

FreeCAD

Uma plataforma de design hackeável

Yorik van Havre FISL16 - 2015

Por favor tuitem com #FreeCAD

Interrompa quando quiser

Perdoe os erros de português (e as piadas prontas)

PDF desta palestra em http://yorik.uncreated.net

Yorik van Havre

Arquiteto (de casas, não de informação!), e um dos desenvolvedores do FreeCAD

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http://www.uncreated.net

http://www.freecadweb.org

Homepage com downloads, etc

Documentação (wiki)

Forum MUITO legal (← vá la!)

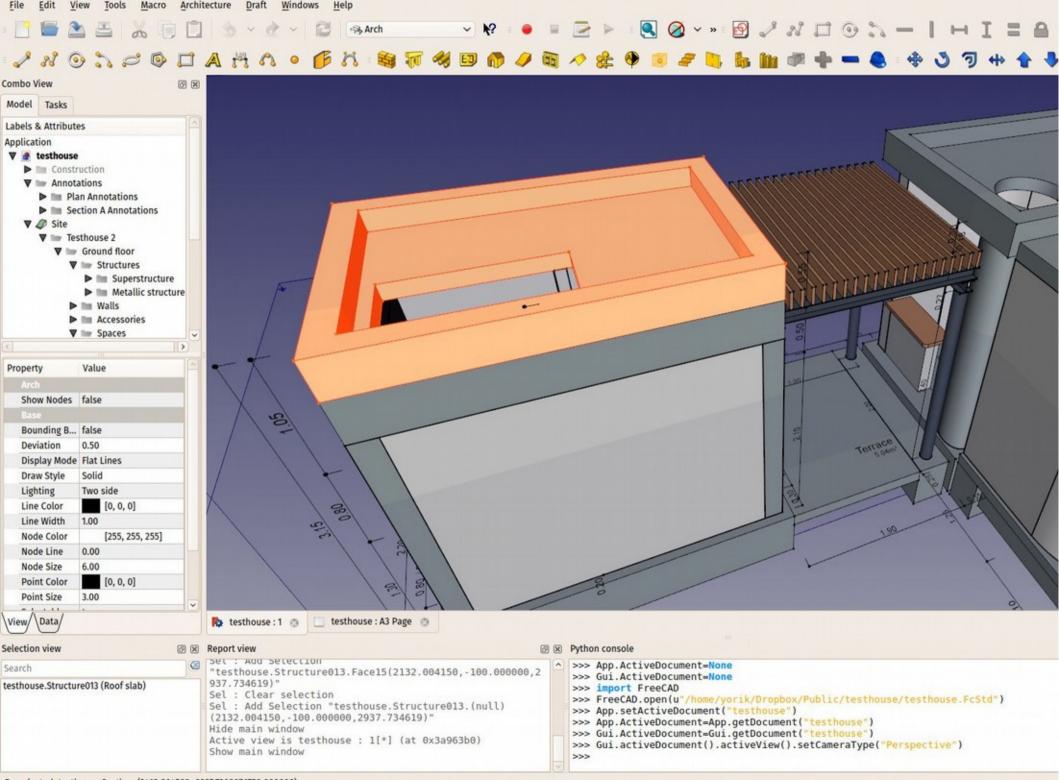
Bug tracker

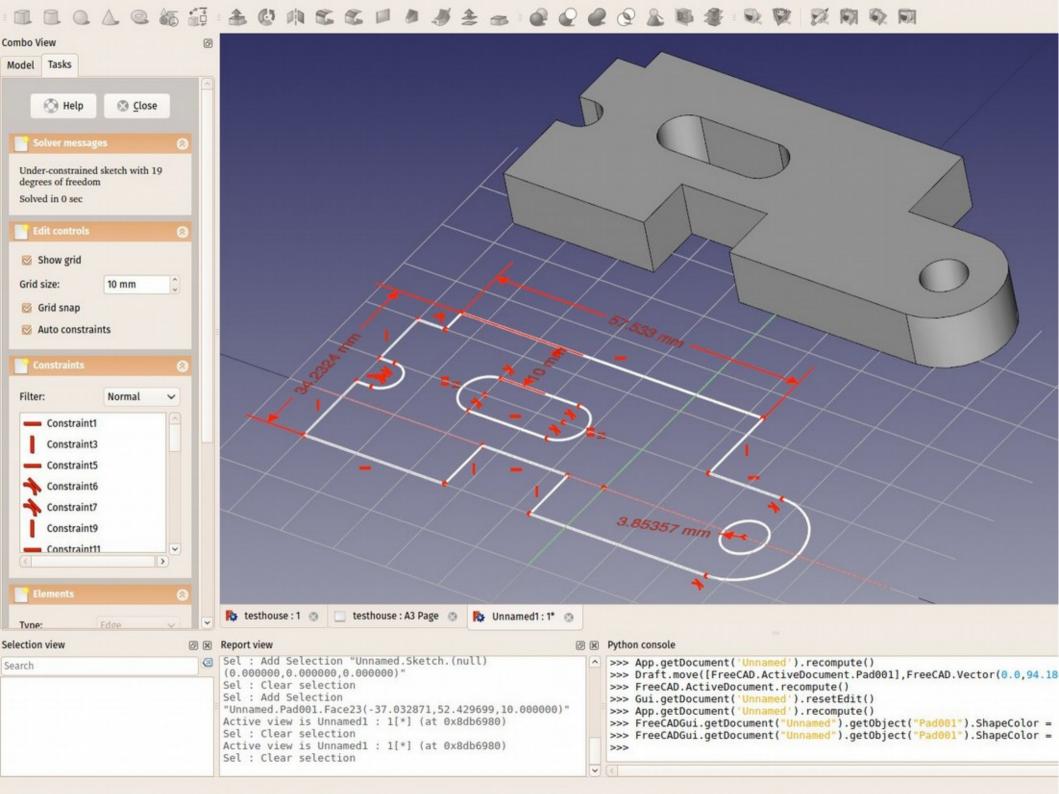
O que é o FreeCAD

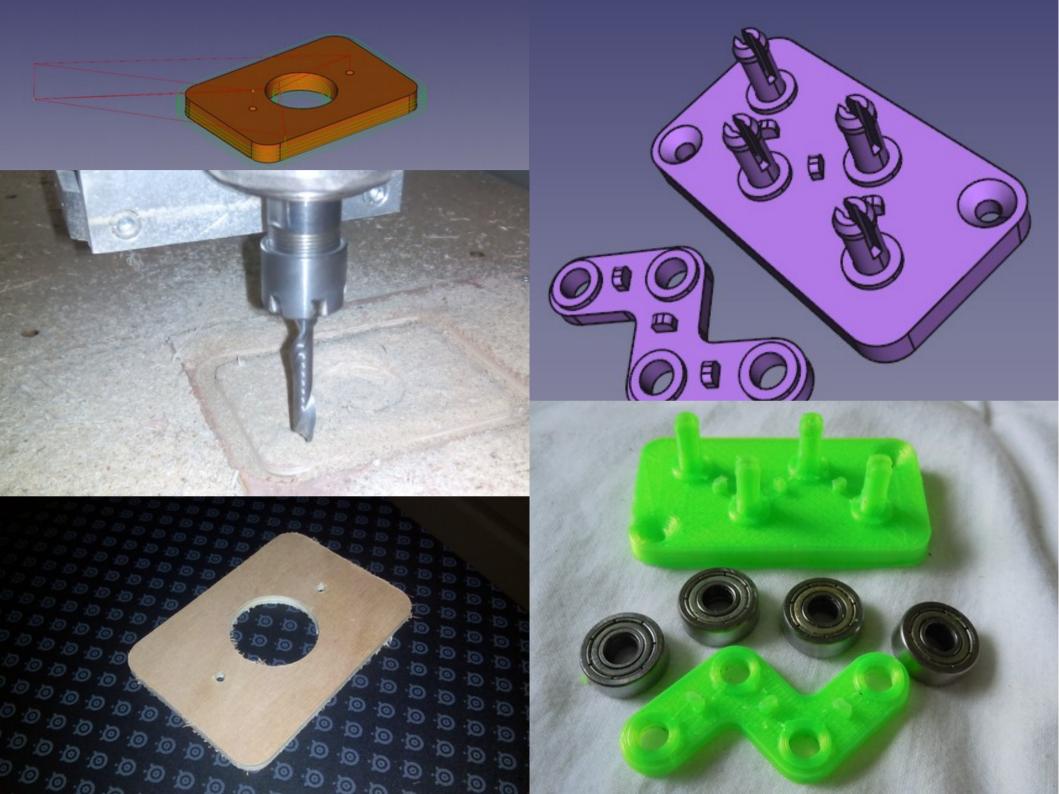
Modelização 3D com precisão

Feito para modelizar "qualquer coisa para ser construído no mundo real"

Paramétrico (a forma dos objetos é controlada por parametros, como "Altura" ou "Largura")







Advanced Search

Sort: Relevant >





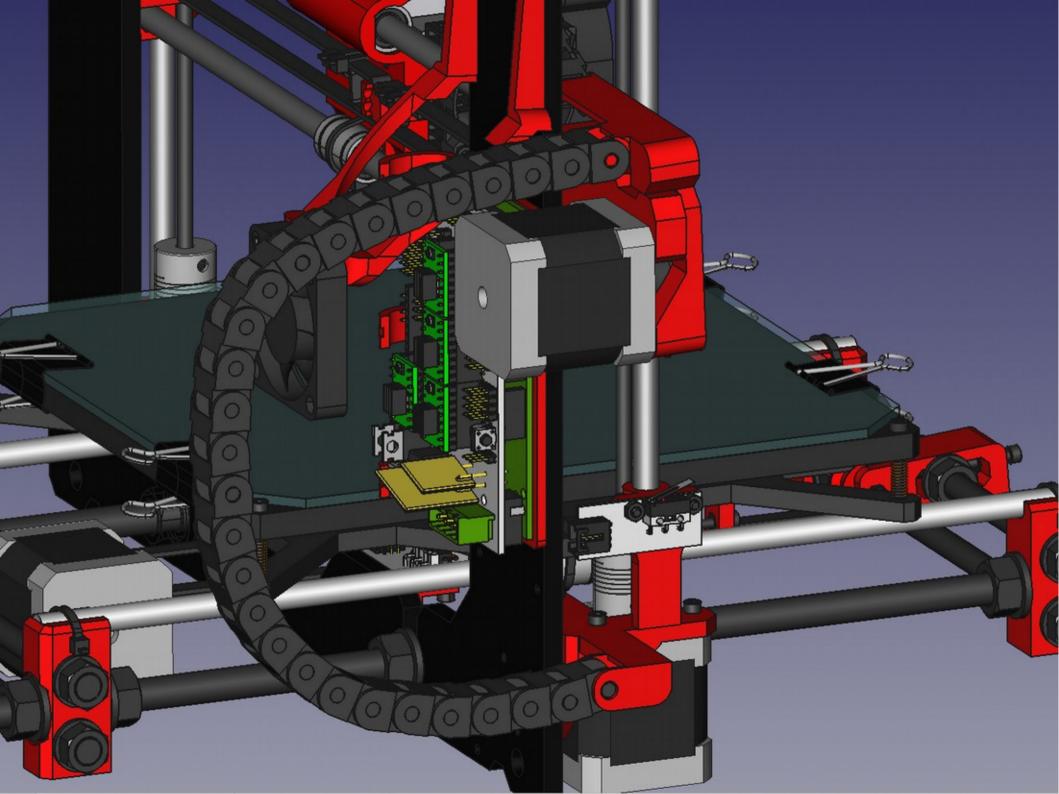


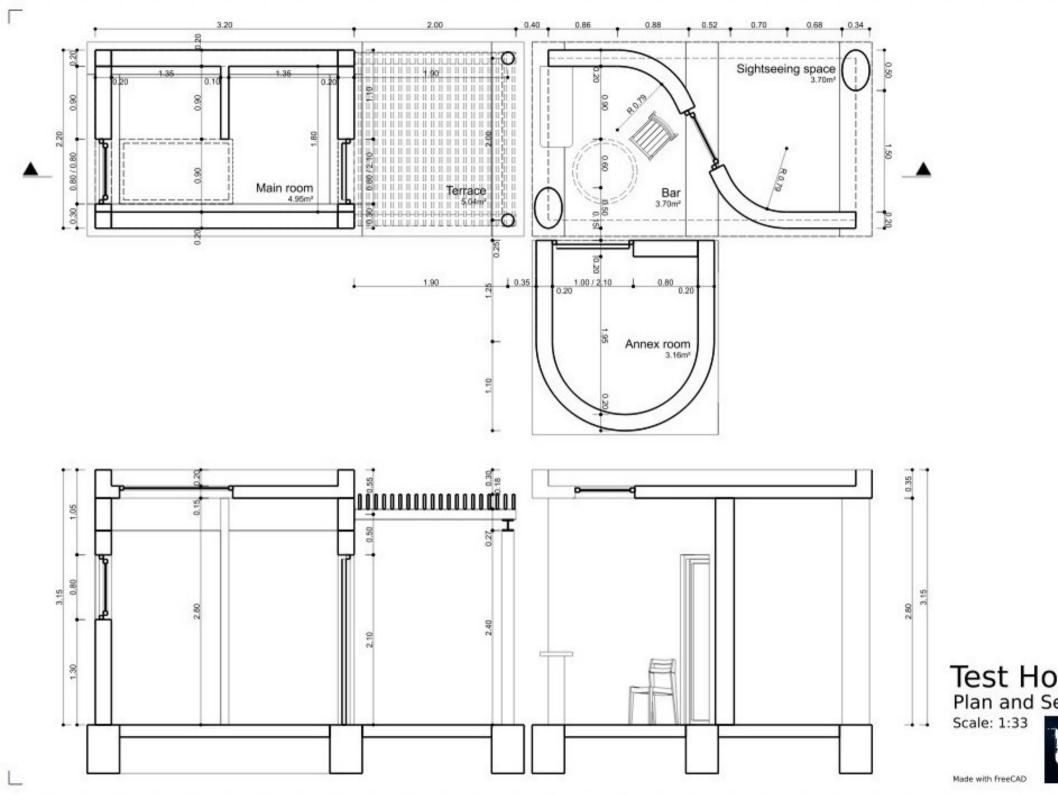


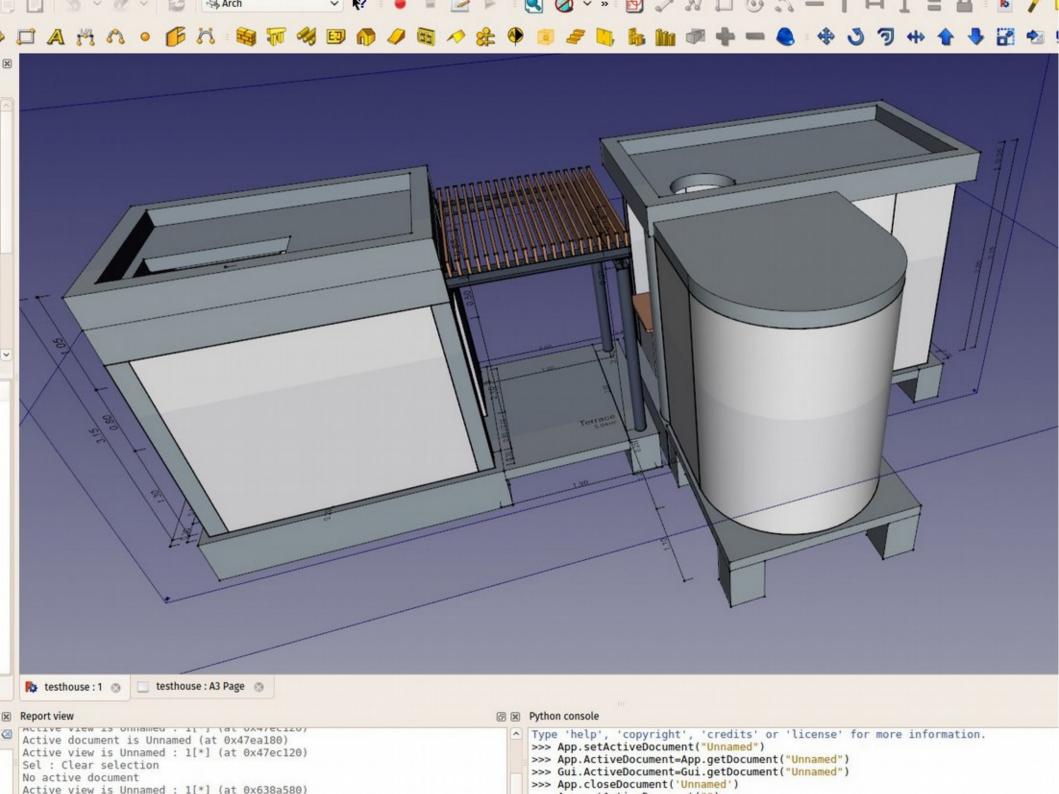


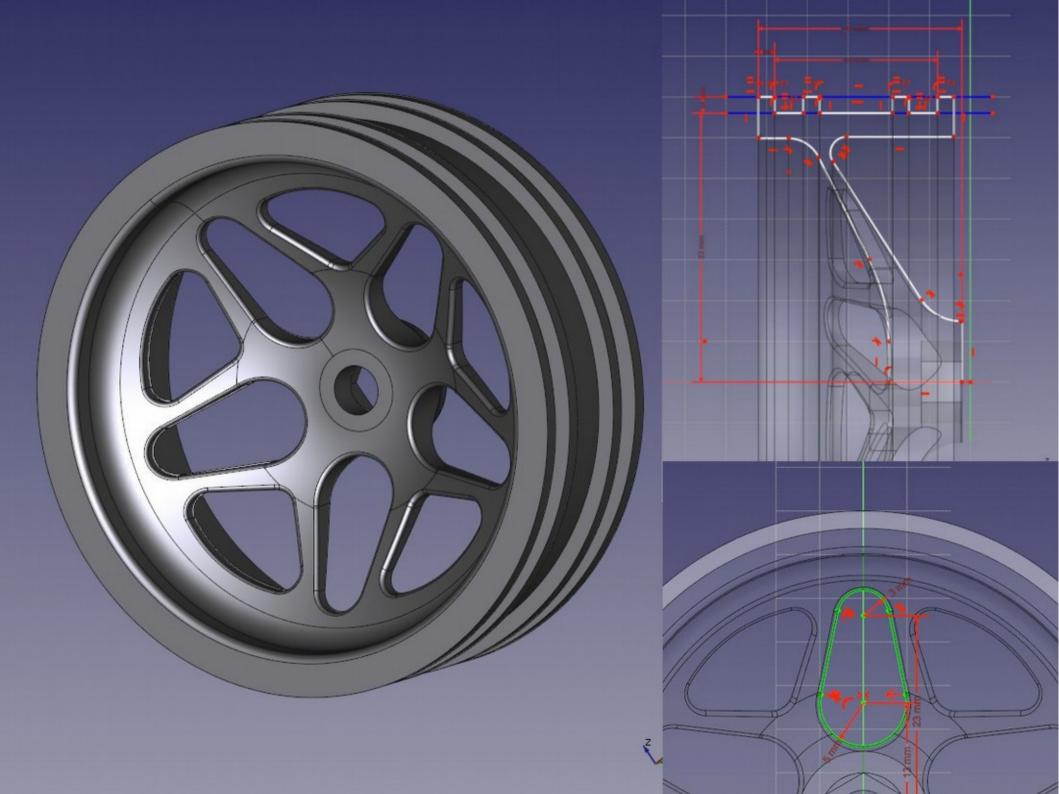


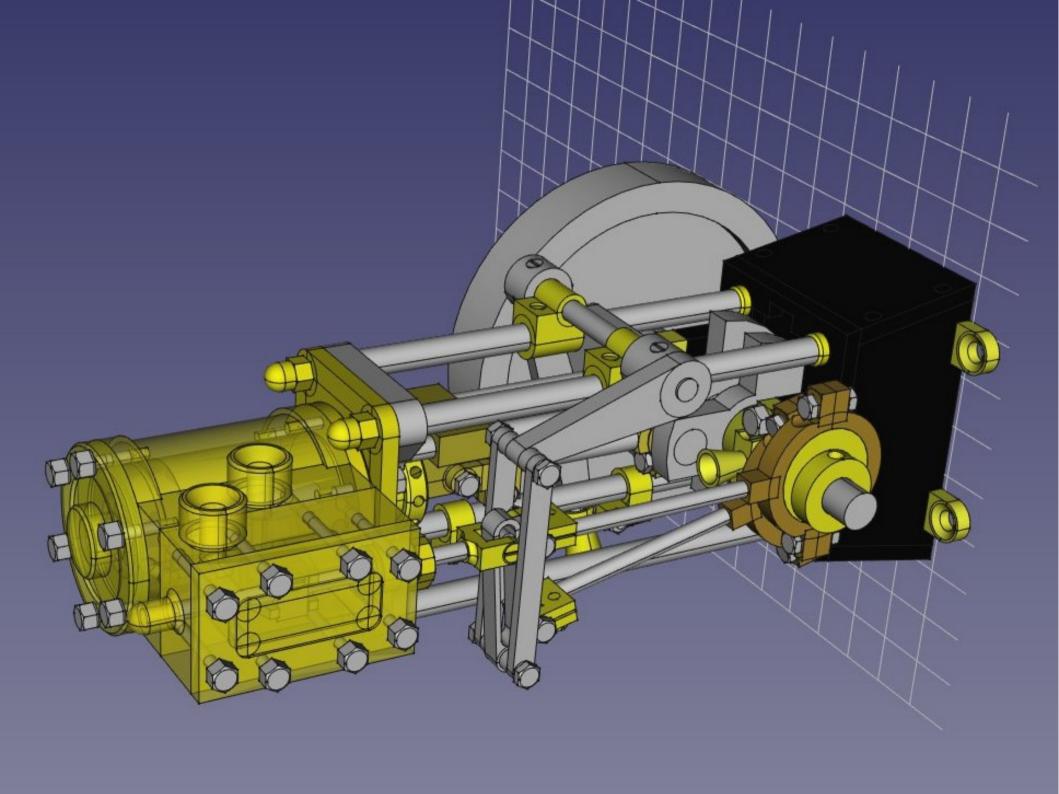


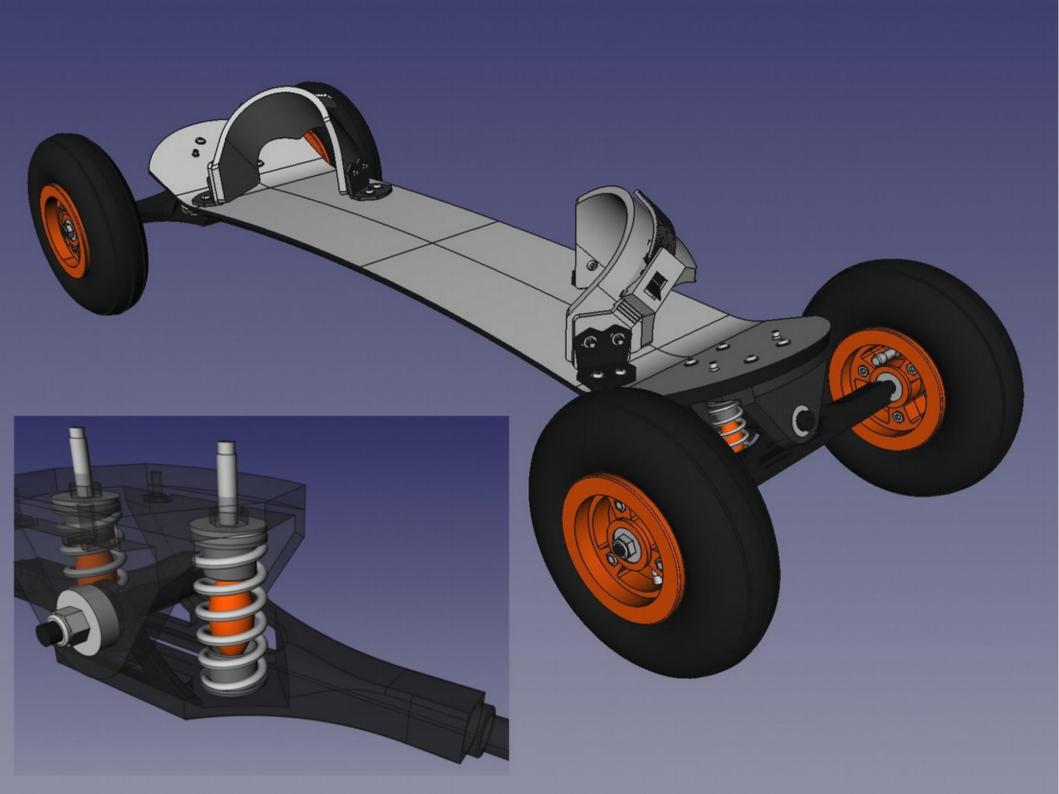


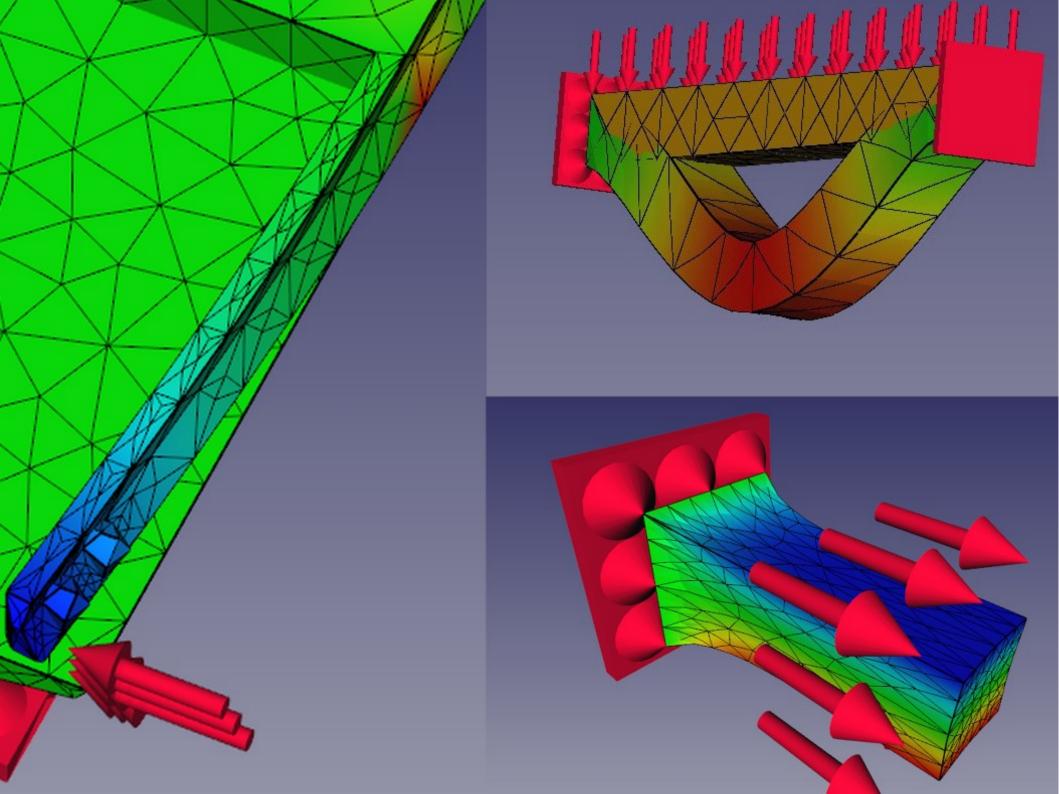












Modularidade

mecânica **GUI** arquitetura base **GUI GUI** design naval

Multi-paradigma

A base é apenas um recipiente para os módulos + uma vista 3D

Todo o resto é definido por módulos: ferramentas, tipos de objetos, formatos de arquivo, etc

Qualquer coisa pode coexistir em um mesmo documento do FreeCAD

Dependências pesadas

- Qt (interface)
- Python (scripting + muitas coisas...)
- OpenCasCade (núcleo geométrico)
- OpenInventor/Coin3D (vista 3D)
- Cada módulo tem as suas: KDL, IfcOpenShell, matplotlib, openSCAD, etc...

Python em todo lugar

- A "cola" entre a base e a interface
- Alguns módulos 100% em python
- O usuário tem acesso a tudo, e tem os poderes de um DEUS programador
- "Aprenda enquanto trabalha"

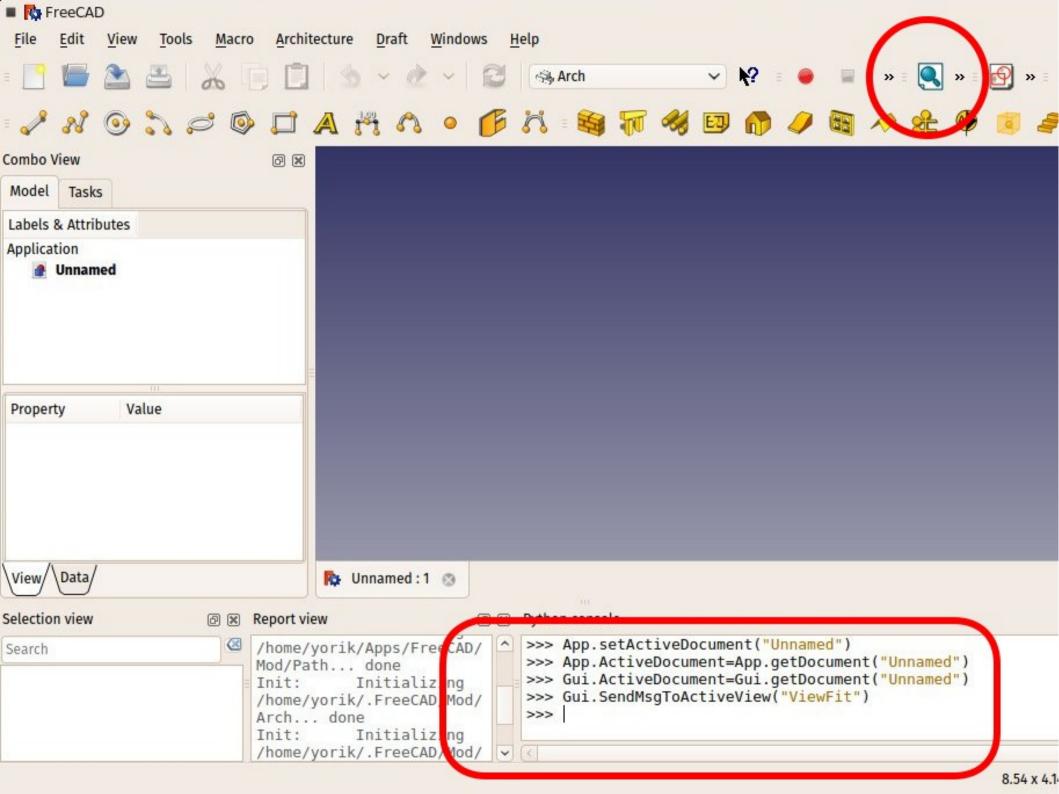
Python é MEGA-FACIL

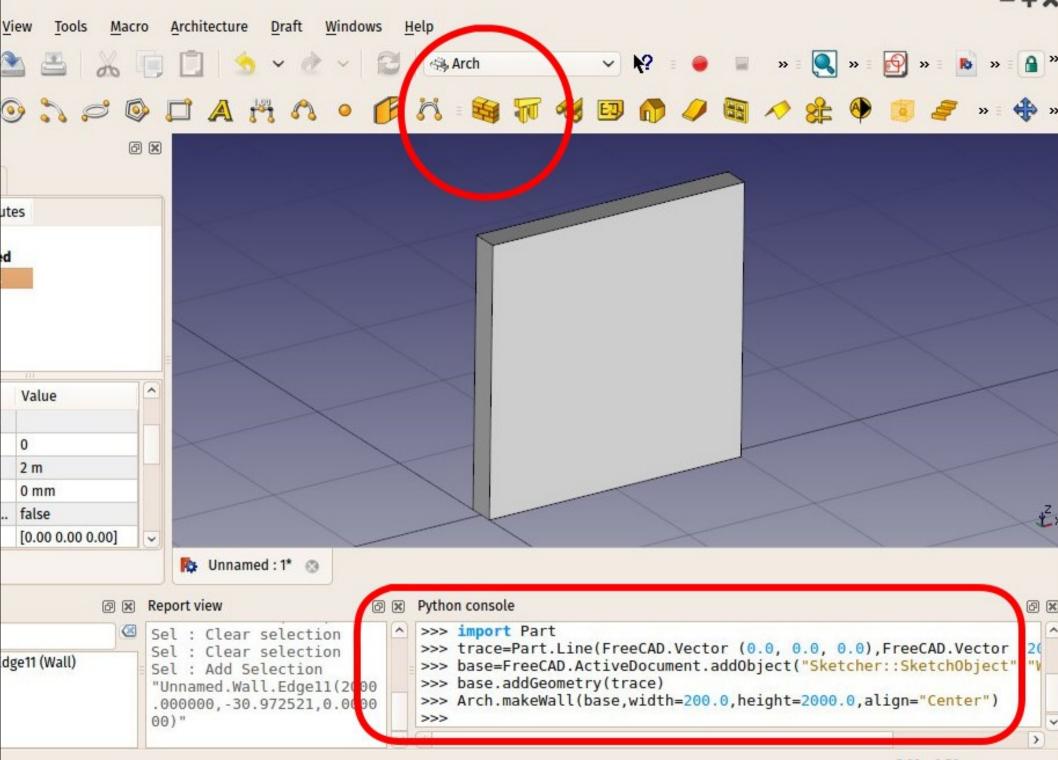
```
>>> print "Geeks will rule the
world"
Geeks will rule the world
>>> resultado = 1 + 1
>>> print resultado
>>> print resultado + 3
```

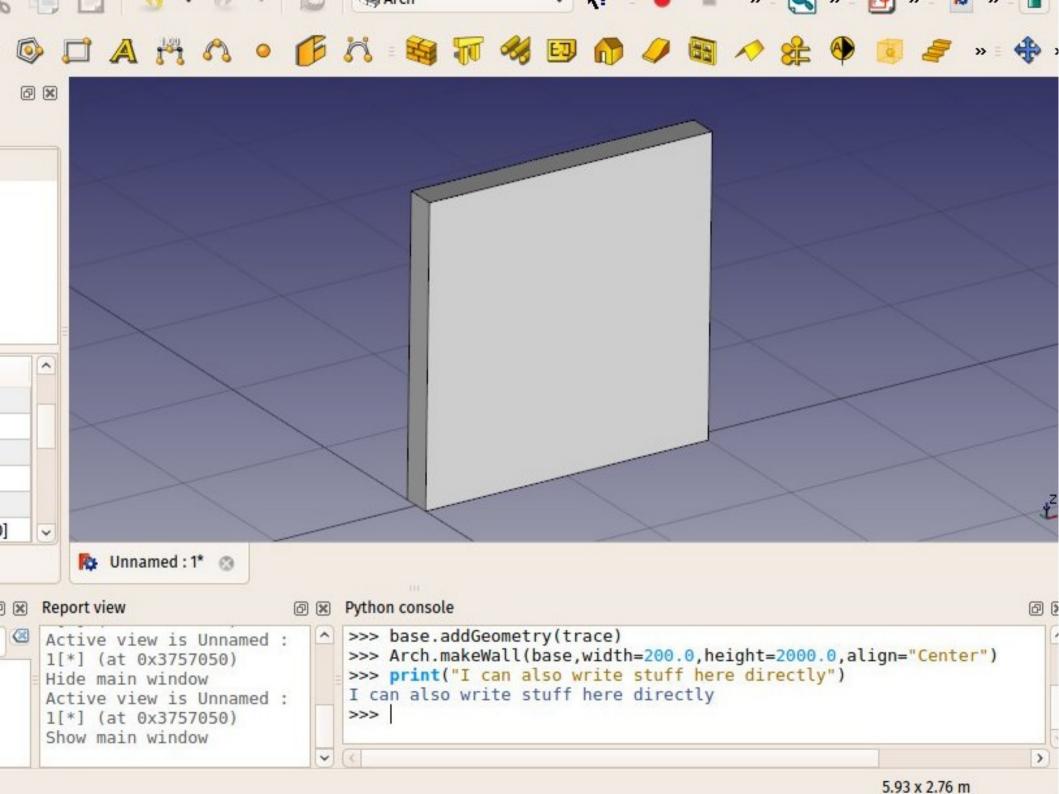
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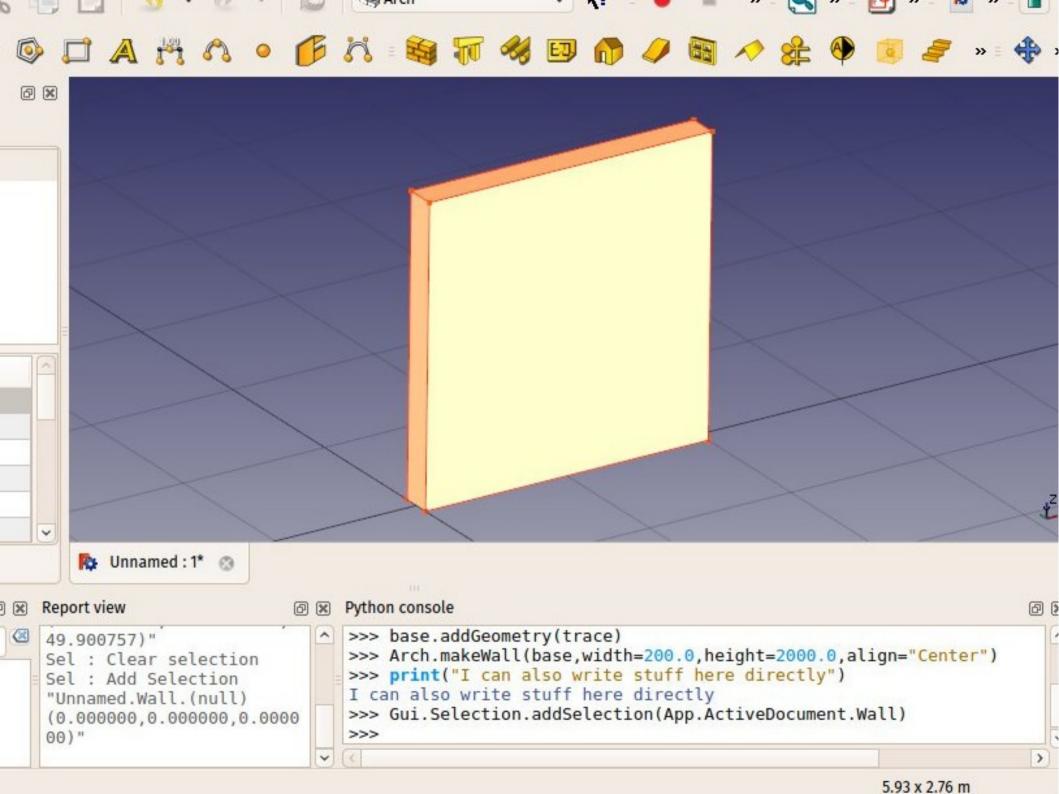
```
Python console

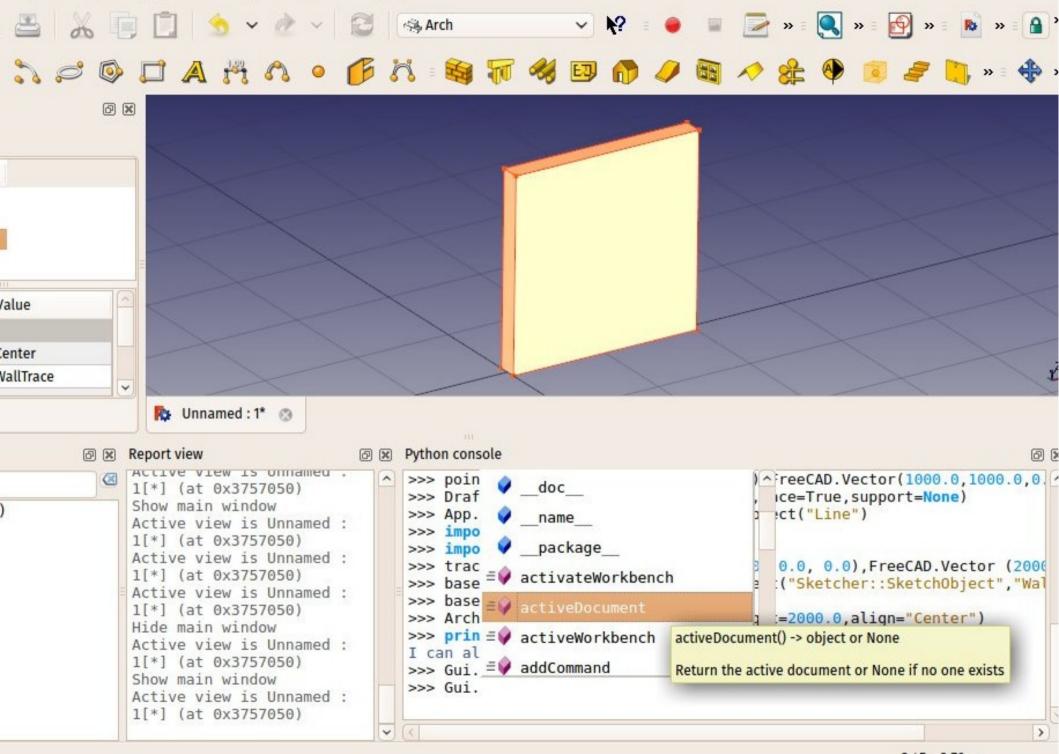
[GCC 4.9.2] on linux2
Type 'help', 'copyright', 'credits' or 'license' for more information.
>>> App.setActiveDocument("Unnamed")
>>> App.ActiveDocument=App.getDocument("Unnamed")
>>> Gui.ActiveDocument=Gui.getDocument("Unnamed")
>>>
>>> print "Geeks will rule the world MESMO"
Geeks will rule the world MESMO
>>> resultado = 1 + 1
>>> print resultado
2
>>> print resultado + 3
5
>>>> |
```



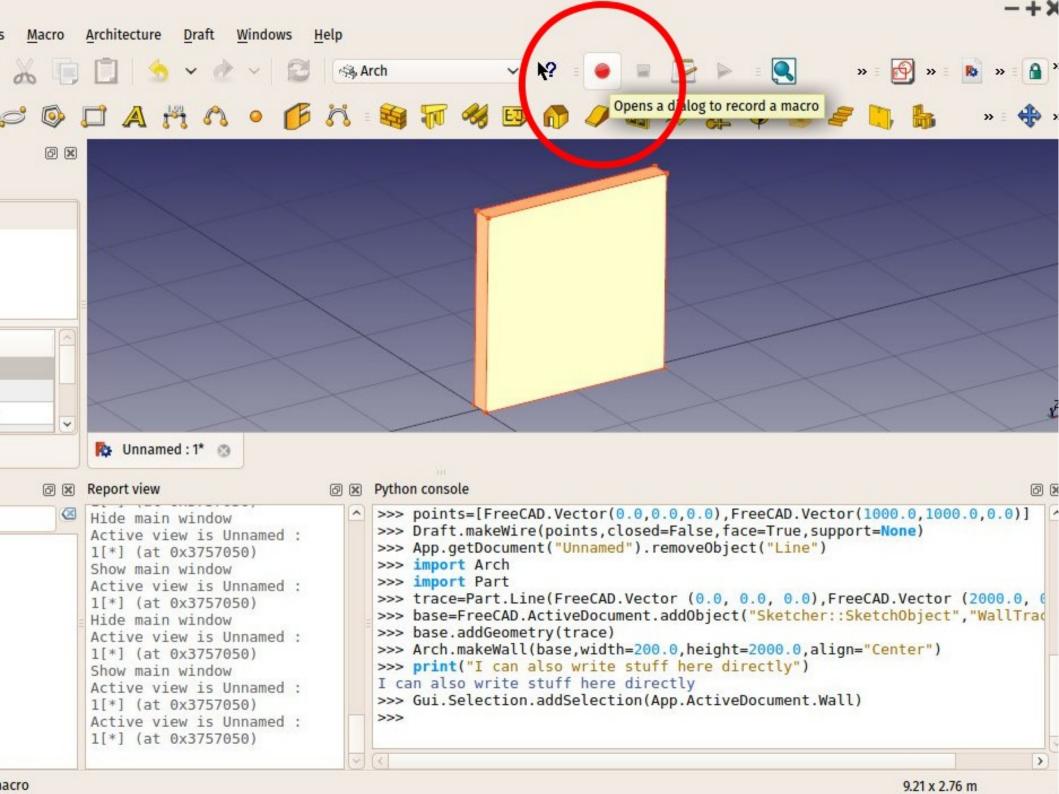


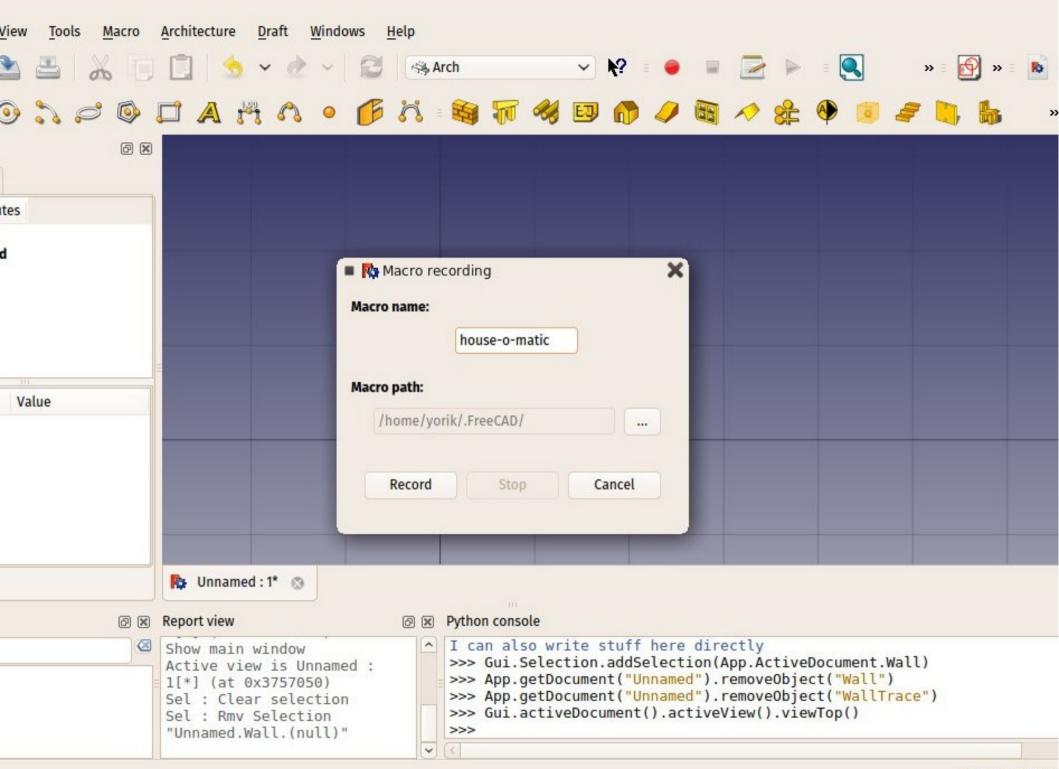


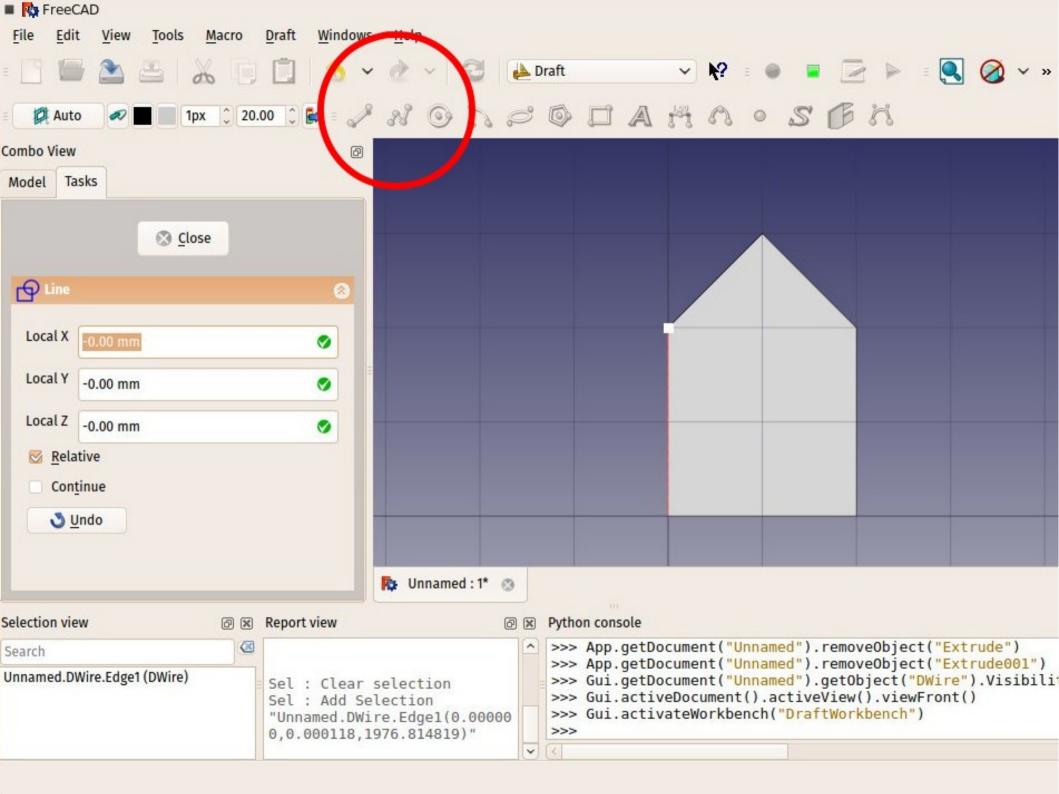


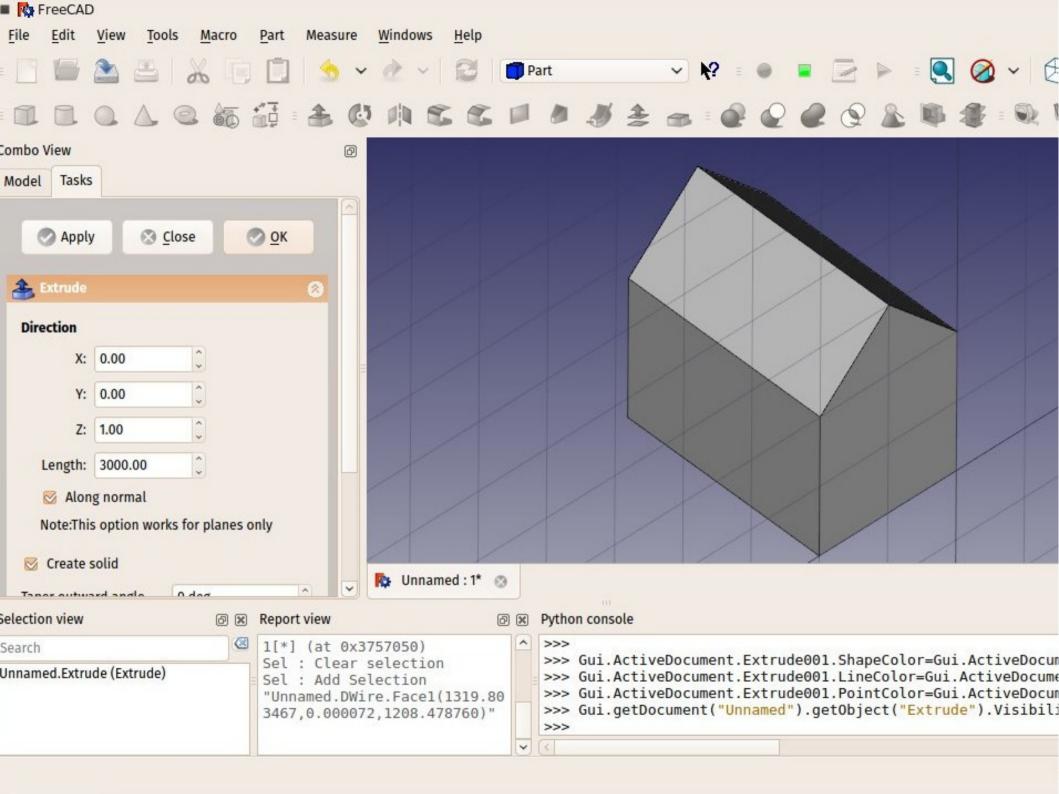


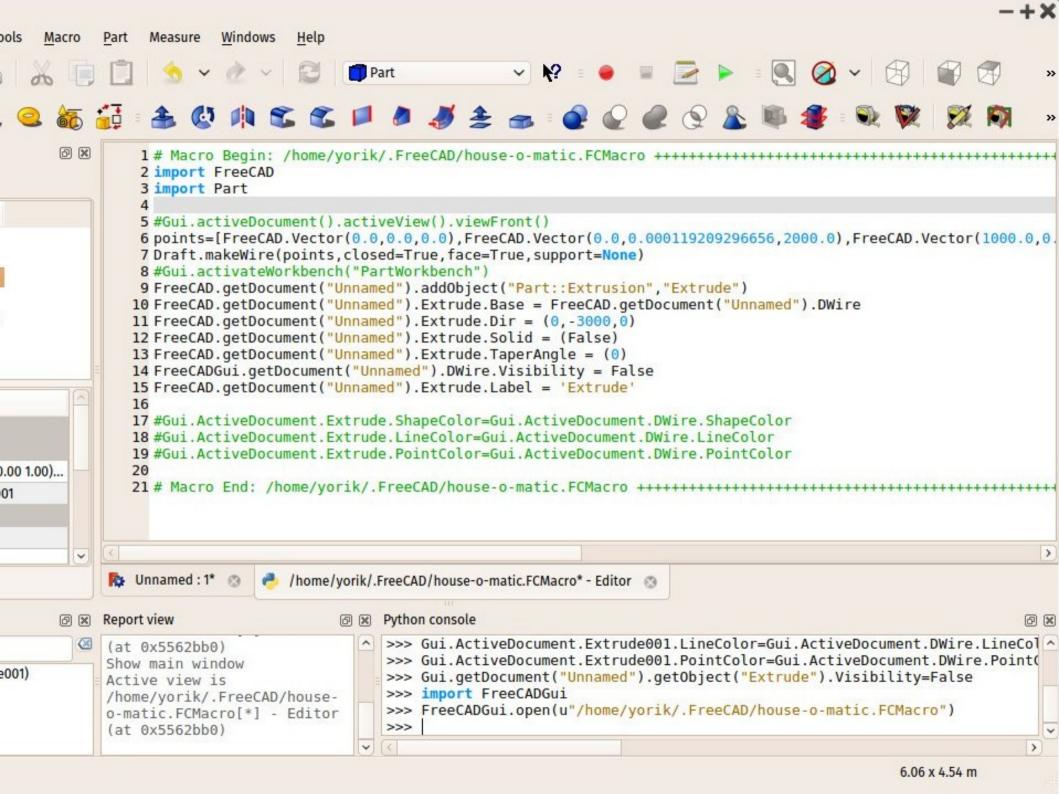
100ts Macro Architecture Drait Windows Help

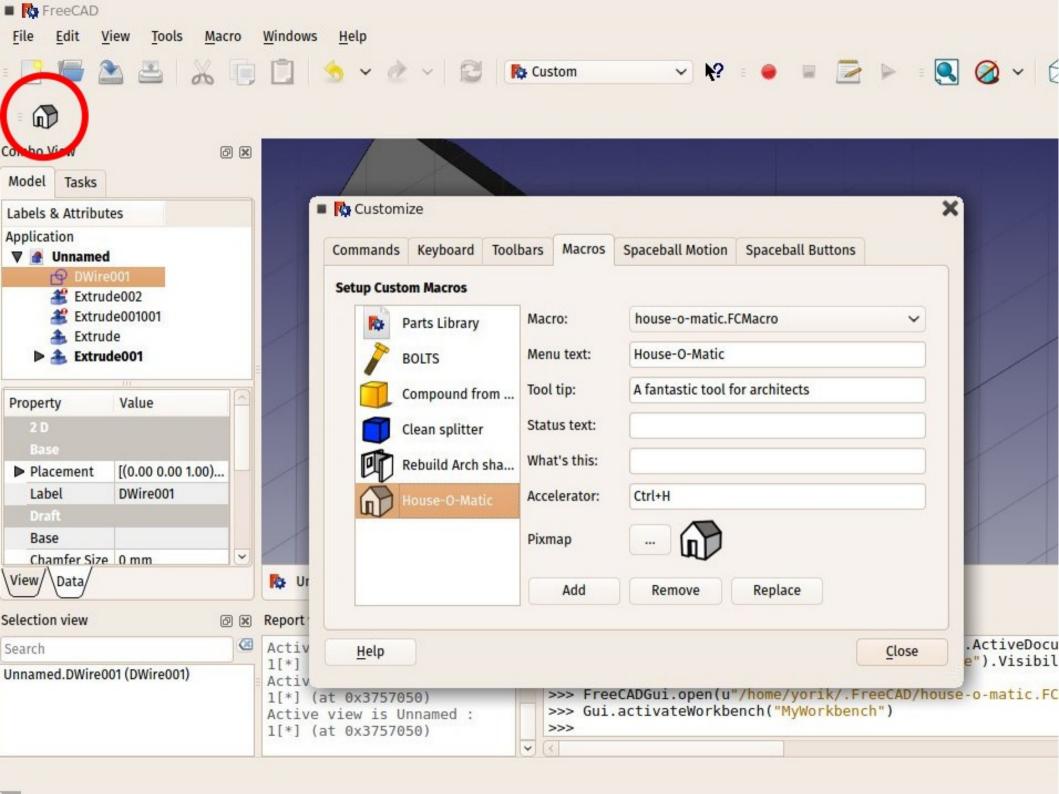












É possível "gravar" tudo?

perai...

A fatal exception OE has occurred at 0028:C00069F8 in UxD VMM(01) + 000059F8. The current application will be terminated.

- * Press any key to terminate the current application.
- * Press CTRL+ALT+DEL to restart your computer. You will lose any unsaved information in all applications.

Press any key to continue _

Podemos gravar todas as operações, e reproduzir até o momento do crash.

Separação entre "base" e "interface"?

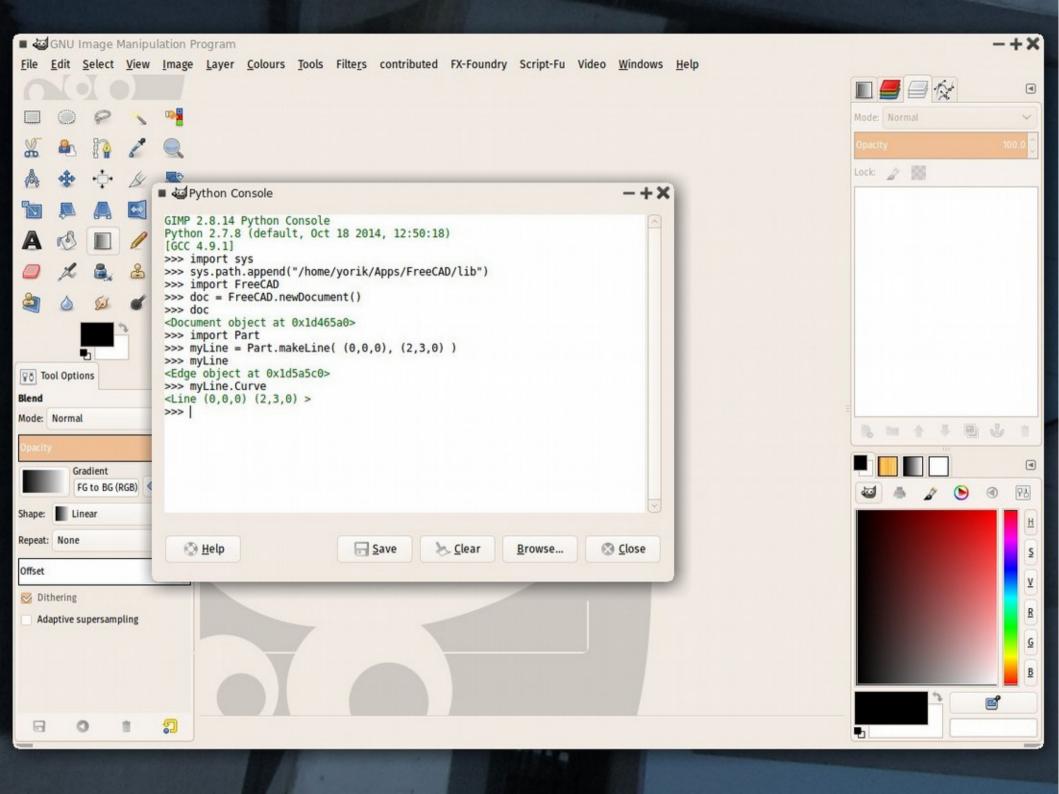
perai de novo...

FreeCAD funciona SEM a interface

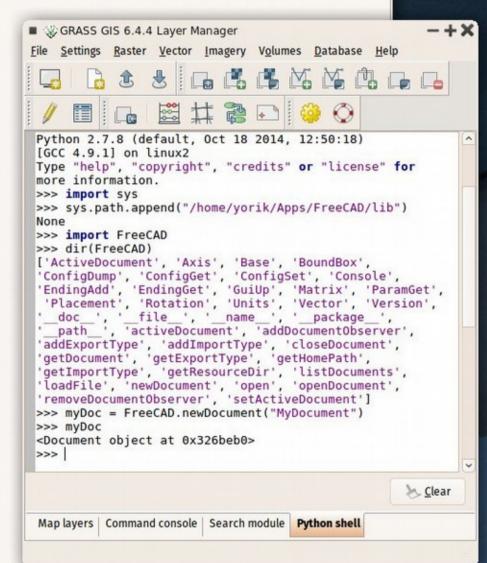
>>> import FreeCAD

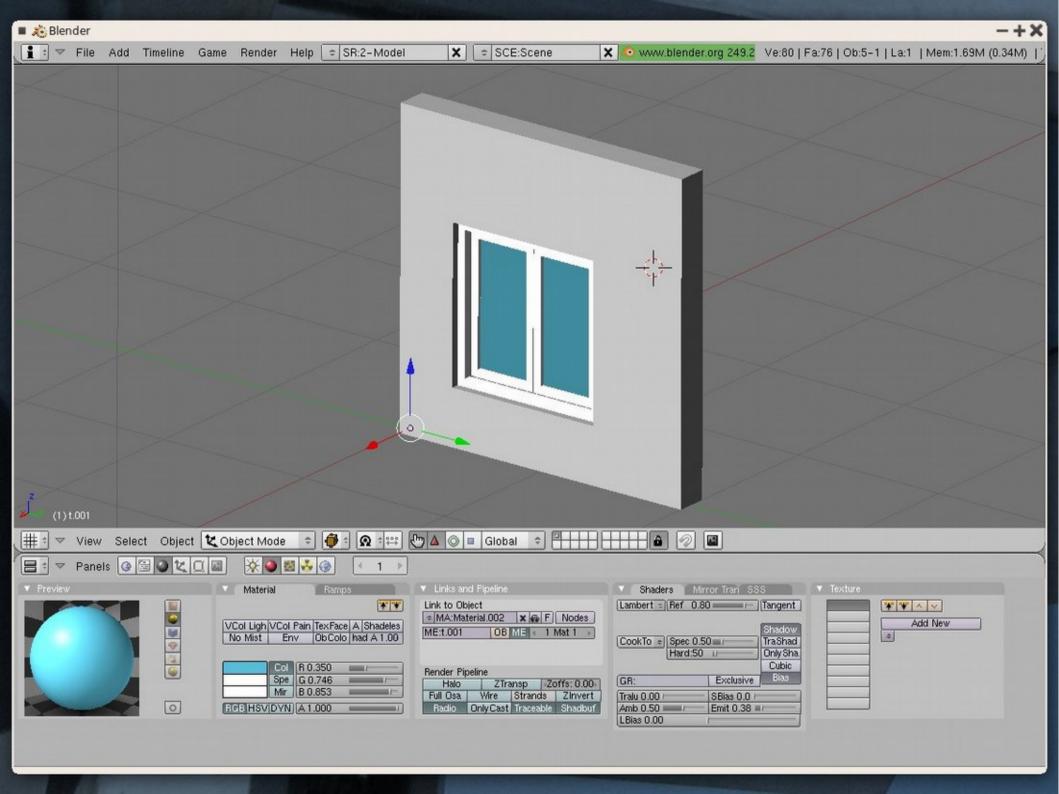
FreeCAD sem interface?

- Pode ser incluído em outras aplicações com uma linha de código
- Todos os módulos continuem funcionando (tambem sem interface)
- Funciona como servidor (web)
- Poderia ter outros interfaces





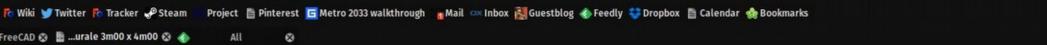




A web!

 Aplicações web podem usar o FreeCAD por trás

- Interfaces WebGL para FreeCAD
- Qualquer coisa que nem imaginamos ainda



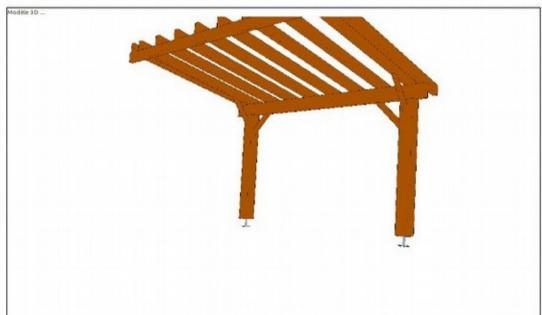
Kit Bois Appentis Murale 3M00 x 4M00 x 10°

Appentis Bois sur mesure en Kit	1470 € livroison inclus		
Largeur x Longueur x Hauteur (m)	3 x 4 x 2,2 m		
Angle de la pente	10"		
Débord des poutres et des solives	20 cm et 30 cm		
Largeur x Longueur à l'extérieur des poteaux	2,4 x 3,4 m		
Quincaillerie fournis	Pieds de poteaux réglables, vis et boulons		
Matériaux, Essence, Traitement, Finition	Bois massif, Pin, Traitement Classe 3 de couleur Brun, Brut		

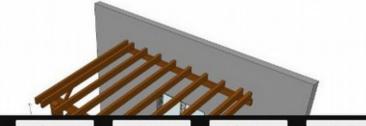
w.woodsuservices.ir/produit/kit-bois-appentis-iliurate-siiloox4iiloo

Pour naviguer dans le modèle 3D :

- Rotation: clic gauche maintenu et déplacement de la souris de gauche à droite et de bas en haut.
- . Zoom : clic molette maintenu et déplacement de la souris de bas en haut.
- Translation : clic droit maintenu et déplacement de la souris de gauche à droite et de bas en haut.



www.wood3dservices.fr



Porque o Python?

- Poderosa API para linguagem C, fácil de integrar ao código C++
- Qualquer biblioteca tem uma versão Python hoje em dia
- A comunidade do software livre adora, a adoção é fácil

Aplicações relacionadas:

livre

- Blender: sim
- Inkscape: sim
- OpenSCAM: sim
- GRASS: sim
- Salome: sim
- OpenSCAD: sim

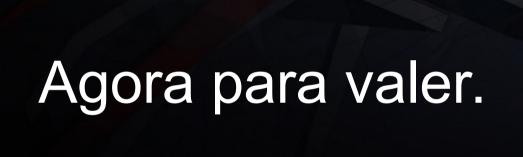
proprietário

- Autocad: sim
- SolidWorks: não
- Catia: sim
- Rhino: sim
- SolidEdge: sim
- Revit: sim

E os usuários finais?

 A fabricação de objetos reais já pede muita dedicação. Já estamos em casa...

- Modelagem 3D precisa e técnica é muito complexa. A programação ajuda muito a simplificar
- Paradigmos evoluem, Python fica



Accesso ao núcleo geométrico

via a API própria do FreeCAD

```
>>> import Part
>>> 1 = Part.makeLine( (0,0,0),(2,2,0) )
>>> Part.show( 1 )
>>> c = Part.makeBox( 2,2,2 )
>>> Part.show( c )
```

Accesso direto ao núcleo geométrico

```
>>> import OCC
>>> from OCC.BRepPrimAPI import
                    BrepPrimAPI MakeBox
>>> c = BrepPrimAPI MakeBox(10,20,
                            30).Shape()
>>> p = Part. fromPythonOCC (c)
>>> Part.show(p)
```

classes.html

15/81/0815

Open CASCADE Technology: Data Structure Index.

Data Structure Index

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Adaptor3d_CurveOnSurface	Geom2dGcc_Circ2d3Tan	MAT_Arc	RWStepShape_RWOrlentedFace	StepToGeom_MakeSurface
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AlS_DataMapOfIOStatus	Georg_CartesianPoint	math_NewtonFunctionSetRoot	RWStepVisual_RWPresentationArea	StepVisual_CameraModelD2
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AlS_DiameterDimension	Geom_Conic	math_Powell	RWStepVisual_RWPresentationLayerUsage	StepVisual_CameraUsage
AIS_Dimension	Georg_ConicalSurface	math_PSO	RWStepVisual_RWPresentationRepresentation	StepVisual_Colour
Att DimensionOwner	Geore Curve	math_PSOParticlesPool	RWStepVisual_RWPresentationSet	StepVisual_ColourRgb
AlS_Drawer	Geom_CylindricalSurface	math_QuickSortOfValueAndflivight	RWStepVisual_RWPresentationSize	StepVisual_ColourSpecification
Alls_EllipseRadiusDimension	Geom_Direction	math_RealRandom	RWStepVisual_RWPresentationStyleAssignment	StepVisual_CompositeText
AlS_EqualDistanceRelation	Geom_ElementarySurface	math_SingleTab	RWStepVisual_RWPresentationStyleByContext	StepVisual_CompositeTextWithExtent
All_EqualRadiusRalation	Geom_Ellipse	math_SVD	RWStepVisual_RWPresentationView	StepVisual_ContextDependentinvisibility
	Geom_Geometry			
All_ExclusionFilter		math_TrigonometricFunctionRoots	RWStepVisual_RWPresentedItemRepresentation	StepVisual_ContextDependentOverRidingStyleditem
Alls_Fix/Relation	Geom_HSequenceOfBSplineSurface	math_Uzawa	RWStepVisual_RWStyledRem	StepVisual_CurveStyle
Att_GlobalStatus	Geom_Hyperbola	math_ValueAndVisight	RWStepVisual_RWSurfaceSideStyle	StepVisual_CurveStyleFont
Att_GraphicTool	Geom_Line	math_Vector	RWStepVisual_RWSurfaceStyleBoundary	StepVisual_CurveStyleFontPattern

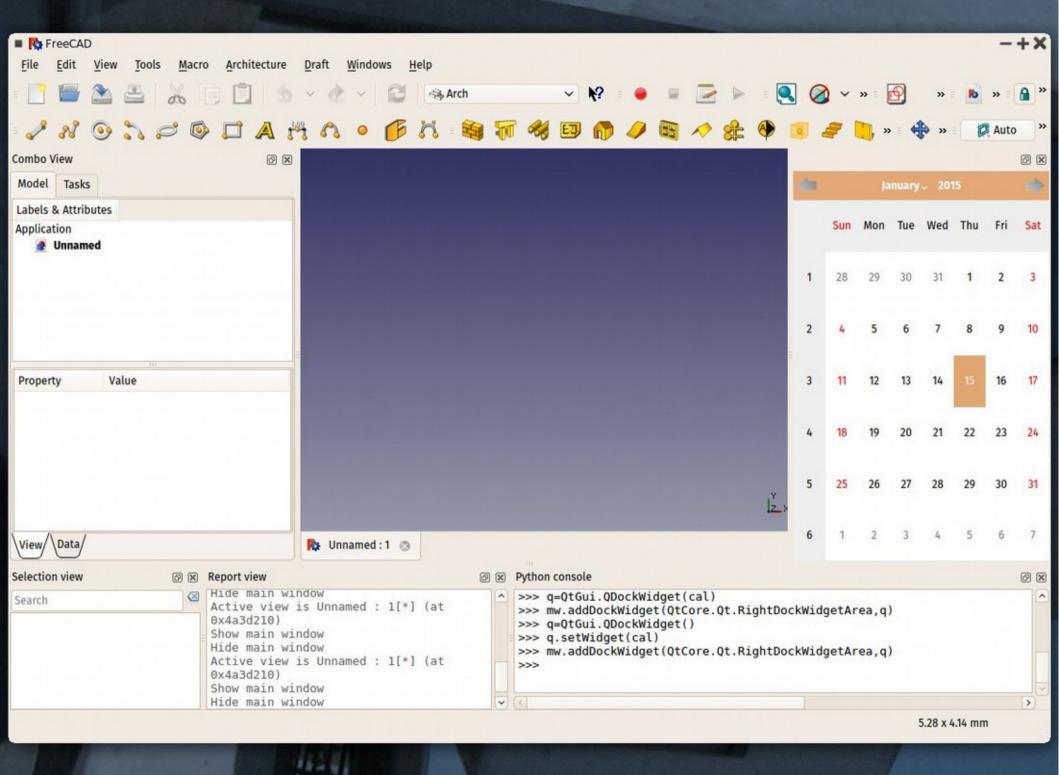
23

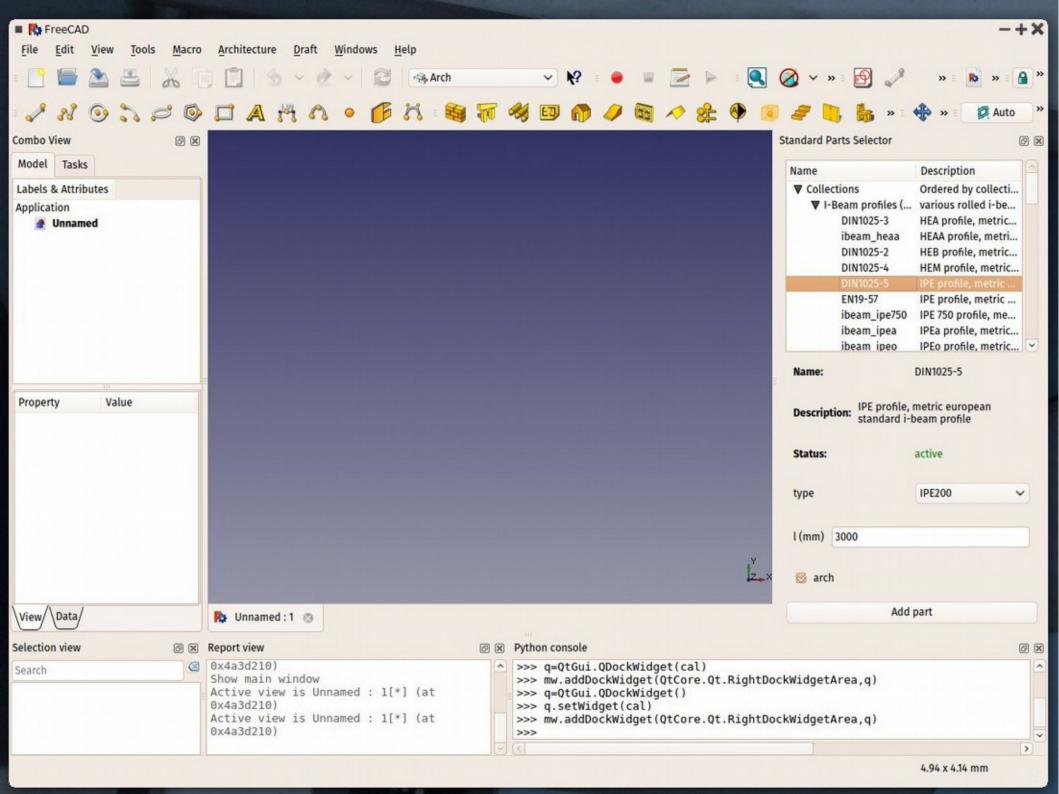
1,646

Accesso à interface

via a própria API python do Qt

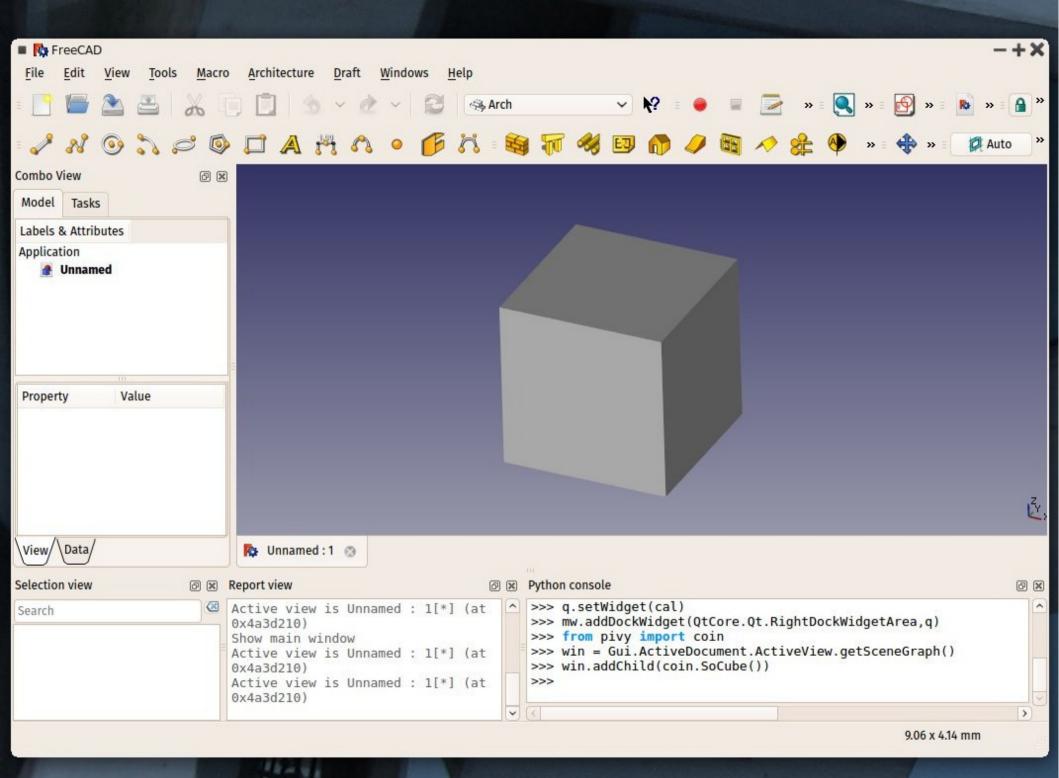
```
>>> from PySide import QtGui, QtCore
>>> mw = FreeCADGui.getMainWindow()
>>> d = QtGui.QDockWidget()
>>> d.setWidget(QtGui.QCalendarWidget())
>>> mw.addDockWidget(d)
```

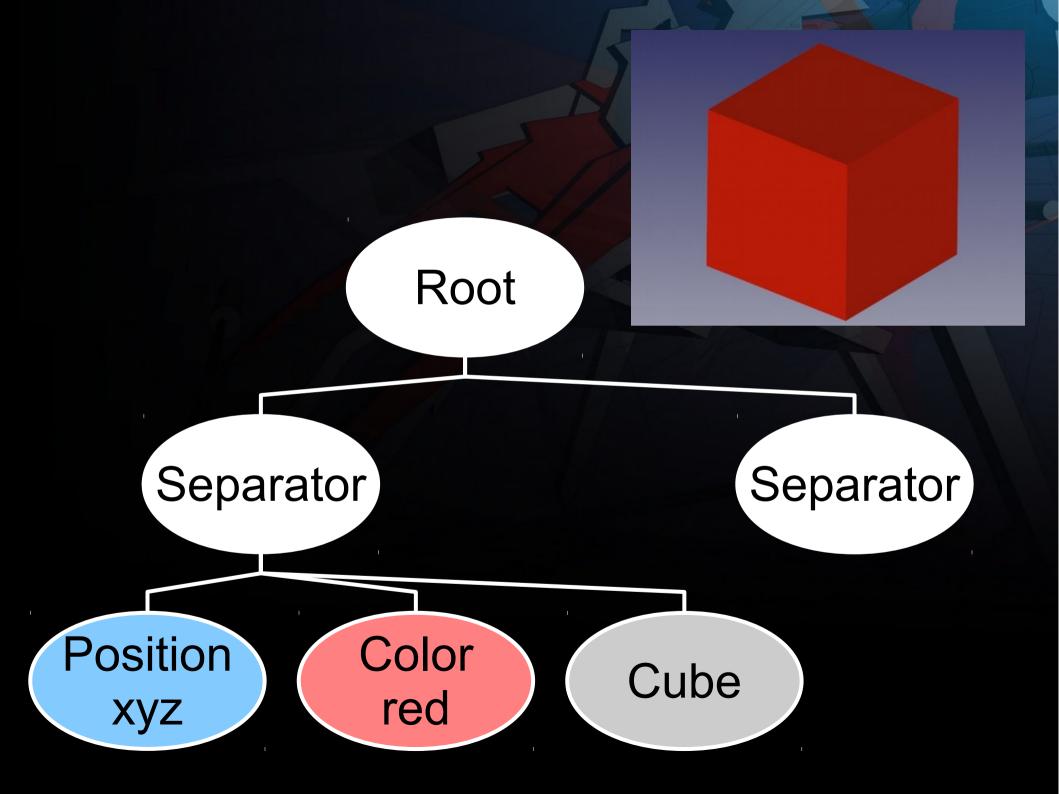


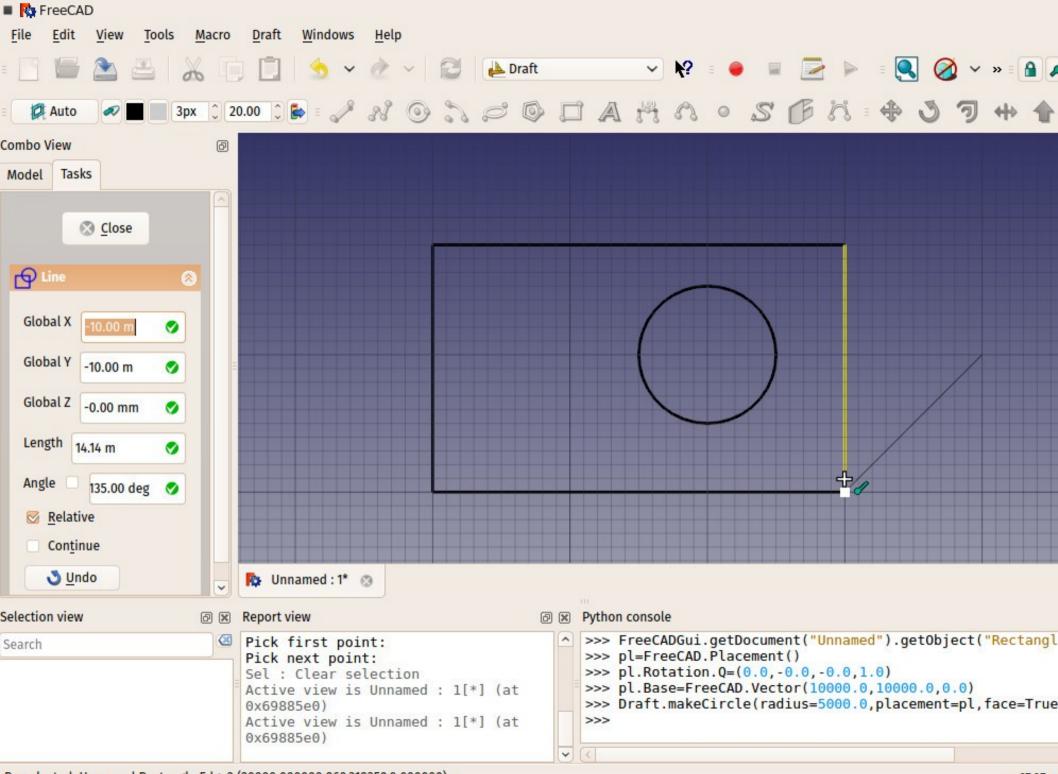


Accesso à vista 3D OpenGL

via a própria API python do Coin3D

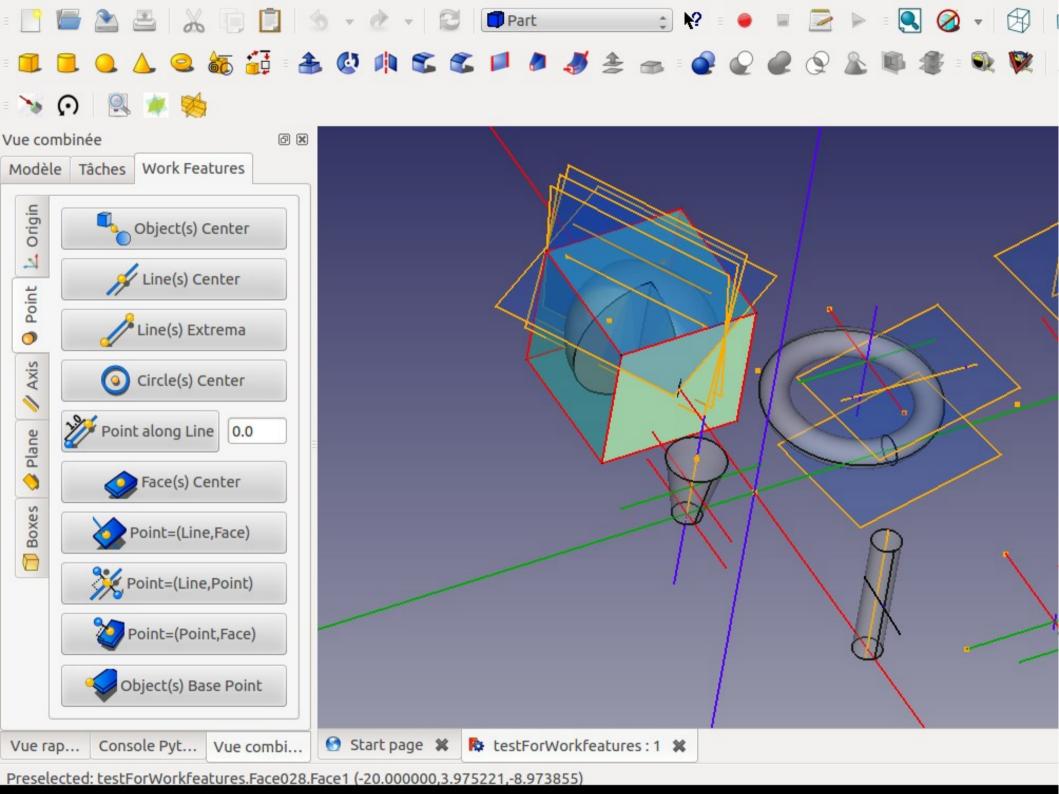






O usuário pode:

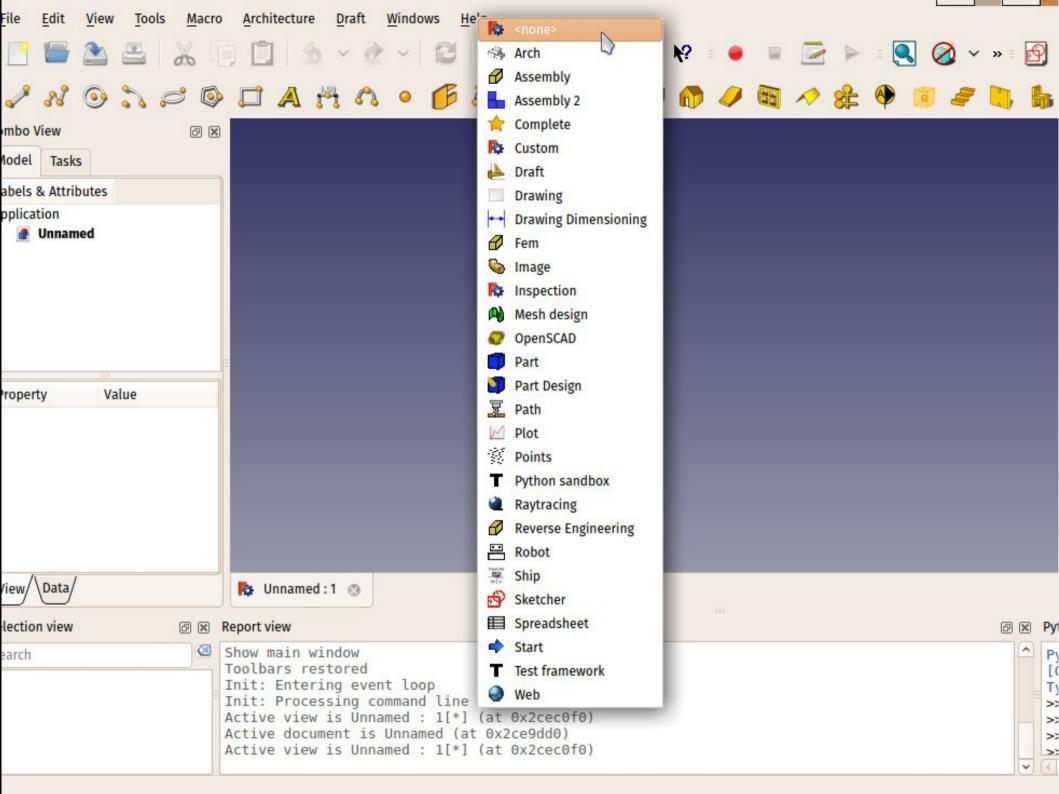
- Gravar rapidamente algumas ações
- Hackeá-las depois
- Criar interfaces mais complexas
- Criar o comportamento necessário na vista 3D



Aprendizado típico:

- Começa por gravar alguma macro.
 "Minha primeira Macro!"
- Publica no site do FreeCAD

- Os usuários gostam! Acrescenta coisas, conserta isso, aquilo...
- Agora precisa de um interface...



O que a comunidade faz:

- Suffoca usuários novos com ajuda
- Guia no mundo complexo da 3D técnica

 Testa e dá um monte de retorno sobre novas funcionalidades

• Decide de quase tudo...

O desenvolvimento

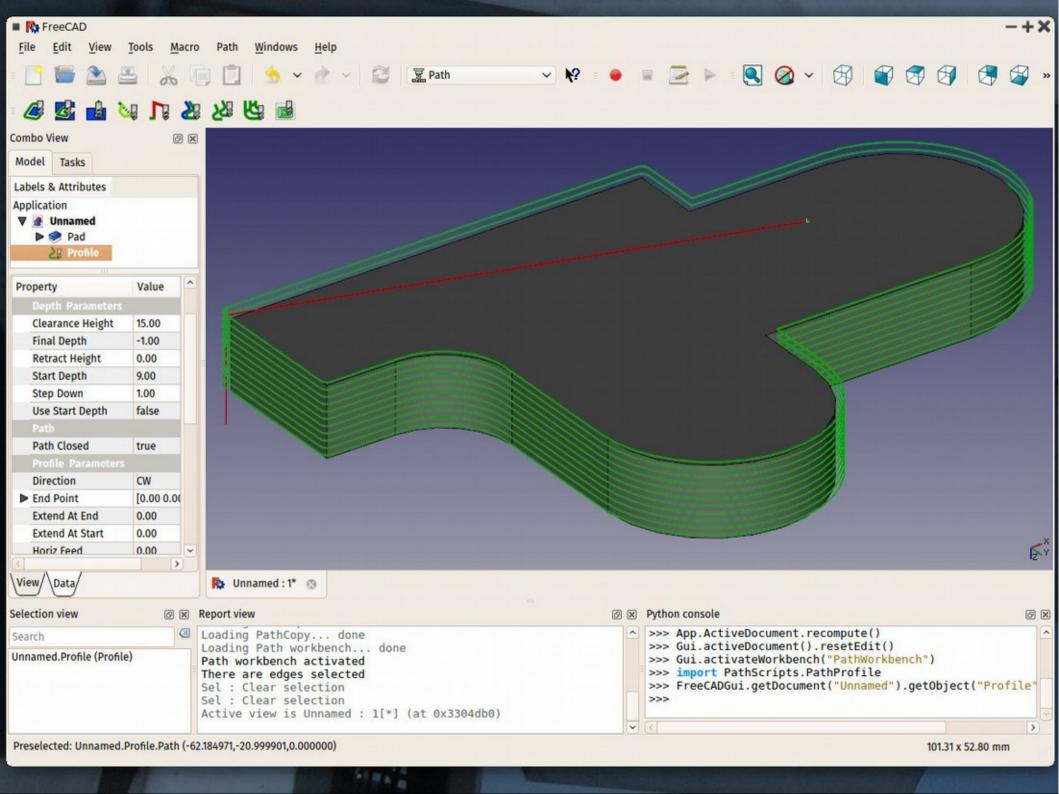
- Não tem regras, metas, prazos
- Não tem plano de entregas, na verdade não tem plano nenhum
- Não tem "relação usuáriodesenvolvedor"

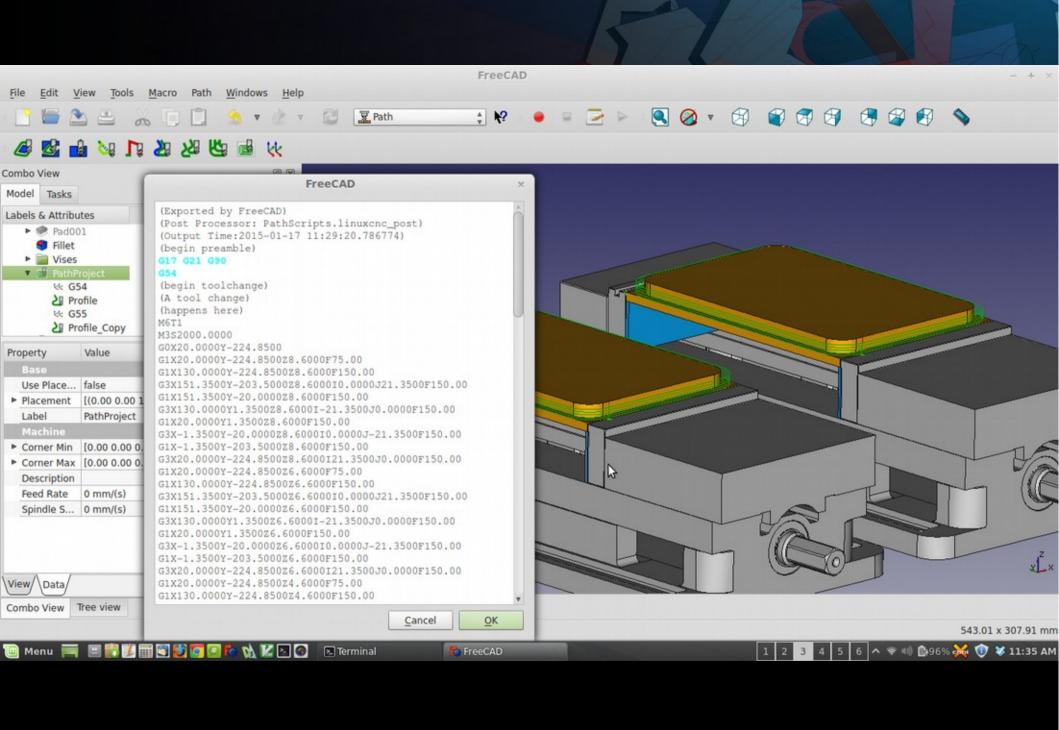
Quase tudo se resolve no forum

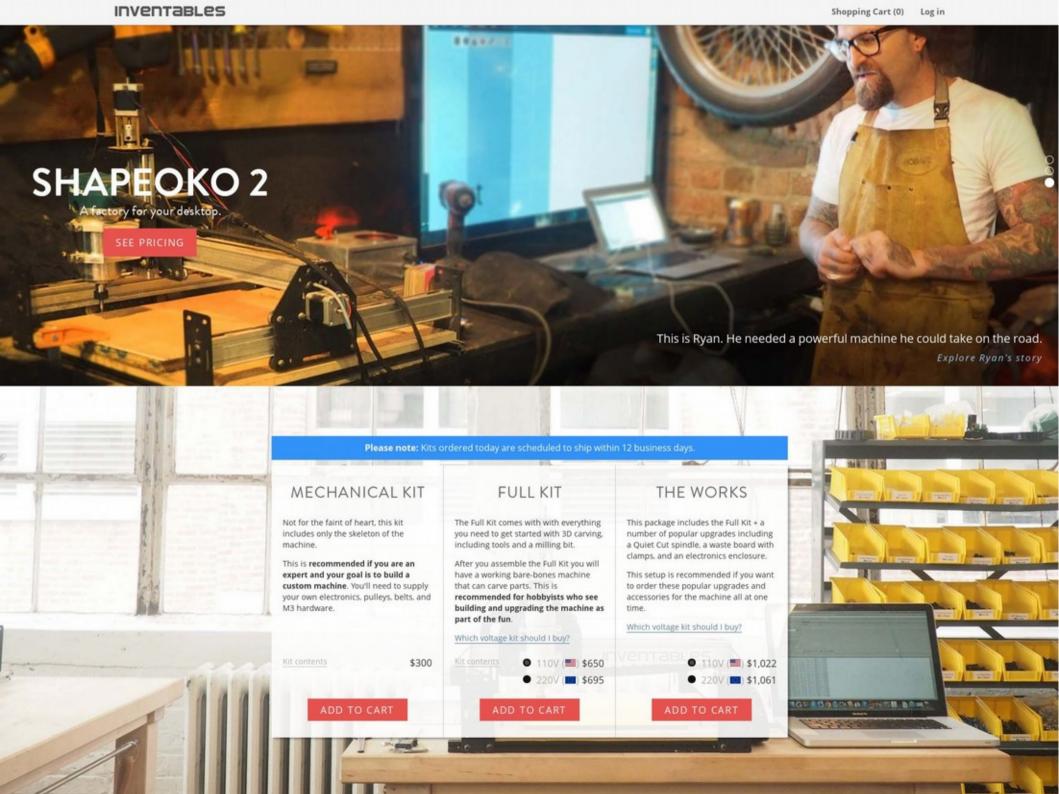
E os desenvolvedores?

- 3 pessoas com direitos de escrita
- 10, 15 contribuintes frequentes
- 1 desenvolvedor PAGO (por você)! https://opendeveloperfunding.wordpress.com/

O módulo PATH







"We're moving into this future where the factory is everywhere, and the design team is everyone. That is an industrial revolution"

"Estamos entrando nesse fututo onde a fábrica é todo lugar, e o designer é todo mundo. Isso é uma revolução industrial"

Alastair Parvin (TED talk) http://www.wikihouse.cc

Obrigado!

http://yorik.uncreated.net @yorikvanhavre