Co-funded by the Erasmus+ Programme of the European Union

INNO3D+

GA number : 2019-1-IE02-KA203-000693

3D Printing Support Service for Innovative Citizens

INNO3D+ Module 5.

TRAINING DOCUMENTS (PBL)

UPV Team:
Ph.D. Santiago Ferrándiz Bou
Ph.D. Octavio Fenollar Gimeno
Ph.D. Juan López Martínez
Ph.D. M. Dolores Samper Madrigal

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

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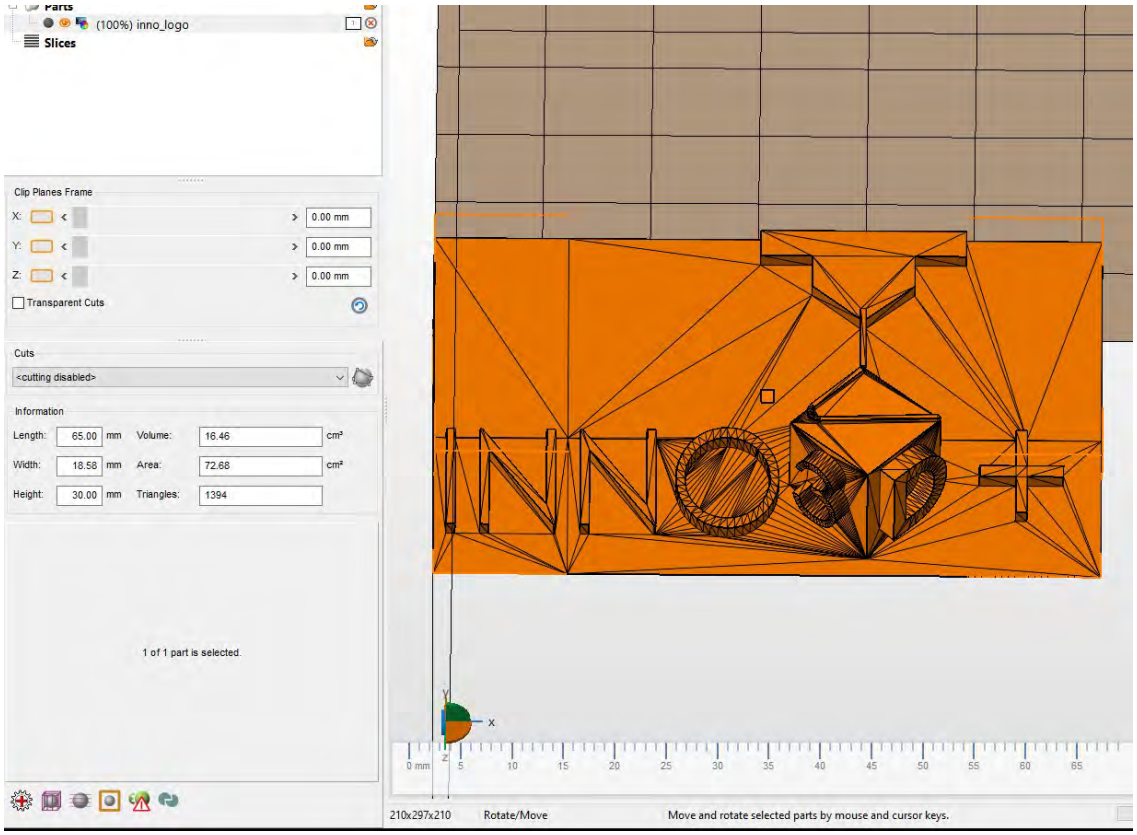
Objectives:

Explain how to select 3D printing materials and how it works on PrusaSlicer interface. Clarify how to select Part accuracy and how to use slicing software (PrusaSlicer). Describe how programming printing parameters.

Problem definition:

Some people ask us about the following 3D print part. No material specification found. In addition, no quality request. They also print faster.

Part dimension information



X= 65,00 mm; y= 18,50 mm: z = 30,00 mm

Download file at: http://personales.upv.es/sferrand/inno_logo.stl

Questions to be solved:

1.- How do you to orient the part?

2.- How many time we use for printing part?

3.- What is the material cost?

4.- What material to select?

References:

https://manual.prusa3d.com/c/English_manuals

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

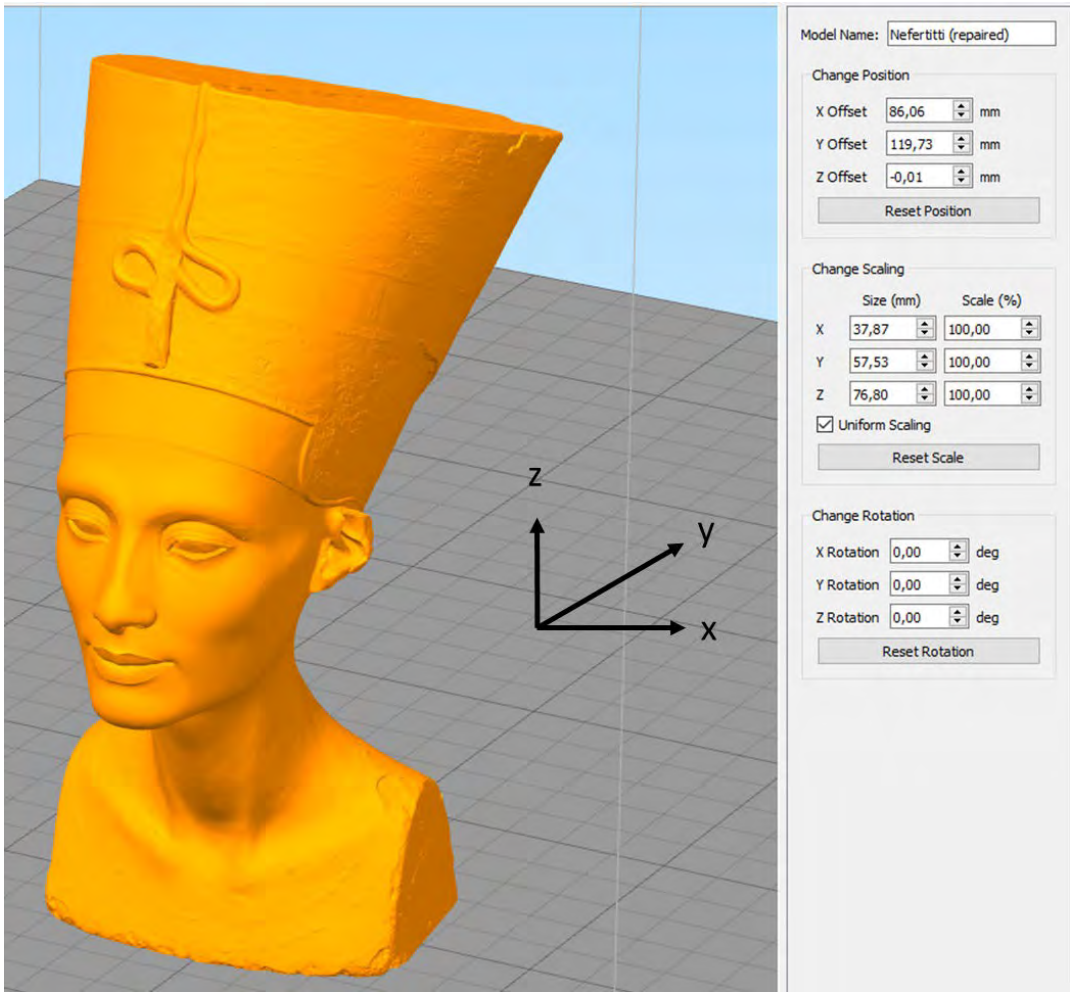
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale the part. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move the part.

Problem definition:

Some people ask us about the following 3D print part. Material specification will be PLA. In addition, quality request 0.15 mm.

Part dimension



X=37,87 mm; y= 57,53 mm: z = 76,80 mm

Download file at: http://personales.upv.es/sferrand/Nefertitti.stl

Questions to be solved:

1.- How do you to orient the part?

2.- It's necessary use supports?. Study different part to orientations

3.- What is the printing time?

4.- How decrease the printing time to 2,5 hours?

5.- How do you generate g-code?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:1376105

https://www.prusaprinters.org/prints/3112#_ga=2.50931626.2065968544.1609843932-42545626.1609843932

Group members:

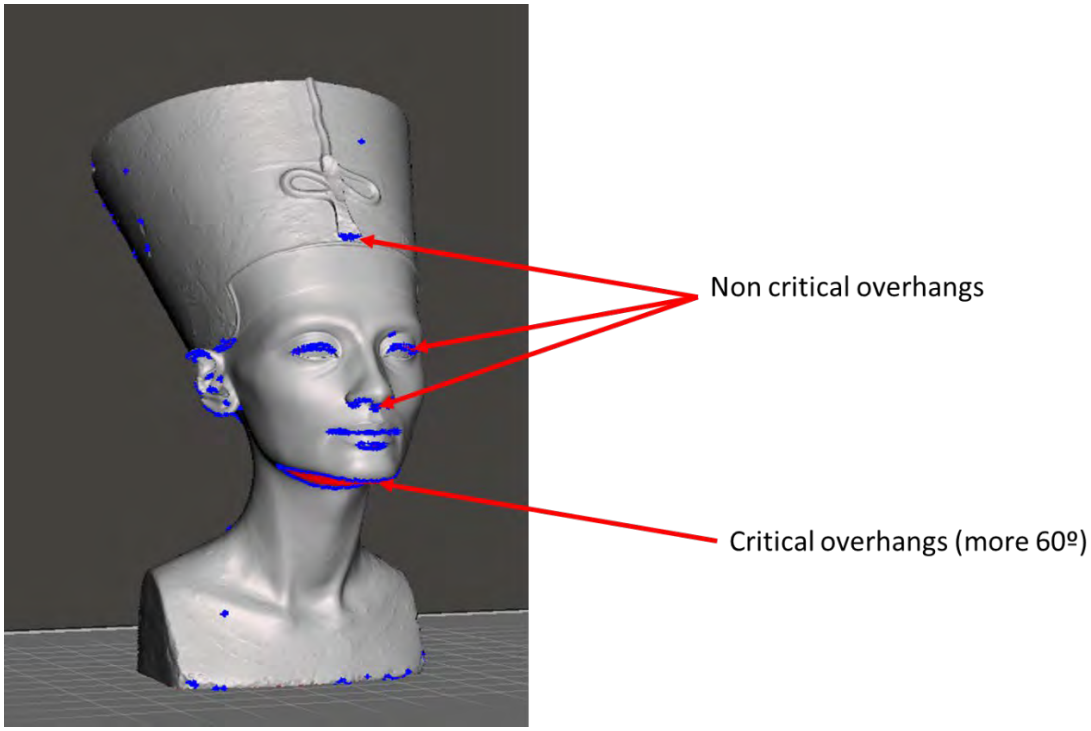
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

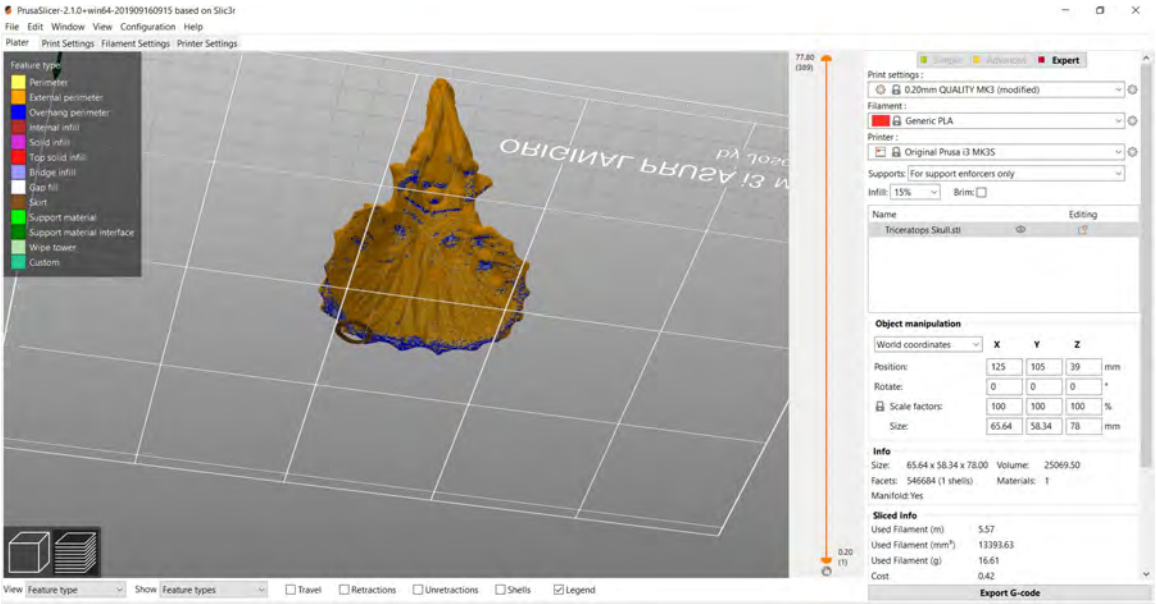
Objectives:

- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

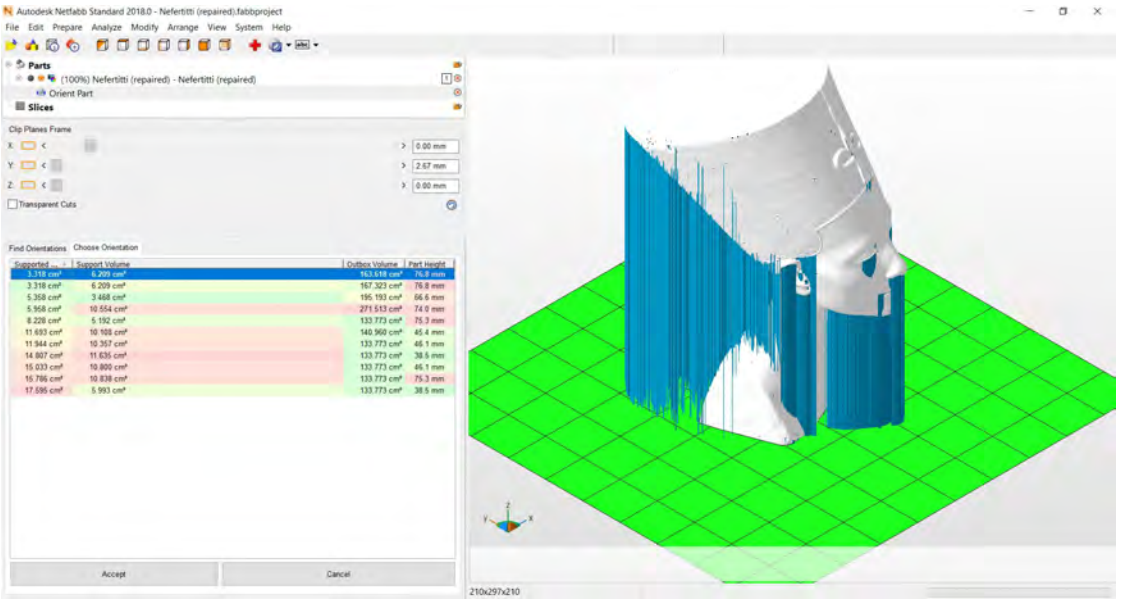
TO ORIENTATION DETERMINATION:

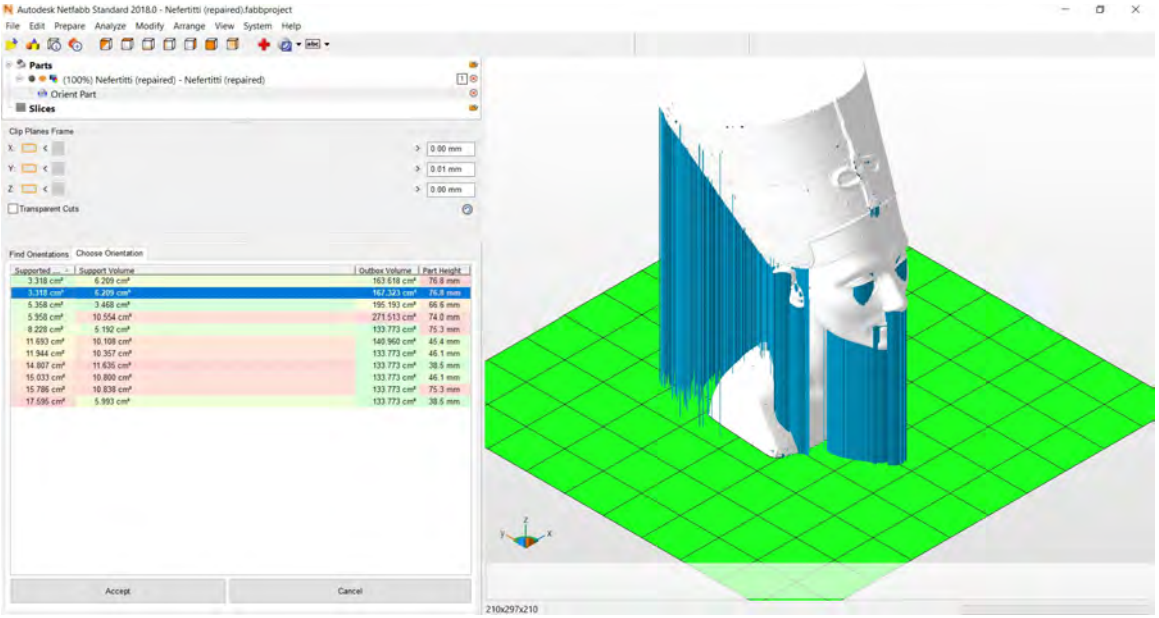
Detect how to orient part. Study of overhangs situations. Critical detection

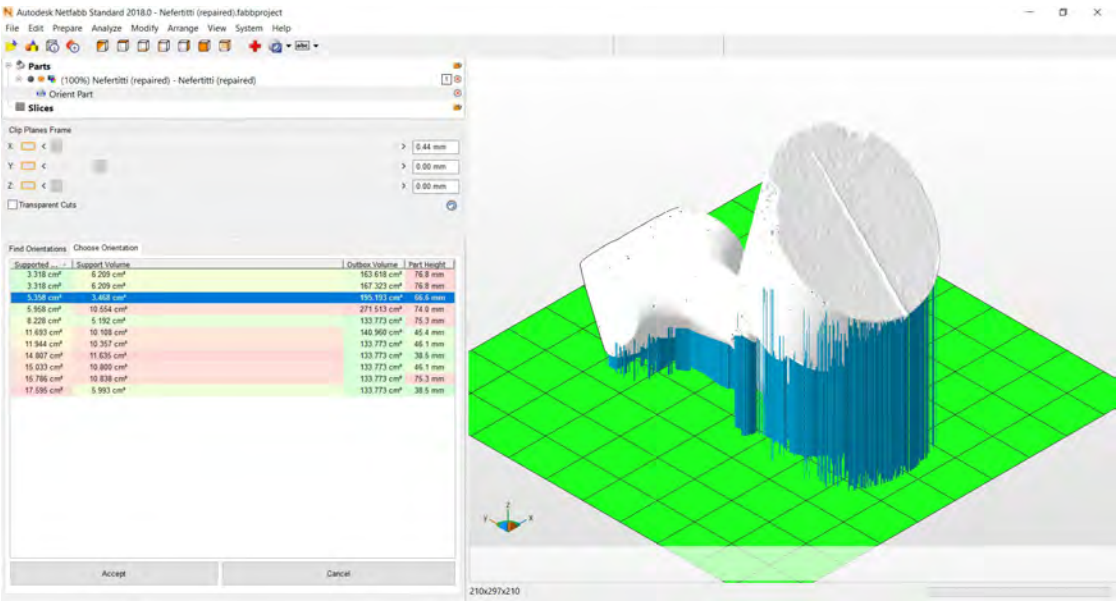


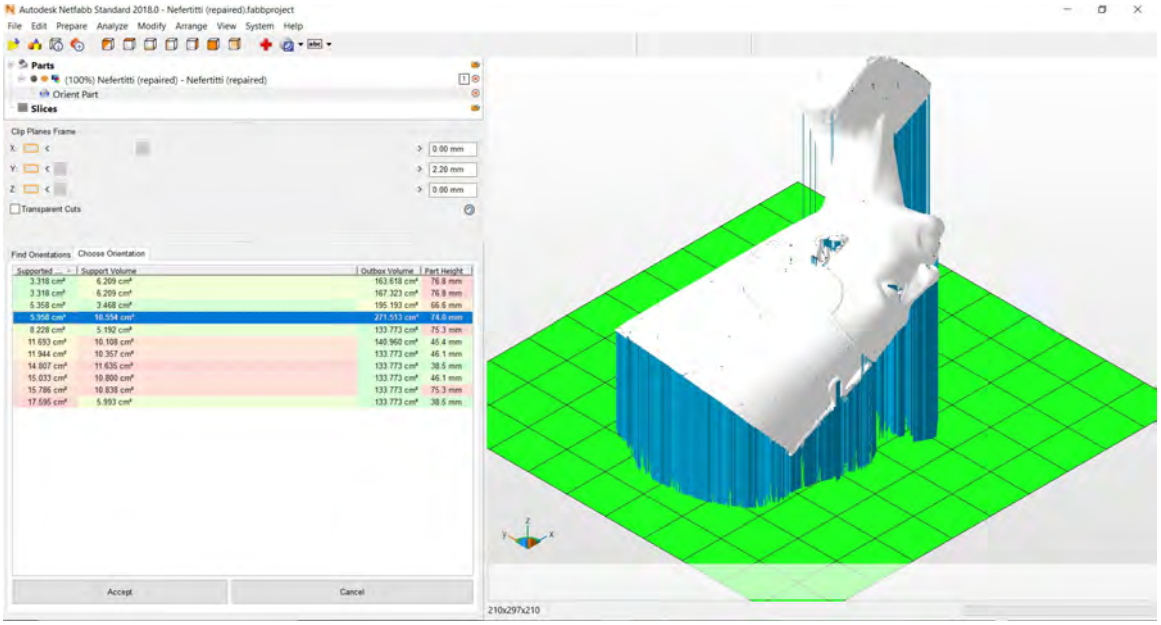


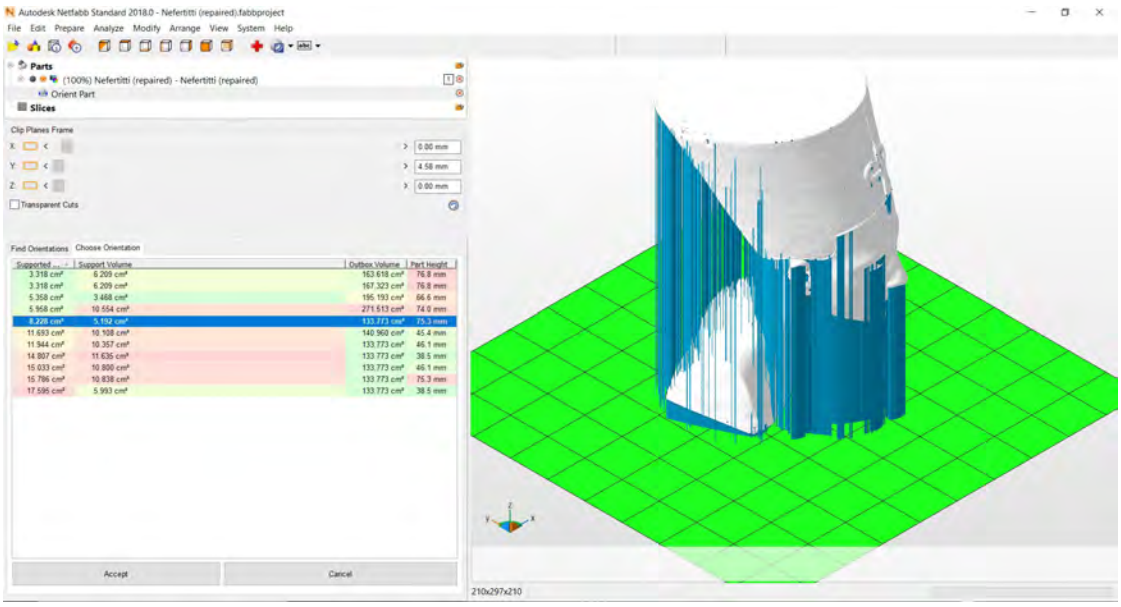
Possibilities (to orientation study)

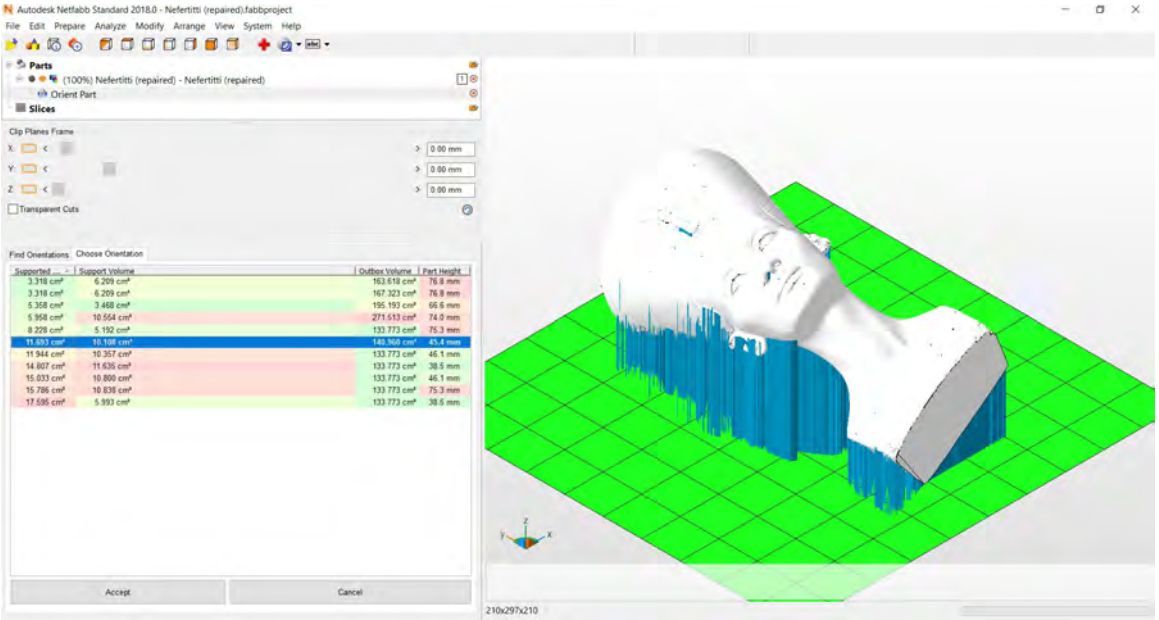


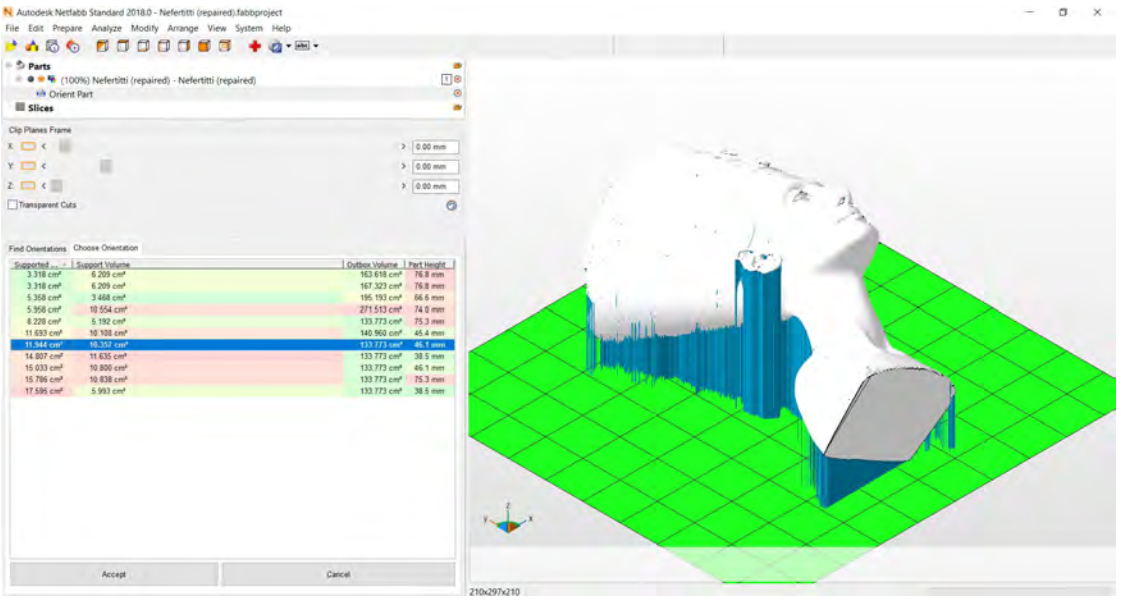

Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Supported ... Support Volume Outbox Volume Part Height
3.318 cm³ 6.209 cm³ 163.618 cm³ 76.8 mm
3.318 cm³ 6.209 cm³ 167.323 cm³ 76.8 mm
5.358 cm³ 3.468 cm³ 195.193 cm³ 66.6 mm
5.958 cm³ 10.554 cm³ 271.513 cm³ 74.0 mm
6.228 cm³ 5.192 cm³ 133.773 cm³ 75.3 mm
11.693 cm³ 10.108 cm³ 140.960 cm³ 45.4 mm
11.944 cm³ 10.357 cm³ 133.773 cm³ 46.1 mm
14.807 cm³ 11.635 cm³ 133.773 cm³ 38.5 mm
15.033 cm³ 10.800 cm³ 133.773 cm³ 46.1 mm
15.786 cm³ 10.838 cm³ 133.773 cm³ 75.3 mm
17.595 cm³ 5.993 cm³ 133.773 cm³ 38.5 mm
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Supported ... Support Volume Outbox Volume Part Height
3.318 cm³ 6.209 cm³ 163.618 cm³ 76.8 mm
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11.944 cm³ 10.357 cm³ 133.773 cm³ 46.1 mm
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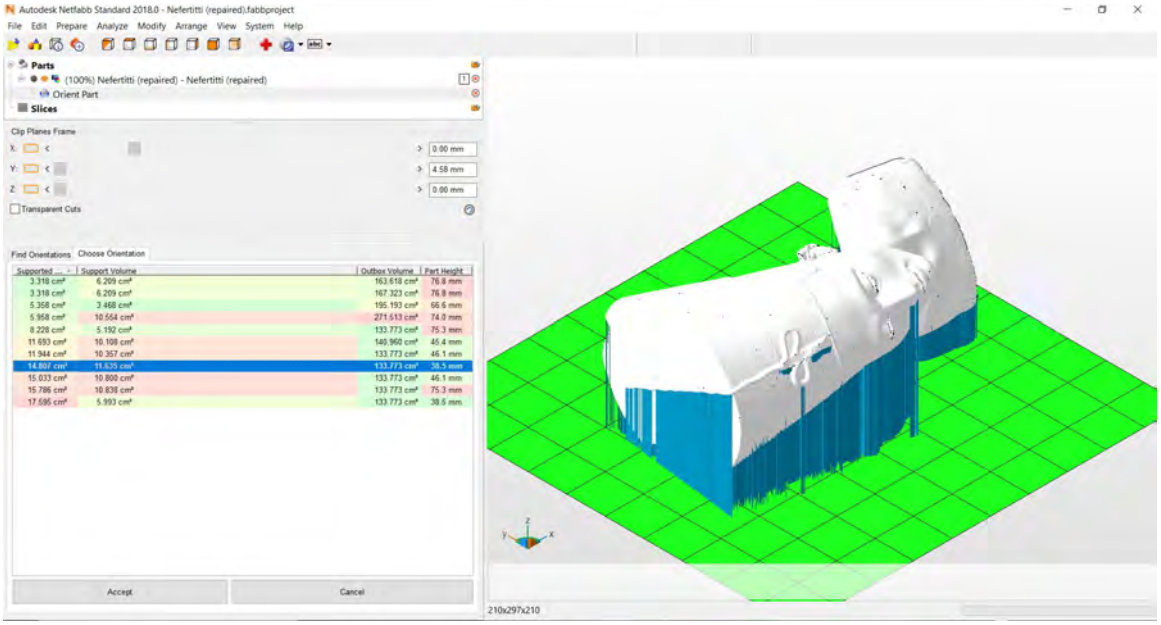
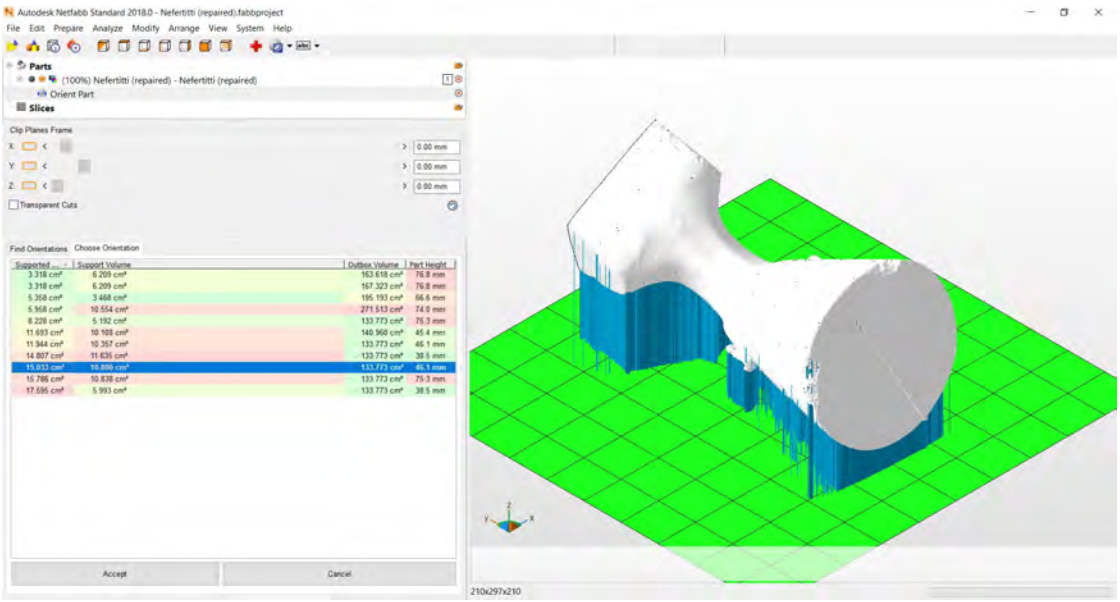
15.786 cm³ 10.838 cm³ 133.773 cm³ 75.3 mm
17.595 cm³ 5.993 cm³ 133.773 cm³ 38.5 mm
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Supported
Support Volume
Outbox Volume
Part Height
Accept
Cancel
210x297x210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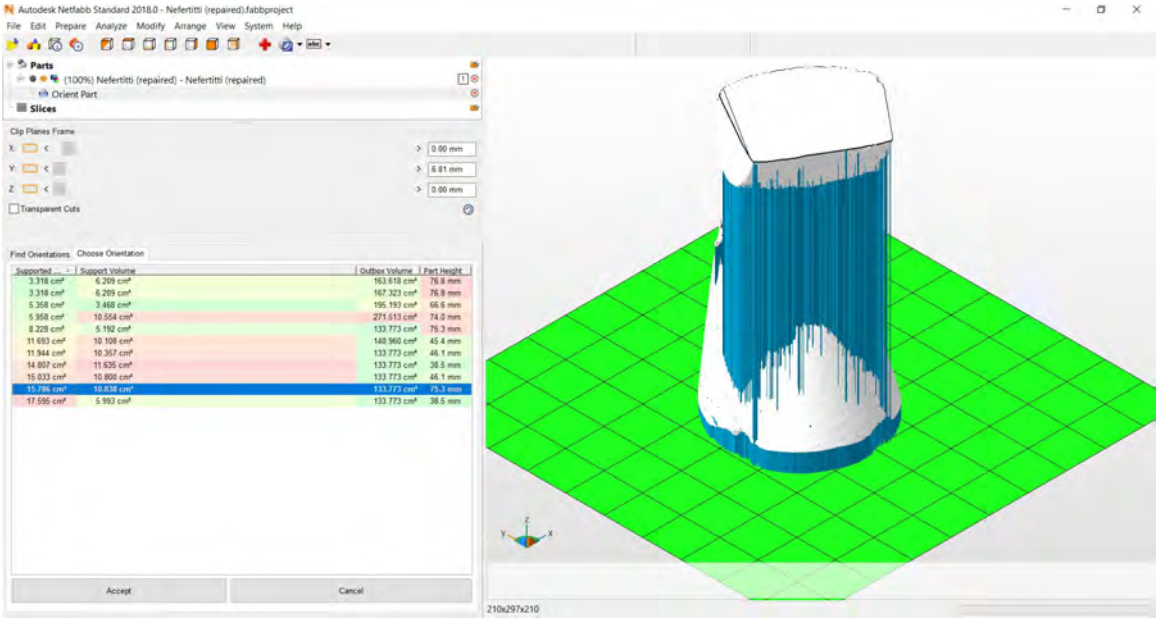
File Edit Prepare Analyze Modify Arrange View System Help
Parts
(100%) Nefertitti (repaired) - Nefertitti (repaired)
Orient Part
Slices
Clip Planes Frame
Transparent Cuts
Find Orientations
Choose Orientation
Supported
Support Volume
Outbox Volume
Part Height
Accept
Cancel
210x297x210


Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
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(100%) Nefertitti (repaired) - Nefertitti (repaired)
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Transparent Cuts
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Choose Orientation
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Cancel
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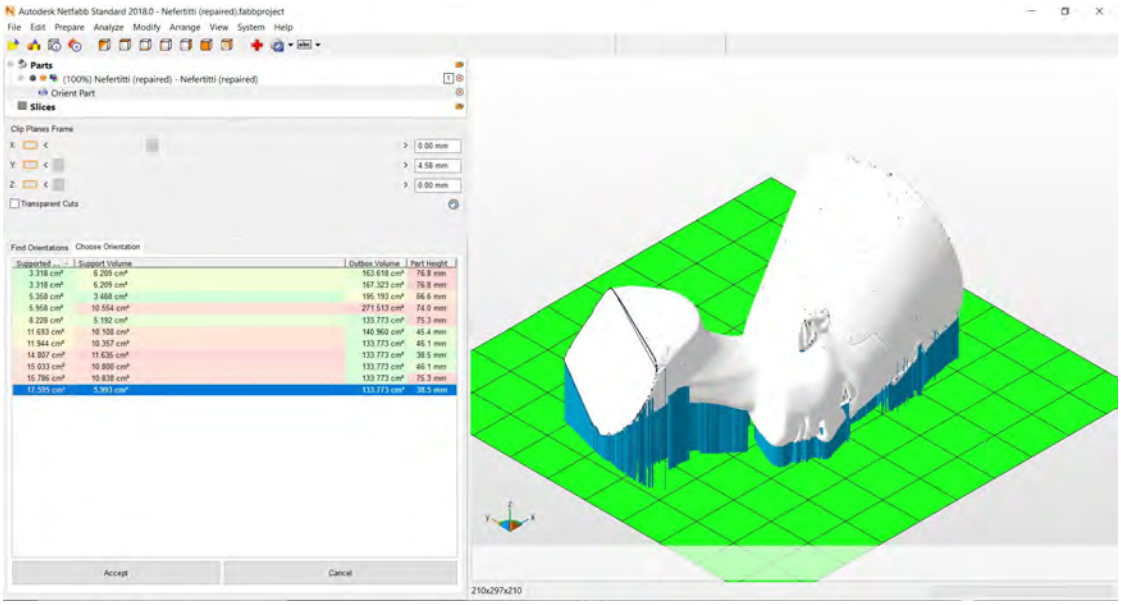
Autodesk Netfabb Standard 2018.0 - Nefertitti (repaired).fabbproject
File Edit Prepare Analyze Modify Arrange View System Help
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Clip Planes Frame
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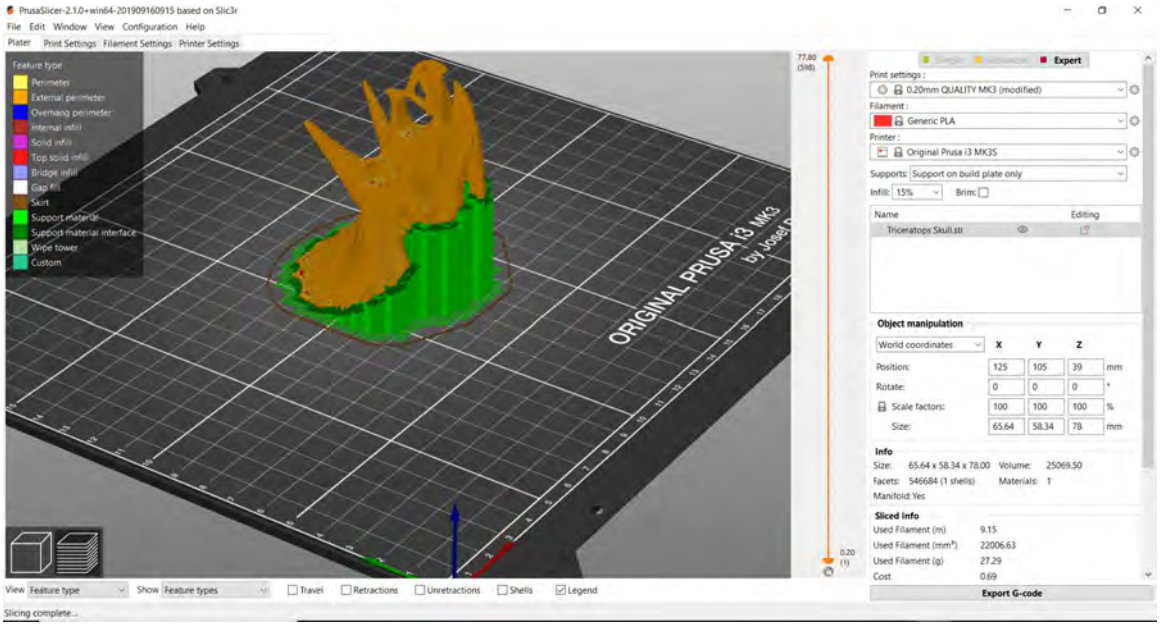
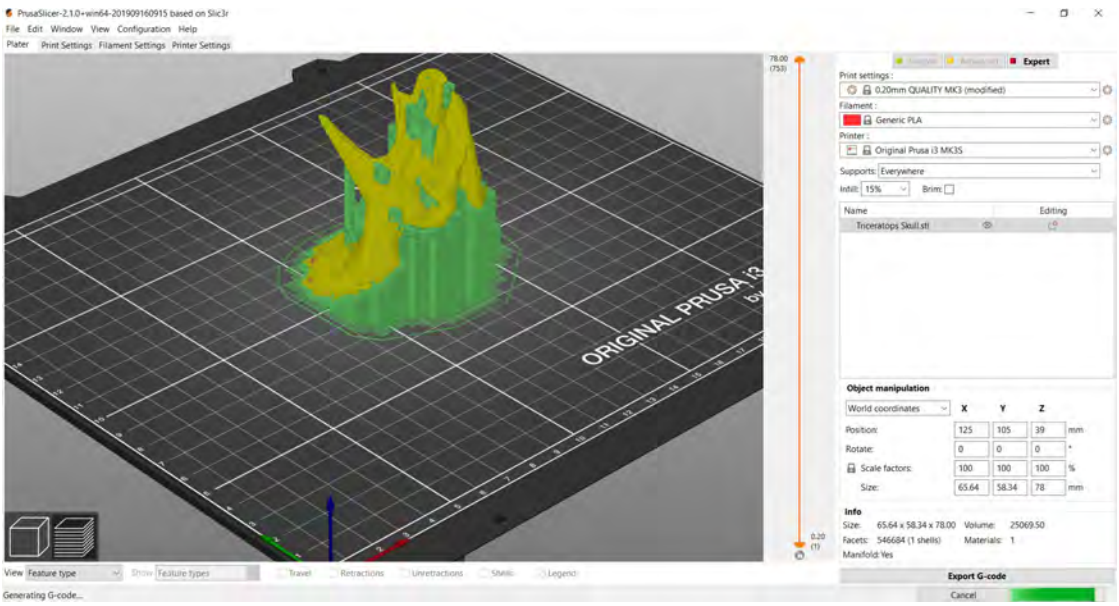
Find Orientations
Choose Orientation
Accept
Cancel
210x297x210


PrusaSlicer-2.1.0+win64-201909160915 based on Slic3r
File Edit Window View Configuration Help
Plater Print Settings Filament Settings Printer Settings
Feature type
Perimeter
External perimeter
Overhang perimeter
Internal infill
Solid infill
Top solid infill
Bridge infill
Gap fill
Skirt
Support material
Support material interface
Wipe tower
Custom
ORIGINAL PRUSA i3 MK3
Expert
Print settings :
0.20mm QUALITY MK3 (modified)
Filament :
Generic PLA
Printer :
Original Prusa i3 MK3S
Supports: Support on build plate only
Infill: 15%
Brim:
Name
Editing
Triceratops Skull.stl
Object manipulation
World coordinates
X Y Z
Position: 125 105 39 mm
Rotate: 0 0 0 °
Scale factors: 100 100 100 %
Size: 65.64 58.34 78 mm
Info
Size: 65.64 x 58.34 x 78.00 Volume: 25069.50
Facets: 546684 (1 shells) Materials: 1
Manifold: Yes
Sliced Info
Used Filament (m) 9.15
Used Filament (mm³) 22006.63
Used Filament (g) 27.29
Cost 0.69
Export G-code
View Feature type
Show Feature types
Travel
Retractions
Unretractions
Shells
Legend
Slicing complete...


PrusaSlicer-2.1.0+win64-201909160915 based on Slic3r
File Edit Window View Configuration Help
Plater Print Settings Filament Settings Printer Settings
ORIGINAL PRUSA i3
Expert
Print settings :
0.20mm QUALITY MK3 (modified)
Filament :
Generic PLA
Printer :
Original Prusa i3 MK3S
Supports: Everywhere
Infill: 15%
Brim:
Name
Editing
Triceratops Skull.stl
Object manipulation
World coordinates
X Y Z
Position: 125 105 39 mm
Rotate: 0 0 0 °
Scale factors: 100 100 100 %
Size: 65.64 58.34 78 mm
Info
Size: 65.64 x 58.34 x 78.00 Volume: 25069.50
Facets: 546684 (1 shells) Materials: 1
Manifold: Yes
Export G-code
Cancel
View Feature type
Show Feature types
Travel
Retractions
Unretractions
Shells
Legend
Generating G-code...

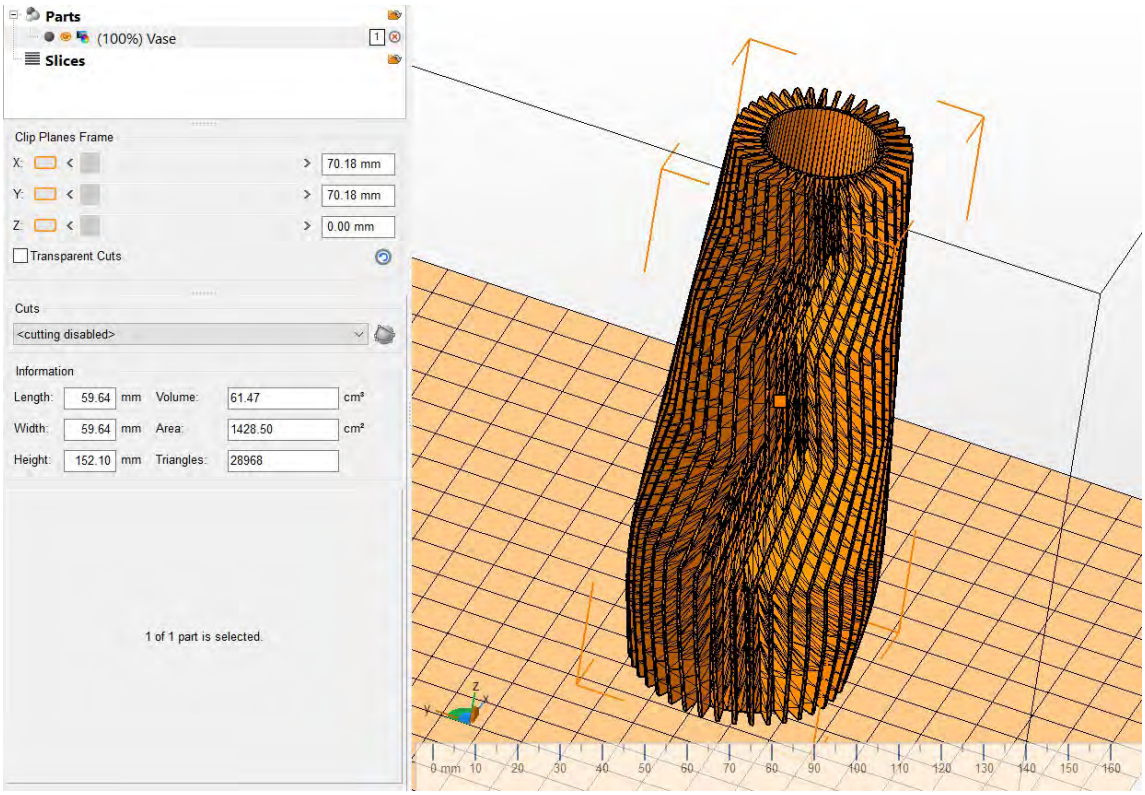
Objectives:

Explain how to orient the part. Clarify if necessary to scale the part. Describe how to select Part accuracy and how use slicing software (PrusaSlicer) to scale, move the part to the center bed.

Problem definition:

Some people ask us about the following 3D print part. Material specification will be timberfill, colour brown. In addition, quality request 0.05 mm. Estimate printing time part. Estimated the cost of the building part.

Part dimension



X=70 mm; y= 70 mm: z = 70 mm

Download file at: http://personales.upv.es/sferrand/Vase.stl

Questions to be solved:

1.- It's possible to duplicate the part?

2.- What is the time to print?

3.- How do you generate g-code?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:481268

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

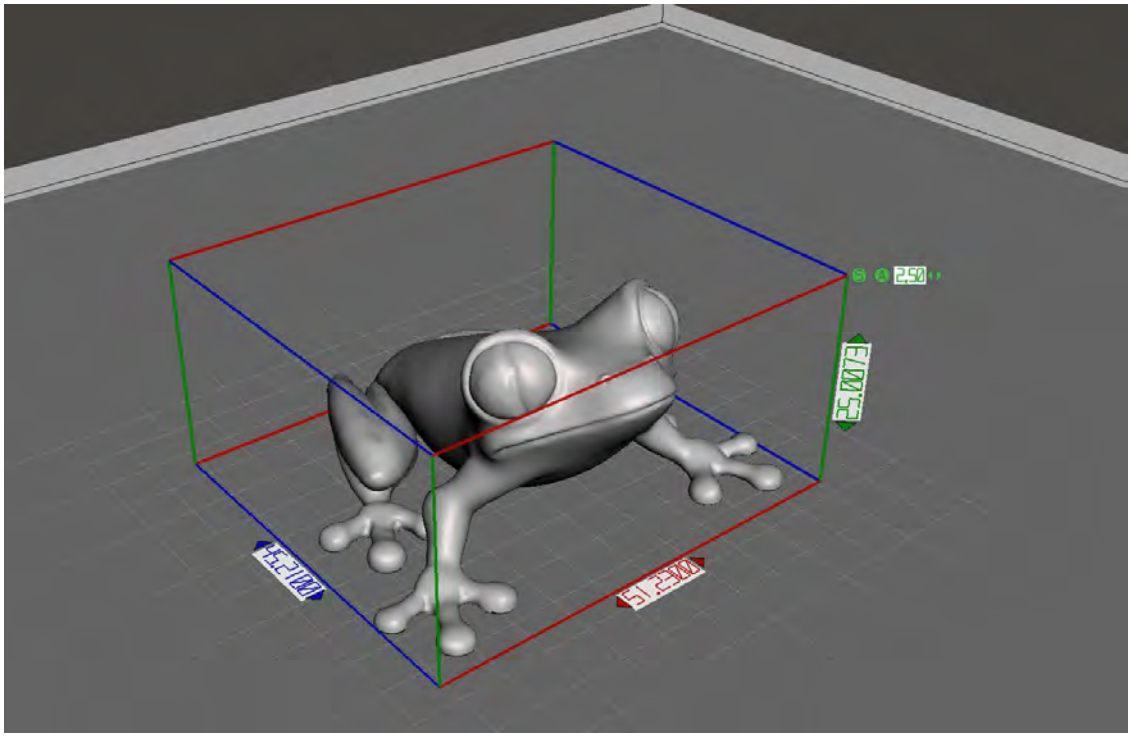
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to copy the part. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) repeat the part.

Problem definition:

Some people ask us about the following 3D print maximum bed copies parts. Material specification will be ABS, colour green. In addition, quality request 0.20 mm draft.

Part dimension



X=51 mm; y= 45 mm: z = 25 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Treefrog.zip

Questions to be solved:

1.- How many parts will be printed?

2.- What is the time to print and material used?

3.- The part need supports?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:18479

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

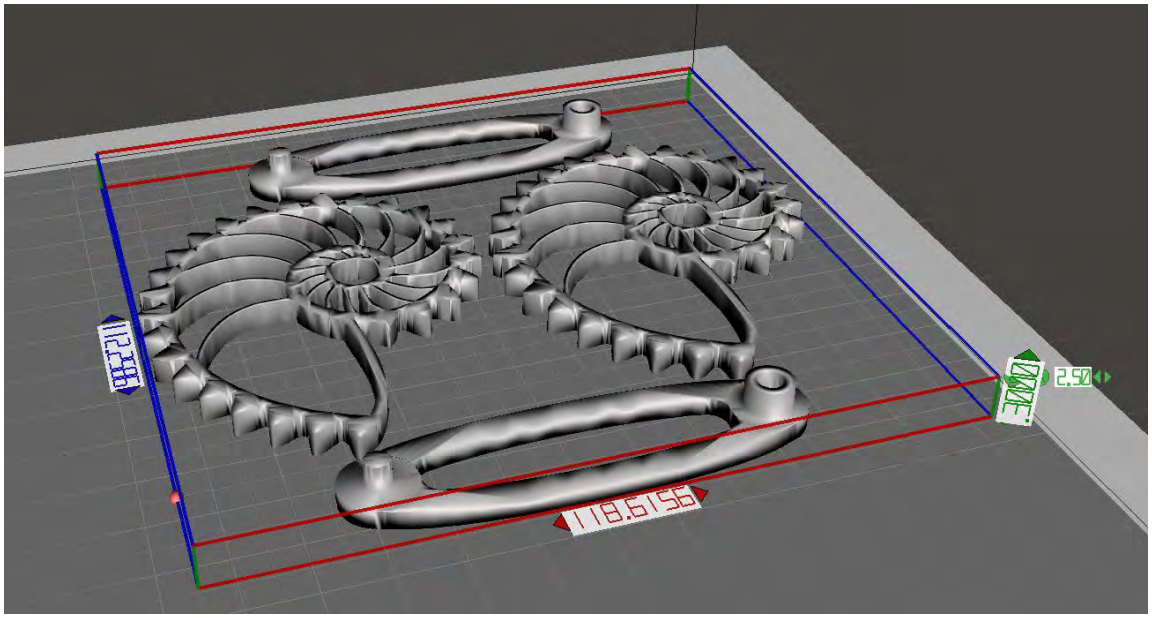
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour red. In addition, quality (HQ) request 0.10 mm. Tolerances to assembly will be needed.

Part dimension



X=118 mm; y= 112 mm: z = 2,5 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Spinner.zip

Questions to be solved:

1.- How do you to orient the parts?

2.- What is the printing time?

3.- How do you generate g-code?

4.- Do you need generate supports?

5.- Do you need tolerances to assemble it?

References:

https://manual.prusa3d.com/c/English_manuals

https://formlabs.com/blog/3D-printing-tolerances-for-engineering-fit/

https://www.fictiv.com/hwg/design/how-to-conduct-a-tolerance-analysis-for-3d-printed-parts

https://www.thingiverse.com/thing:2284711

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

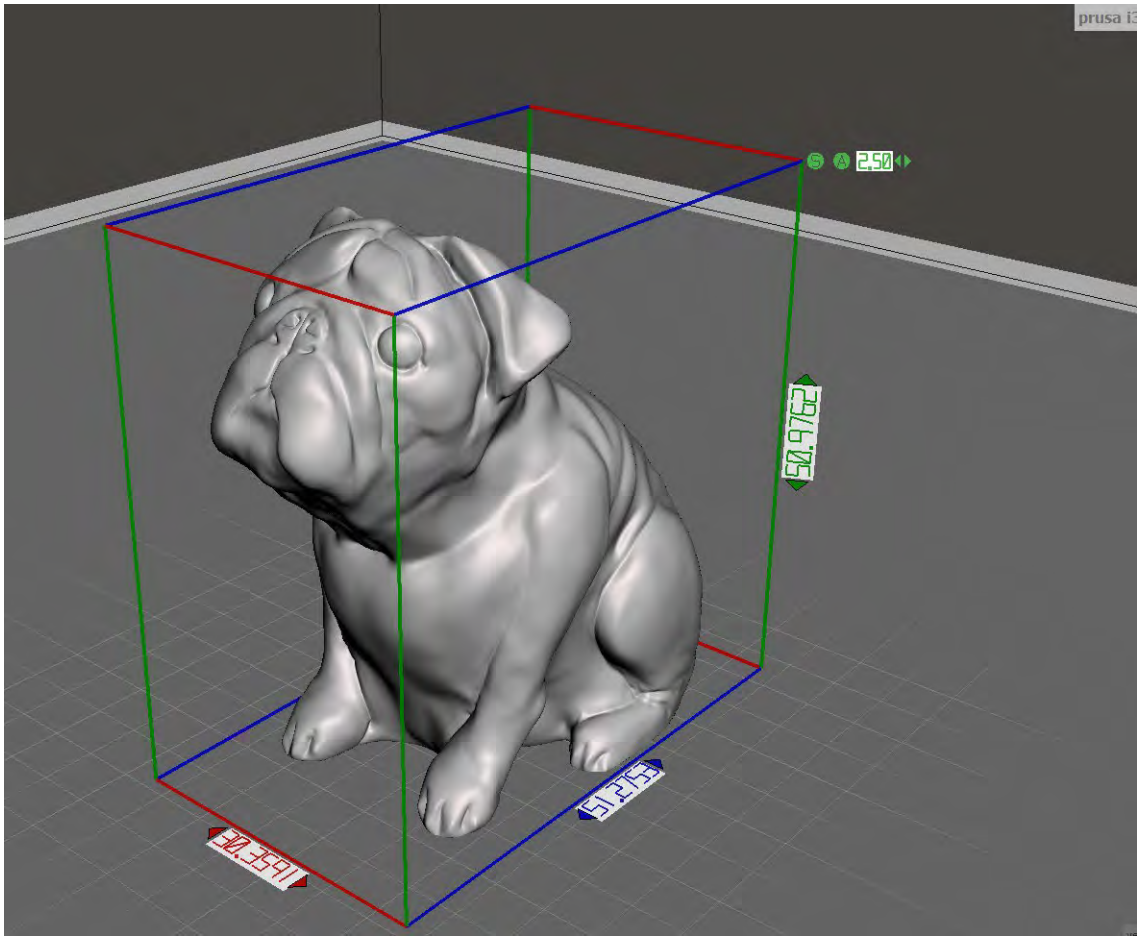
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to copy the part and clarify how to specify the number of instances and how to use slicing to create lamination.

Problem definition:

Some people ask us about to print 4 part copies. Material specification will be PET. In addition, quality speed request will be 0.15 mm. Infill pattern: grid; infill density: 20%. Study if you must print the parts with or without supports.

Part dimension



X=30 mm; y= 51 mm: z = 51 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Buddy.zip

Questions to be solved:

1.- How do you create the 4 part instances?

2.- Do you use pocket menu?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.prusaprinters.org/prints/62#_ga=2.49474341.2065968544.1609843932-42545626.1609843932

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale the part or generate supports. Clarify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. The original file come from a 3d scanner. Material specification will be ABS, colour white. In addition, quality (HQ) request 0.10 mm. Infill pattern: honeycomb, 40%. The original dimensions are unknown.

Part dimension

X=0 mm; y= 0 mm: z = 0 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/santi_original.zip

Questions to be solved:

1.- It's necessary generate supports?

2.- Scale until to use 2 h printing time.

3.- What's the scale applied?

4.- What are the final dimension?

5.- How do you generate g-code?

References:

https://manual.prusa3d.com/c/English_manuals

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

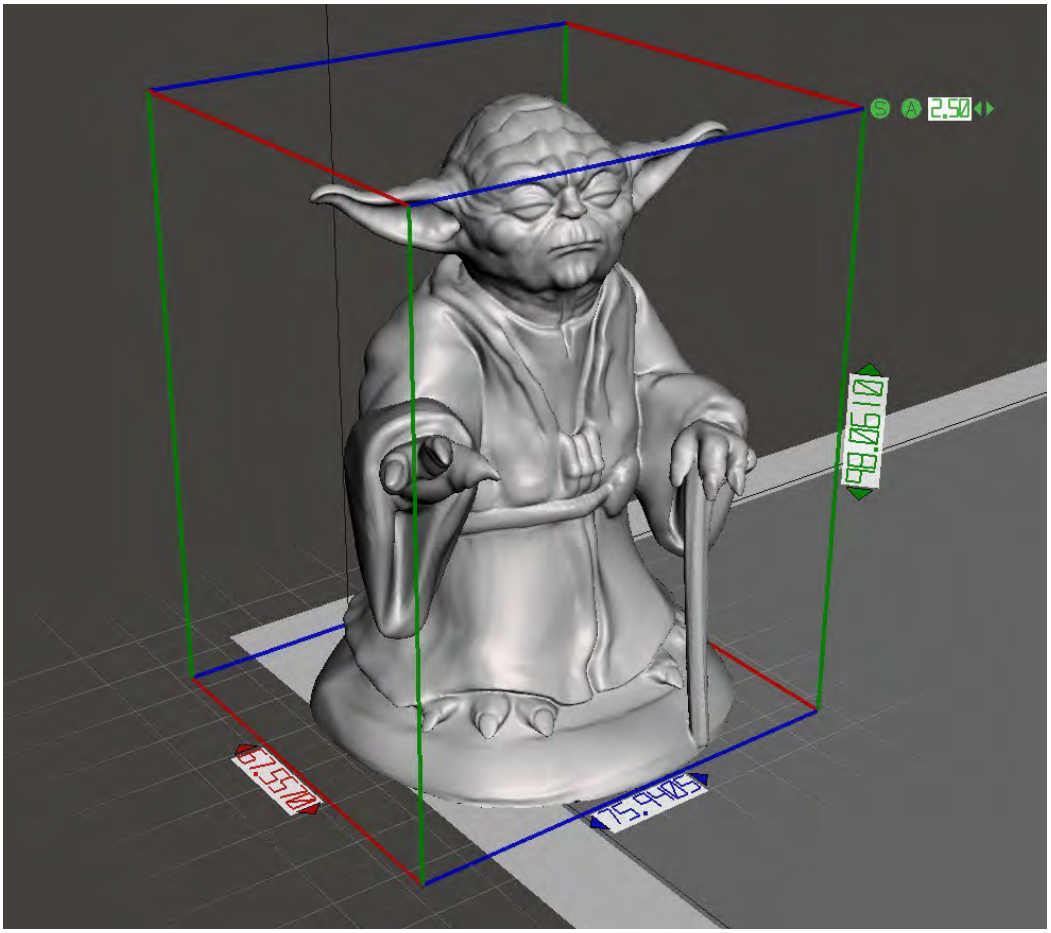
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale the part or generate supports. Describe how to select Part accuracy and how use slicing software (PrusaSlicer) to scale, move and generate g code of the part. How use the brim option.

Problem definition:

A maker asks us to print the part of the image below. The original file come from a 3d scanner. Material specification will be PP. In addition, quality (HQ) request 0.05 mm. Estimate if necessary to use the brim option for this print part.

Part dimension



X=76 mm; y= 68 mm: z = 98 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/YodaForce.zip

Questions to be solved:

1.- It's necessary generate supports?

2.- How many time it's used?

3.- Scale until use 15 h printing time.

4.- What's the scale applied?

5.- What are the final dimension?

6.- How do you generate g-code?

7.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

https://cults3d.com/es/modelo-3d/juegos/master-yoda-doberman

Group members:

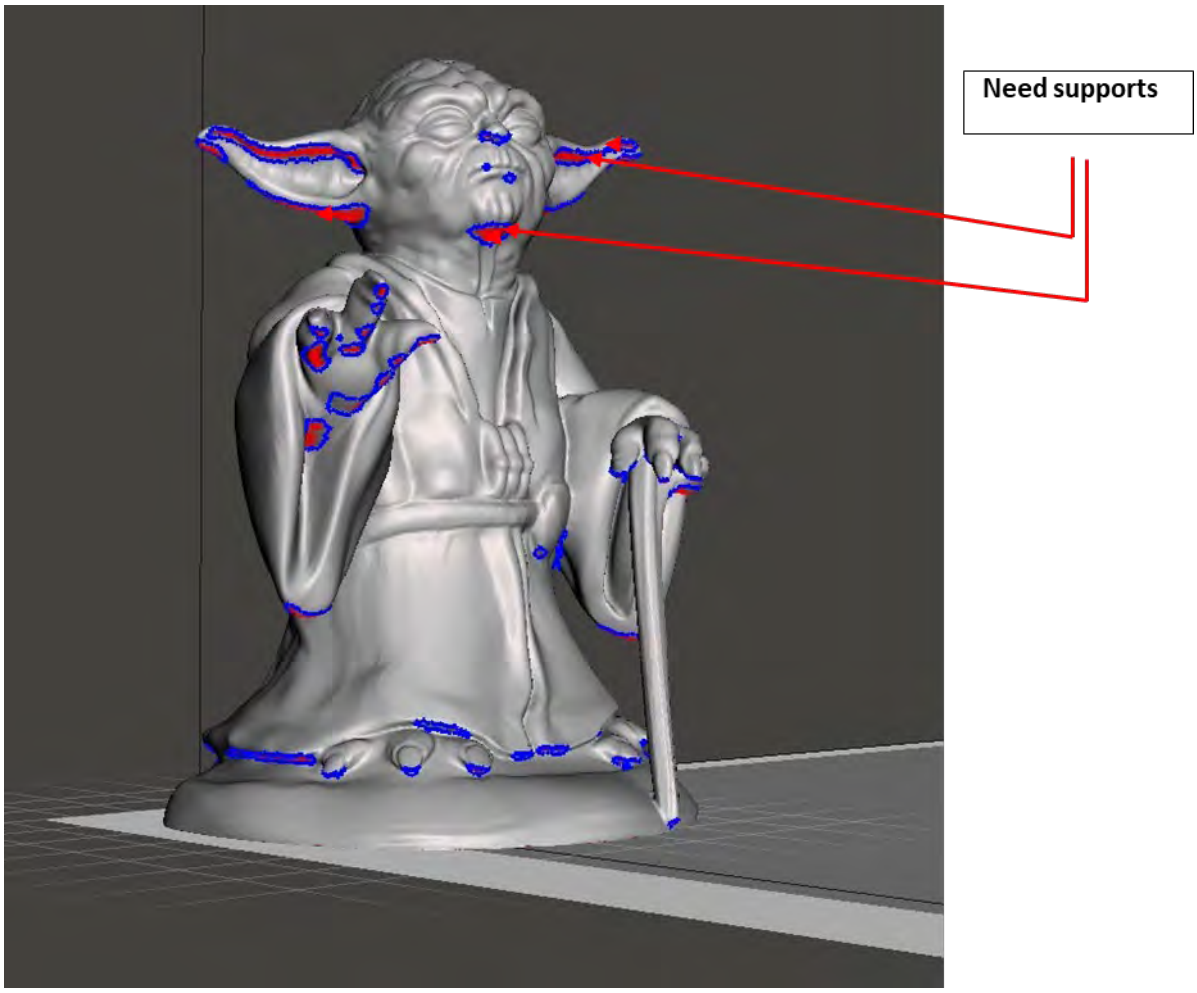
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

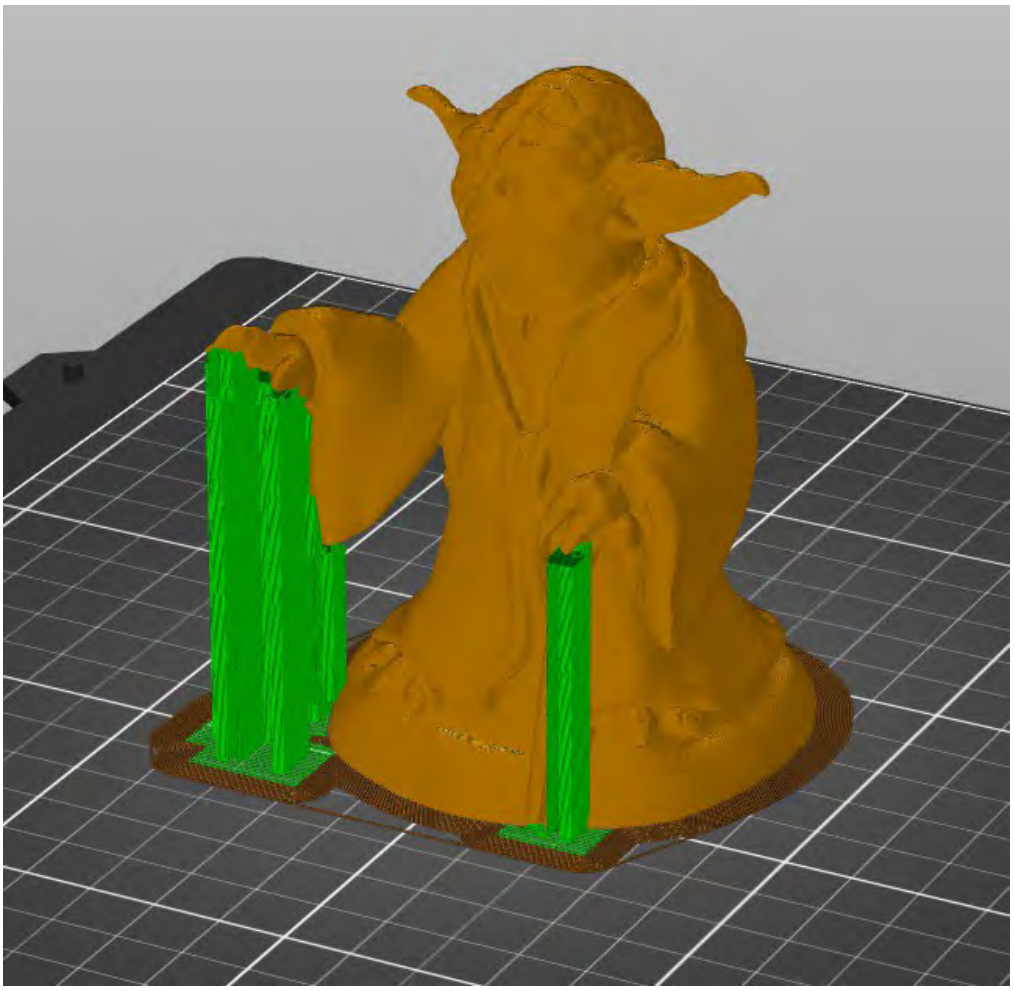
- Ability to select 3d printing materials
- Ability to generate personalized supports
- Skill to scale part
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

TO ORIENTATION DETERMINATION:

Detect how to orient part. Study of overhangs situations. Critical detection.

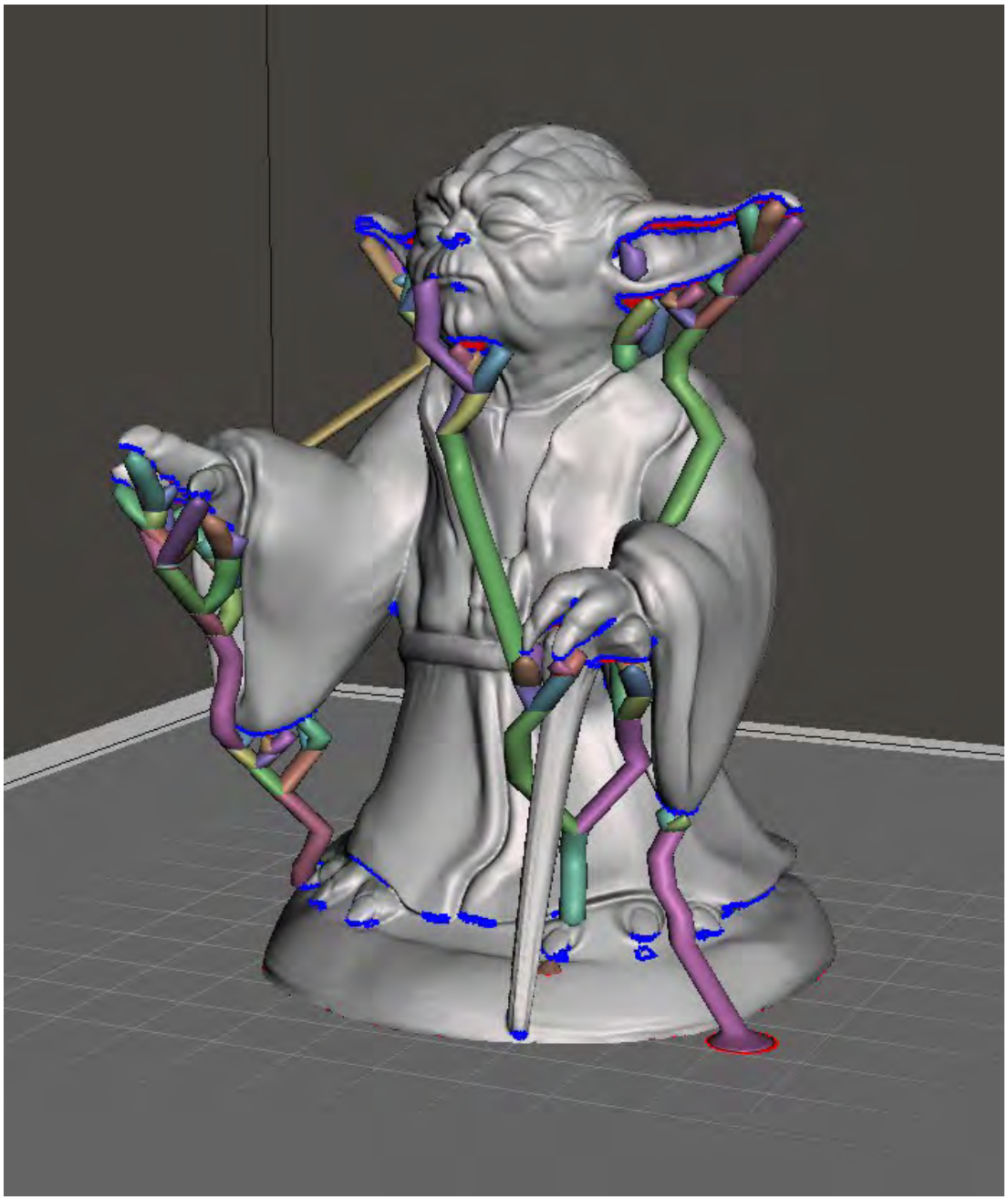


Possibilities (supports alternatives)



Software used: Prusa_Slicer. Support on plate only.

Other alternatives will be:



Software used: Autodesk Meshmixer

References:

Autodesk Meshmixer manual

https://all3dp.com/meshmixer-tutorial/

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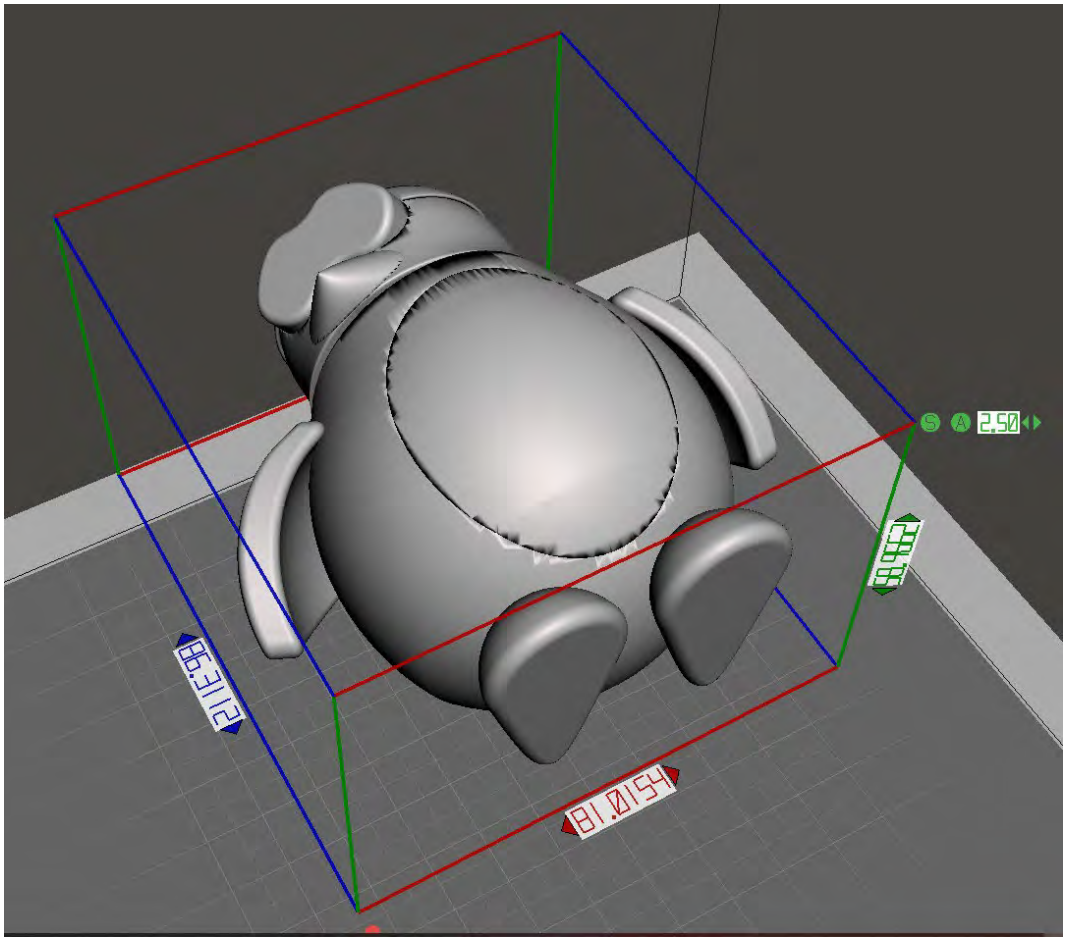
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale the part or generate supports. Describe how to select Part accuracy and how use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour white. In addition, quality (STD) request 0.30 mm.

Part dimension



X=86 mm; y= 81 mm: z = 58 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Pingu-80.zip

Questions to be solved:

1.- How do you orient the part?

2.- Could we print it without supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

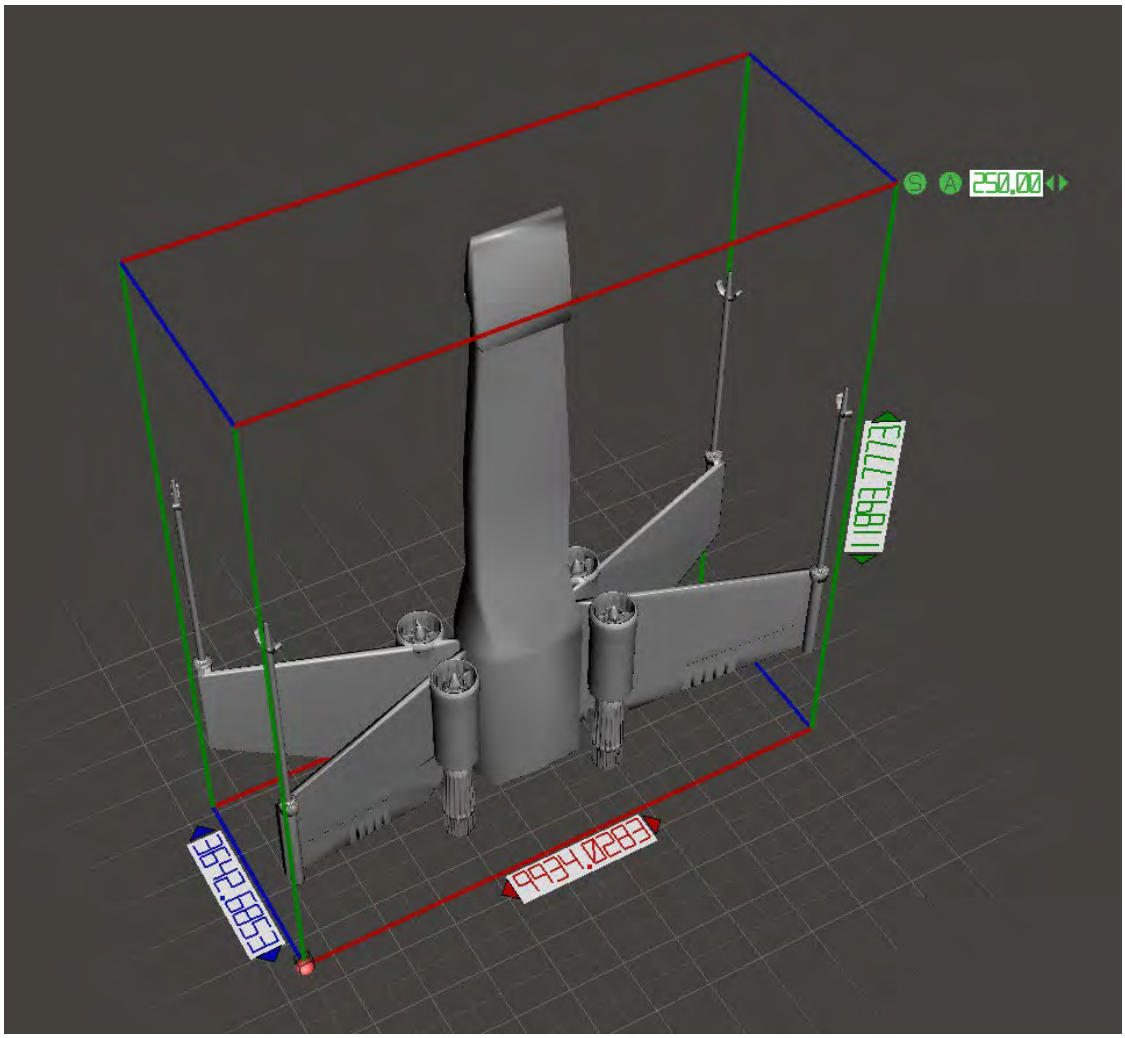
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale the part. Describe how print without generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PETG, colour white. In addition, quality (draft) request 0.30 mm. The original dimensions are unknown.

Part dimension



X=? mm; y= ? mm: z = ? mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/sw_ship.zip

Questions to be solved:

1.- Could you print the part without supports?

2.- What problem do you expect will be in the antennas?

3.- How do you scale to print using 7 hours?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:131466

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

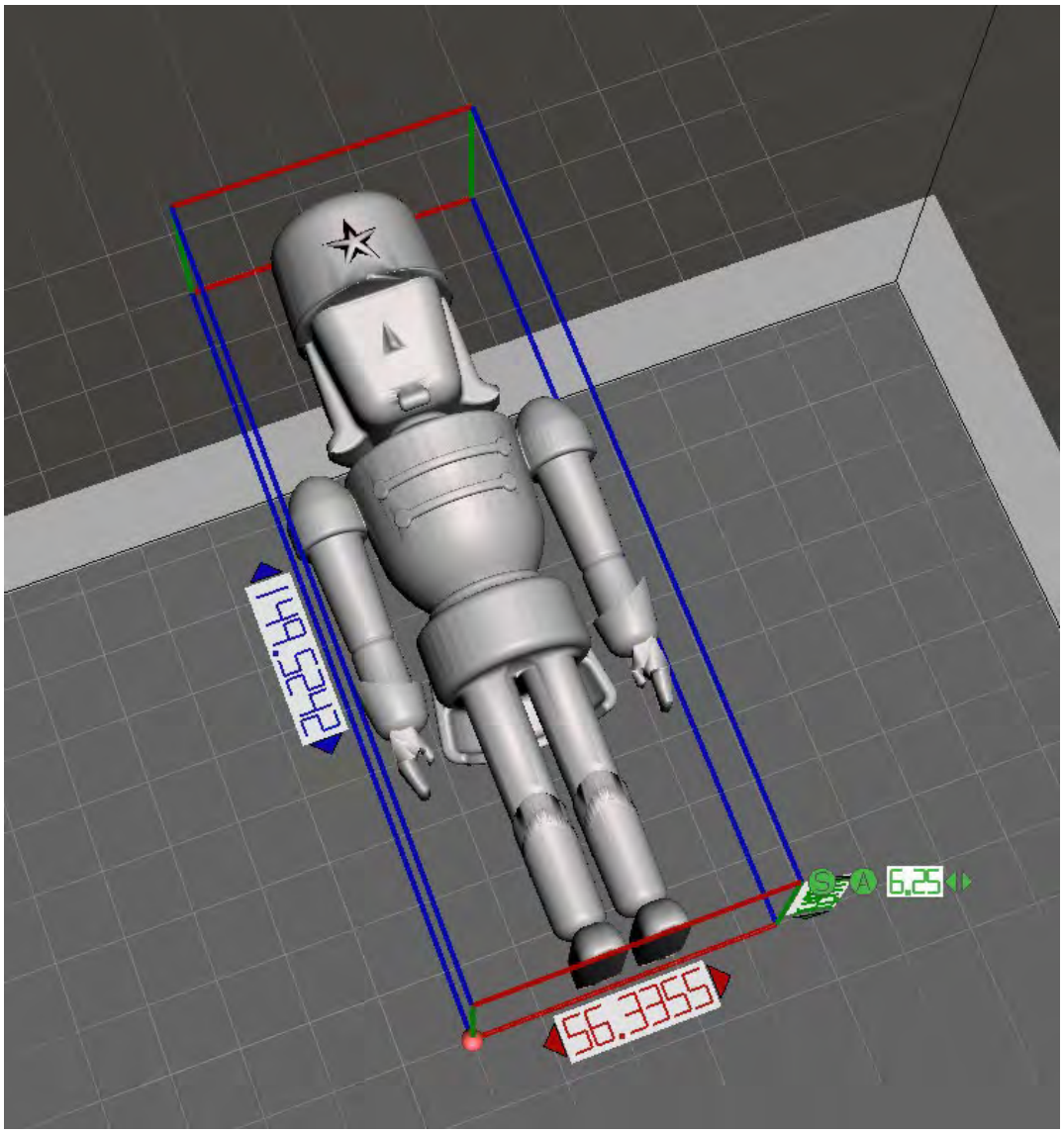
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale the part. Clarify how print without generate supports. Specify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. The original file come from a 3d scanner. Material specification will be PUR, colour black. In addition, quality (draft) request 0.20 mm.

Part dimension



X=56 mm; y= 149 mm: z = 35 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/nutcracker.zip

Questions to be solved:

1.- Could you print the part without supports?

2.- What problem do you expect will be in the arms?

3.- How do you scale to print using 4 hours?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:1904482

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

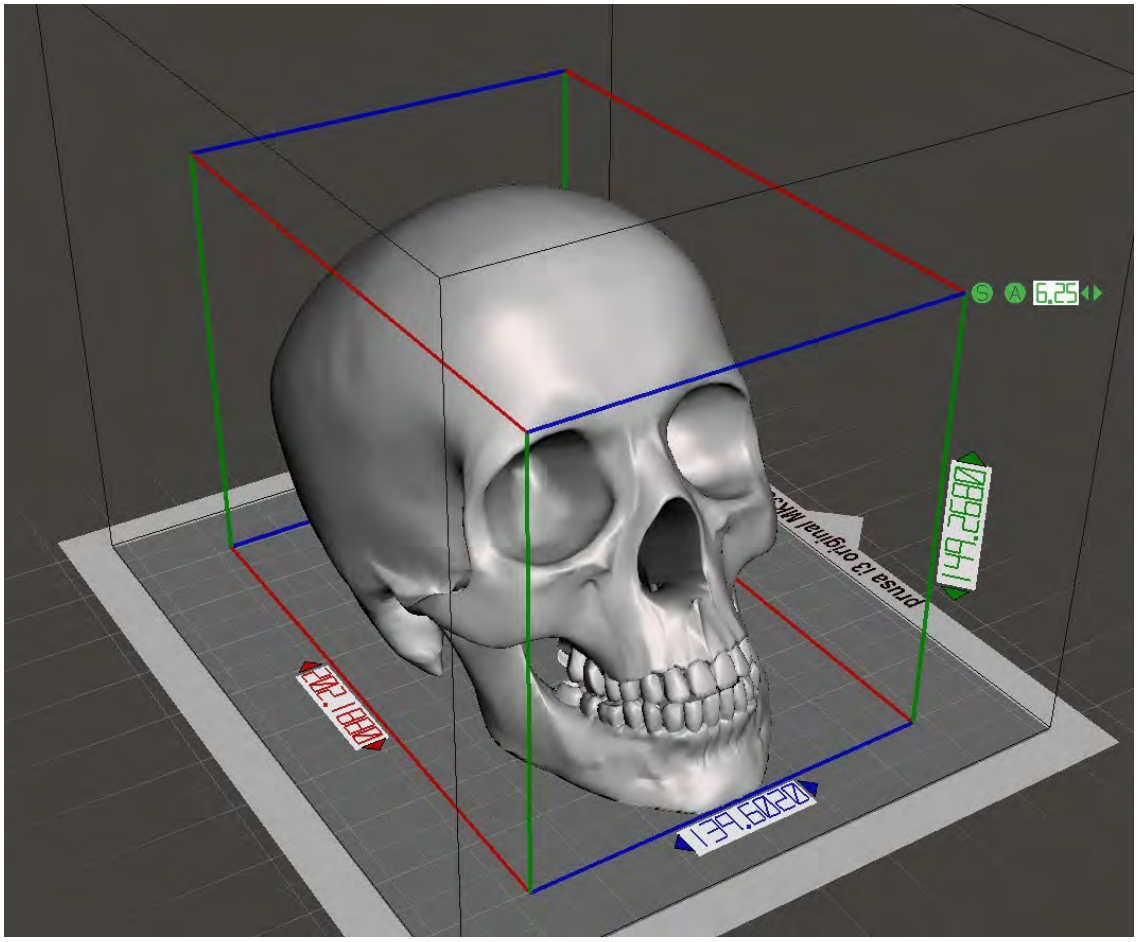
Objectives:

Explain how to select 3D printing materials and how to orient the part. Verify if necessary to scale the part. Describe how print without generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. The original file come from a TAC scanner. Material specification will be PC+ABS. In addition, quality (speed) request 0.15 mm.

Part dimension



X=139 mm; y= 202 mm: z = 149 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Scull_geant.zip

Questions to be solved:

1.- Could you print the part without supports?

2.- How do you scale to print using 2 hours?

3.- How much it costs (€)?

4.- How do you generate g-code?

References:

https://manual.prusa3d.com/c/English_manuals

https://www.thingiverse.com/thing:518109

Group members:

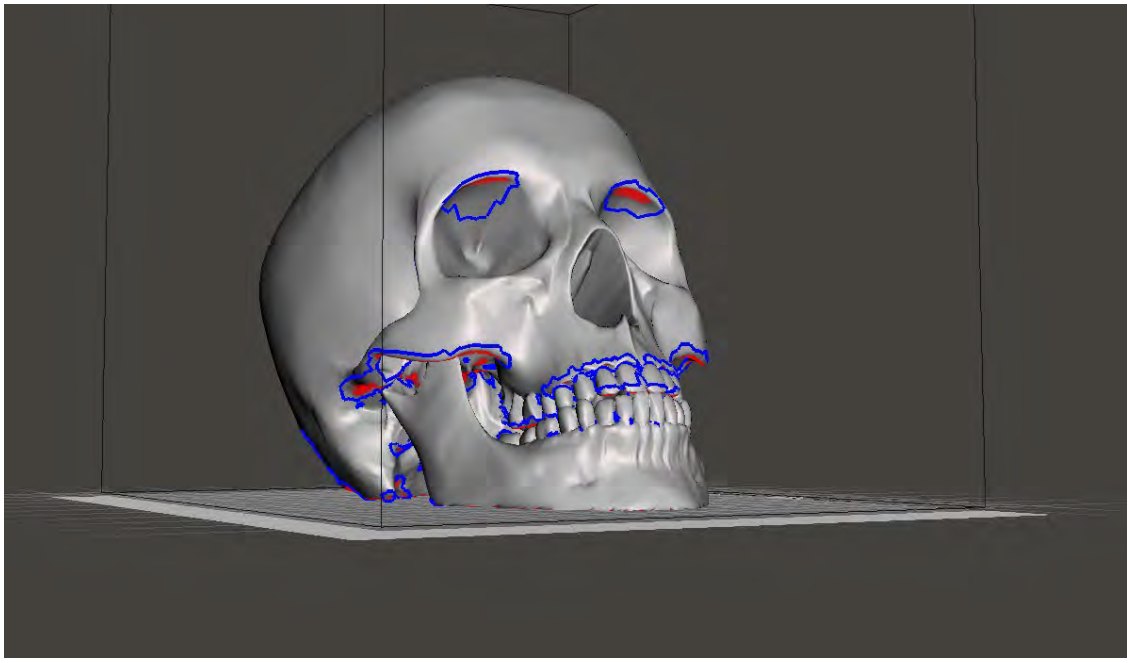
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

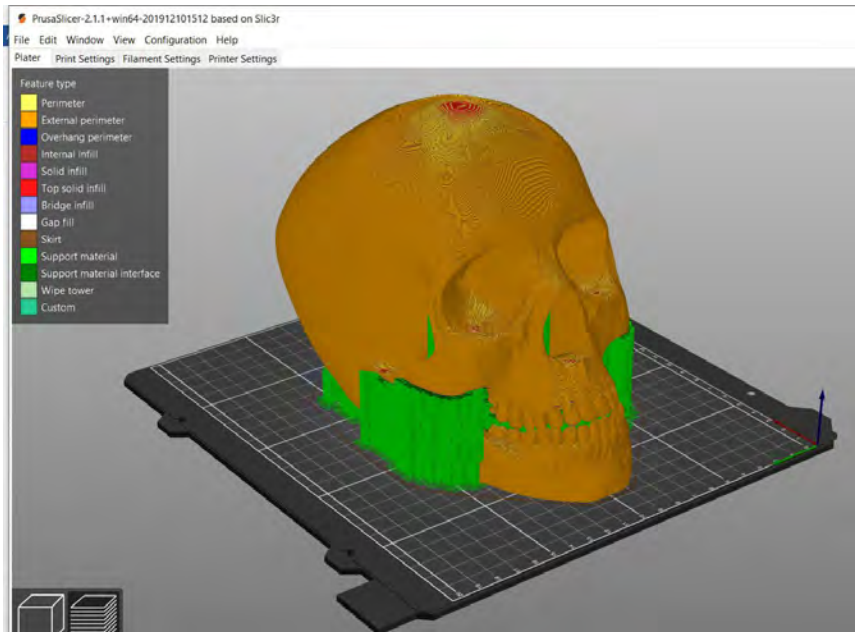
- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

TO ORIENTATION DETERMINATION:

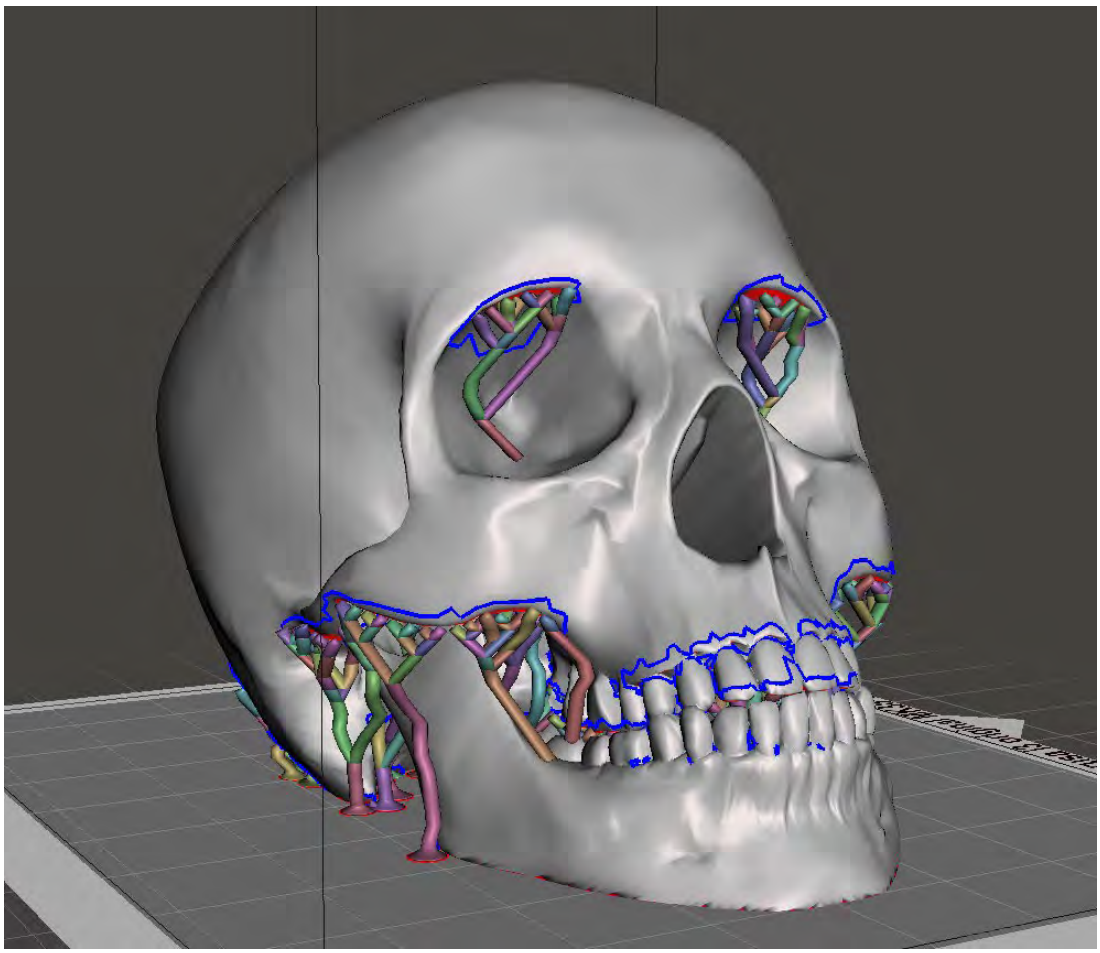
Detect how to orient part. Study of overhangs situations. Critical detection

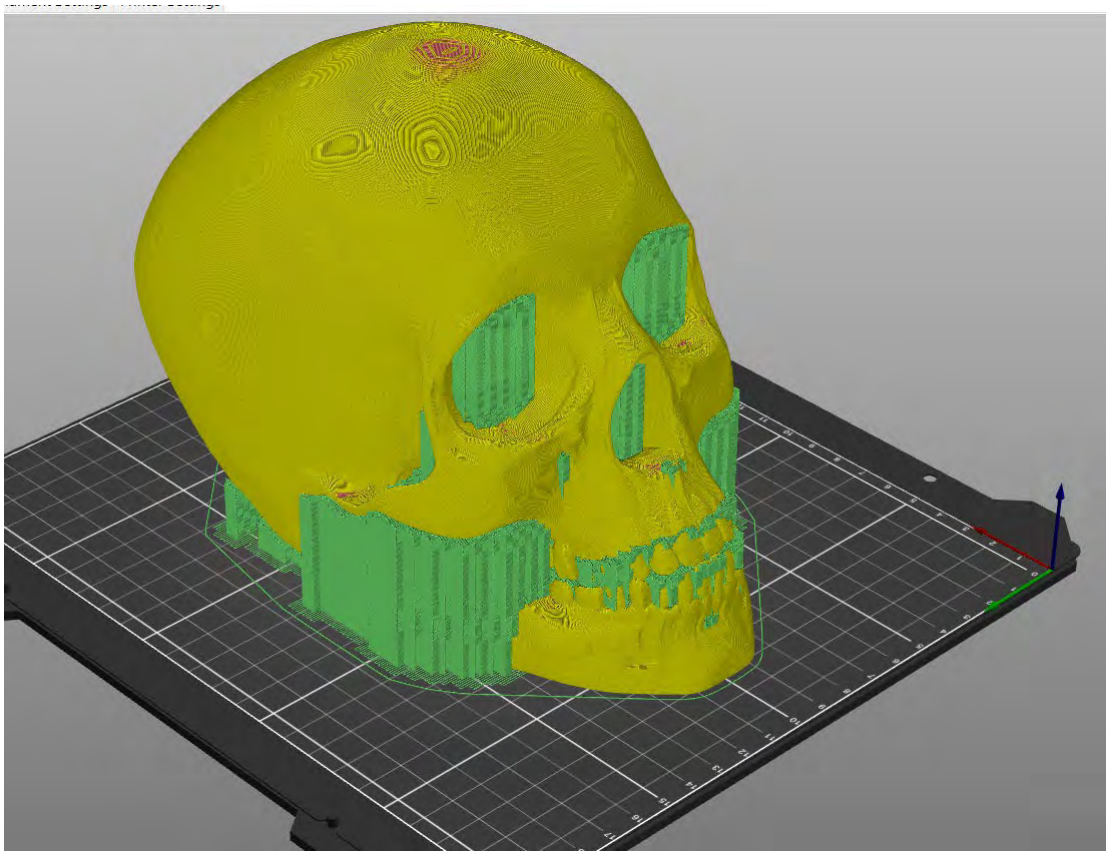


Possibilities



With other program:





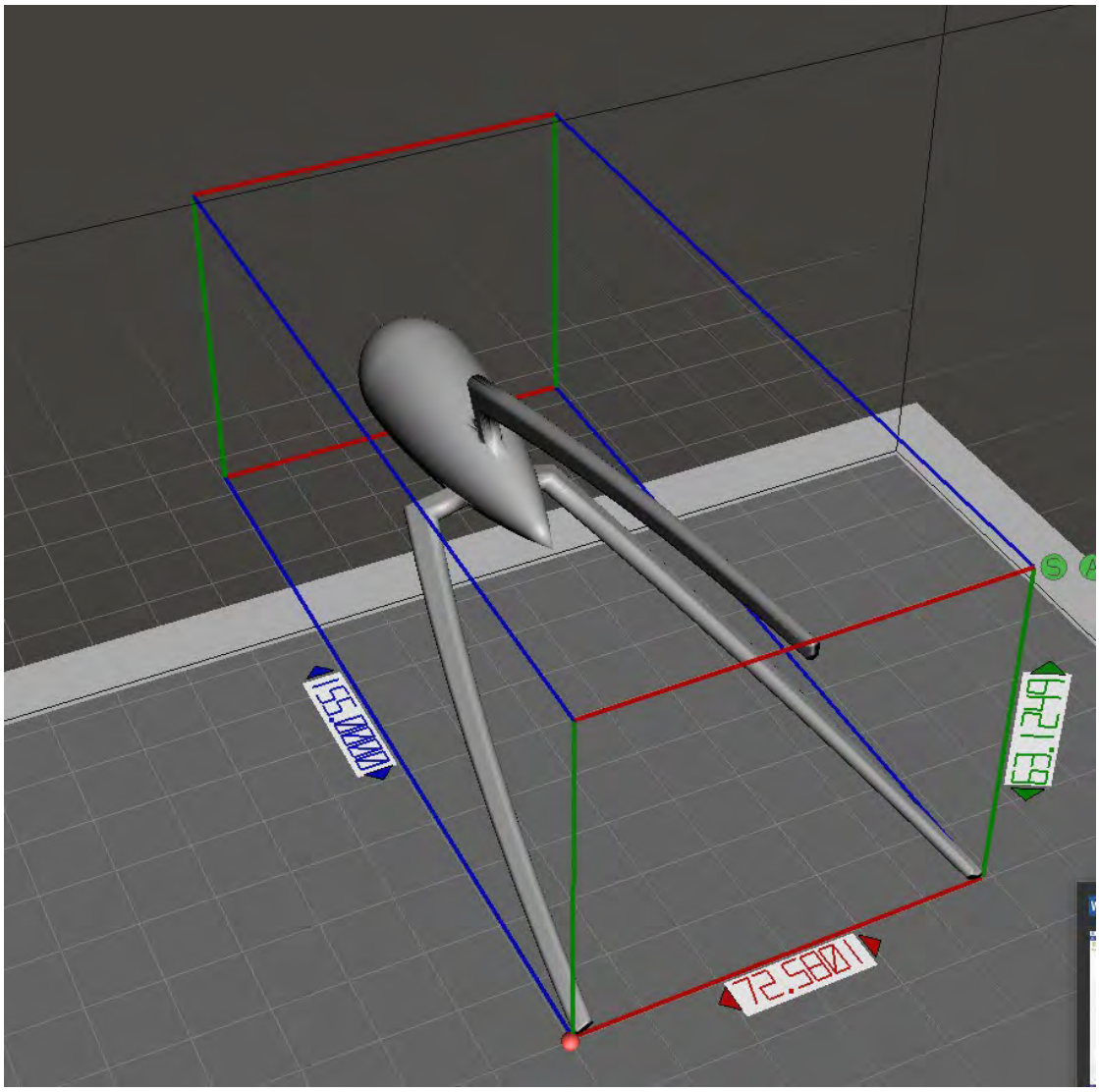
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale the part or generate supports. Clarify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour white. In addition, quality (STD) request 0.30 mm. Infill pattern: triangles, 60%. It's very important not use supports.

Part dimension



X=72 mm; y= 155 mm: z = 63 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/squeezer.zip

Questions to be solved:

1.- How do you orient the part?

2.- Could we print it without supports?

3.- How do it?

4.- What is the printing time?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:21116

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

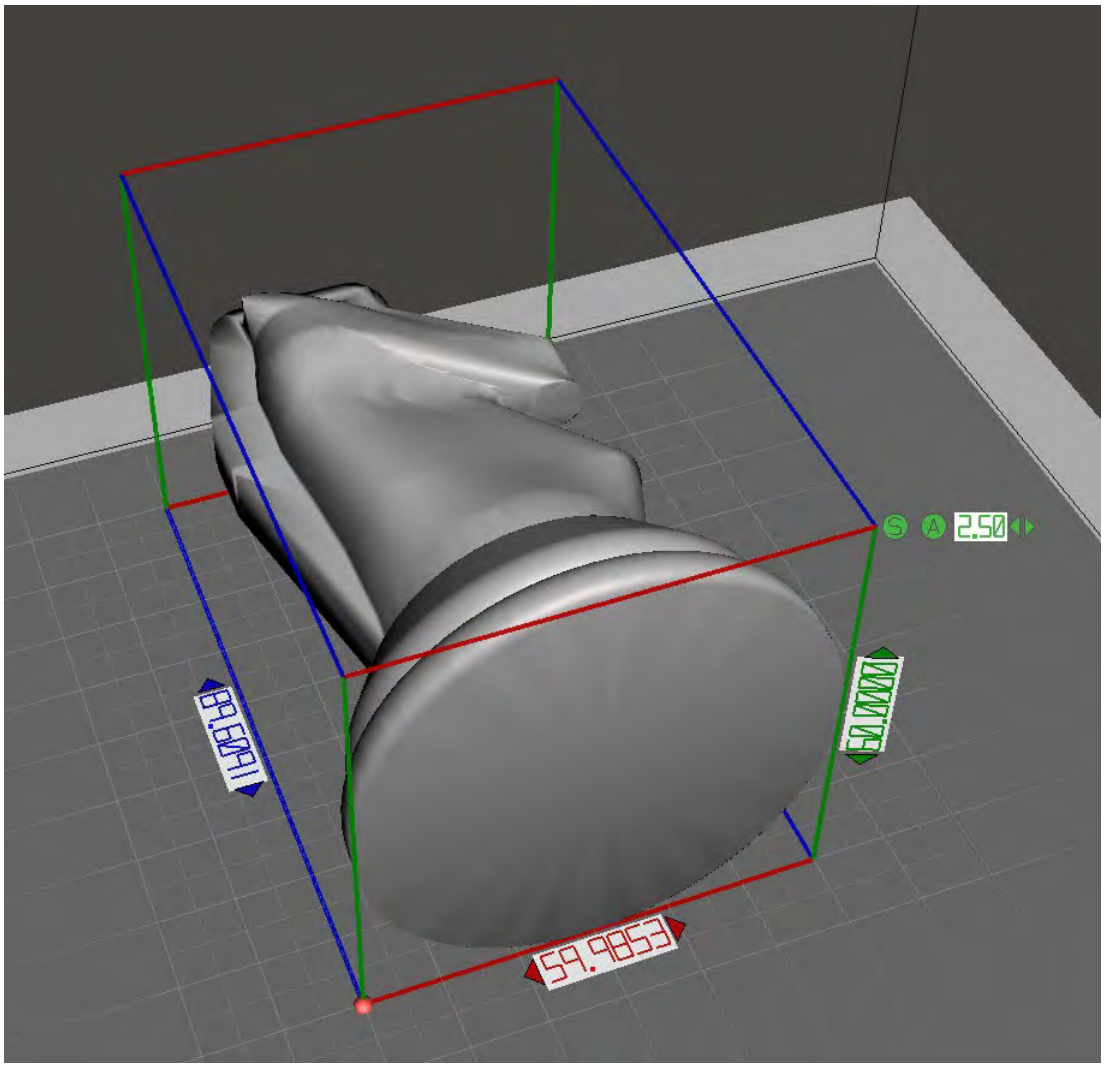
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be ASA, colour white. In addition, quality (SPEED) request 0.20 mm. Infill pattern: linear, 50%. It's important not use supports.

Part dimension



X=60 mm; y= 90 mm: z = 60 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/ches_horse.zip

Questions to be solved:

1.- How do you orient the part?

2.- Could we print it without supports?

3.- How?

4.- What is the time to print?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:4168753

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

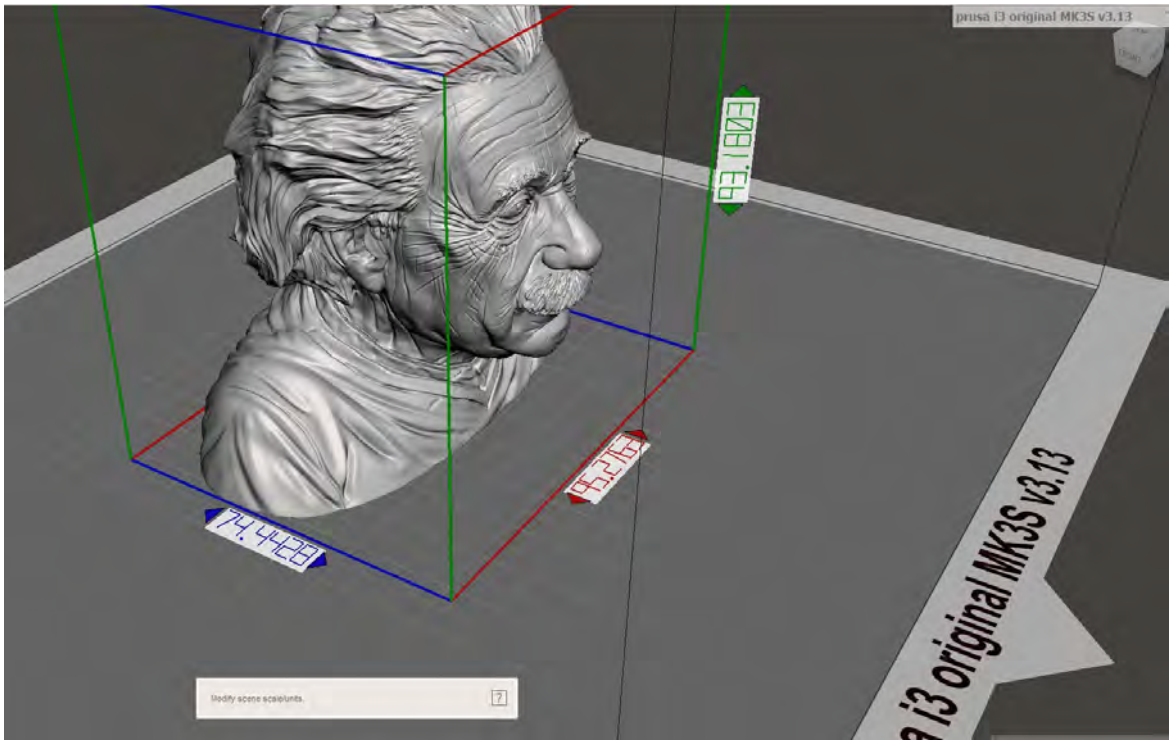
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be CPE, colour white. In addition, quality (SPEED) request 0.20 mm. Infill pattern: linear, 40%. It's important not use supports.

Part dimension



X=95 mm; y= 74 mm: z = 93 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Albert_Einstein_highres.zip

Questions to be solved:

1.- Could we print it without infill?

2.- How?

3.- How do you increase the wall thickness of the part?

4.- What is the print time?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://cults3d.com/es/modelo-3d/variado/albert-einstein-bust

https://www.thingiverse.com/thing:3646052

Group members:

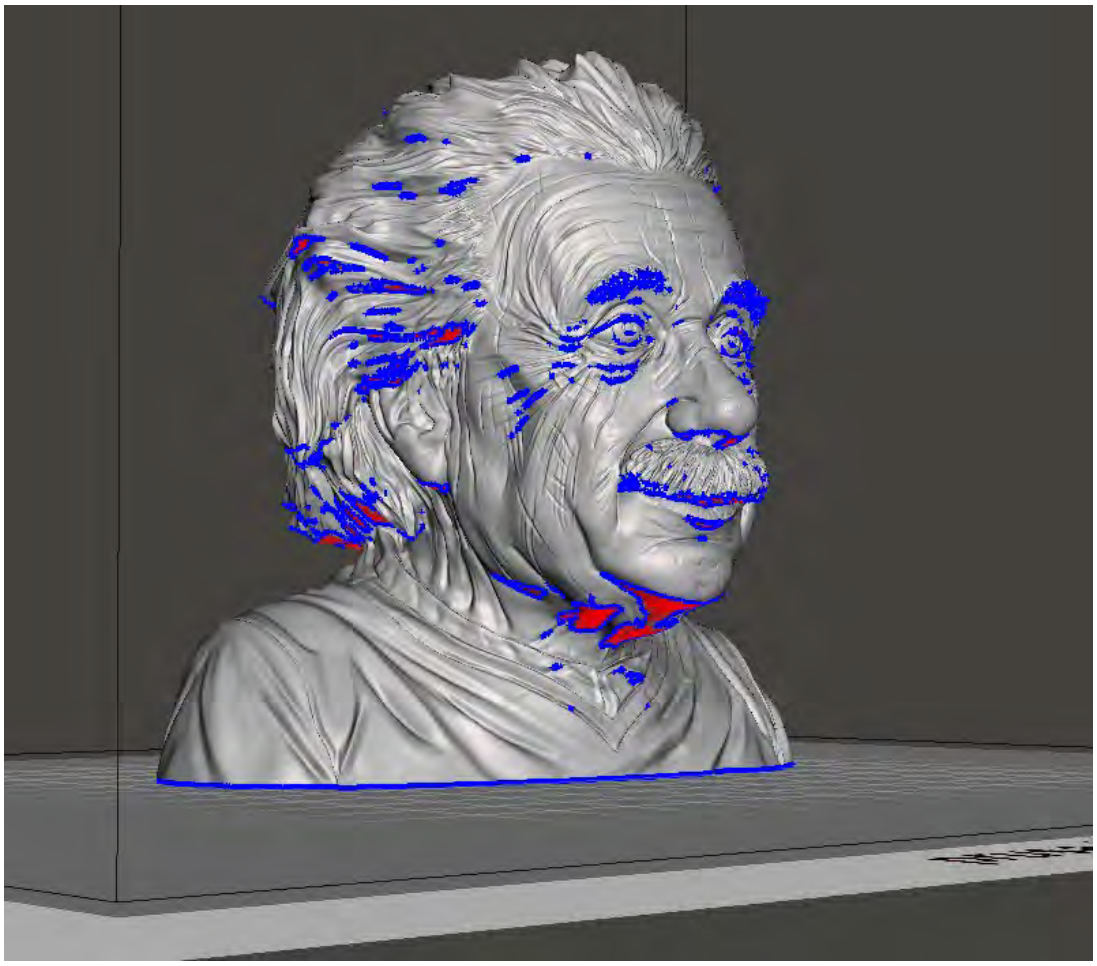
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

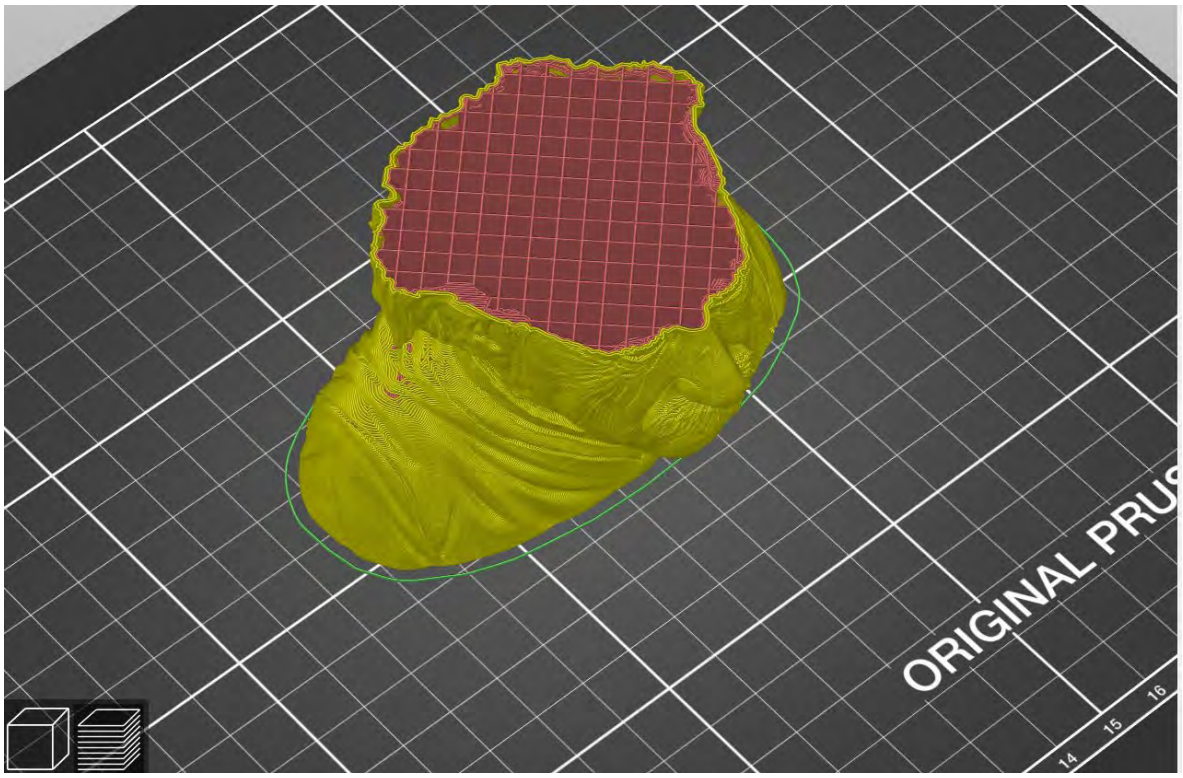
- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

TO ORIENTATION DETERMINATION:

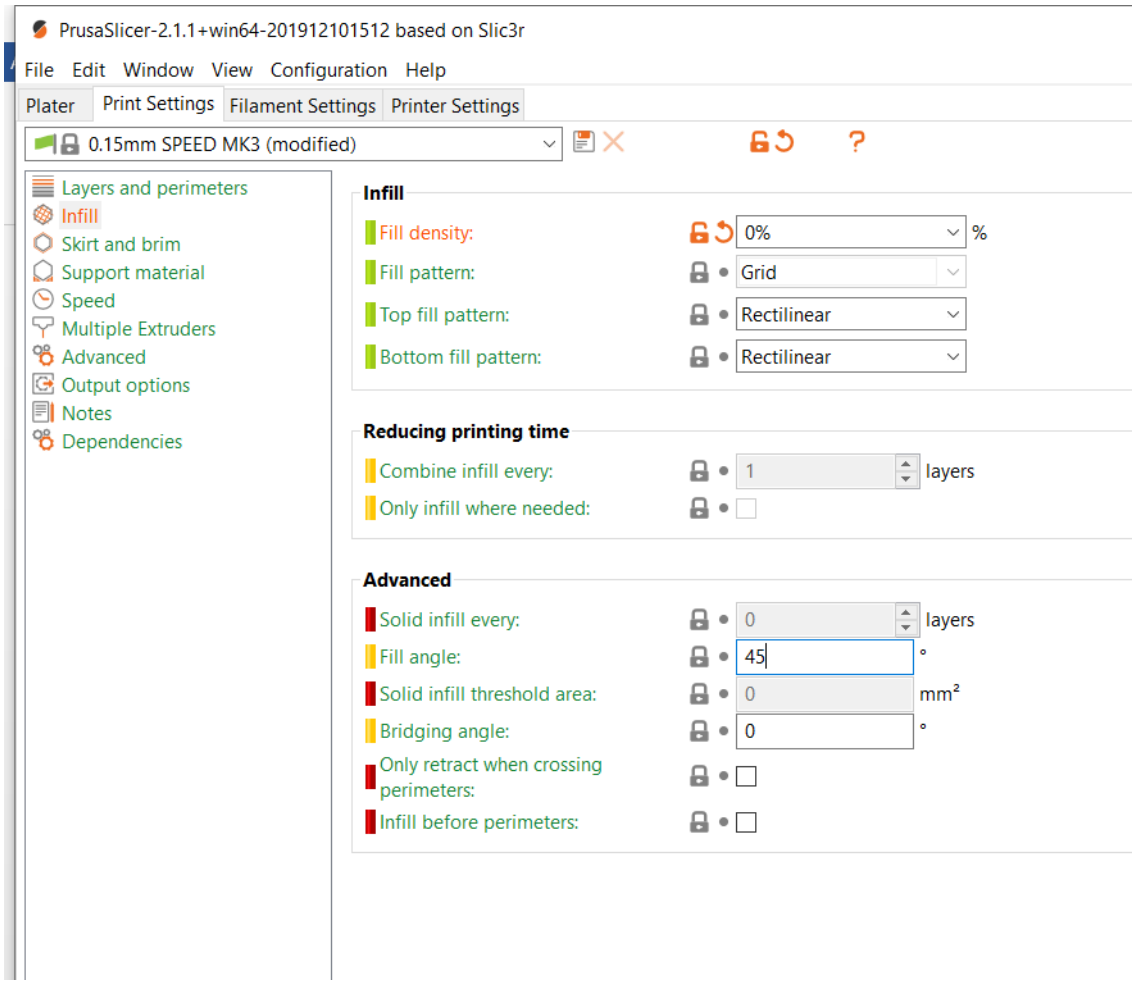
Detect how to orient part. Study of overhangs situations. Critical detection

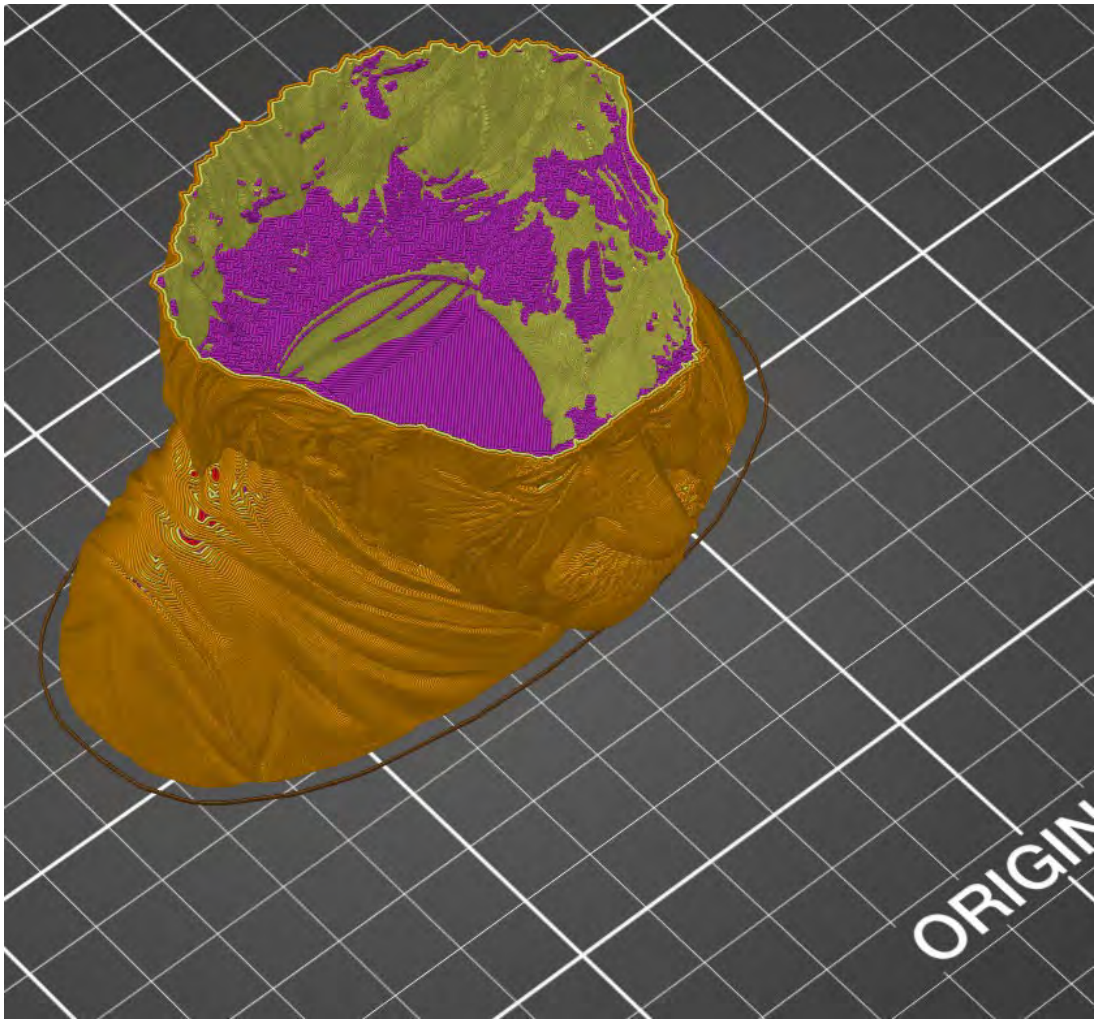


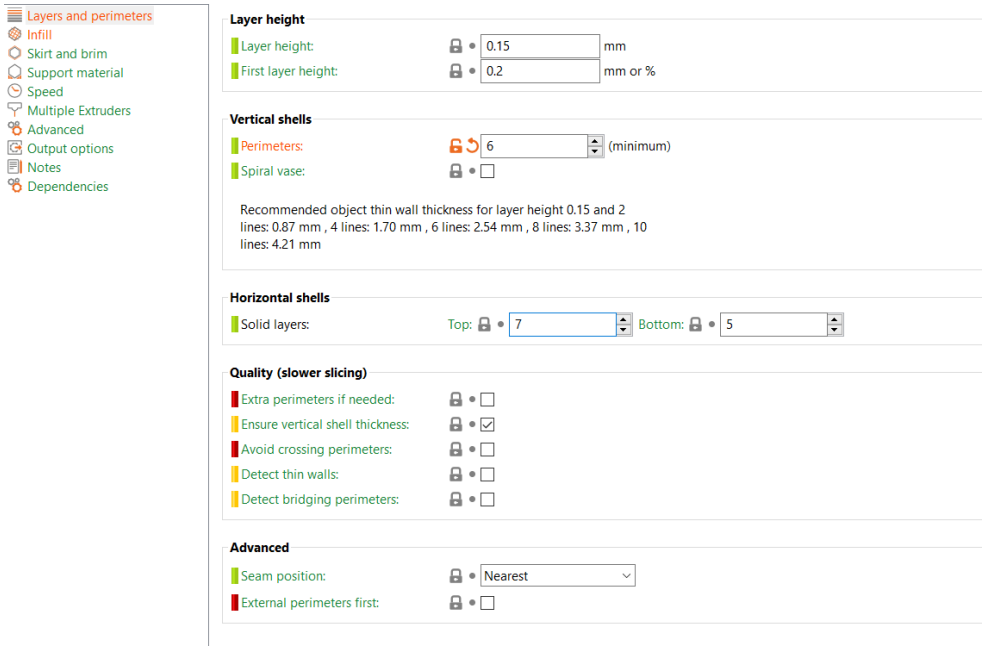
Possibilities (infill)

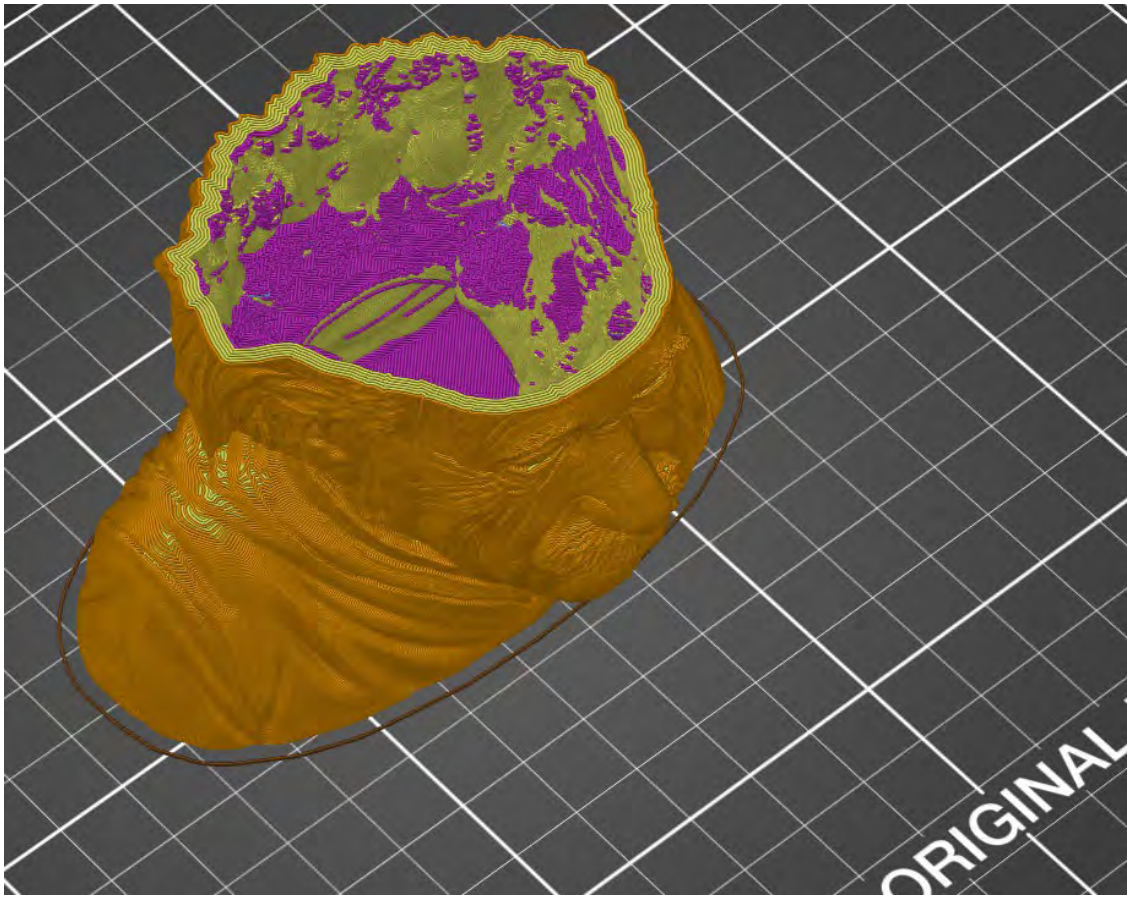


Possible solution:




ORIGIN


Layers and perimeters
Infill
Skirt and brim
Support material
Speed
Multiple Extruders
Advanced
Output options
Notes
Dependencies
Layer height
Layer height: 0.15 mm
First layer height: 0.2 mm or %
Vertical shells
Perimeters: 6 (minimum)
Spiral vase:
Recommended object thin wall thickness for layer height 0.15 and 2 lines: 0.87 mm , 4 lines: 1.70 mm , 6 lines: 2.54 mm , 8 lines: 3.37 mm , 10 lines: 4.21 mm
Horizontal shells
Solid layers: Top: 7 Bottom: 5
Quality (slower slicing)
Extra perimeters if needed:
Ensure vertical shell thickness:
Avoid crossing perimeters:
Detect thin walls:
Detect bridging perimeters:
Advanced
Seam position: Nearest
External perimeters first:


ORIGINAL

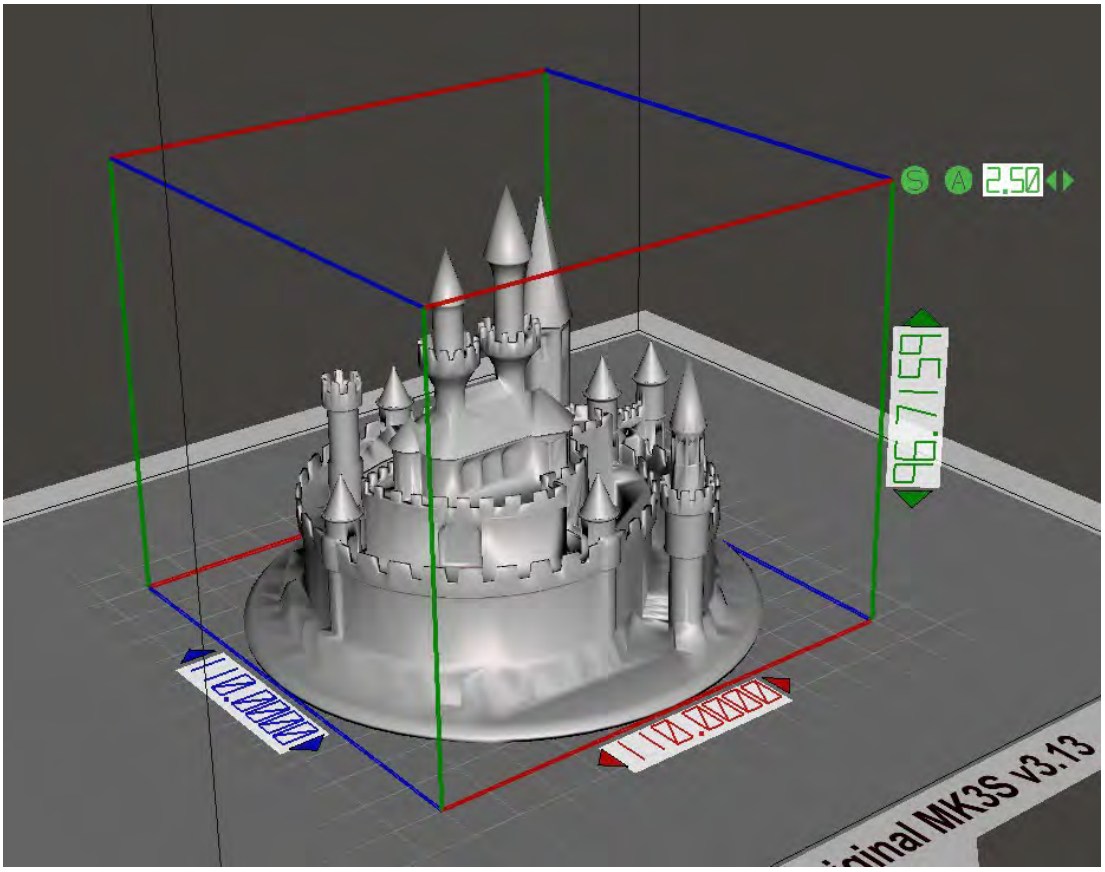
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be ABS, colour white. In addition, quality (HQ) request 0.05 mm. Infill pattern: linear, 30%. It's important not use supports.

Part dimension



X=110 mm; y= 110 mm: z = 97 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Castle.zip

Questions to be solved:

1.- How do you increase the part to print the maximum platform size?

2.- How?

3.- What is the printing time?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://cults3d.com/es/modelo-3d/arquitectura/vik60

https://www.thingiverse.com/thing:394390

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

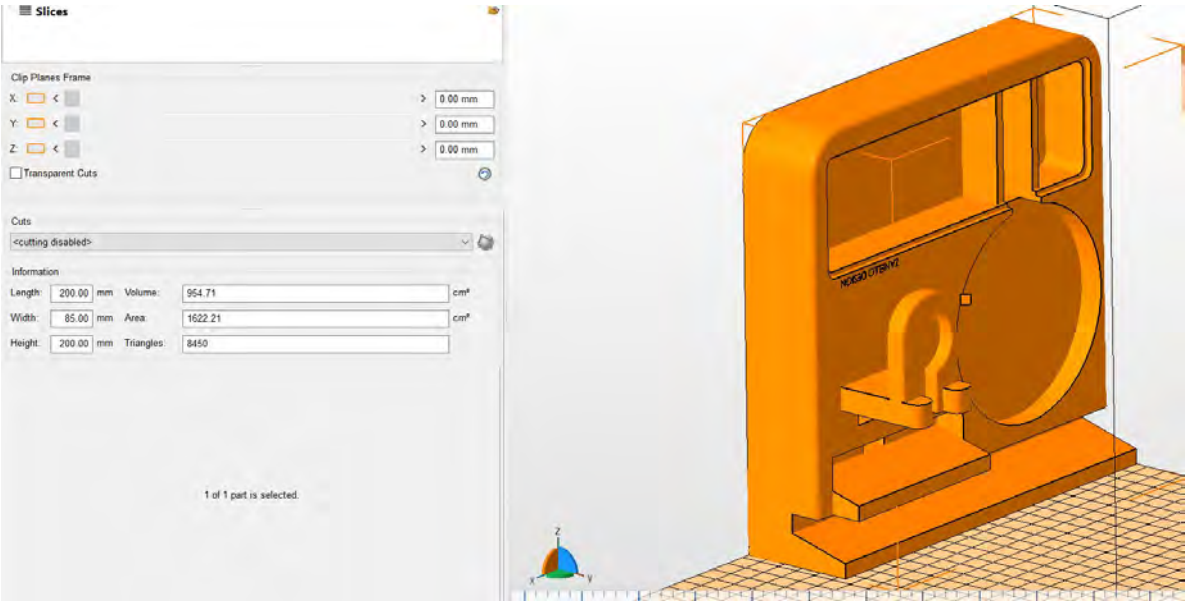
Objectives:

Explain how to select 3D printing materials and how to orient the part. Student have to use cut tools and Z level. Student must use control printer and bed dimensions.

Problem definition:

While we are printing, filament was finished (along the night). The print time estimation was 40 h. We don't have the same colour filament. How print the part rest? It's necessary to repeat the printed part?

Part dimension



X=200 mm; y= 200 mm: z = 80 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Base-movil-3.0.zip

Questions to be solved:

1.- How do you print the rest of the part?

2.- How do you proceed?

3.- How do you generate g-code?

References:

https://manual.prusa3d.com/c/English_manuals

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

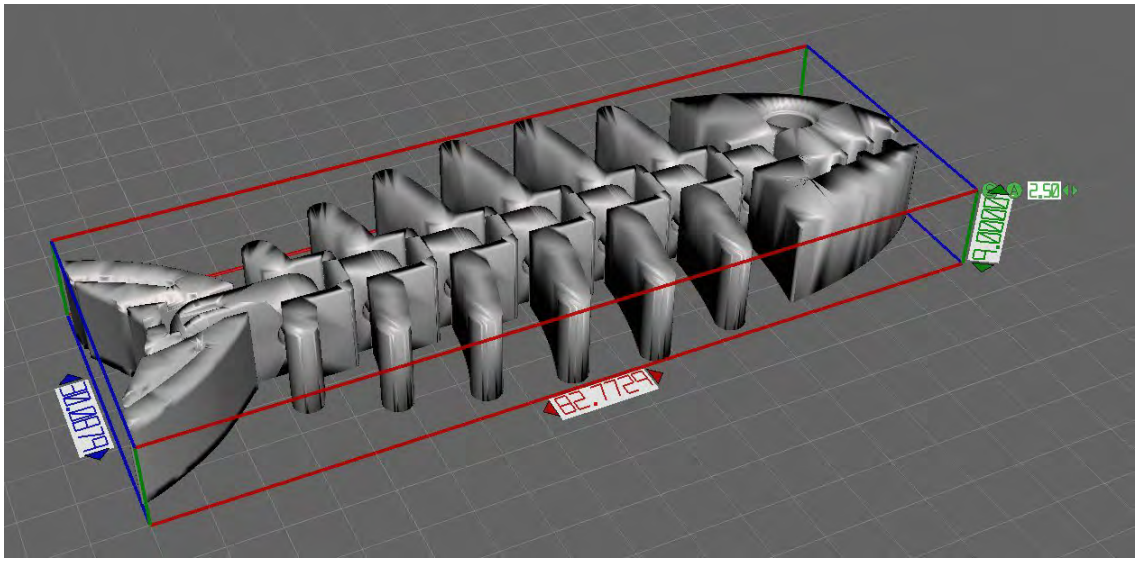
Objectives:

Explain how to select 3D printing materials and how to orient the part. Specify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be HIPS, colour white. In addition, quality (detail) request 0.10 mm. Infill pattern: cubic, 60%. It's important not use supports.

Part dimension



X=88 mm; y= 30 mm: z = 9 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/fish_fossilz.zip

Questions to be solved:

1.- How do you increase the part movement?

2.- How do you generate supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:1276095

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

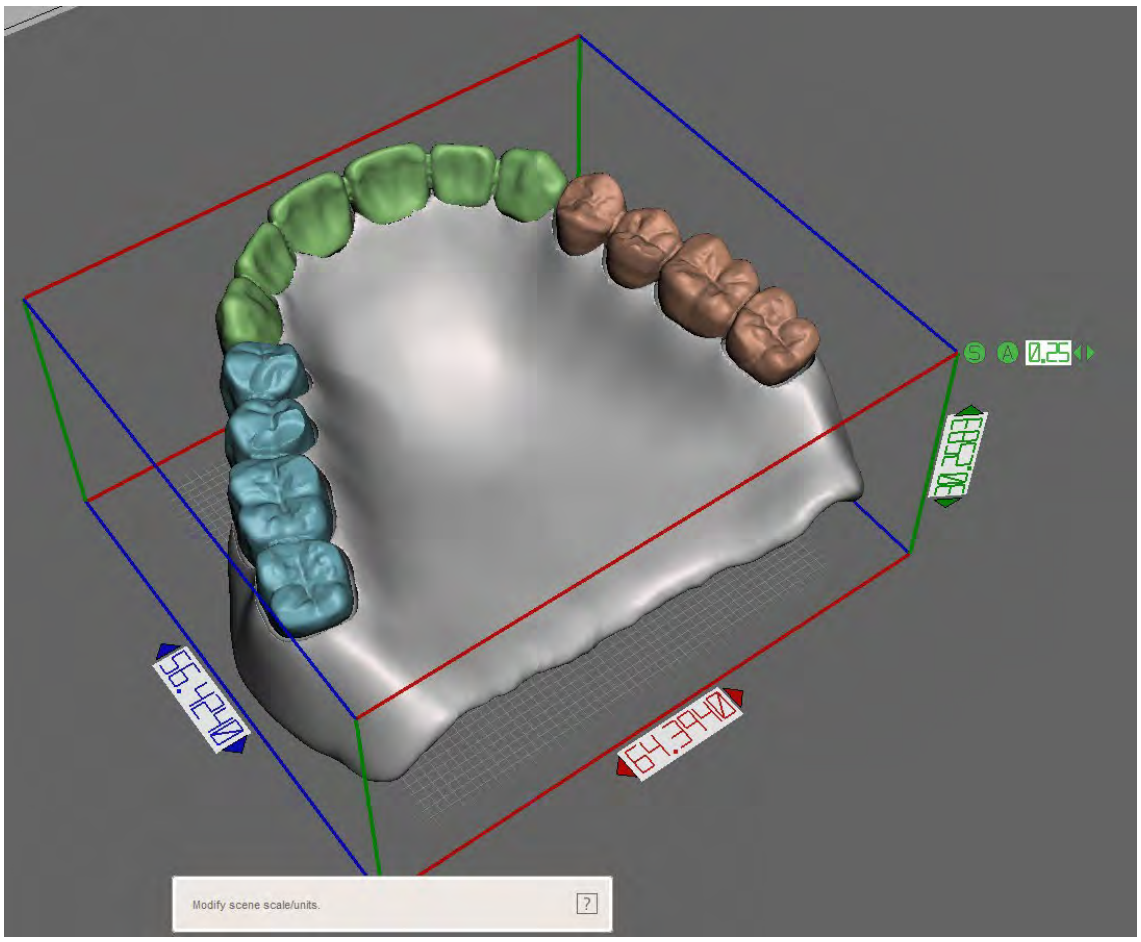
Objectives:

Explain how to select 3D printing materials and how to orient the part. Specify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC-MAX, colour white. In addition, quality (detail) request 0.05 mm. Infill pattern: concentric, 80%. It's important to use append assembly mode.

Part dimension



X=64 mm; y= 56 mm: z = 30 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Full_Denture_Maxillary_With_Separate_Teeth_Files.zip

Questions to be solved:

1.- How do you append parts?

2.- Do you generate assembly parts?

3.- How do you generate supports?

4.- What is the time to print?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3587989

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

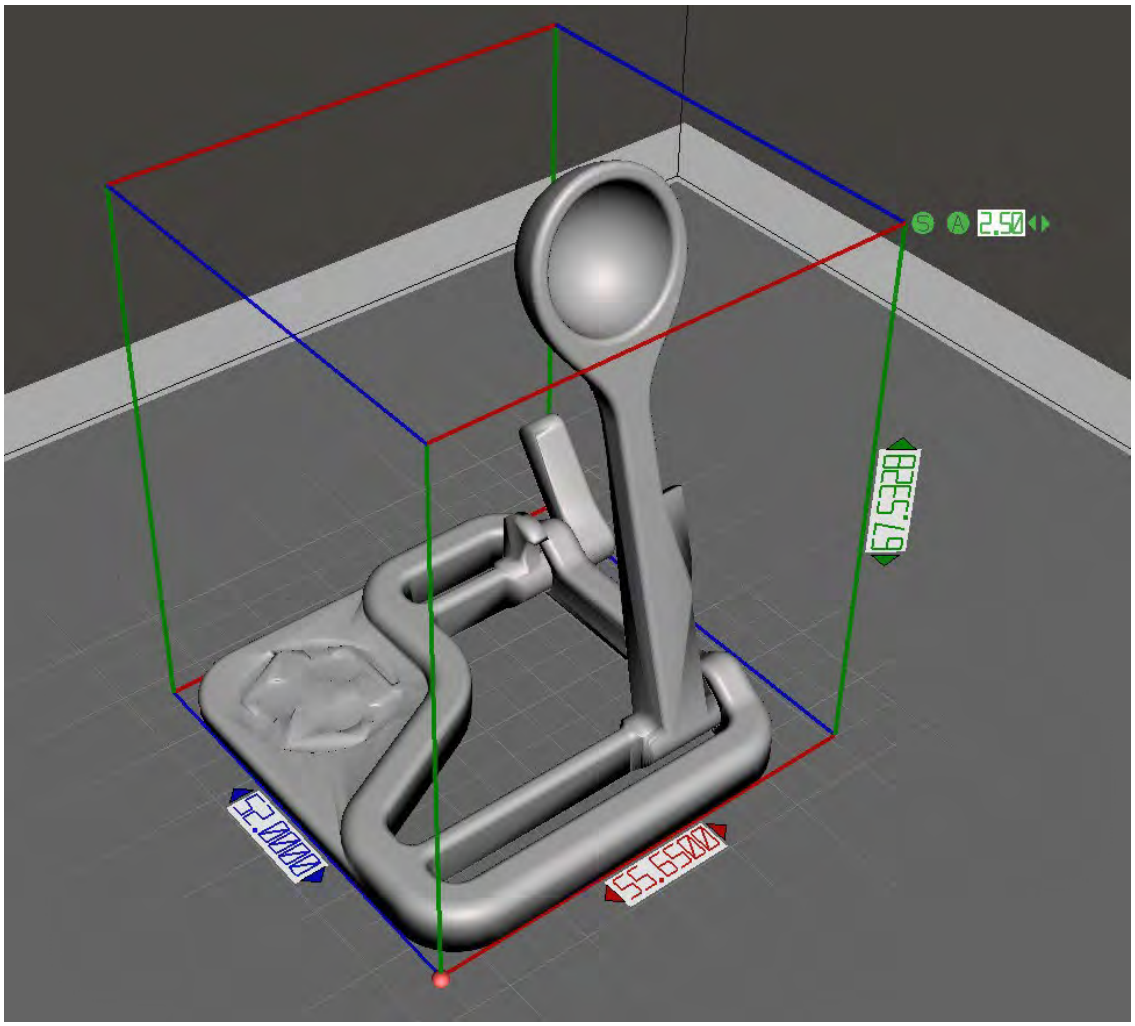
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be Taulman t glass, colour green. In addition, quality (speed) request 0.2 mm. Infill pattern: gyroid, 20%.

Part dimension



X=56 mm; y= 52 mm: z = 67 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Micro_Catapult.zip

Questions to be solved:

1.- How do you orient the parts?

2.- How do you generate supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:1763518

Group members:

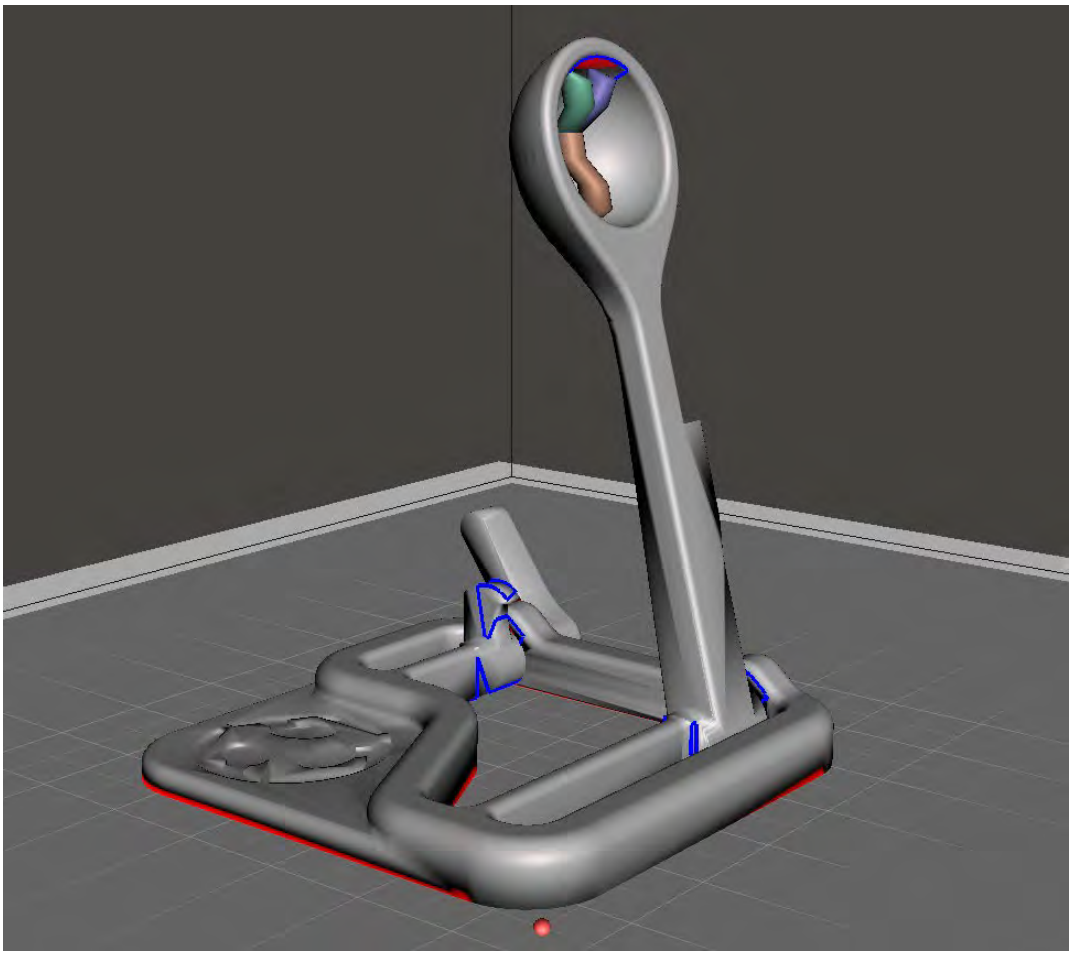
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

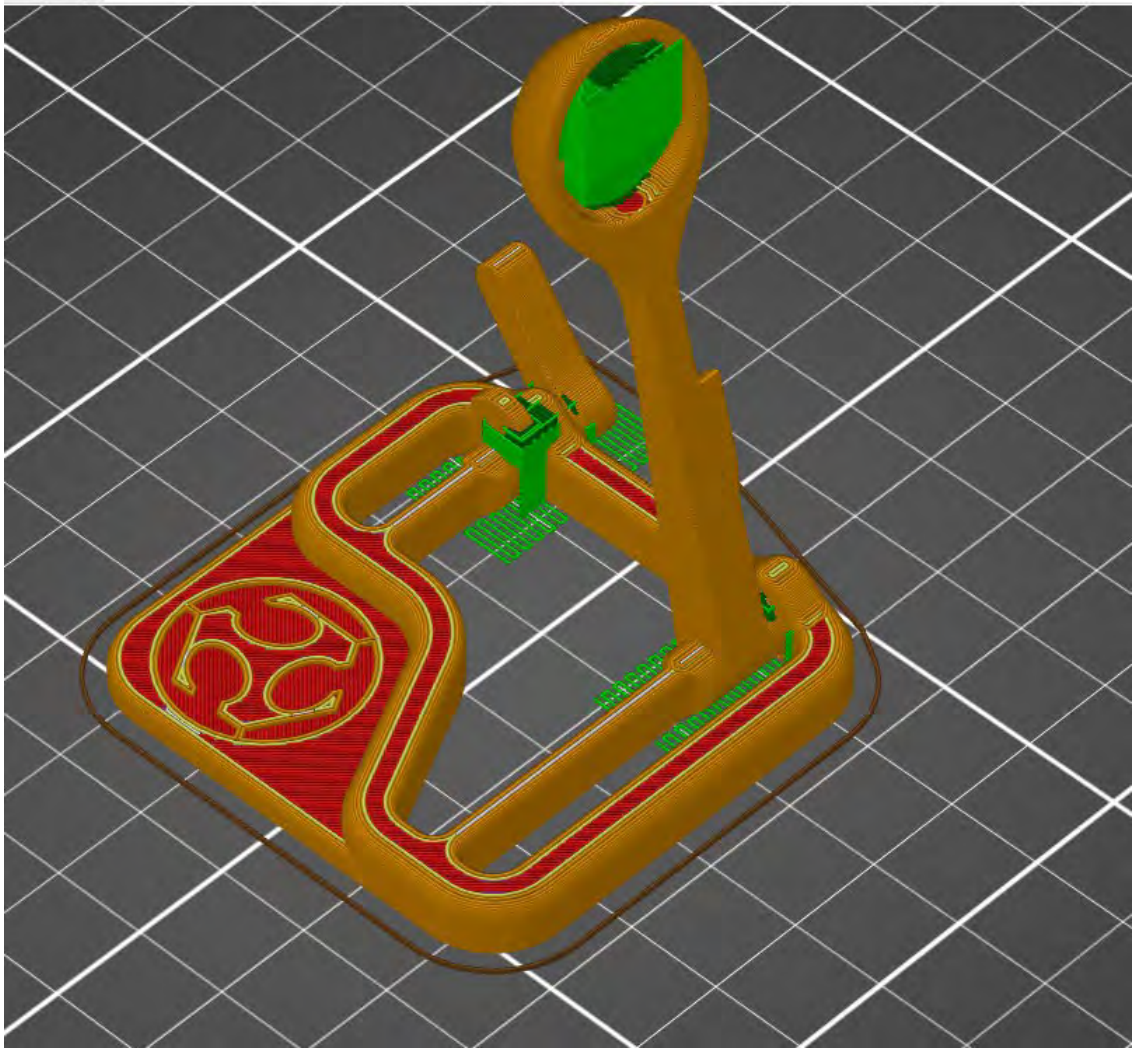
- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

TO ORIENTATION DETERMINATION:

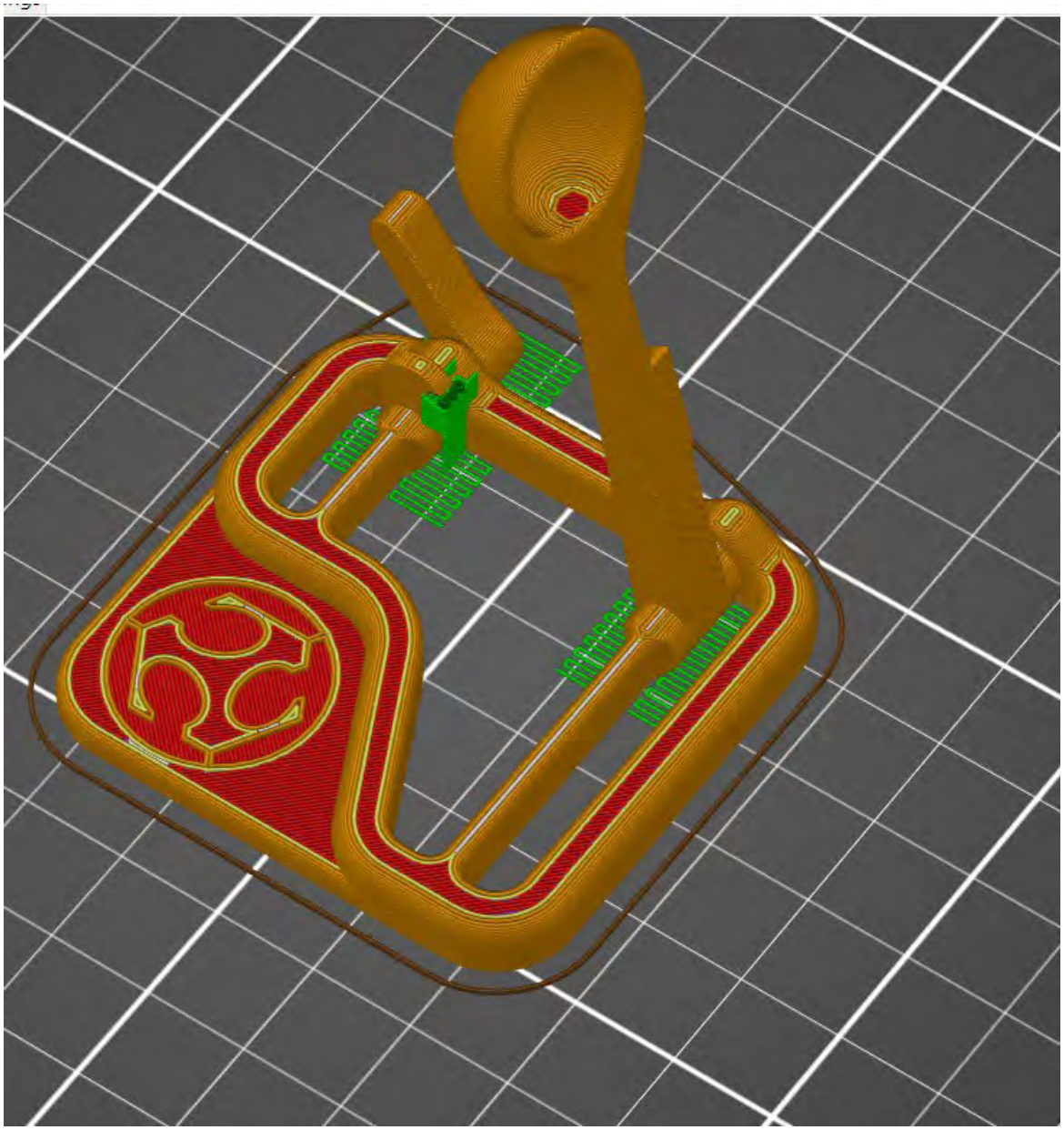
Detect how to orient part. Study of overhangs situations. Critical detection



Possibilities



Everywhere option



On built plate only

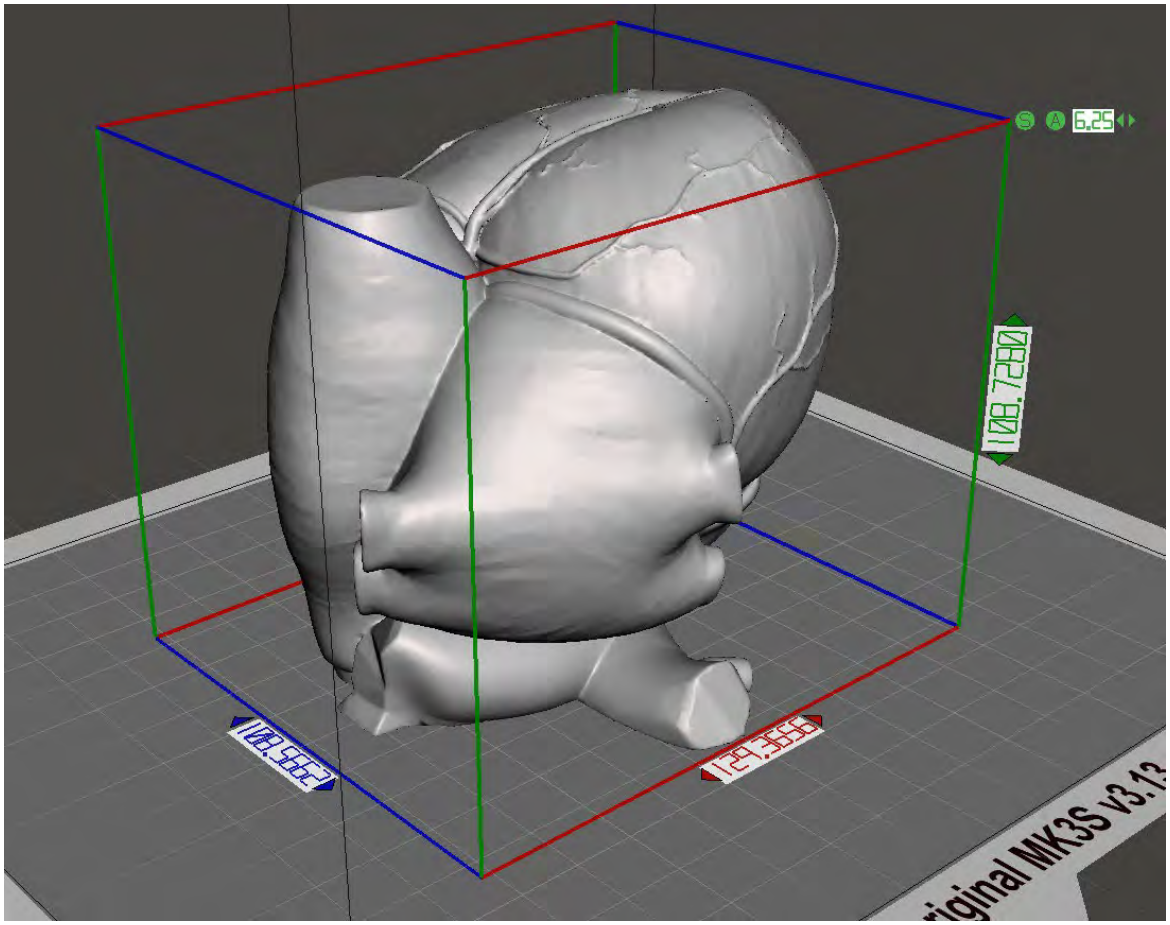
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be filaflex, colour clear. In addition, quality (ultradetail) request 0.07 mm. Infill pattern: Hilbert curve, 50%. Don't use supports.

Part dimension



X=129 mm; y= 108 mm: z = 108 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/anatomical_heart.zip

Questions to be solved:

1.- How do you orient the parts?

2.- How do you not generate supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:852939

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

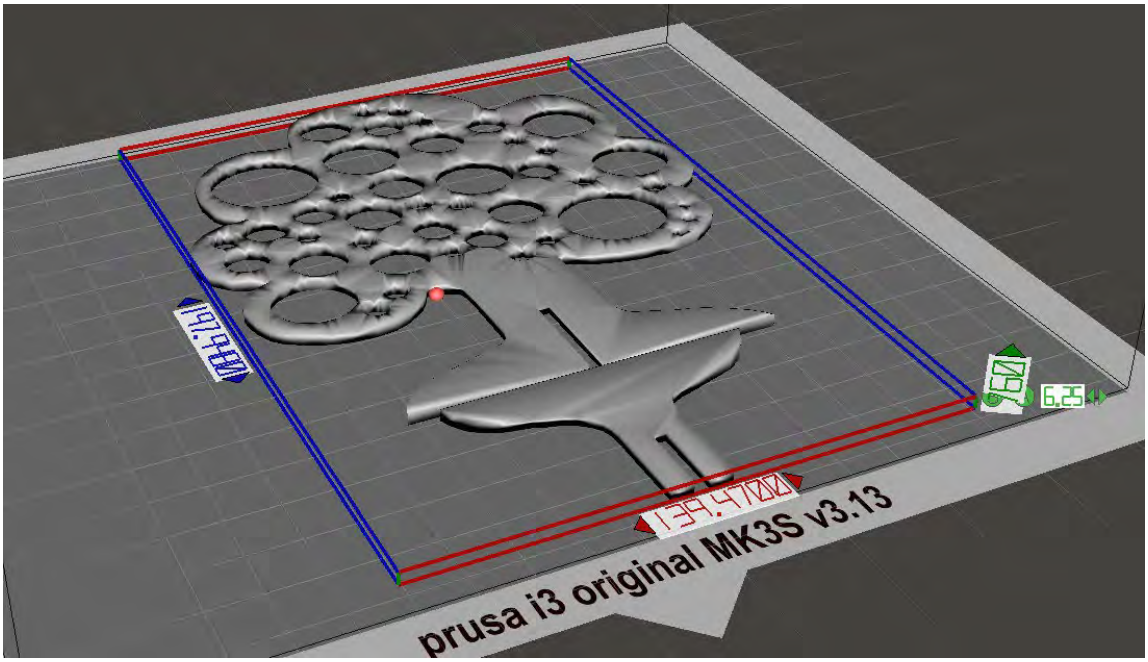
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour clear. In addition, quality (ultradetail) request 0.07 mm. Infill pattern: lineal, 90%. Don't use supports.

Part dimension



X=139 mm; y= 149 mm: z = 8 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Jewelry_Tree.zip

Questions to be solved:

1.- How do you print two complete parts?

2.- How do you not generate supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

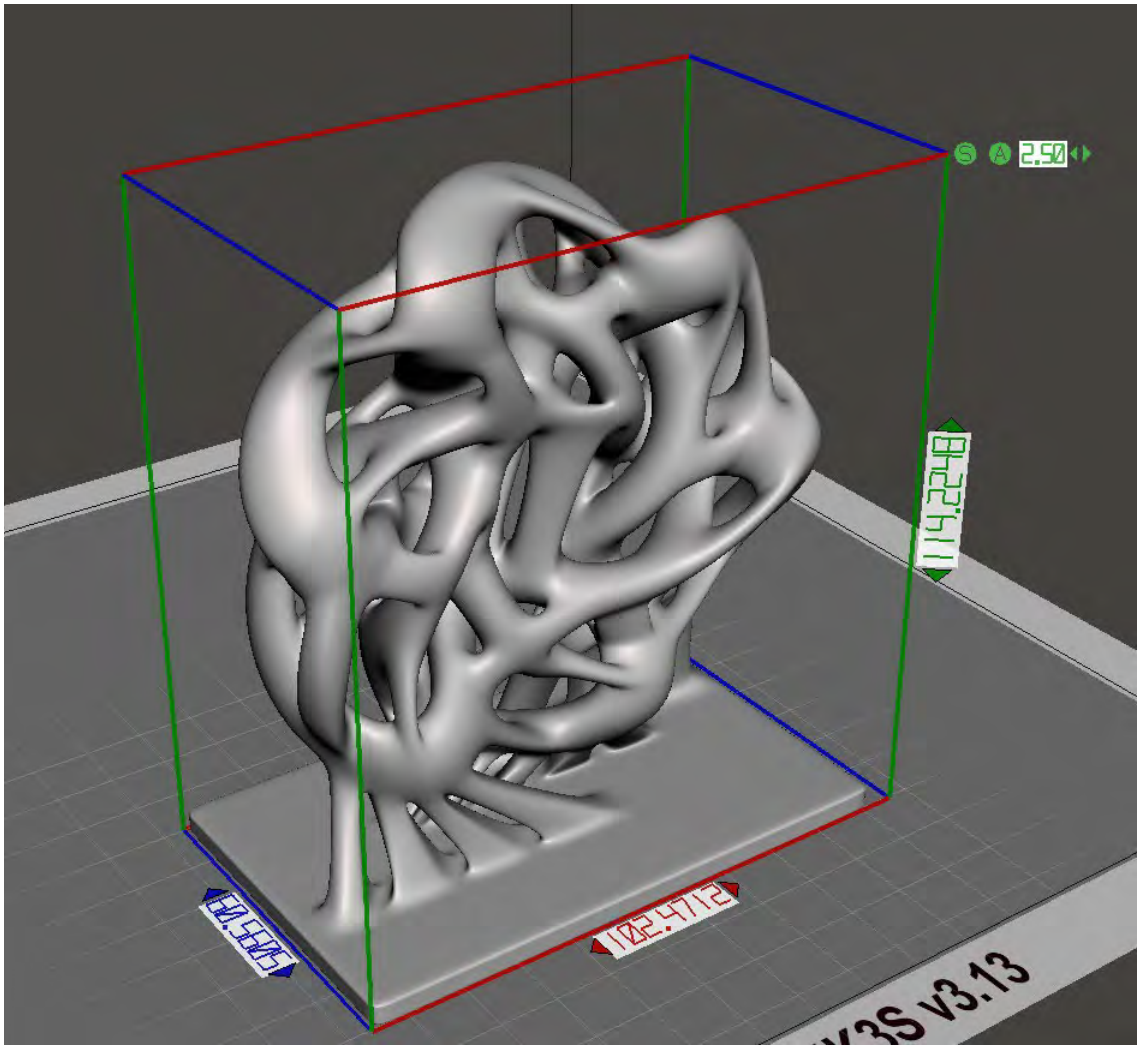
Objectives:

Explain how to select 3D printing materials and how to orient the part. Analyze if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour clear. In addition, quality (ultradetail) request 0.05 mm. Infill pattern: Hilbert curve, 70%. Don't use supports.

Part dimension



X=102 mm; y= 60 mm: z = 114 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Knot_Vortex.zip

Questions to be solved:

1.- How do you print the complete parts?

2.- How do you not generate supports?

3.- What is the time to print?

4.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:96354

Group members:

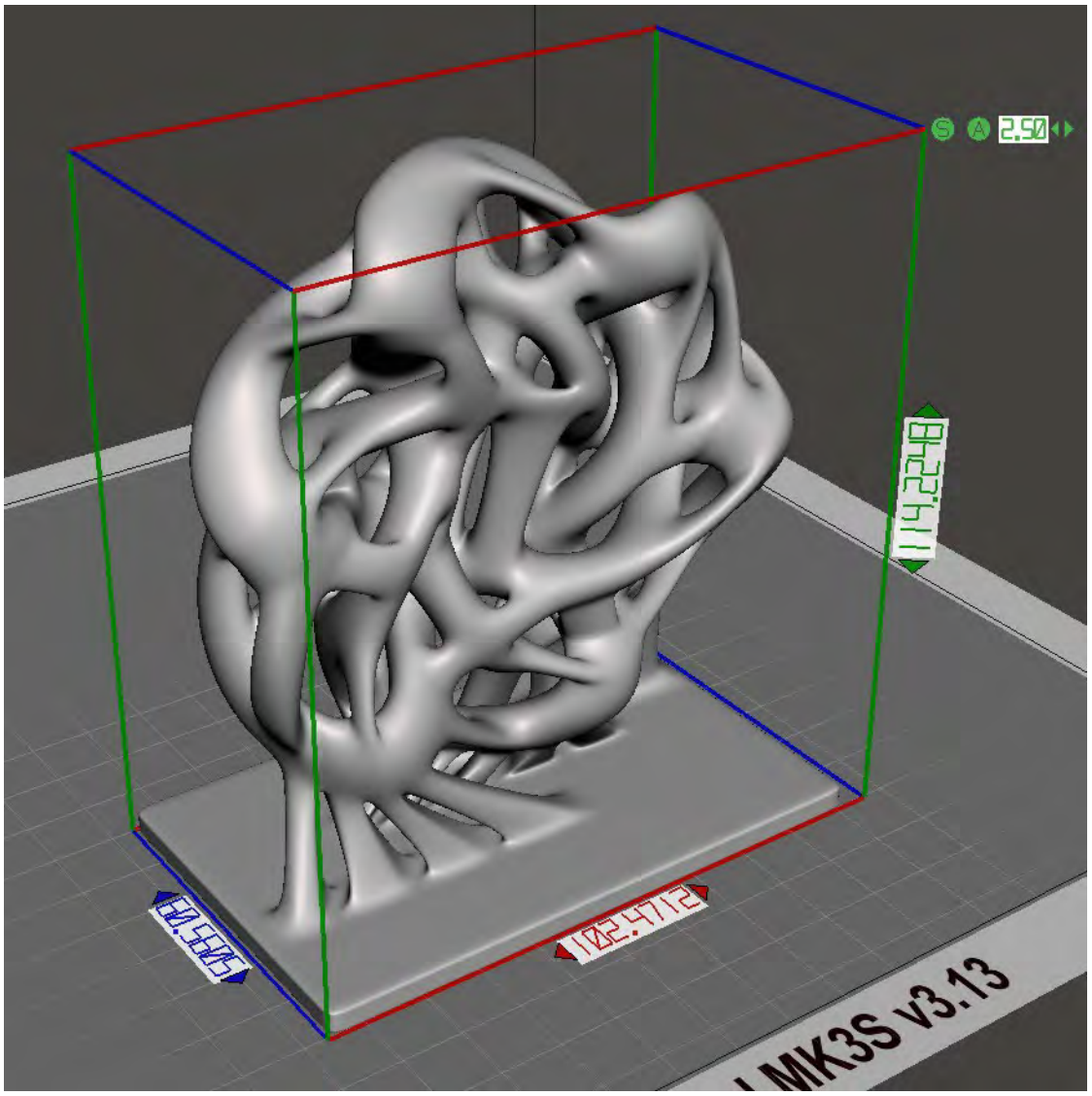
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

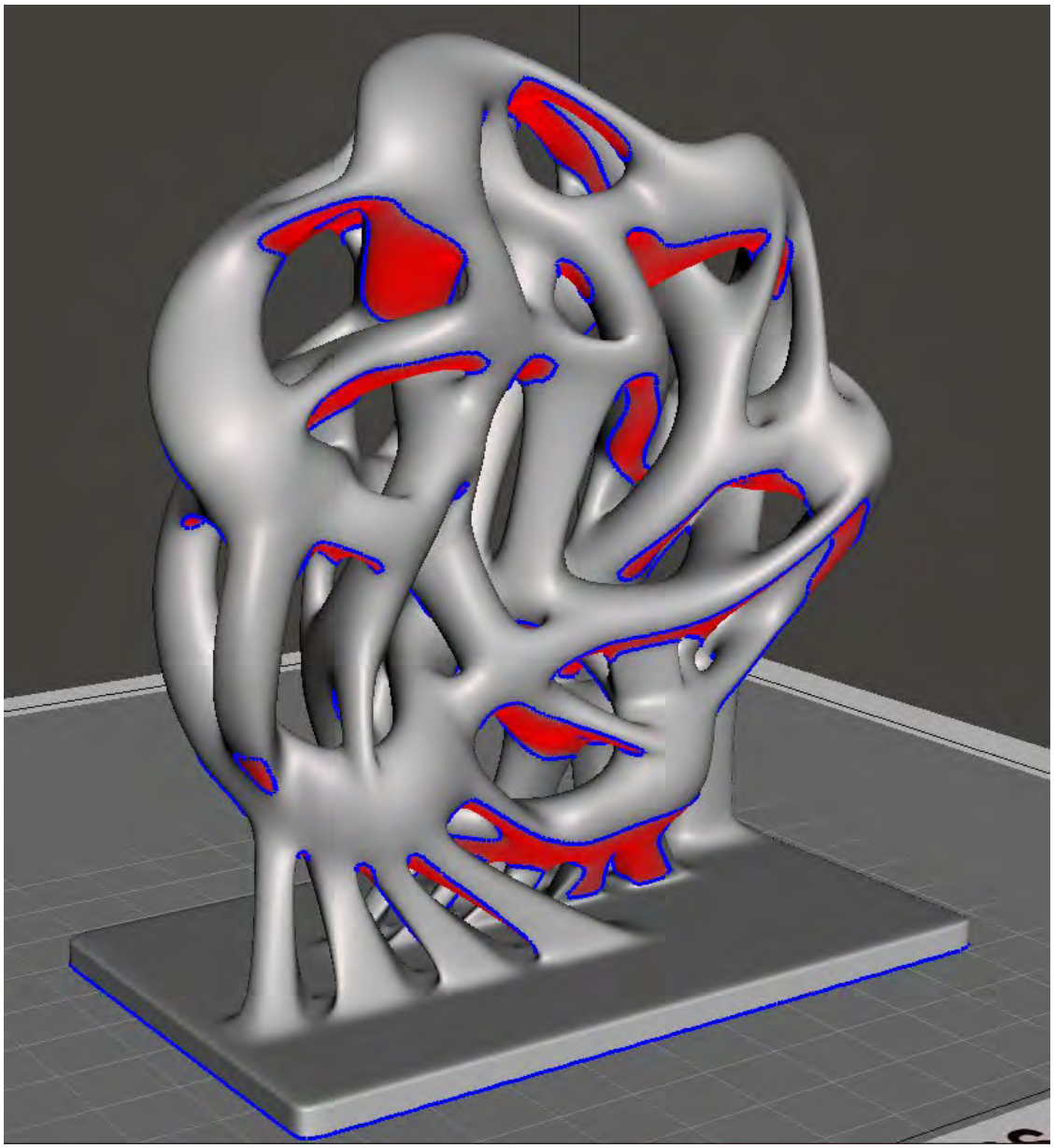
- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

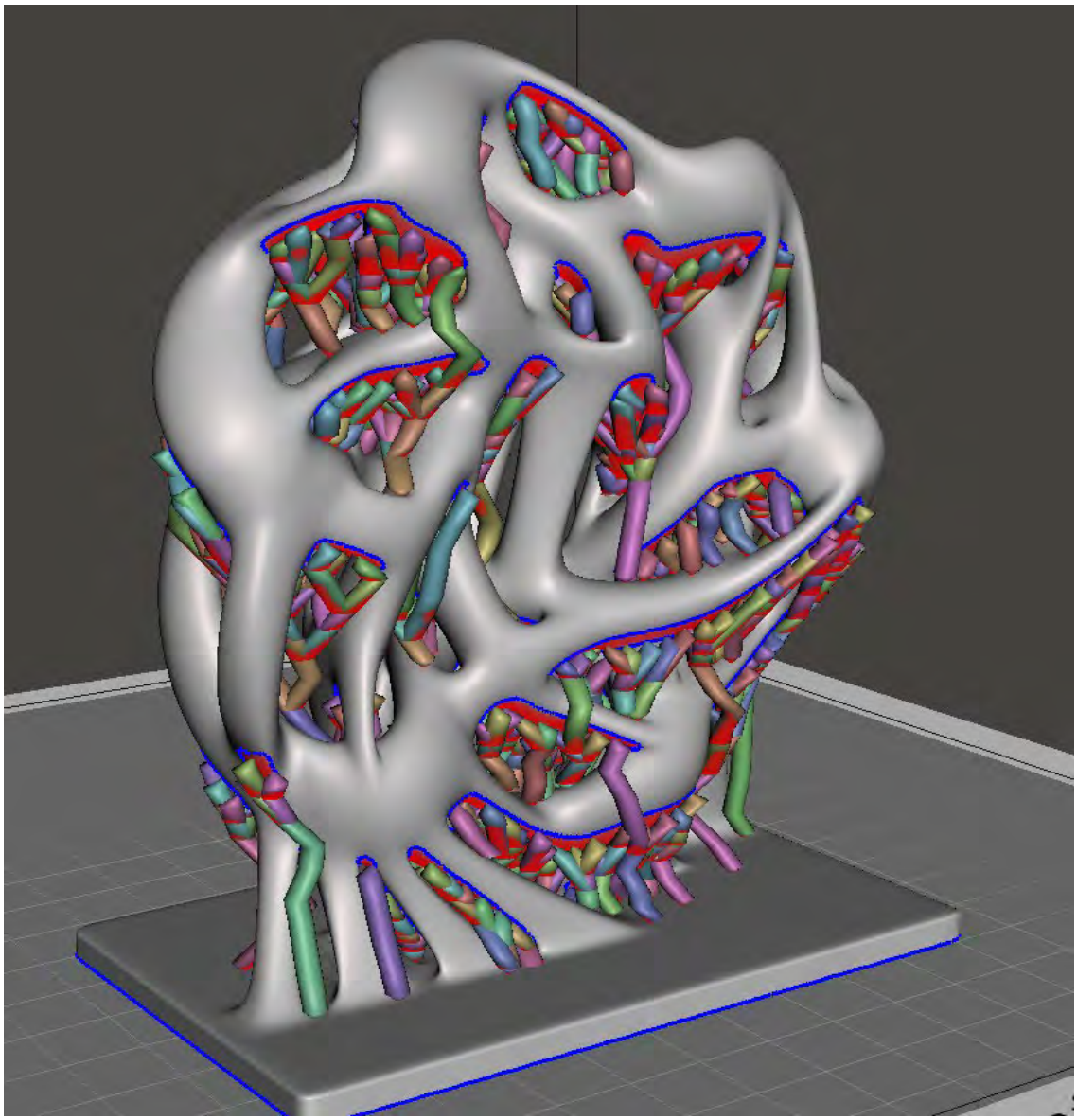
TO ORIENTATION DETERMINATION:

Detect how to orient part. Study of overhangs situations. Critical detection

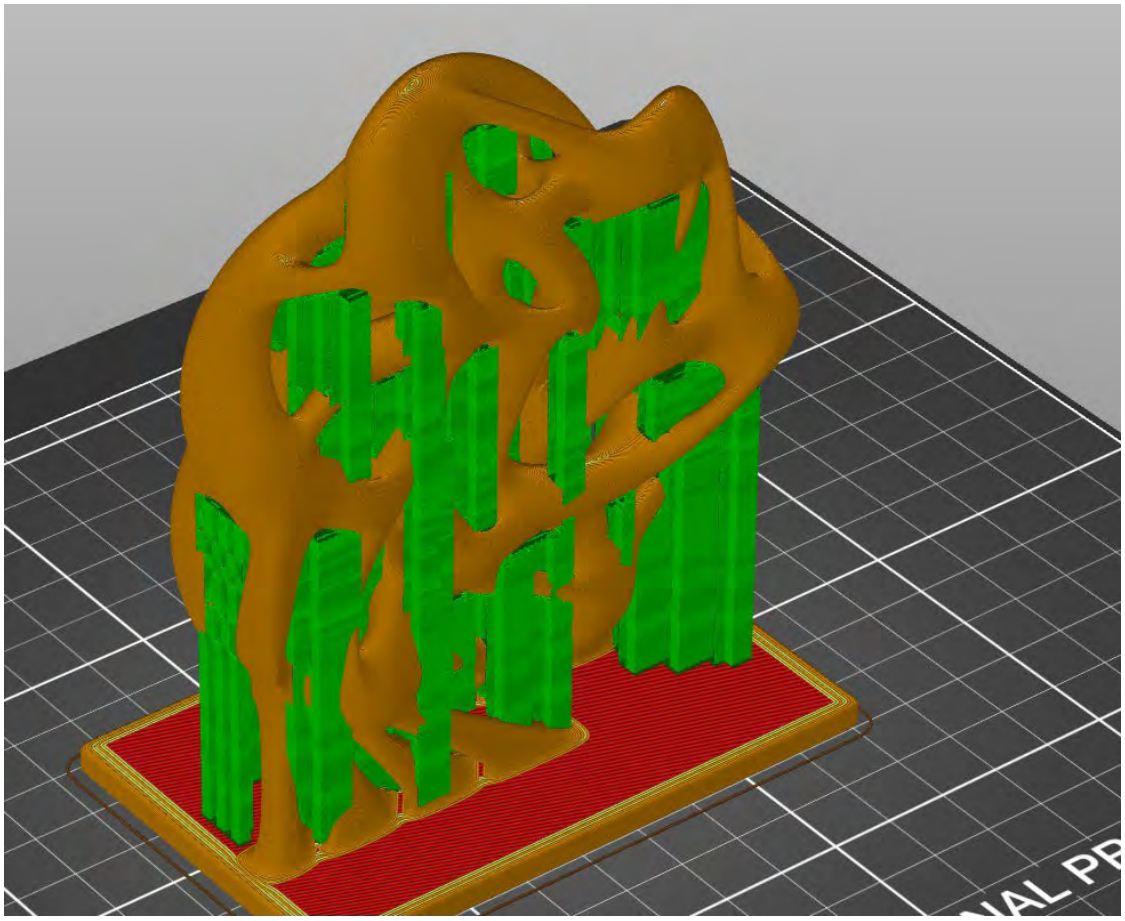


Possibilities

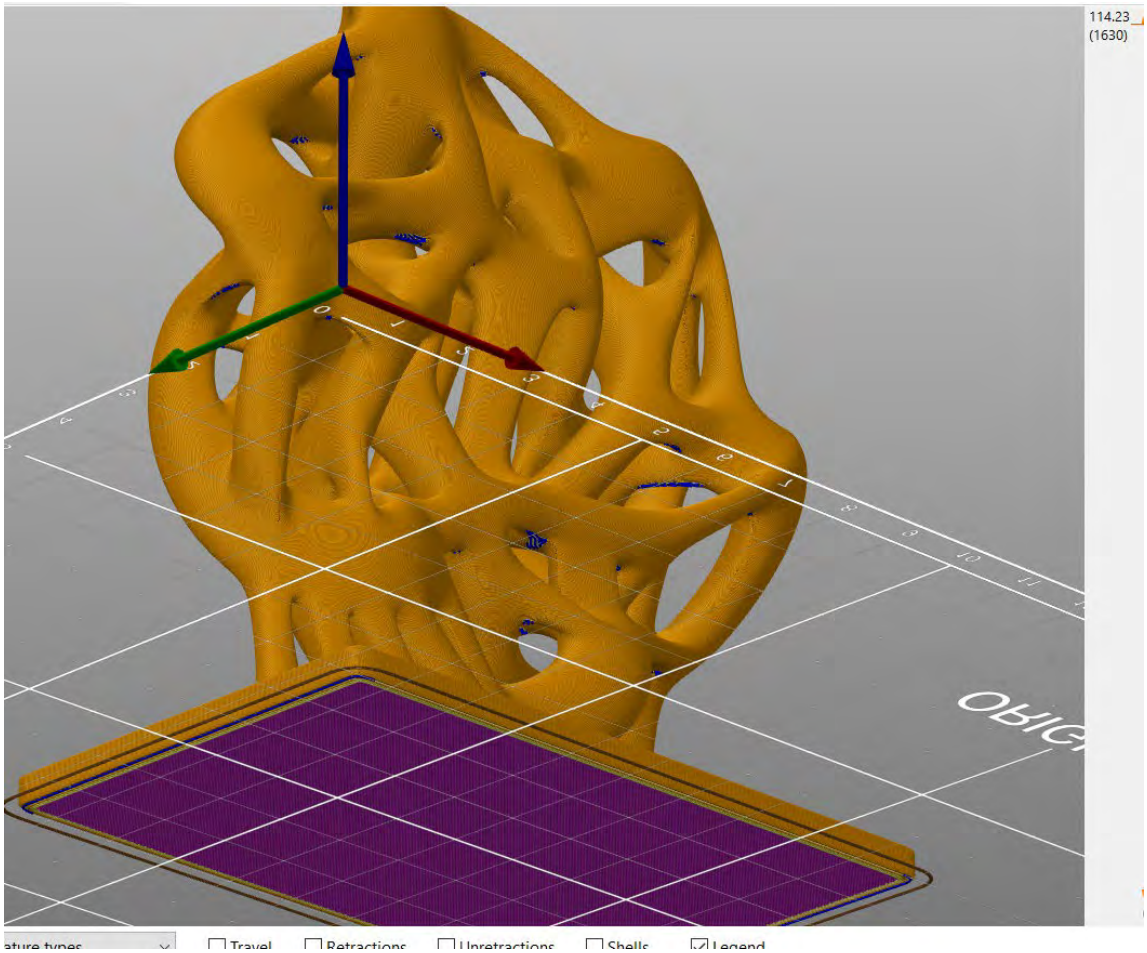




Everywhere option



On built plate only



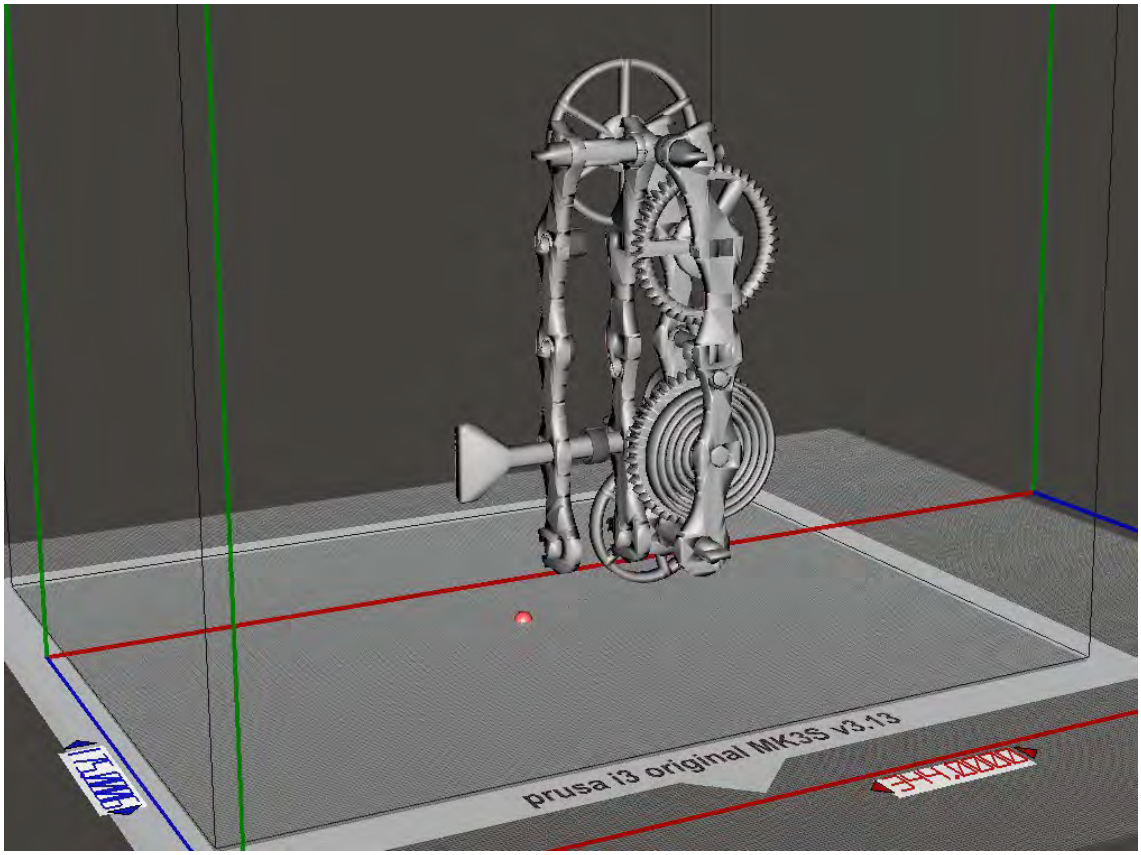
Objectives:

Explain how to select 3D printing materials and how to orient the part. Analyze if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be ABS, colour clear. In addition, quality (detail) request 0.10 mm. Infill pattern: rectangular, 50%. Don't use supports.

Part dimension



X=344 mm; y= 155 mm: z = 493 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Fully3D-printablewind-upcargiftcard.zip

Questions to be solved:

1.- How do you print the complete parts?

2.- How it's his distribution on the bed?

3.- How do you repair one faulty part?

4.- How do you not generate supports?

5.- What is the time to print?

6.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3308710

Group members:

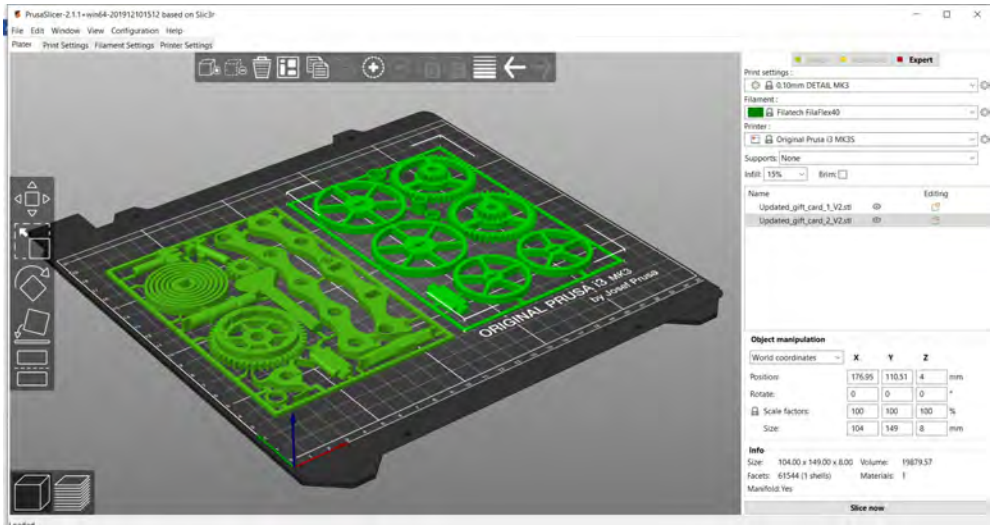
(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

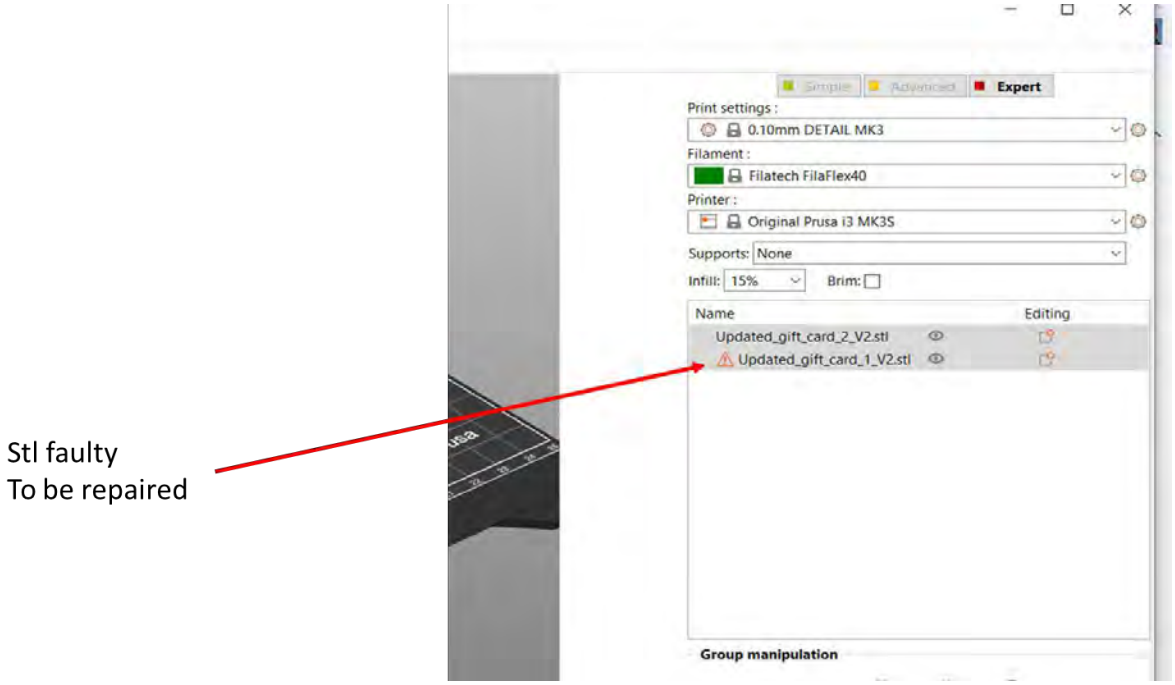
Objectives:

- Ability to select 3d printing materials
- Ability to select Part accuracy
- Skill to select Surface finish
- Skill to use slicing software (PrusaSlicer)
- Ability to programming printing parameters

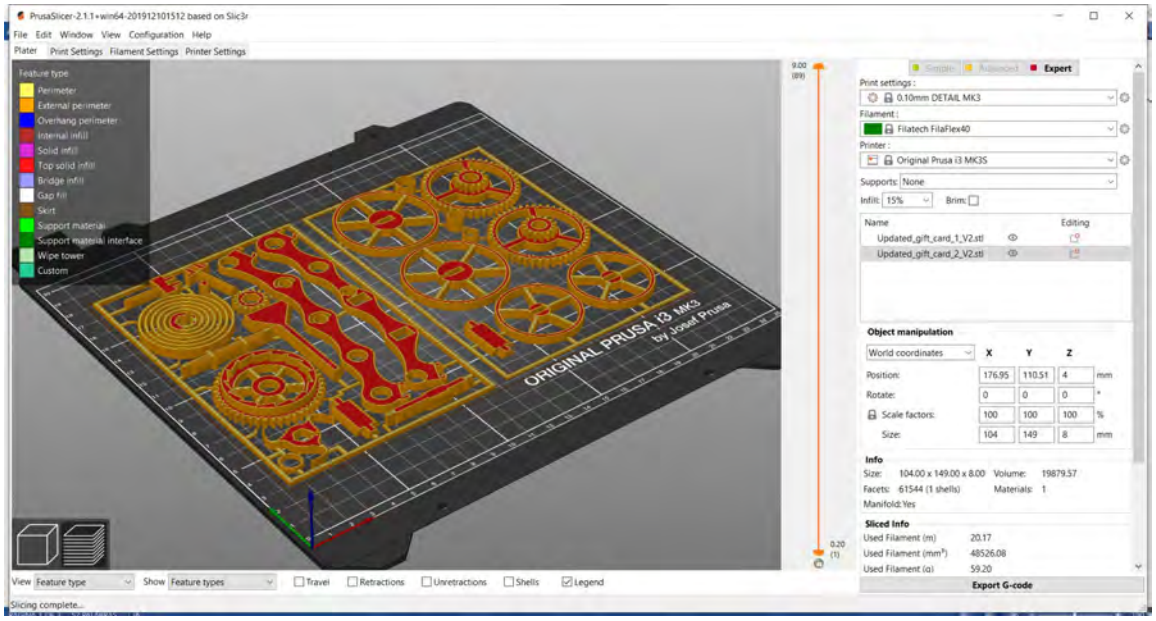
TO ORIENTATION DETERMINATION:

Detect how to orient part. Study of overhangs situations. Critical detection





Possibilities



Without supports

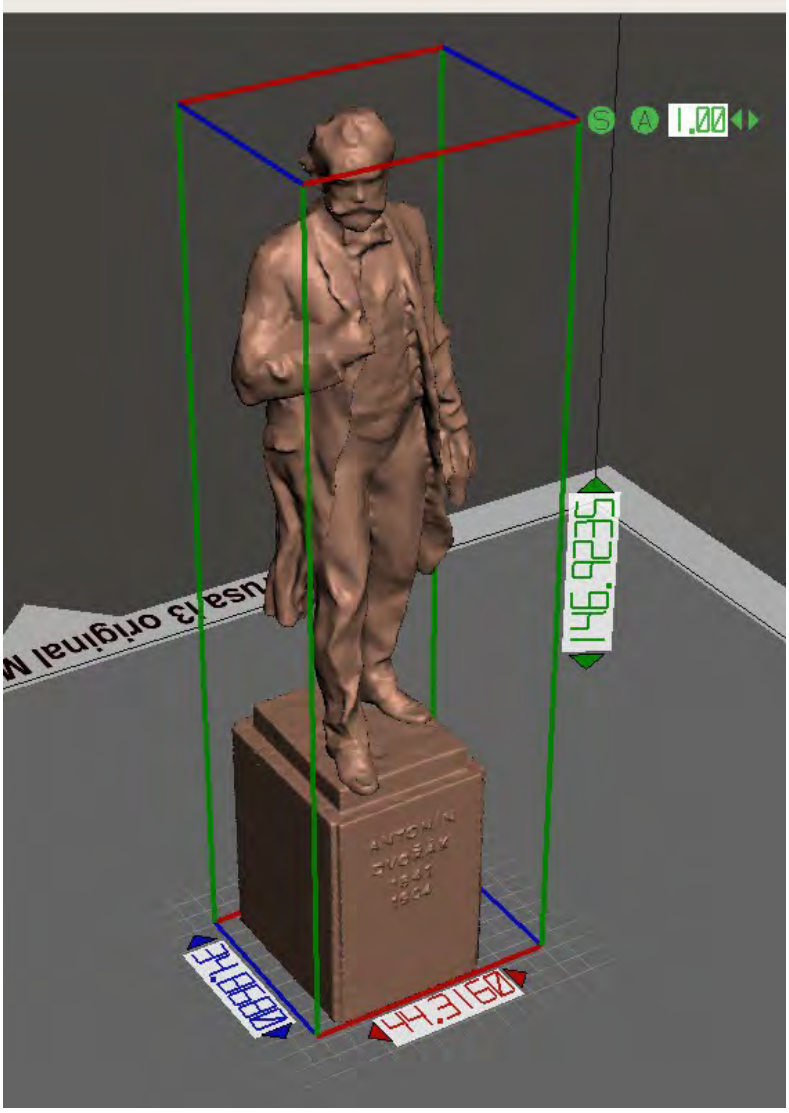
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC+ABS, colour clear. In addition, quality (detail) request 0.10 mm. Infill pattern: none. Don't use supports.

Part dimension



X=44 mm; y= 34 mm: z = 146 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/dvorak.zip

Questions to be solved:

1.- How do you print the complete parts without infill?

2.- How it's his wall thickness?

3.- How do you not generate supports?

4.- What is the time to print?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.prusaprinters.org/prints/159-antonin-dvorak-photogrammetry-scan#_ga=2.130976847.1346234595.1609841594-485828114.1609841593

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

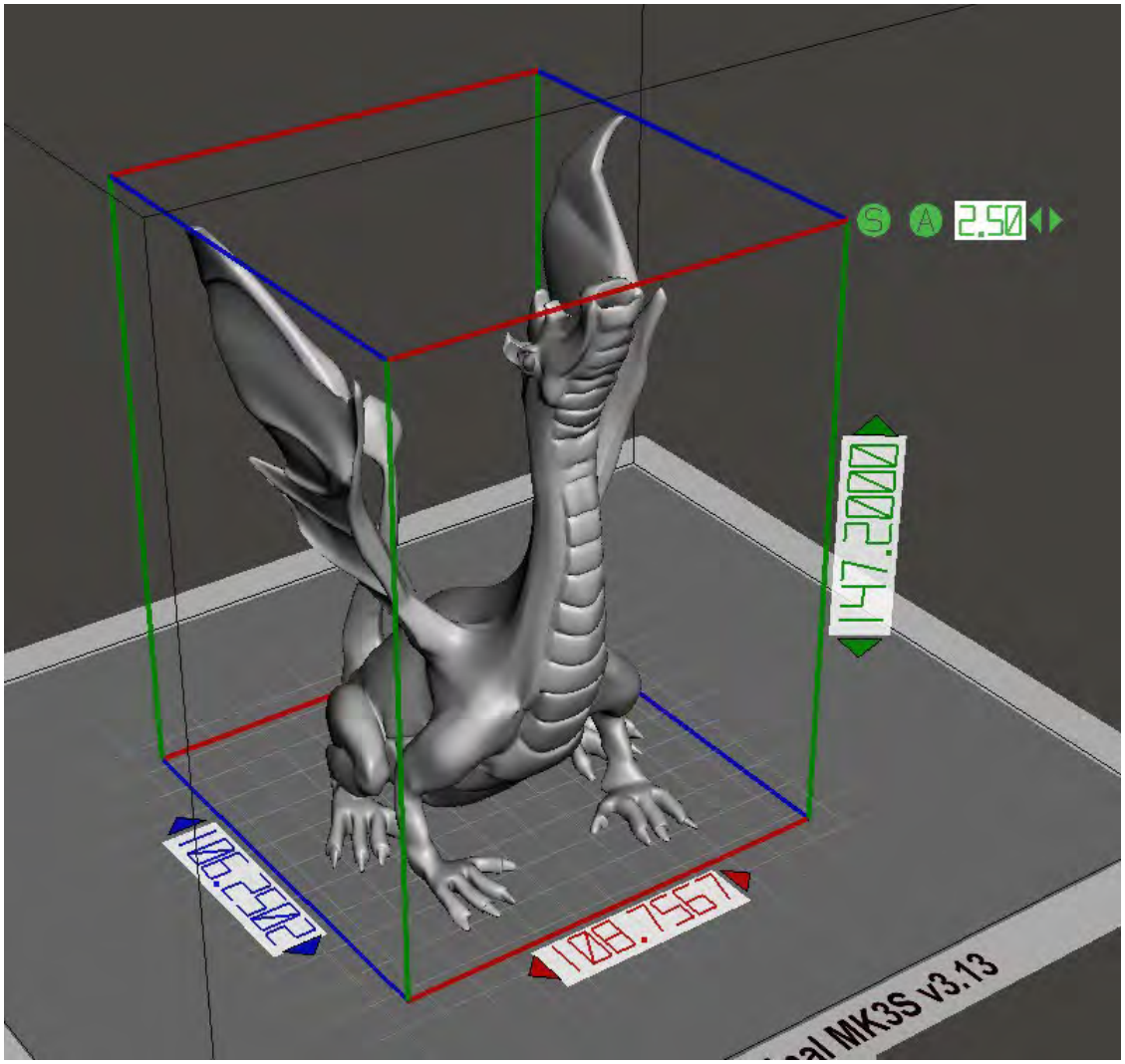
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale, cut the part or generate supports. Analyze how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC-max, colour green. In addition, quality (speed) request 0.15 mm. Infill pattern: octagram spiral. Density: 40%. Print duplicate parts.

Part dimension



X=108 mm; y= 106 mm: z = 147 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Adalinda.zip

Questions to be solved:

1.- How do you generate the minimum supports?

2.- How do you duplicate the part?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3897893

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

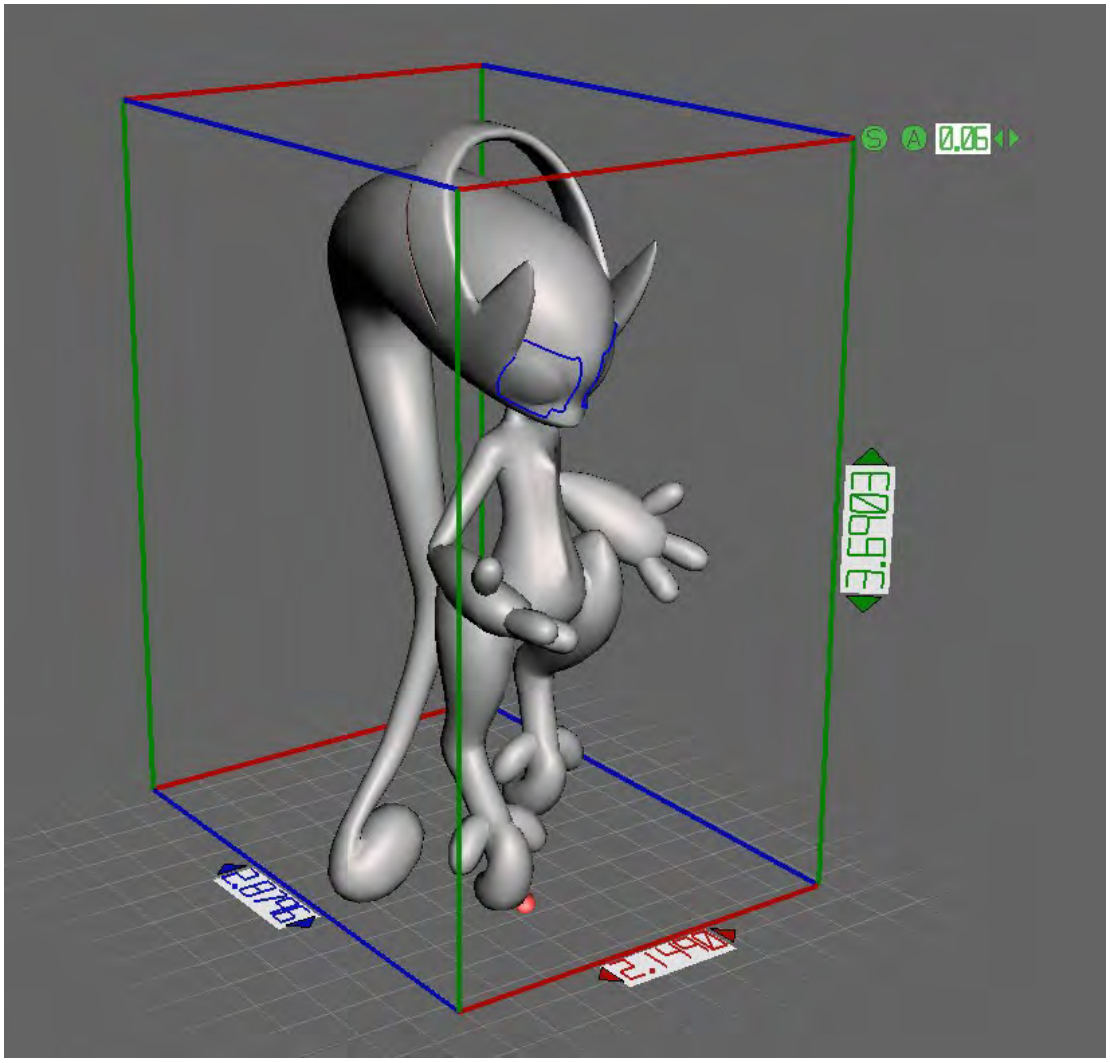
Objectives:

Explain how to select 3D printing materials and how to orient the part. Analyze if necessary to scale, cut the part or generate supports. Justify how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC-max, colour green. In addition, quality (speed) request 0.15 mm. Infill pattern: stars. Density: 40%. Print to scaled part to 2000%.

Part dimension



X=2 mm; y= 2 mm: z = 3 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Mega_Mewtwo_X_and_Y_With_Supports.zip

Questions to be solved:

1.- How do you generate the minimum supports?

2.- How do you to scale the part?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3143752/comments

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

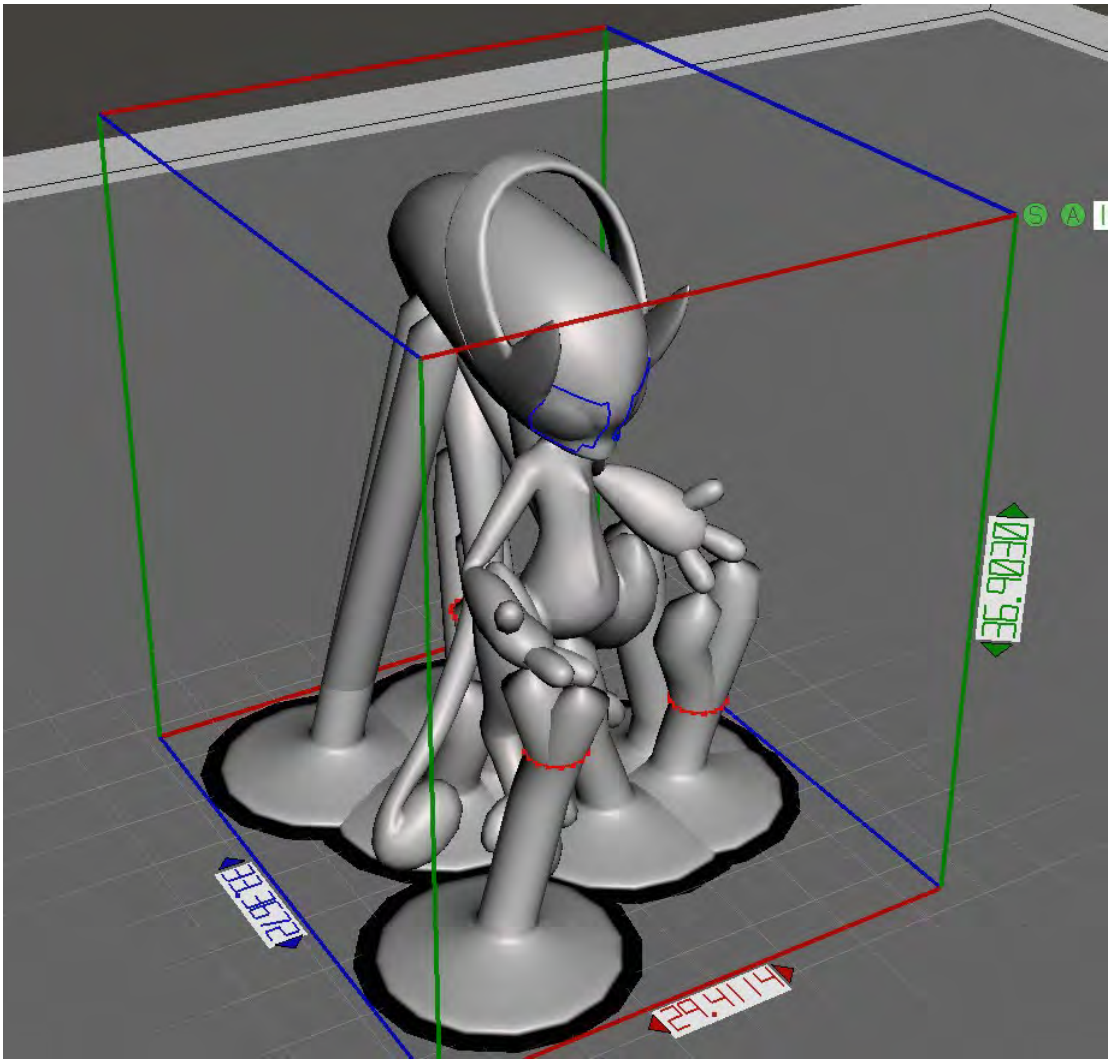
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale, cut the part or generate supports. Analyze how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC-max, colour green. In addition, quality (speed) request 0.15 mm. Infill pattern: stars. Density: 40%. Print to scaled part to 200%.

Part dimension



X=29 mm; y= 33 mm: z = 36 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Mega_Mewtwo_X_and_Y_With_Supports.zip

Questions to be solved:

1.- How do you generate the minimum supports?

2.- How do you scale the part?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3143752

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

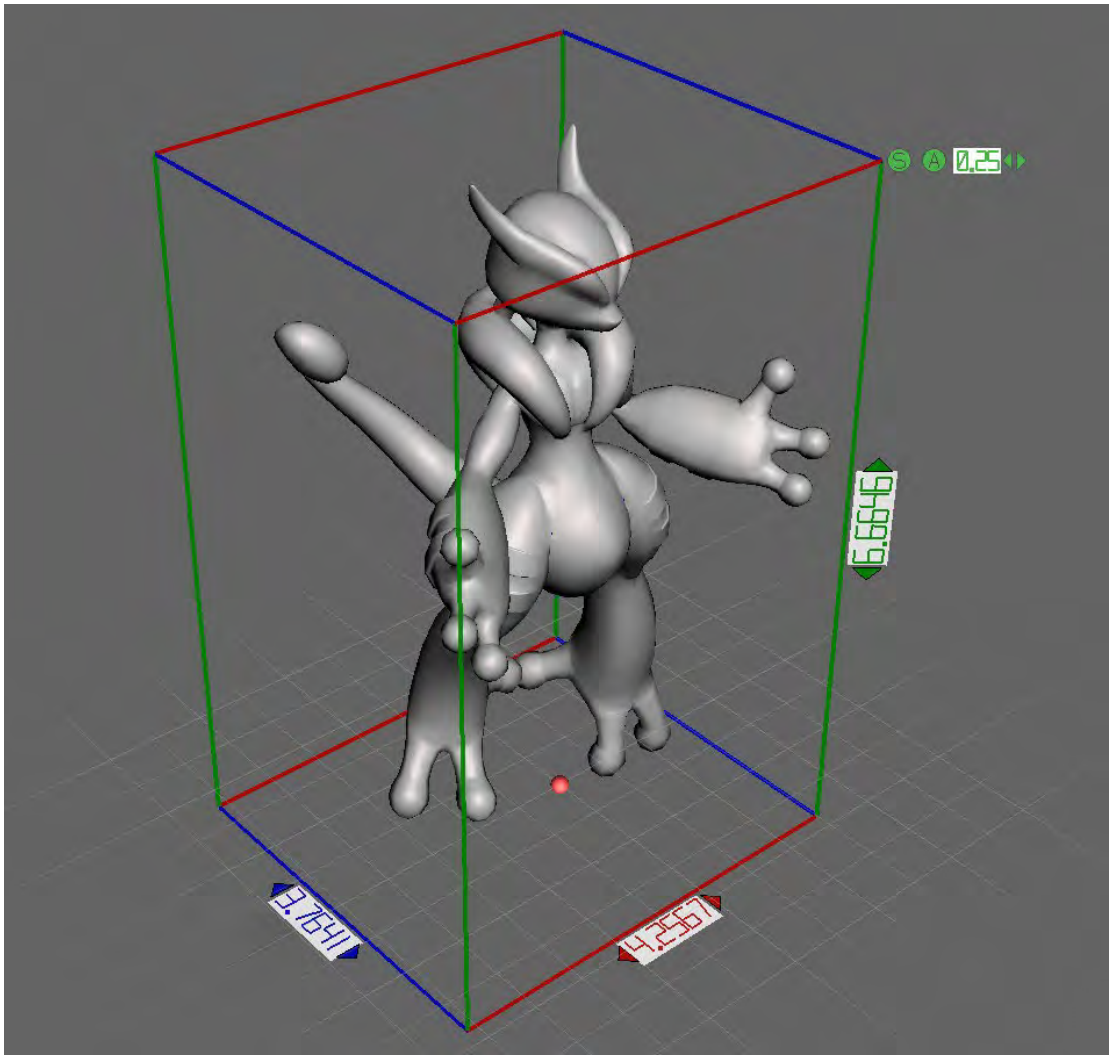
Objectives:

Explain how to select 3D printing materials and how to orient the part. Justify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PC-ABS, colour green. In addition, quality (speed) request 0.30 mm. Infill pattern: stars. Density: 60%. Print to scaled part to 1500%.

Part dimension



X=4 mm; y= 4 mm: z = 6 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Mega_Mewtwo_X_and_Y_With_Supports.zip

Questions to be solved:

1.- How do you generate the minimum supports?

2.- How do you scale the part?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

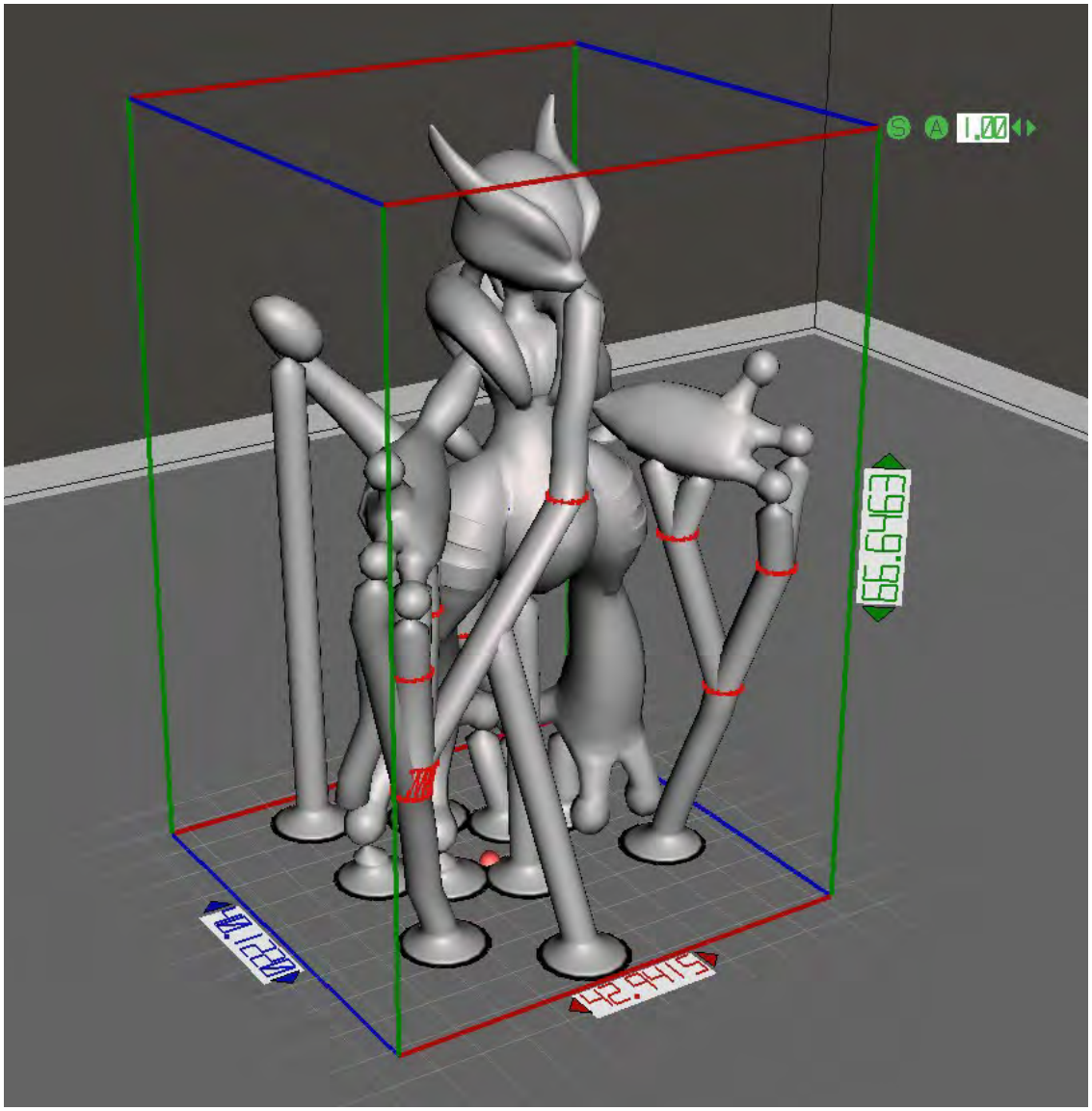
Objectives:

Explain how to select 3D printing materials and how to orient the part. Describe if necessary to scale, cut the part or generate supports. Analyze how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be filamentum cpe, colour green. In addition, quality (speed) request 0.20 mm. Infill pattern: stars. Density: 80%. Print to scaled part to 150%.

Part dimension



X=40 mm; y= 42 mm: z = 66 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Mega_Mewtwo_X_and_Y_With_Supports.zip

Questions to be solved:

1.- What is the tensile stress of the material?

2.- How do you scale the part?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:3143752

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour green. In addition, quality (speed) request 0.20 mm. Infill pattern: cubic. Density: 70%. Parts must be distributed on the optimized bed.

Part dimension

X=40 mm; y= 42 mm: z = 66 mm

Download file at: http://elblogdelplastico.blogs.upv.es/files/2019/12/Traction_Engine.zip

Questions to be solved:

1.- What is the best optimized parts distribution?

2.- How many loads do you need, in order to complete the traction engine?

3.- What is the printing time?

4.- How many grams will be used?

5.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:1530768

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

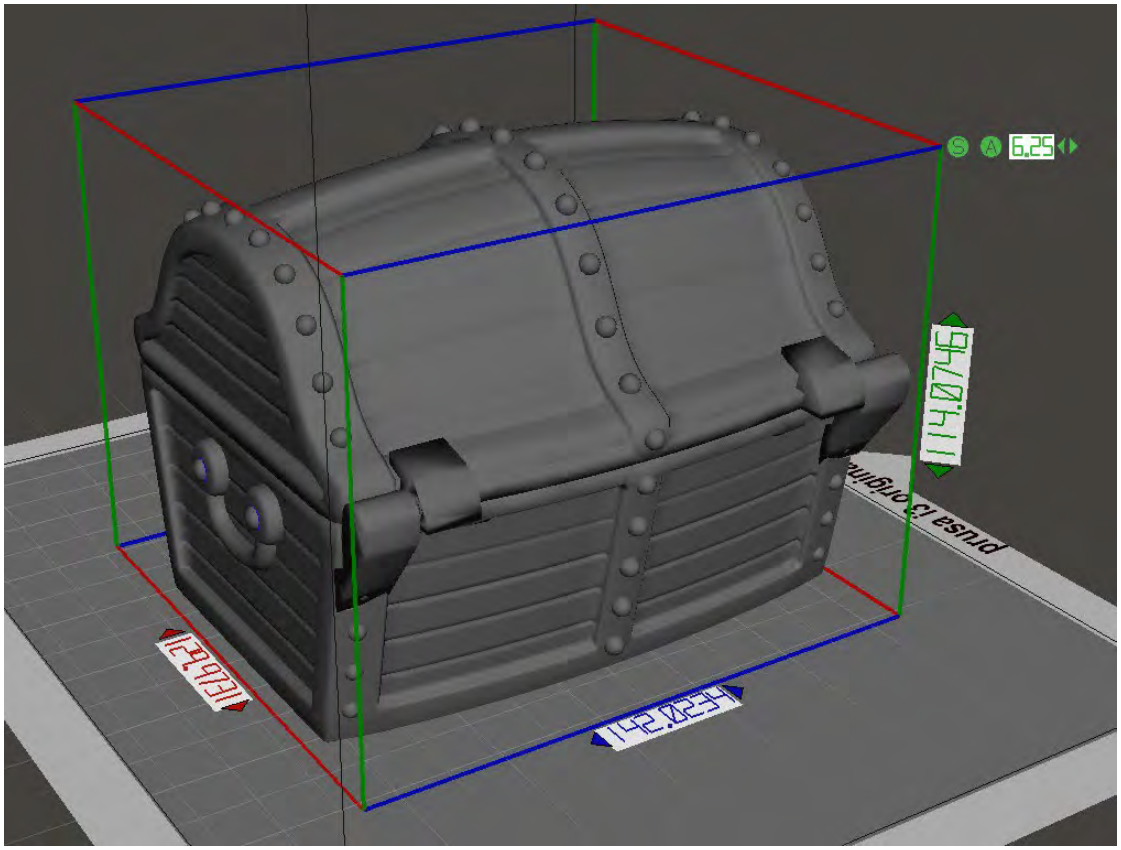
Objectives:

Explain how to select 3D printing materials and how to orient the part. Clarify if necessary to scale, cut the part or generate supports. Describe how to select Part accuracy and how to use slicing software (PrusaSlicer) to scale, move and generate g code of the part.

Problem definition:

A maker asks us to print the part of the image below. Material specification will be PLA, colour grey. In addition, quality (quality) request 0.01 mm. Infill pattern: lineal. Density: 20%. Parts must be distributed on the optimized bed.

Part dimension



X=142 mm; y= 129 mm: z = 114 mm

Download file at:
http://elblogdelplastico.blogs.upv.es/files/2019/12/Treasure_Chest_Remix.zip

Questions to be solved:

1.- What is the best optimized parts distribution?

2.- How many loads do you need, in order to complete the traction engine?

3.- What is the printing time?

4.- What about the supports?

5.- How many grams will be used?

6.- How much it costs (€)?

References:

https://manual.prusa3d.com/c/English_manuals

IO_3.pdf

https://www.thingiverse.com/thing:1738724

Group members:

(1) DEFINE the question carefully: what are you trying to find out?	
(2) EXPLORE possible solutions. List these below.	(3) NARROW your choices: weed, sort, prioritize
(4) TEST your ideas: obtain further information.	
(5) CONCLUSION: Write a conclusion that draws upon lab test results. Your Instructor may request that your conclusion employ specific technical terms.	

Objectives:

Explain how calibrate the printer.

Problem definition:

“At the start of the XYZ calibration procedure the printer homes the X and Y-axis. After that, the Z-axis will begin to move up until both sides touch the printed parts at the top. Please make sure the print head went all the way up the Z-axis and that you heard a rattling sound as the Z stepper motors skip steps. This procedure ensures, that 1) the X-axis is perfectly horizontal, 2) the print nozzle is in a known distance from the print bed. If the print head did not touch the end stoppers at the top of the Z-axis, the printer could not possibly know the distance the print nozzle is from the print bed and it could, therefore, crash into the print bed during the first round of the X/Y calibration procedure.

The printer also checks the temperature of the PINDA probe. The XYZ calibration procedure also prompts you to -Please clean the nozzle for calibration. Click when done-.

Calibrate Z is located in the LCD Menu - Calibration - Calibrate Z . It is always done with the steel sheet on. It should be performed whenever you move the printer to a different location. It saves the heights of all 9 calibration points in non-volatile memory. The stored information is used every time mesh bed levelling is called during a print. When the measured values are vastly different from the stored values, the print is cancelled because it is a good indicator something is wrong. Calibrate Z is a part of the routine Calibrate XYZ so there’s no need to run it after a successful Calibrate XYZ. It is a good practice to run this procedure every time you travel with the printer or the printer is shipped the geometry might change slightly and cause an error.

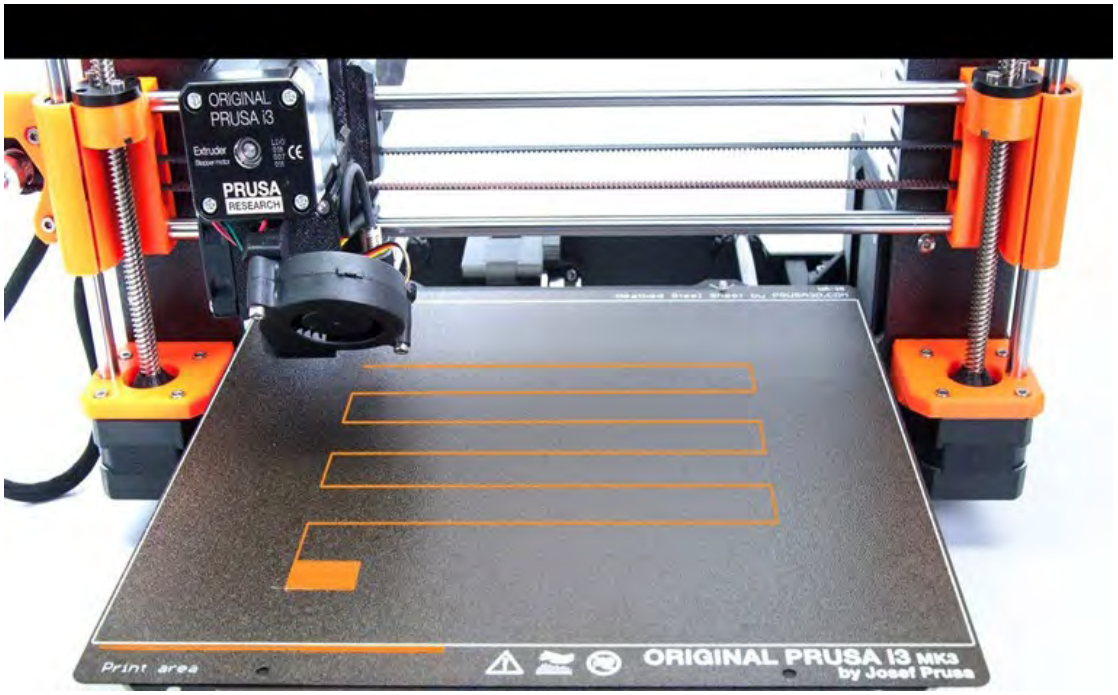
At the start of the Z calibration procedure the printer homes X and Y-axis. After that, Z-axis will begin to move up until both sides touch the printed parts at the top. Please make sure the Z-axis went all the way up and you heard a rattling sound as the Z stepper motors skip steps. This procedure ensures, that 1) the X-axis is perfectly horizontal, 2) the print nozzle is in a known distance from the print bed. In case the Z carriage did not touch the end stoppers, the printer could not possibly know the height of the print nozzle above the print bed and it could, therefore, crash into the print bed during the Z calibration procedure.

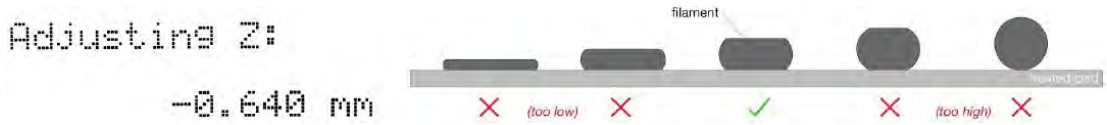
The Z calibration procedure also prompts you to "Please clean the nozzle for calibration. Click when done." (1)

First layer calibration.

Now we will finally calibrate the distance between the tip of the nozzle and the probe. Check if your print surface is clean! You can find instructions on how to clean it in the chapter 6.3.2 Flexible steel sheet surface preparation. Don't forget to complete 6.3.5 Calibrate XYZ chapter or you can permanently damage the print surface!

You can launch the calibration from LCD Menu - Calibration - First layer cal. The printer will probe the bed and start printing a zig-zag pattern on the print surface. The nozzle will be at the height based on the PINDA probe setting, it must not by any means touch the printing surface.





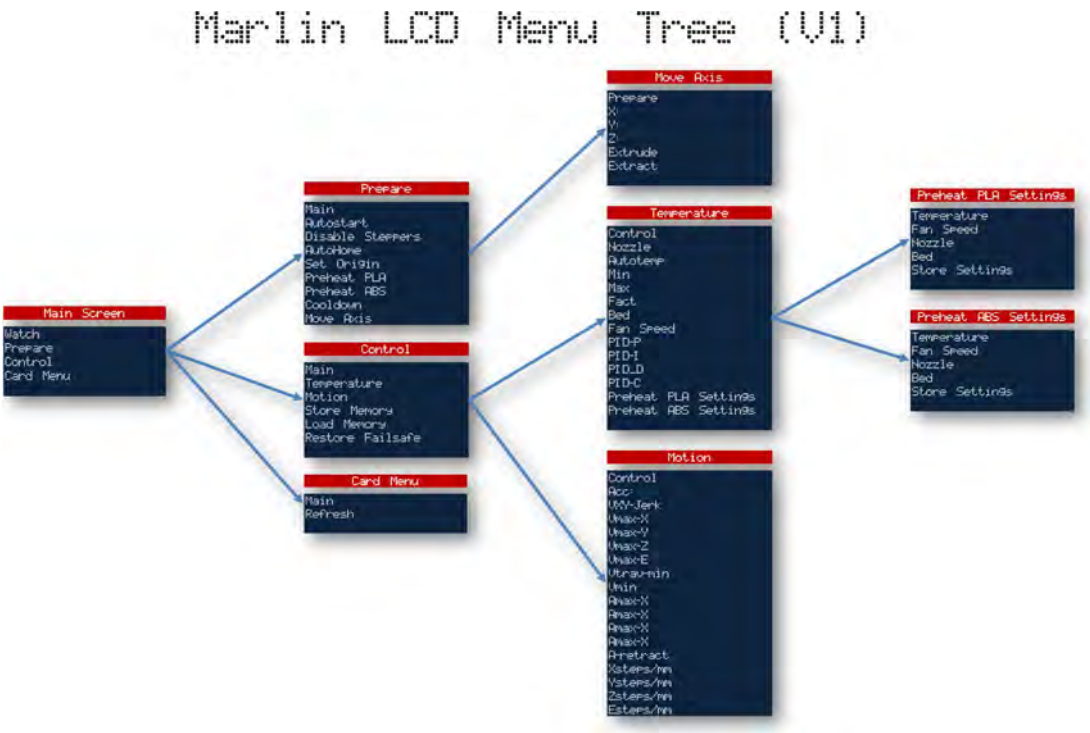
Pict. 10 - How to tune the nozzle height live during the test print. Note: -0.640 mm is only for illustration. Your setting will be different!

Observe the line which is being extruded on the print surface. A new menu will automatically show up where you can tune the nozzle height in real time by turning the knob. The aim is to adjust the nozzle height until the extruded plastic sticks nicely to the bed and you can see that it is being slightly squished. The value should not exceed -2.000 mm. If you have to adjust it more (e.g. -2.500), move the P.I.N.D.A probe slightly higher. Please refer to our knowledge base in case the P.I.N.D.A probe needs to be re-aligned. (1)

(1) Prusa3d manual

https://www.youtube.com/watch?v=GE-lrRbU124#action=share


GUIDE FOR A NEW USER
PRUSA RESEARCH
by JOSEF PRUSA
MK3
EVERYONE IS A MAKER ONLY I AM A PRINTER
PRUSA
0:00 / 13:30


Marlin LCD Menu Tree (V1)
Main Screen
Watch
Prepare
Control
Card Menu
Prepare
Main
Autostart
Disable Steppers
AutoHome
Set Origin
Preheat PLA
Preheat ABS
Cooldown
Move Axis
Control
Main
Temperature
Motion
Store Memory
Load Memory
Restore Failsafe
Card Menu
Main
Refresh
Move Axis
Prepare
X
Y
Z
Extrude
Extract
Temperature
Control
Nozzle
Autotemp
Min
Max
Fact
Bed
Fan Speed
PID-P
PID-I
PID-D
PID-C
Preheat PLA Settings
Preheat ABS Settings
Motion
Control
Acc
Vmin
Vtrav-min
Amax-X
Amax-X
Amax-X
Amax-X
A-retract
Xsteps/mm
Ysteps/mm
Zsteps/mm
Esteps/mm
Preheat PLA Settings
Temperature
Fan Speed
Nozzle
Bed
Store Settings
Preheat ABS Settings
Temperature
Fan Speed
Nozzle
Bed
Store Settings

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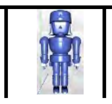
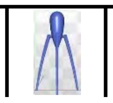
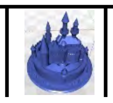
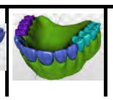
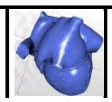
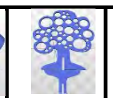
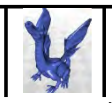
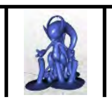
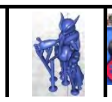
skills to be acquired	PBL1	PBL2	PBL3	PBL4	PBL5	PBL6	PBL7	PBL8	PBL9	PBL10	PBL11	PBL12	PBL13	PBL14	PBL15	PBL16	PBL17	PBL18	PBL19	PBL20	PBL21	PBL22	PBL23	PBL24	PBL25	PBL26	PBL27	PBL28	PBL29	PBL30	PBL31	PBL32
																																
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About the 3D printing technologies																																
Ability to select 3d printing technologies																			X			X										
Ability to recognize technologies build size	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skills to recognize dimensional Accuracy on 3D printing technologies							X X X X X X																									
Capacity to select between conceptual design, embodiment design (form, fit and function) or detailed design							X	X	X	X	X	X	X	X	X	X	X	X	X					X								
About the 3D printing materials																																
Ability to select 3d printing materials		X															X								X						X	
Skill to recognize mechanical properties like ease of printing, Visual quality, Max stress, Elongation at break		X																														
Skill to recognize mechanical properties like Impact resistance, layer adhesion (isotropy), Heat resistance																			X					X							X	
Ability to select Part accuracy			X		X					X	X		X				X	X	X					X	X			X		X		
Skill to select Surface finish																												X		X		X
Skill to select material post processing													X				X	X														
Ability to select cold welding procedures									X	X	X		X				X								X							
About the 3D printing process data																																
Demonstrated ability to recognize STL, AMF, 3MF, PLY, OBJ input files	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ability to recognize technologies estimation built time		X															X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ability to use STL repairing software, Netfabb, Cura, Simplify3D, Slic3r prusa, Pronterface, Repetier Host, Meshmixer, Meshlab, Magics, Deskartes.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skill to use slicing software Netfabb, Cura, Simplify3D, Slic3r prusa, Pronterface, Repetier Host, Meshmixer, Meshlab, Magics, Deskartes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skill to manage Print Quality Troubleshooting Guide	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ability to recognize 3d printing glossary and terminology	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skill to manage closed surfaces/solids				X						X																						
Ability to use platform built simulators				X						X																						
Skill to manage booleans operations, symmetry, to scaled, duplicated parts with dedicated software	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ability to programming printing parameters (Hotend diameter, slicing layer, skirt, dual printing, Hotend material to selection, supports to orientation, infill and form density)(11)						X X X X X X X X X X X X X X X X X X X X X																										
About the 3D printing desktop layout																																
Ability to recognize technologies build size			X						X	X	X					X	X							X							X	
Ability to recognize dimensional										X						X	X															
Accuracy on 3D printing technologies																	X															
Ability to work with network printers or estandalone																	X															
Skill to make 3d printer configurations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skill to make 3d printer calibration																							X	X	X						X	
Attitude to built 3d printed part cost estimation																X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Attitude to solve print Quality troubleshooting																																
Skill to change 3d print materials																	X															
About the 3D printing post- Processing																																

| | | |