimate the time and material required for printing the 3D model and also generates the G code for printing the model which is fed into the printer through an SD card at the time of printing.

Technical Specifications:

- Printing Time: 1 hrs 55 mins 49sec
- Weight of the model : 44g
- Scale:- X : 38.29 mm Y : 38.28 mm Z : 92.51 mm
- Length of filament required: 7.53m
- Color scheme: line type
- Layer height: 0.2mm
- Line width: 0.4mm
- Wall speed: 30m/s
- Support flow: 80%

- Support overhang angle: 45
- Infill speed: 60mm/sec
- Support density: 10%
- Infill sparse density: 100%
- Printing Temp: 205°C
- Build plate temp : 90°C
- Print speed: 60mm/s
- Material: PLA

SPECIFICATIONS OF 3D PRINTER:

- Technology: Fused deposition Modelling
- Print size: 250mm*305mm*400mm
- Compatible materials: PLA,PVA,ABS,HIPS,PET-G, Nylon, etc
- Material colours available: More than 30 colours
- Bed levelling: Industrial Grade fixed bed
- Print resolution : 100-300 Microns
- Hot end type: Dual extruder
- Nozzle type: Brass
- Nozzle max temp: 265 C
- Max Bed Temp: 110 C
- Working Ambient Temp: 15-40 C
- Connectivity: SD Card/ USB/Wi-Fi
- Power: Input voltage = 220V, 50H ;Input current= 10 Amp

LEARNING FROM THE MODULE:

- Developing designing skills
- Understanding the working of 3D printers
- Learning various approaches to creating the same design
- Helped learn how to work with software like Free CAD and CURA

REFERENCES:

- IIT Kharagpur Diy Laboratory (Youtube Channel)
- www.Sharptoughened.com
- Book on Cad and 3D printing

Declaration

I confirm that all content in this report is on my own and not copied from any friend/classmate or online course.

Signature- _____

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