

Saving Time with Code in Rhino3D

An overview in Python scripting

Adam Penner

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Who am I? Education

Saving Time
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Rhino3D
Adam Penner

- Hometown: Hamilton, Massachusetts
- Graduated in 2017 from Colorado School of Mines
- B.A. in Engineering Physics



Grays Peak, 14,278 ft



Who am I?

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- Sept, 2017: Started at Paul's Custom Canvas in Denver, CO



Dillon Reservoir, 9,017 ft



Goals

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- What is Scripting?
- What can it do?
- What is Python?
- What is Macros vs. Scripts?
- Resources for learning
- Resources for creating scripts



Salmon Lake, 11,250ft



Scripting

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- Simple computer programs to accelerate repetitive tasks
- Great for simple tasks with minimal inputs
- Minimize Clicks
- Maximize consistency

Python

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Python is a high-level programming language of general purpose programming. Released in 1991, Python emphasizes readability appealing to beginners and experts alike. Python is completely open source, which means nobody owns it. So it is free and we always be free, this means that there is a fantastic community constantly sharing ideas and developing new and innovative products on the Python platform.

Rhino.Python

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Rhinoceros 3D includes Python and can integrate Python scripts very easily. Python is a simple language to read and write and with the included Rhino packages scripting repetitive tasks, from simple to extremely complicated can be done without the need for a degree in Computer Science.

Key Differences Between Macros and Scripts

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Macros

- Mimic Key strokes in Rhino
- Uses Rhino Command Line Interface
- Cannot skip or modify lines
- No loops or recursion

Scripts

- Between Macros and full programs/plug-ins
- Control of which line is executed next
- Flow control or "Condition evaluation"
- Available on both Windows and Mac

Macro Applications

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- Perfect for simple, repetitive commands
- Many Rhino commands are actually macros
- Good for selecting common Rhino command options

Script Applications

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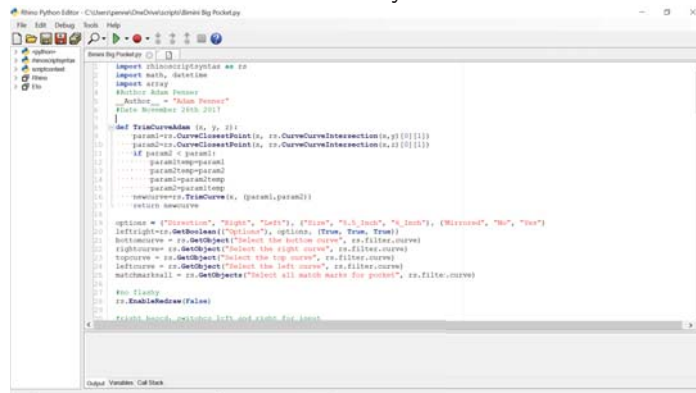
- Infinite possibilities
- Can do anything a computer can do
- Great for more complex, yet still repetitive tasks
- Human input required
- Function like Rhino commands

Rhino Python Editor

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Rhino's Built in Python Editor



```
1 import rhinocompile as rc
2 import math, datetime
3 import array
4 #Author Adam Penner
5 __Author__ = "Adam Penner"
6 #Date Modified 10/01/2017
7
8 def FindCurveMatch (c, p, r):
9     param1=rc.CurveClosestPoint(c, rc.CurveCurveIntersection(c,r)[0][1])
10    param2=rc.CurveClosestPoint(c, rc.CurveCurveIntersection(c,r)[1][1])
11    if param1 < param2:
12        paramTemp=param1
13        param1=param2
14        param2=paramTemp
15    newCurve=rc.FindCurve(c, (param1,param2))
16    return newCurve
17
18 options = ["Direction", "Right", "Left", "None", "A_Side", "B_Side", "Mirror", "No", "Yes"]
19 leftFilter=rc.GetBoolean("Options", options, (True, True, True))
20 bottomCurve = rc.GetObject("Select the bottom curve", rc.Filter.curve)
21 rightCurve = rc.GetObject("Select the right curve", rc.Filter.curve)
22 topCurve = rc.GetObject("Select the top curve", rc.Filter.curve)
23 leftCurve = rc.GetObject("Select the left curve", rc.Filter.curve)
24 matchmark1 = rc.GetObject("Select all match marks for pocket", rc.Filter.move)
25
26 #no Error
27 rc.EnableRedraw(False)
28
29 rc.RefreshCommandWindow()
```

- No need for third party editor or compiler
- Rhino Command "EditPythonScript"