



Project code:
2019-1-EL01-KA201-062914

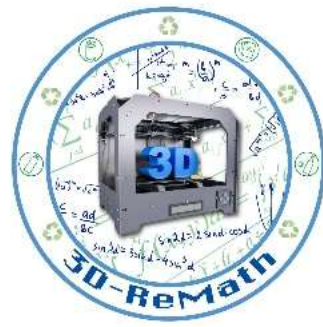
Erasmus+ Call: 2019 - KA2 -



3D printing technology aims students understanding maths and recycling procedure

*Curricula 3: Open Source S/W for Digital Files
"Introduction to Slicing Software"*

Output 3 (O3) - 3D Printing and Maths



Overview (1/2)

In this lesson we learn what slicer software does and why it is necessary in order to 3D print a file. We also learn the process of generating G-Code from .STL files and what G-Code is.



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Overview (2/2)

- 3D Slicing Software
- 3D Models Format
- Generating g-code



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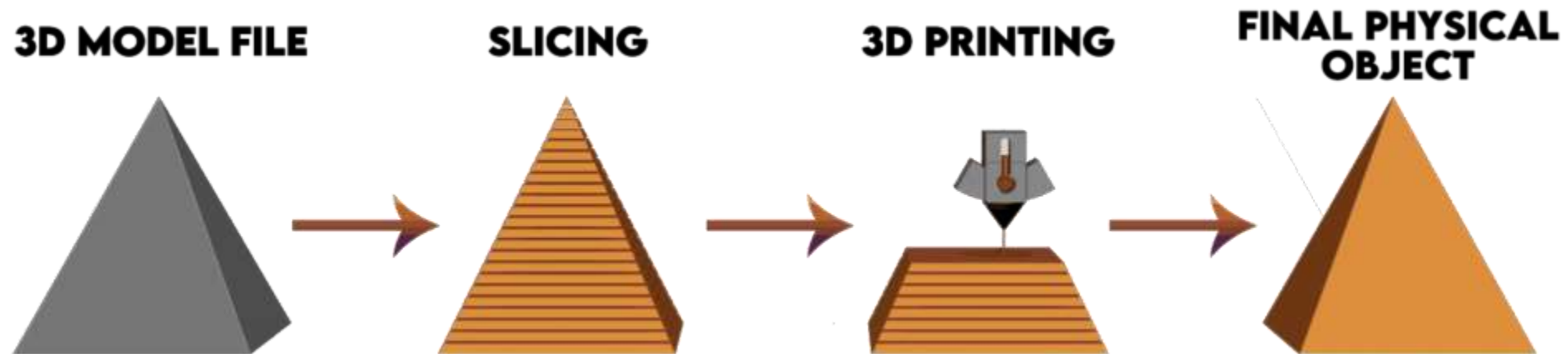
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3D Slicing Software

- The slicer, also called slicing software, is computer software used in the majority of 3D printing processes for the conversion of a 3D object model to specific instructions for the printer.



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Introduction to Slicing



Stereolithography (.STL) file G-code Print

these layers into paths which are saved as g-code your printer interprets

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The diagram illustrates the 3D printing process in three stages. On the left, a solid purple hippo model is shown under the heading 'Stereolithography (.STL) file'. In the middle, the same hippo is shown as a series of horizontal purple lines, representing the slicing process, under the heading 'G-code'. On the right, a 3D printer nozzle is shown printing the hippo layer by layer, under the heading 'Print'. A text box at the bottom of the middle stage reads: 'these layers into paths which are saved as g-code your printer interprets'. Below the diagram is a video player interface with a progress bar and control icons.



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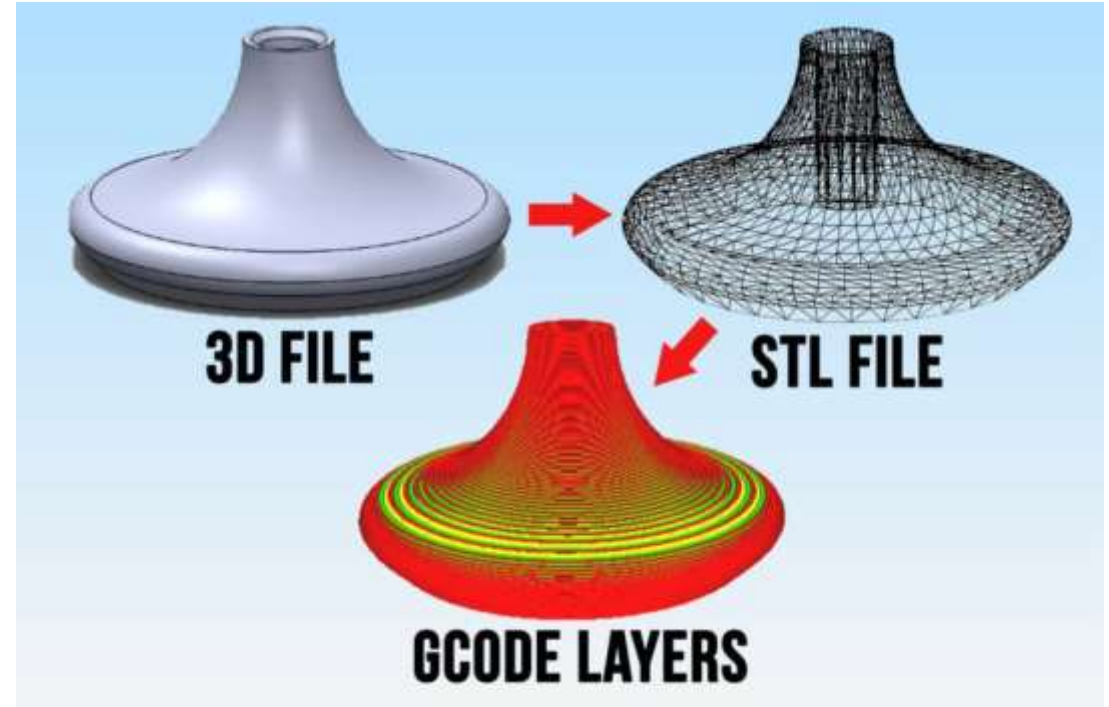
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3D Models Format

- In particular, the conversion from a model in STL format to printer commands in g-code format in fused filament fabrication and other similar processes.



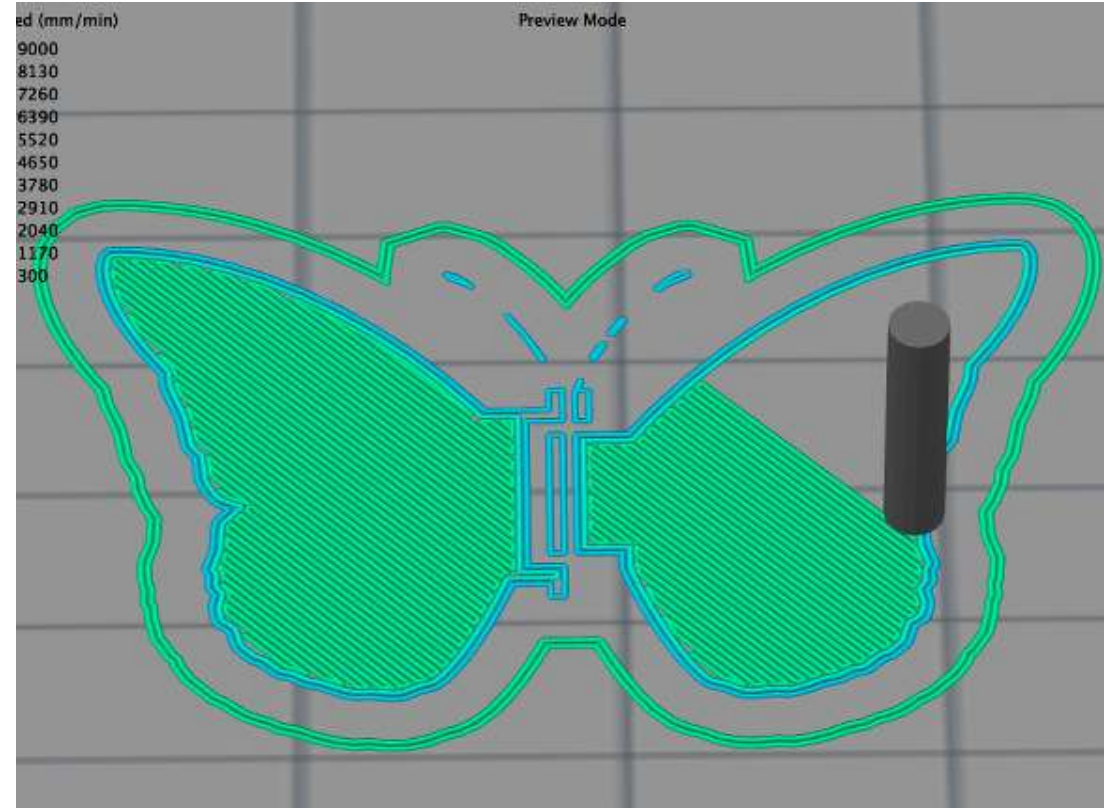
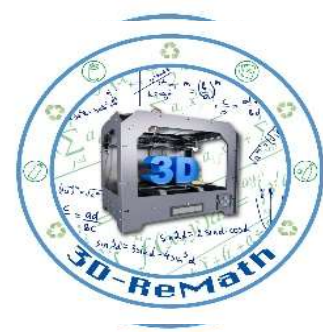
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3D Slicing Process

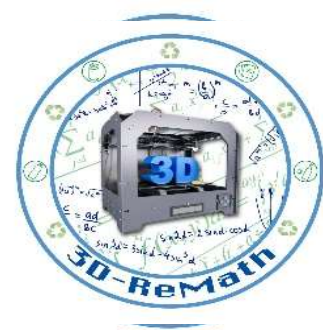
- The slicer first divides the object as a stack of flat layers, followed by describing these layers as linear movements of the 3D printer extruder, fixation laser or equivalent.



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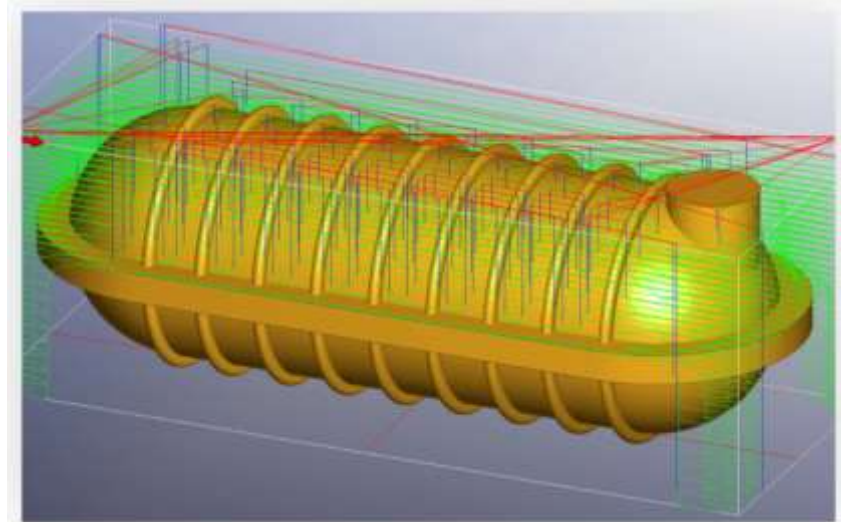
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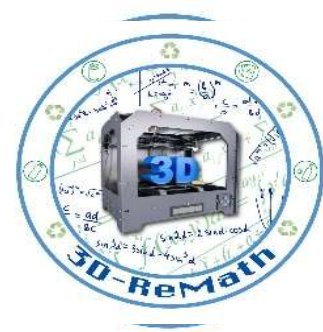




Generating G-Code (1/2)

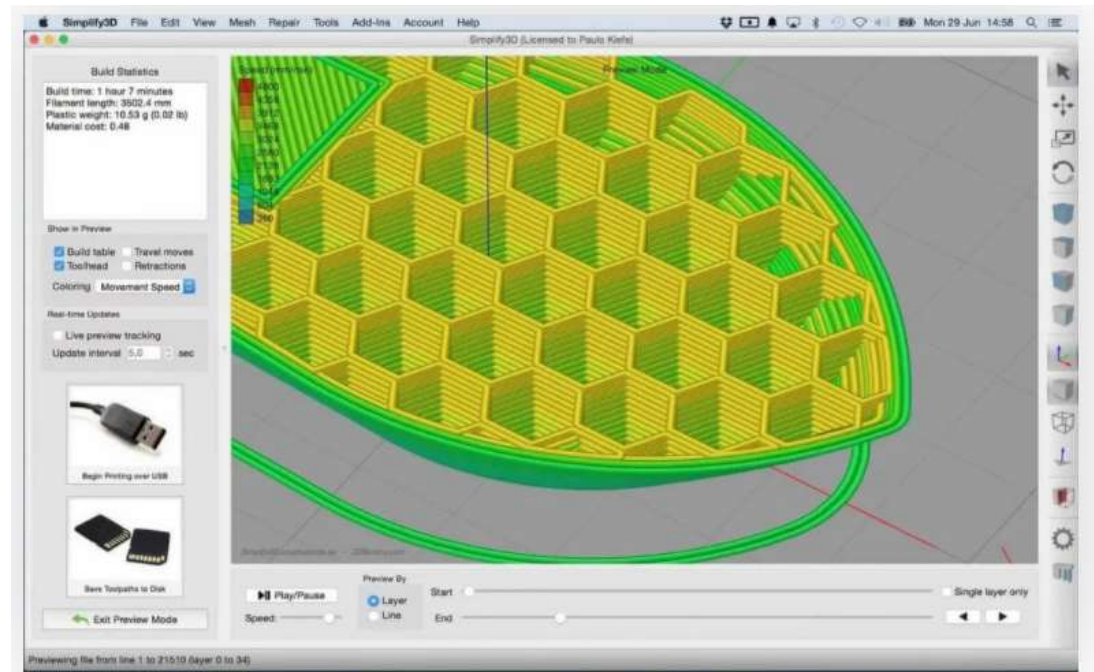
- All these movements, together with some specific printer commands like the ones to control the extruder temperature or bed temperature, are finally written in the g-code file, that can afterwards be transferred to the printer.





Generating G-Code (2/2)

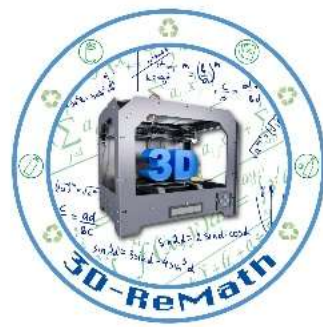
- 3D printing creates smooth, attractive parts because it uses a small nozzle to extrude thin layers of plastic. Even a small printed part can have hundreds of layers, each with hundreds of small motions, meaning tens of thousands of lines of G-code.



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The cycle for generating G-code

- The basic cycle for generating 3D printing G-code is as follows:
- Identify the outlines, both exterior and interior, in order to determine what's “inside” and “outside” the layer.
- Determine how infill will be laid within the interior of the layer.
- Create an optimized traversal of the layer's extrusion for outlines and infill.
- Set the speed, extrusion, temperatures, and fan speed.
- Create G and M codes for the start and end.
- Convert the full traversal path into GXX movements, adding extrusion E and feed rate F.

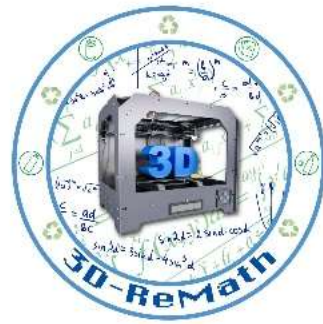


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Examples of 3D Slicing Software



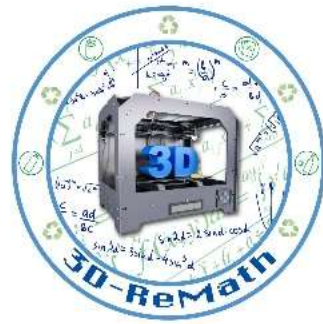
- Ultimaker Cura
- SuperSlicer
- PrusaSlicer
- Slic3r
- Eiger
- Simplify3D



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3D Printing Basics: The Slicer!

PrusaSlicer-2.2.0 based on Slic3r

File Edit Window View Configuration Help

Plater Print Settings Filament Settings Printer Settings

Print settings : **Simple** Advanced Expert

Print settings : 0.15mm QUALITY

Filament : Prusament PLA

Printer : Original Prusa MINI

Supports : None

Infill : 15% Brim :

Object manipulation

Name: **treefrog_45_cut.stl**

	X	Y	Z	
Position:	91.4	95.49	12.49	mm
Rotate:	0	0	0	°
Scale factors:	100	100	100	%
Size:	50.72	46.97	25	mm

it's giving you. Really quick, really effective.
The other one is the "slice Z" tool that,

Generating G-code...

1:53 / 14:40 · Plater >

Export G-code Cancel



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Thank you!!

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