

Rhinoceros
+
Grasshopper
+
Digital Fabrication

Day1 (一) 單元建構 _ *RH*基本介紹

09-10 = 場地準備
10-12 = 介面與基本幾何物件操作
12-13 = 中餐
13-17 = Boolean、Nurbs Surface1
17-18 = 場地回復

Day4 (四) 條件生成 _ *GH*參數應用

09-10 = 場地準備
10-12 = 資料處理與優化設計(ParametricDome)
12-13 = 中餐
13-17 = 輸出數位構築元件
17-18 = 場地回復

Day2 (二) 形態組織 _ *RH*設計操作

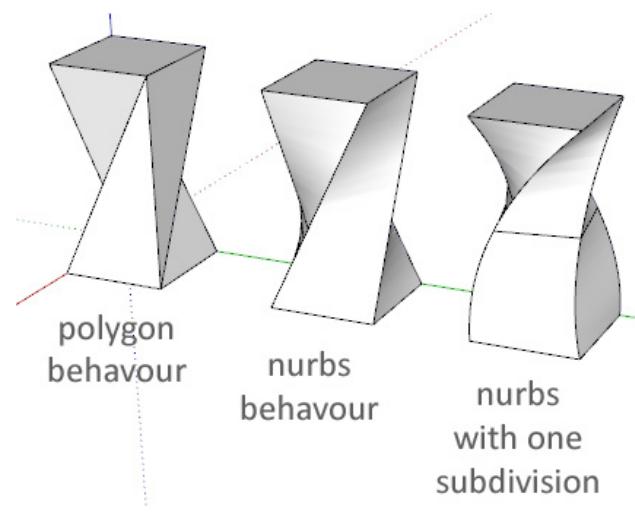
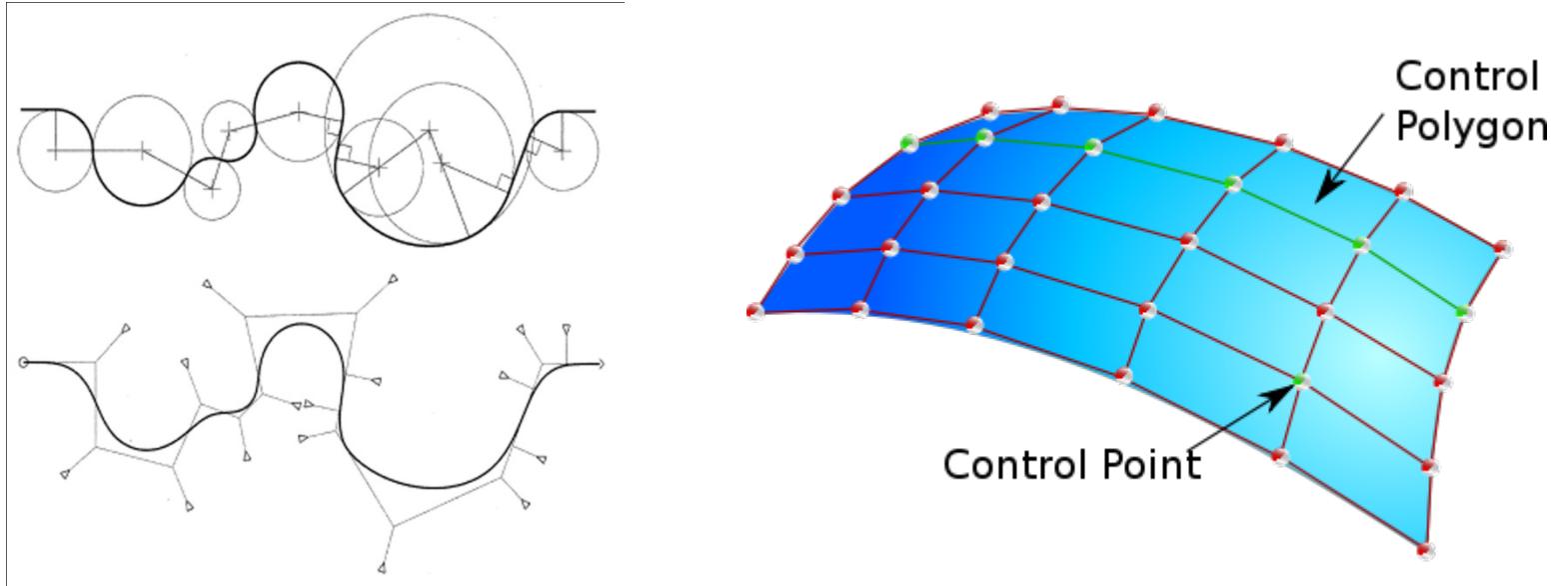
09-10 = 場地準備
10-12 = Nurbs Surfac2、Mesh(SubD)
12-13 = 中餐
13-17 = 渲染與3D列印輸出
17-18 = 場地回復

Day5 (五) 數位構築實踐

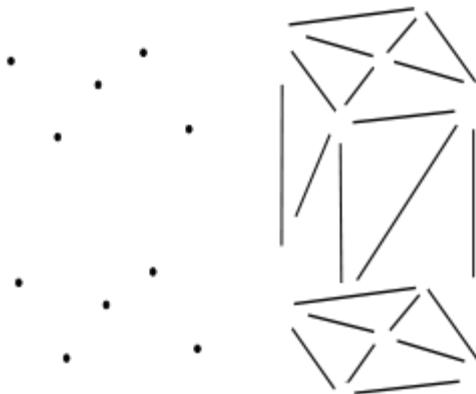
09-10 = 場地準備
10-12 = 組裝數位構築元件
12-13 = 中餐
13-17 = 成果發表
17-18 = 場地回復

Day3 (三) 邏輯文法 _ *GH*資料結構

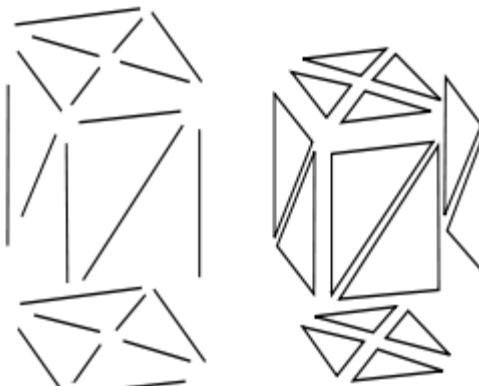
09-10 = 場地準備
10-12 = GH介面與參數化概念(ParametricColumn)
12-13 = 中餐
13-17 = 資料結構介紹與應用List、Path(GenerativePattern)
17-18 = 場地回復



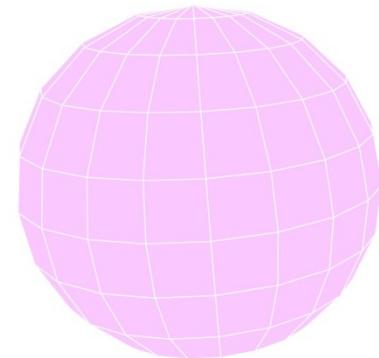
Descriptive Geometry
Non-Uniform Rational Basis Spline
Mesh



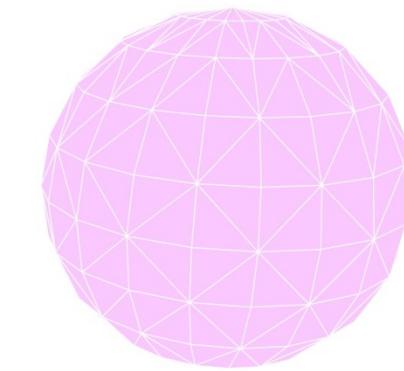
Mesh Vertices



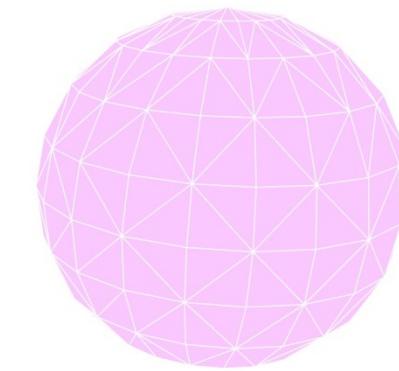
Mesh Edges



Mesh Faces



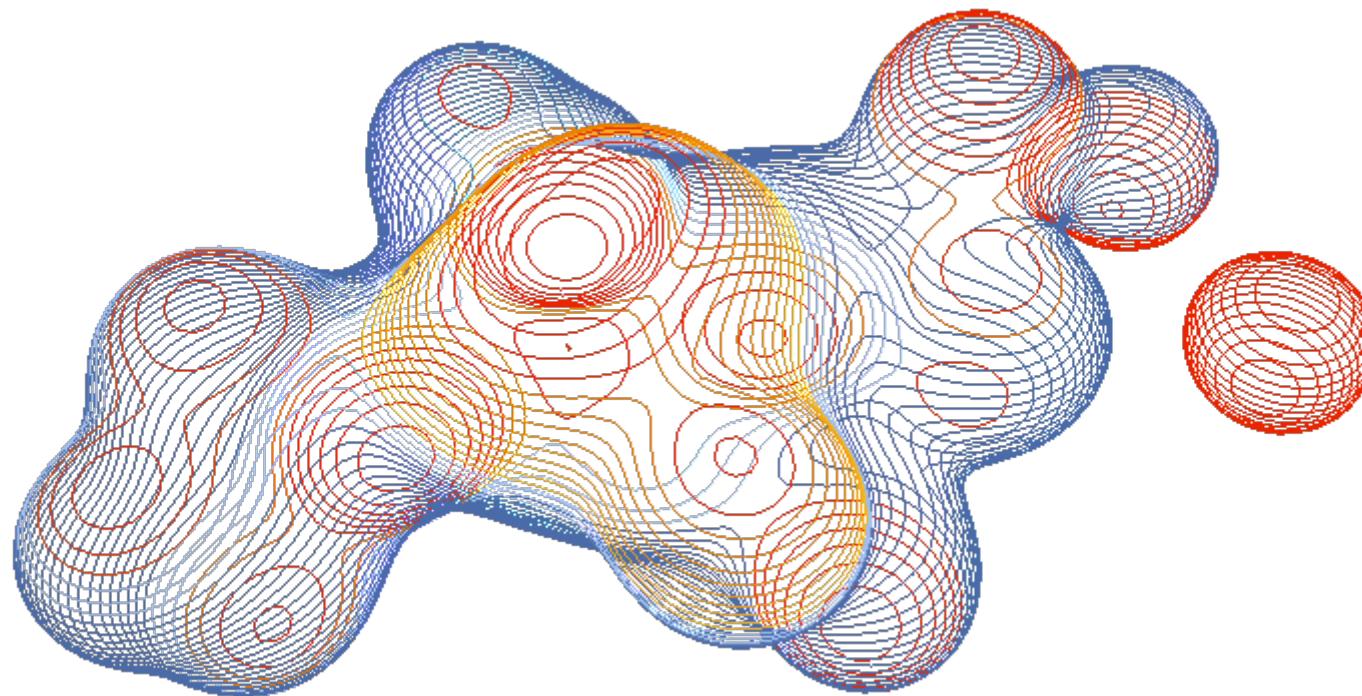
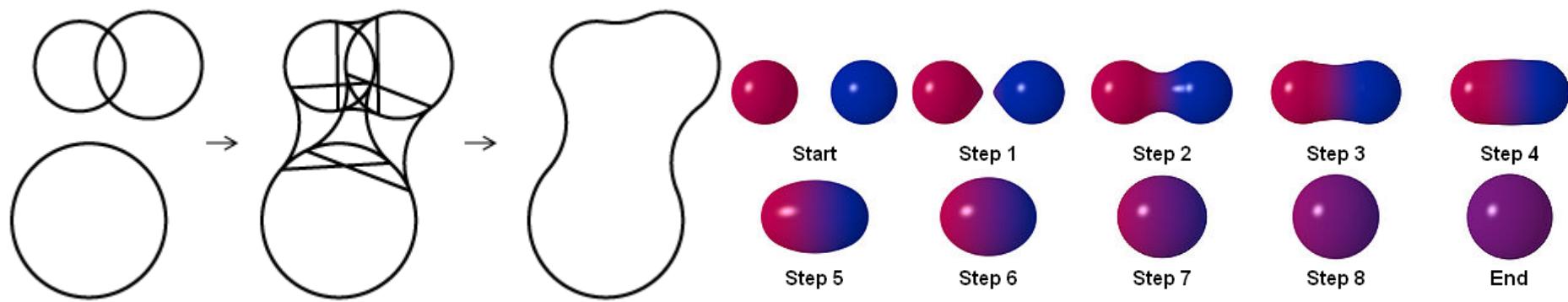
Mesh Quads



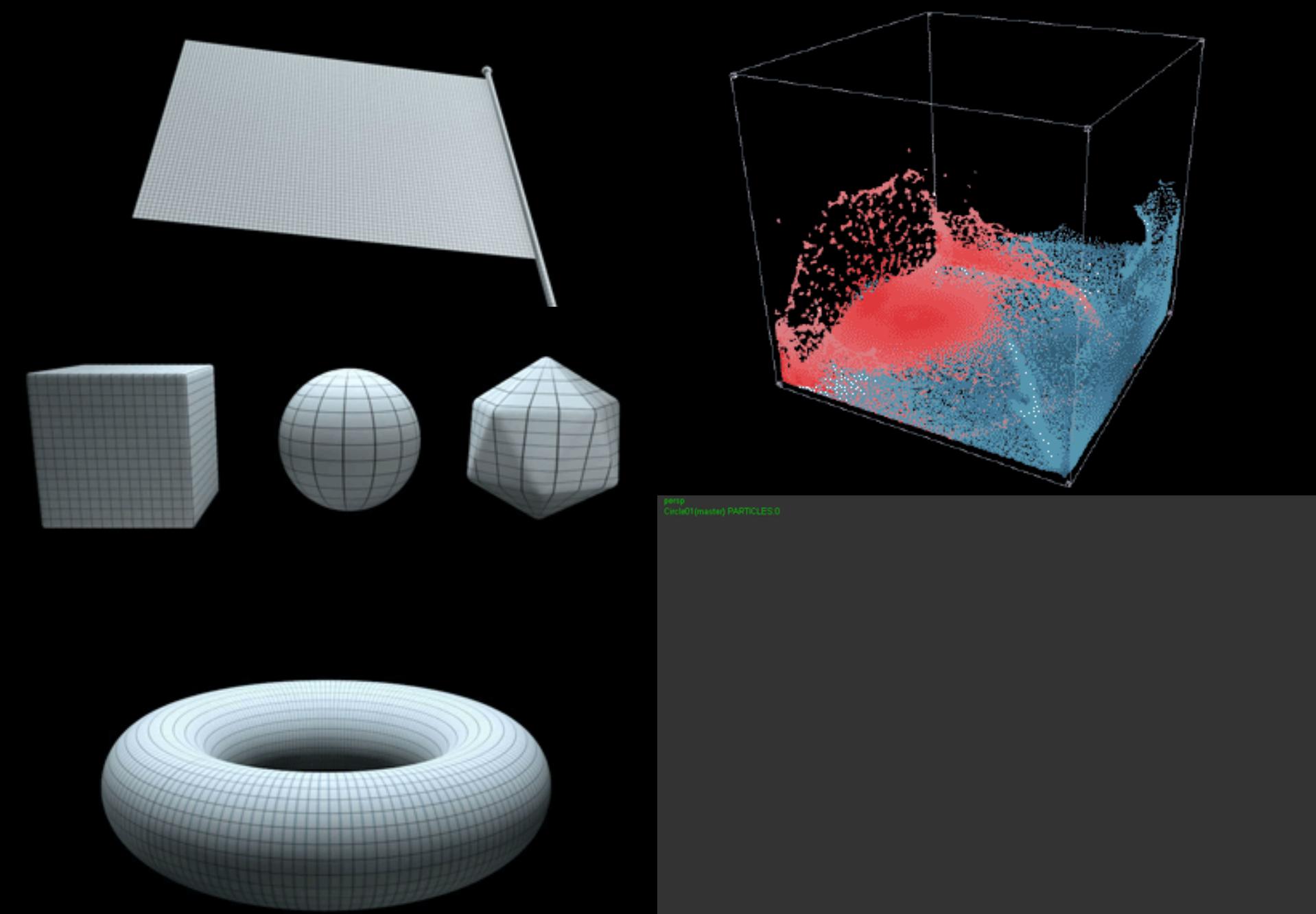
Mesh Triangles



MESH



Blob / Metaball 後設球



Particle System 粒子系統

TC 00:00:00 F 0 ST 00:07:09

- 工業設計
- 建築設計
- 交通工具設計
- 船艇設計
- 珠寶設計
- 鞋類設計
- 家具設計
- 電影道具設計
- 機械設計
- 飛機設計
- 太空船
- 生物
- 人物
- 卡通
- 機器人
- 場景
- 學生作品

上傳您的作品



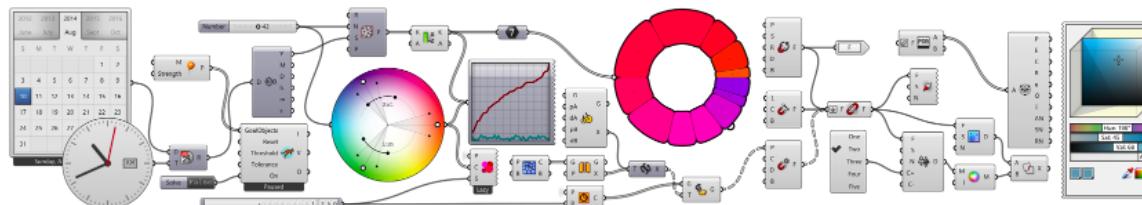
1992 May	Meeting with Applied Geometry integrating AGLib, NURBs geometry library, in AutoCAD.
1992 Nov	McNeel/AG agreement to develop AccuModel, NURBs modeling for AutoCAD .
1992 Nov	Michael Gibson hired as an intern. He brought Sculptura, a mesh modeler.
1993 Mar	Sculptura released.
1993 Nov	Sculptura 2 nicknamed Rhinoceros
1994 Apr	Rhino beta released on the Graphic Alternative BBS.
1994 Aug	Sculptura renamed Rhinoceros after trademark problems with AccuModel.
1994 Aug	Private showing of Rhino at SIGGRAPH.
1994 Nov	Sale of AG to Alias.
1995 Jun	Alias purchased by Silicon Gra Alias final. phics.
1997 May	Last build of AccuModel for AutoCAD. Rhinoceros focus on the Windows version.
1998 Jul	Rhinoceros 1.0 released.
1999 Jan	Japanese version released.
1999 Jan	First public beta of 1.1 released.
1999 Jan	First European reseller meeting in Barcelona.
1999 May	Shipping Korean version.
2000 Aug	Rhinoceros 2.0 shipping.
2003 Jan	Rhinoceros 3.0 shipping.
2007 Jan	Rhinoceros 4.0 shipping.
2008 Mar	Grasshopper for Windows.
2012 Nov	Rhinoceros 5.0 shipping.
2015 Jun	Rhinoceros 5.0 for Mac.
2016 Jan	Grasshopper Beta for Mac.
2018 Feb	Rhinoceros 6.0 released.

Rhino 6 for Windows 的新功能

概觀

在 Rhino 6 for Windows, 我們已將 Grasshopper 這個廣受歡迎的視覺程式語言完全的融入在我們之中, Grasshopper 不再只是beta版, 而是成為一個穩定的開發環境。我們也將一些需要基本檢修的功能重新編寫並且改善工作流程, 這些都是亮點...

Grasshopper



漫長的 beta 階段已經結束: Grasshopper, 世界上最美麗的程式語言, 現在已完全是 Rhino 的一部分。 Grasshopper 在過去十年被用在最雄偉的設計專案上 - 就像Rhino 已經成為強大的開發平台。 Grasshopper 為許多第三方的構成要素提供基礎, 範圍從環境分析到機器人控制。

[所有細節...](#)

提案



提案是重要關鍵: 在設計的每個階段, 幾乎都需要跟客戶、合作廠商或是大眾溝通。 我們已經改進 Rhino 以便幫助您可以更快速、以高解析色澤來展示您的作品。 主要的改變在於彩現、材質、完整捕捉視圖, 現在都可以更輕鬆、更快速的呈現、討論、制定決策。

[所有細節...](#)

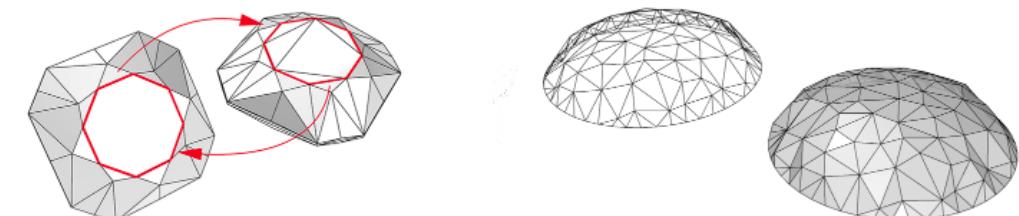
建立2D圖面



建立2D圖面已全面改寫, 現在可以提供更快、更好、更清楚、更加客製化的功能。

[所有細節...](#)

Rhino 優化



建模過程使用的指令為數眾多, Rhino 6 修正了數以百計的小錯誤, 並將不同但類似的功能合併, 簡化操作。

[所有細節...](#)

開發平台



Rhino 不僅只是建模軟體, 還有豐富的外掛程式及開放原碼的開發工具。 Rhino 正在快速的成為追求設計理念的開發平台, Rhino 6 為我們免費的 SDKs 帶來了重大的改進, 透過 API 精細的改進、更好的操作說明以及更多來自 Grasshopper 存取 Rhino 的指令...

[所有細節...](#)

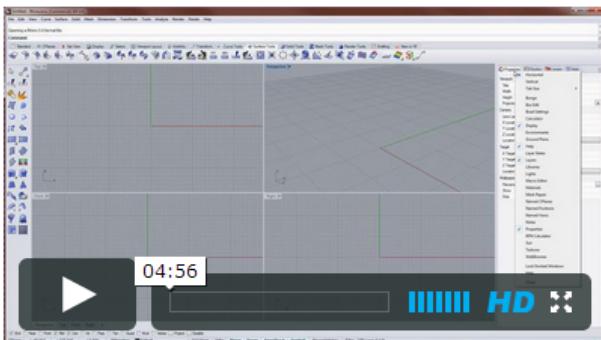


新文章

- 跟我讀『RhinoPython 101』系列影片 – By Jorin
- Rhino 5 置換貼圖功能
- Grasshopper工業設計運用入門簡介
- 多管交集曲面
- 由3D到2D再到3D

FRIDAY, FEBRUARY 1, 2013

Rhino 5 介面簡介



這個教學影片提供Rhino 5新使用者一個最新的介面導覽，內容包括視圖旋轉、平移、縮放，工具列群組，面板等介紹。

POSTED BY YOKO AT 12:52 AM [\[REPLY\]](#)

LABELS: V5新功能, 教學影片

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語言 [\[選項\]](#)

McNeel 成立於 1980 年，是一家私人及員工所共有的公司，在西雅圖、波士頓、邁阿密、布宜諾斯艾利斯、巴塞隆納、羅馬、東京、台北、漢城、吉隆坡、上海都有負責銷售與技術支援的據點。世界各地的經銷商、OEM 廠商、教育訓練中心總計有 700 多家。

[訂閱](#)

分類

- Brazil (8)
- Flamingo nXt (3)
- Grasshopper (9)
- Neon (4)
- Paneling Tools (20)
- Revit (2)
- RhinoPython (1)
- RhinoScripting (1)
- V5新功能 (14)
- 中文發音 (1)
- 作業視窗 (5)
- 尺寸標註 (1)
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- 曲面的編輯 (2)
- 物件鎖點 (2)
- 界面 (1)
- 硬體需求 (1)
- 網格 (1)
- 資訊分享 (2)
- 逆向工程 (2)

Rhino 維基首頁



這Rhino使用者:這個是屬於大家的網站，歡迎參與編輯，若想學習如何編輯，詳見：[aboutwiki](#)

en
cs
de
es
fr
it
ja
ko
pl
zh
zh-tw



資訊、常見問題及知識

- [Rhino討論版](#) - 到這裡來詢問McNeel技術團隊及Rhino專家們的問題吧！中文版也即將登場。
 - [Rhino V5社群](#) - 參與Rhino社群討論。
 - [常見問題](#) - 在news group常見的問題及其解答。
 - [常見回覆](#) - 這裡有一系列我們常回覆的問題。
 - [白皮書](#) - 各式技術文件白皮書清單。
 - [Rhino不為人知的秘密](#) - 許多Rhino專家的密技，幫助您節省更多時間。
 - [Rhino V5指令清單](#) - Rhino所有指令說明清單。
 - [Rhino 5線上說明](#) - 目前暫提供英文版，繁中版稍後上線。
 - [Wish List](#) - 您覺得Rhino遺漏了些甚麼功能嗎？您可以查找看看是否在wish list清單上。
-
- [安裝建議](#) - 各類關於安裝Rhino V3, V4及V5系統管理員疑難排解。
 - [Rhino進階自動安裝](#) - 關於使用程序安裝、安裝資料匣內容及註冊相關技術。
 - [Rhino 5啟動當機說明](#) - 若Rhino在您的電腦啟動失敗，這裡有一些說明讓您了解查找並排除問題。
-
- [Mac Rhino](#) - 關於Rhinoceros for OS X版本的資訊。
-
- [使用Rhino彩現](#) - 所有Rhino相容彩現器及平台介紹資訊。
 - [Rhino與其他軟體協同工作](#) - Rhino與其他相關軟體連結工作的技巧及建議。
 - [Rhino 新聞群組 - NNTP版本](#) - 新聞群組目前已經停止貼文，但您依然可以在此尋找舊文。若您需要技術支援，請到 [新Rhino討論版](#)
 - [Rhino 新聞群組 - 網頁版](#) - 新聞群組目前已經停止貼文，但您依然可以在此尋找舊文。

資源、模型、教學、部落格及網路研討會

- [模型](#) - Rhino模型網站連結清單。
- [巨集、腳本及外掛程式](#) - 由Rhino使用者自行開發的各式工具，並有簡易說明及教學。
- [自訂工具列](#) - 由Rhino V3/V4使用者自行製作的工具列分享及使用巨集及腳本分享的各種應用功能。
- [自訂工作環境](#) - 一個可以分享您自訂Rhino工作環境的空間。
- [進階顯示模式](#) - Rhino 5 新的進階顯示模式設定及分享。
- [剖面線圖庫及線型](#) - 剖面線圖庫及線型分享。
- [3D量測手臂](#) - 3D量測手臂相關資訊。
- [環境貼圖、材質、紋理貼圖及其他](#) - 分享您的材質、環境貼圖及相關資料的空間。
- [教學](#) - Rhino教學網站連結清單。
- [講師網站](#) - 提供Rhino講師分享學生作品、教學及教學大綱的園地。
- [Rhino官網](#)
- [Rhino 3D Help網站](#) - 一個有很多教學、模型及與多資訊的新網站(英文網站)。
- [網路研討會](#) - 相關網路研討會影片連結及未來的網路研討會清單。

新聞、使用者案例及作者簡介



Where Rhino 5 users gather.

Groups



Neon

1776 members



Grasshopper

345 members



PanelingTools

252 members



RhinoScript

134 members



Python

133 members



food4Rhino

131 members



Rhino OS X

98 members



Rhino FabLab

92 members



VisualARQ

79 members



Brazil

75 members



Generative Jewelry and F...

66 members



EvoluteTools

57 members

Rhino 5 is shipping

The world's most versatile 3-D modeler now handles bigger projects, faster, with **more than 2,000 enhancements**.

Contact your local dealer to order Rhino 5. Meanwhile, try the [eval](#).

Soon, Rhino 5 users will be invited to get involved in the [service release](#) development process.

System Requirements

Join the Discussion Forum

Join the Rhino development and support teams, seasoned users, and new users sharing tips and ideas on the discussion forum.

Latest Rhino Forum Topics

Clipping Plane Edges not printing

Wish: group command for marked layers

Strange dots

Creating a spline between two curves

View problem when I move with an object

Gumball planes more visible please

Problem joining blended surfaces

Baking vertex colors into bitmap

How to stop object falling over?

Control-Shift-Right Mouse Button

V6 per file Macros and Scripts : 'ScriptBox'

Make 2D and hyperthreading

Many repeated shapes slowing everything down a lot. Any way to avoid it?

Struggling with Cplane

Is V-Ray popular?

Welcome to
Rhino Community
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or [Sign In](#)

Or sign in with:



Translate

請選取語言

由「[Google 翻譯](#)」技術提供

Events

Rhino and Grasshopper training

September 5, 2013 at 6pm to
November 10, 2013 at 7pm –
Bucharest

Module 03 / Rhinoceros intermediate & advanced

September 13, 2013 at 4pm to
September 28, 2013 at 12am –
Bucharest

IBEX

September 17, 2013 to
September 19, 2013 – Kentucky
Exposition Center

Diseño y Modelado de Suelas -
Exclusivo para Mujeres

September 21, 2013 at 9am to
December 7, 2013 at 11:30am –
León, México

Certificate in Jewellery CAD
Technology- Rhinoceros

September 23, 2013 to
November 8, 2013 – Mahalaxmi,
Mumbai

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討論話題

分類

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如何訪問 McNeel 原廠英文論壇

當你的網頁流覽器的語言設定以繁體中文或簡體中文為優先語言時訪問 rhino3d.com/forum 會被導引至此中文論壇，如果你想訪問 McNeel 英文論壇可以從 rhino3d.com/en/forum 進入。當你的網頁流覽器的語言設定非以繁體中文或簡體中文為優先語言時訪問 rhino3d.com/forum 會被導引至 McNeel 英文論壇，你可以從 rhino3d.com/tw/forum 或 rhino3d.com/c... [閱讀更多](#)



1

319

[zh_TW.dates.tiny.date_month](#)

歡迎來到 McNeel 原廠中文論壇

歡迎來到 McNeel 原廠中文論壇! McNeel 中文技術支援團隊很高興在此見到你，繁體/簡體中文用戶都可以在此提問、討論、分享關於 McNeel 產品的任何事物。開始 登入 - 此論壇可以跨平台 (電腦、手機、平板) 追蹤你看過的主題與新主題，但此功能必需登入論壇才能發揮作用，所以請務必註冊一個帳戶。搜尋 - 論壇右上角的搜尋功能可以在你輸入關鍵字時動態過濾出相關的主題，在你建立新主題前可以用來搜尋是否曾經有... [閱讀更多](#)



2

529

[zh_TW.dates.tiny.date_month](#)

Layer manage panel問題

[Rhino for Windows](#)

8

10

12 分鐘

Solidpoint on 与 shift+ctrl 连用时

[Rhino for Windows](#)

3

10

2 小時

Attach model option工作不正常。

[Rhino for Windows](#)

2

11

1 天

出现黑屏现象当调动toolbar时 (WIP)

[Rhino for Windows](#)

11

23

1 天

all categories ▾

Latest

New (85)

Unread (21)

Top

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See 1 new or updated topic

  Welcome to McNeel Forums

Welcome to the McNeel Forums! We (the McNeel developers and support team) are glad you're here. We welcome simple or complex questions, from new or veteran users, about all our products. Translated discussion forums ... [read more](#)



0

34.7k

Jun '13

Plan and section view fail in big project •

 VisualARQ

2

43

5m

Dynamic Simulations and Optimization •

 Kangaroo

2

61

18m

Line are not visible when i import .dxf file into rhino 5 •



0

4

30m

Disappearing icons in Grasshopper - 5.4.2

 GH for Mac

14

927

42m

Removing triangulation •

 Rhino for Windows

2

19

1h

How to Create single polysurface from multiple planer patches not in same plane •

 Grasshopper

14

124

1h

How can i find a mathematical equation for a 3d geometry •

 Rhino for Windows

1

20

1h

Divide surface based on corners

 Grasshopper

45

494

2h

Clayoo inverts "Isolate" command

 rhino6, clayoo, isolate

12

78

2h

Extrude with point attractor parameter

 GH for Mac

4

79

2h

Rhino Plug-ins

[Last updated](#) [Most downloaded](#) [Best rated](#)

MeshPaint3D
Free



ArrayCrv
PLUS Free



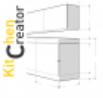
Armadillo Eval



Scan&Solve...
Eval



EvoluteTools
Lite... Free



KitchenCreat
or Free



AuroraJewels
Free



Auxpecker
Free



Layout
Manager Free



VisualARQ
Eval



Rhino
Membrane
Eval



Rhino Tracks
Eval

[All plug-ins for Rhino](#)

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iRhino 3D

View native 3DM files
on your iPad or iPhone

[Download](#)

Grasshopper Add-ons

[Last updated](#) [Most downloaded](#) [Best rated](#)

Human
(Formerly...)
Free



Geco Free



gHowl Open
source



Elk Free



Sandbox
Topology
Open source



BIM
GeomGym
IFC Eval



LunchBox
Free



BullAnt Eval



Selectable
Preview Free



SPM Vector...
Free



calabi yau...
Open source



Primate:
Leap... Free

[All add-ons for Grasshopper](#)

Quick Links

Field:

2D/3D graphics (37), Architecture (65), Digitizing & Reversing (7), Free time (7), Industrial Design (27), Interface & Analysis (32), Jewelry Design (11), Manufacturing (21), Marine (5), Mathematics (23), Mechanical Engineering (17), Physics Solvers (10), Structural Engineering (21)

Platform:

Grasshopper 0.6 (2), Grasshopper 0.7-0.8 (23), Grasshopper 0.9 (47), Rhino 4.0 (32), Rhino 5.0 (39)

License:

Free (76), Eval (24), Open source (10)

Like us!

**Food4Rhino**

1,782

Remote

Textures and Backgrounds

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Getting Started with Rhino Development



What	Where	How	Why
RhinoCommon			Write Rhino plugins & Grasshopper components
Rhino.Python			Cross-platform scripting
openNURBS			3dm file reading and writing
RhinoScript			Rhino for Windows scripting
C/C++			Rhino for Windows plugins
Grasshopper			Grasshopper components
RhinoMobile			3D mobile application development

Welcome to the Rhino 6 version of this site. Looking for the Rhino 5 version?

Still unclear? Browse the [Guides](#). Ask a question in the [Forum](#). Check out the [FAQ](#). Ask a developer.

Rhino developer tools are royalty free and include support.

<https://developer.rhino3d.com/>



Grasshopper Components

Version 0.9.76.0, 3114 components including addons.

Curve > Analysis

	Center (Cen) Find the center point and radius of arcs and circles.
	Evaluate Length (Eval) Evaluate a curve at a certain factor along its length. Length factors can be supplied both in curve units and normalized units. Change the [N] parameter to toggle between the two modes.
	Closed (Cl) Test if a curve is closed or periodic.
	Control Points (CP) Extract the nurbs control points and knots of a curve.
	Control Polygon (CPoly) Extract the nurbs control polygon of a curve.
	Curve Closest Point (Cr CP) Find the closest point on a curve.
	Curvature Evaluate the curvature of a curve at a specified parameter.
	Derivatives (CDiv) Evaluate the derivatives of a curve at a specified parameter.
	Discontinuity (Disc) Find all discontinuities along a curve.
	Extremes (X-tremez) Find the extremes (highest and lowest points) on a curve.
	Curve Nearest Object (CrvNear) Find the object nearest to a curve.

Curve > Primitive

	Arc Create an arc defined by base plane, radius and angle domain.
	Modified Arc (ModArc) Create an arc based on another arc.
	Arc 3Pt (Arc) Create an arc through three points.
	Arc SED (Arc) Create an arc defined by start point, end point and a tangent vector.
	BiArc Create a bi-arc based on endpoints and tangents.
	Circle (Cir) Create a circle defined by base plane and radius.
	Circle 3Pt (Circle) Create a circle defined by three points.
	Circle CNR (Circle) Create a circle defined by center, normal and radius.
	Circle Fit (FCircle) Fit a circle to a collection of points.
	Circle TanTan (CircleTT) Create a circle tangent to two curves.
	Circle TanTanTan (CircleTTT) Create a circle tangent to three curves.
	Ellipse Create an ellipse defined by base plane and two radii.
	InCircle

Surface > Analysis

	Area Solve area properties for breps, meshes and planar closed curves.
	Box Corners Extract all 8 corners of a box.
	Box Properties (BoxProp) Get some properties of a box
	Brep Closest Point (Brep CP) Find the closest point on a brep
	Brep Edges (Edges) Extract the edge curves of a brep.
	Brep Topology (Topology) Get and display the topology of a brep.
	Point In Brep (BrepInC) Test whether a point is inside a closed brep
	Point In Breps (BrepsInC) Test whether a point is inside a collection of closed breps
	Brep Wireframe (Wires) Extract the wireframe curves of a brep.
	Deconstruct Box (DeBox) Deconstruct a box into its constituent parts.
	Deconstruct Brep (DeBrep) Deconstruct a brep into its constituent parts.
	Evaluate Box (Boxv)

Mesh > Util

	Occlusion (Occ) Solve occlusion for a collection of view rays and obstructions.
	Blur Mesh (MBlur) Blur the colours on a mesh
	Mesh Brep (Mesh) Create a mesh that approximates Brep geometry
	Simple Mesh (SMesh) Create a mesh that represents a Brep as simply as possible
	Cull Faces (CullF) Cull faces from a mesh
	Cull Vertices (CullV) Cull vertices from a mesh
	Delete Faces (DeleteF) Delete faces from a mesh
	Delete Vertices (DeleteV) Delete vertices from a mesh
	Mesh Join (Mjoin) Join a set of meshes into a single mesh
	Quadrangulate (Quad) Quadrangulate as many triangles as possible in a mesh
	Settings (Custom) (Custom Mesh Settings) Represents custom mesh settings.
	Settings (Sneed) (Lapped)

Curve > Util

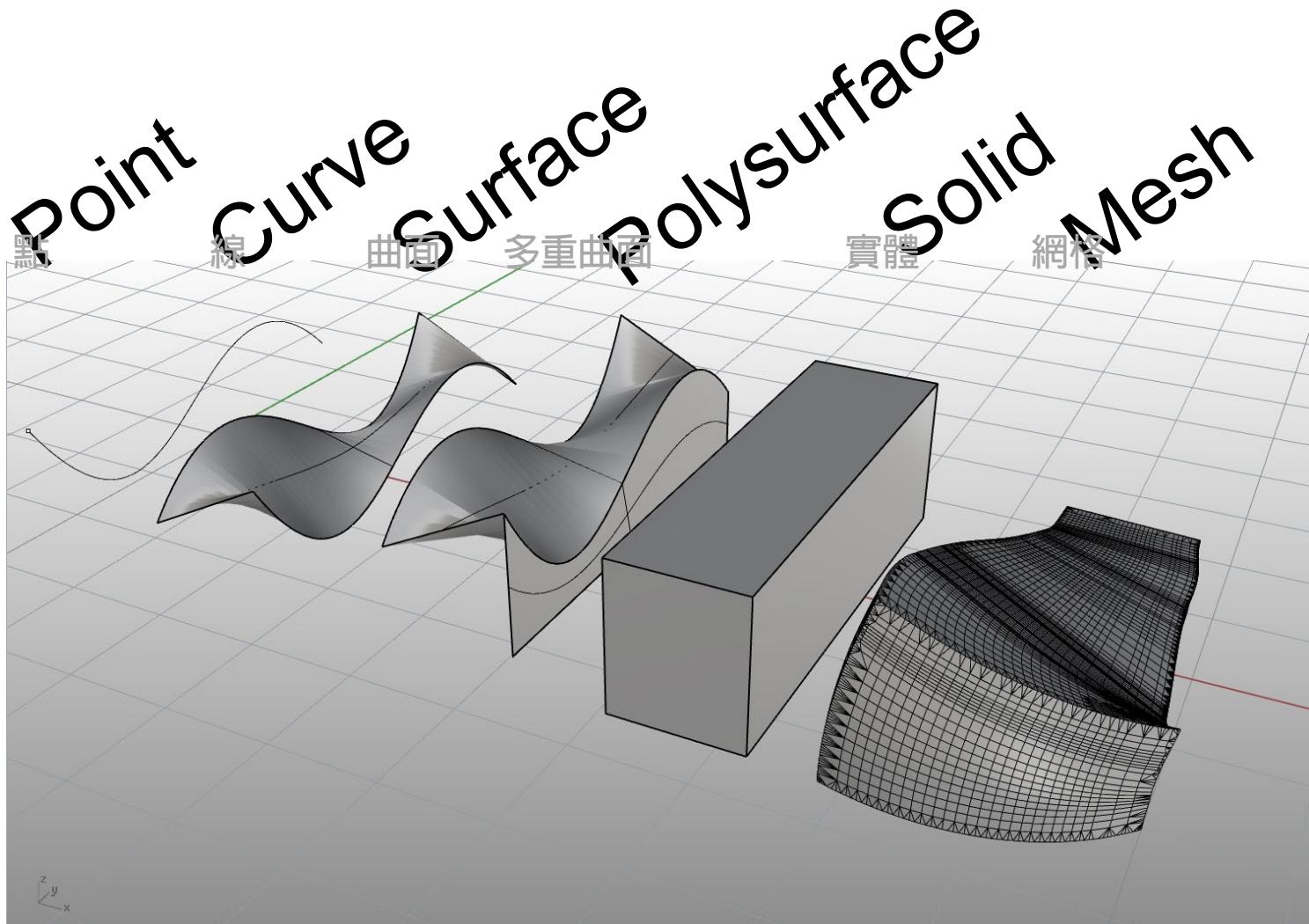
	Seam Adjust the seam of a closed curve.
	Curve To Polyline (ToPoly) Convert a curve to a polyline.
	Extend Curve (Ext) Extend a curve by a specified distance.
	Fillet Fillet the sharp corners of a curve.
	Fillet Distance (Fillet) Fillet the sharp corners of a curve by distance.
	Fillet Fillet a curve at a parameter.
	Fit Curve (Fit) Fit a curve along another curve.
	Flip Curve (Flip) Flip a curve using an optional guide curve.
	Join Curves (Join) Join as many curves as possible
	Offset Offset a curve with a specified distance.
	Offset Loose (Offset (L)) Offset the control-points of a curve with a specified distance.
	Offset Loose 3D (Offset (3D)) Offset the control-points of a curve with a specified distance in 3D.

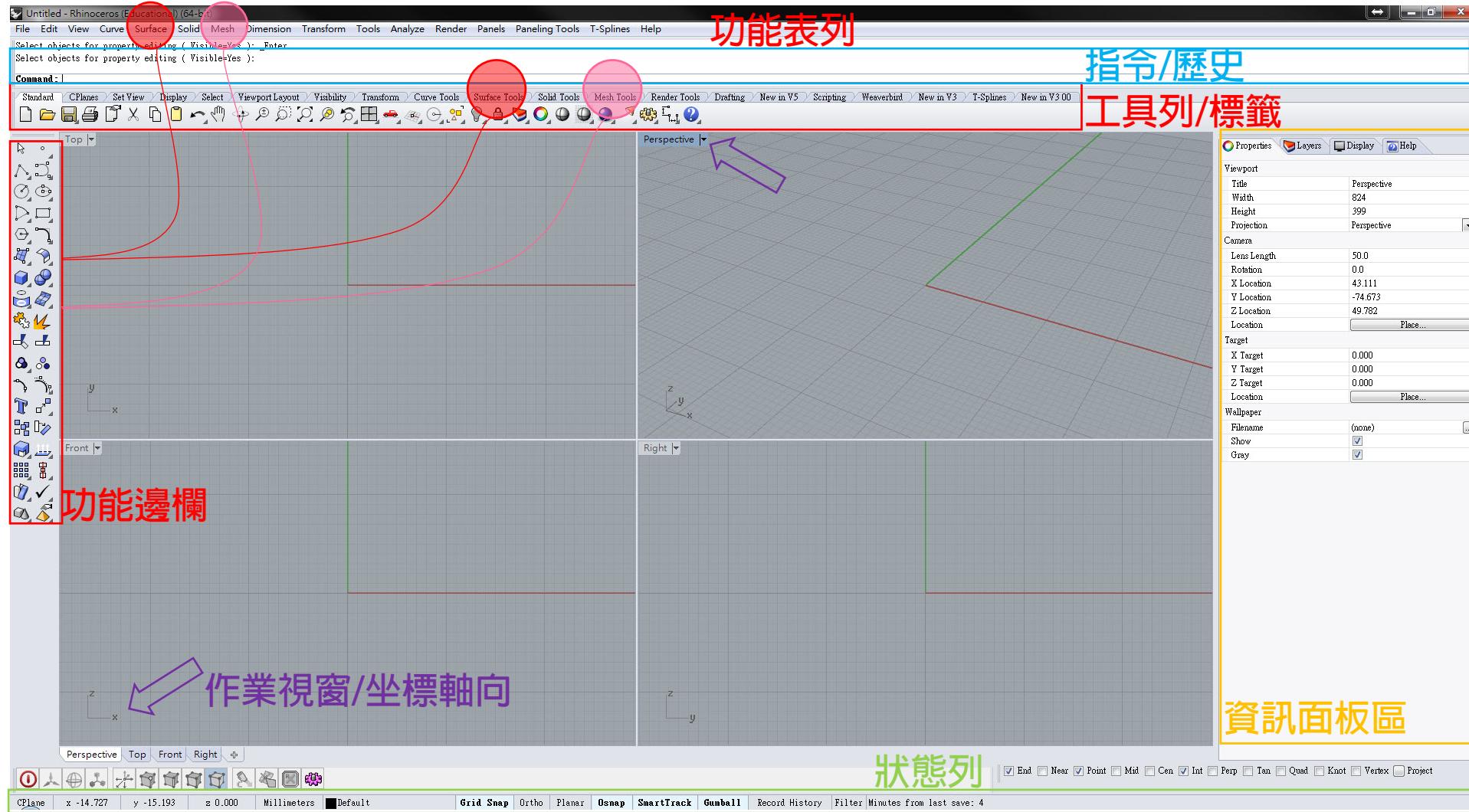
Rhinoceros_01

UI & 2D

Rhinoceros

Object Type





User Interface



點 Point

線 Line/Curve
NURBS Curve

曲面 Surface

實體 Solid

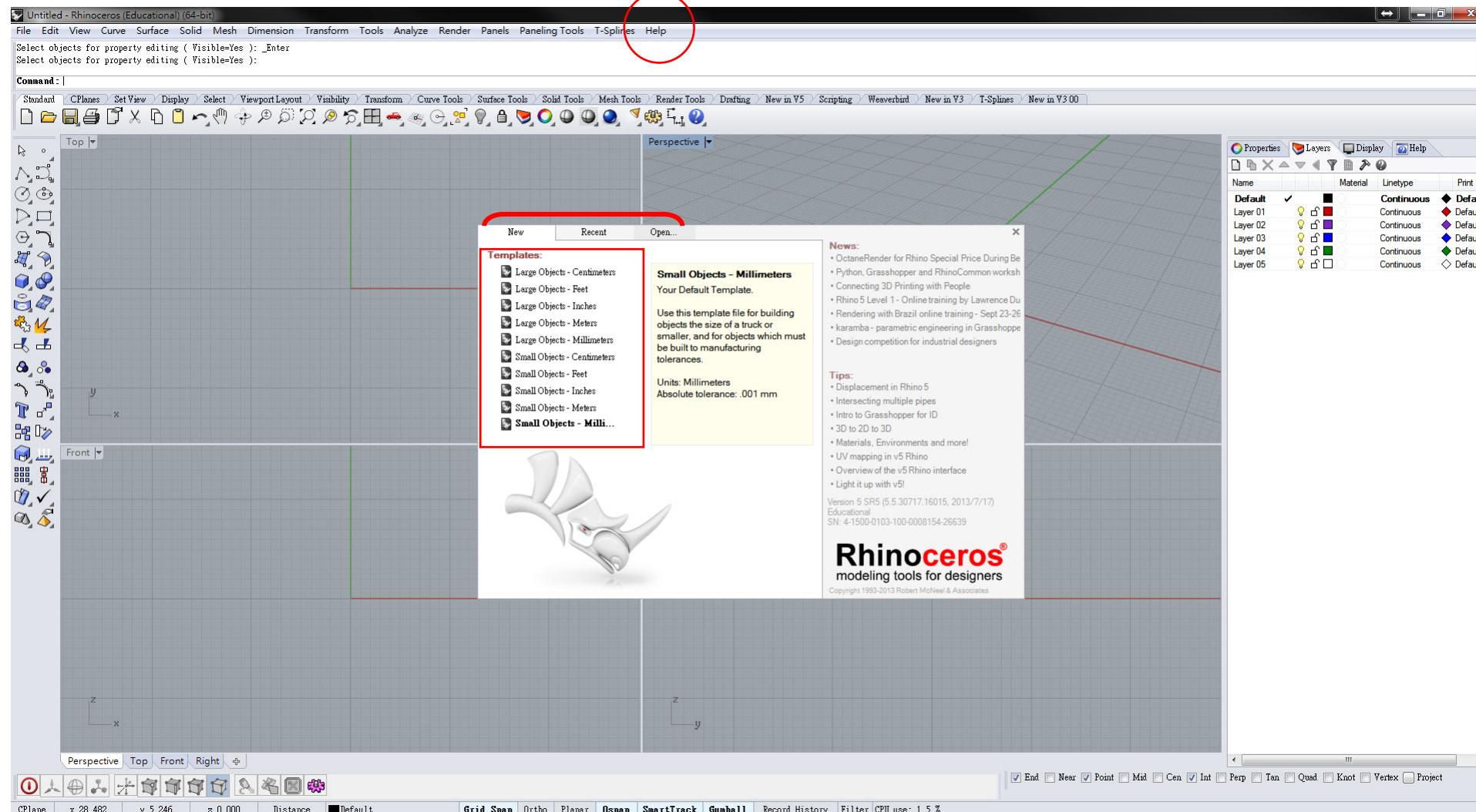
網格 Mesh

編輯

修改

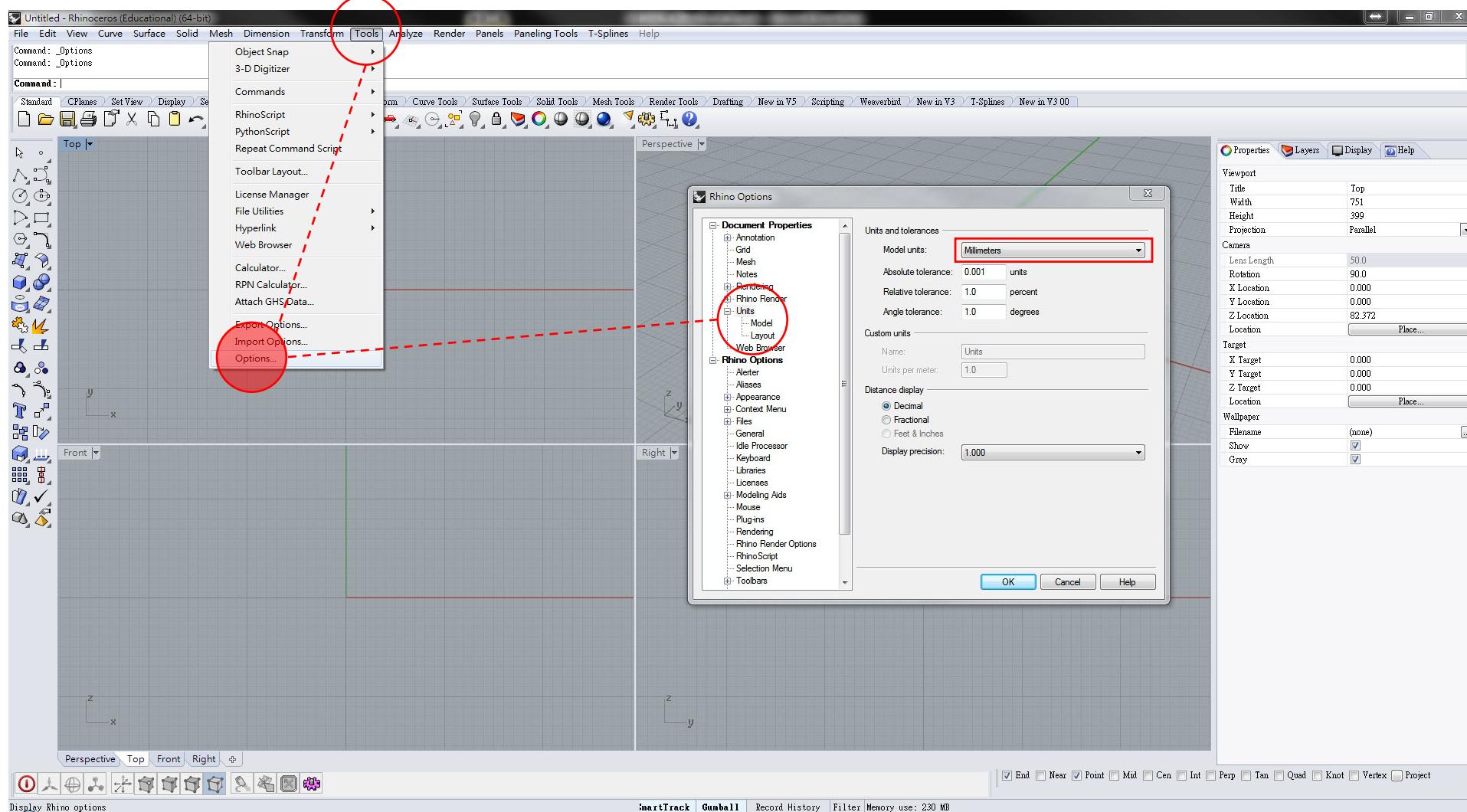
分析

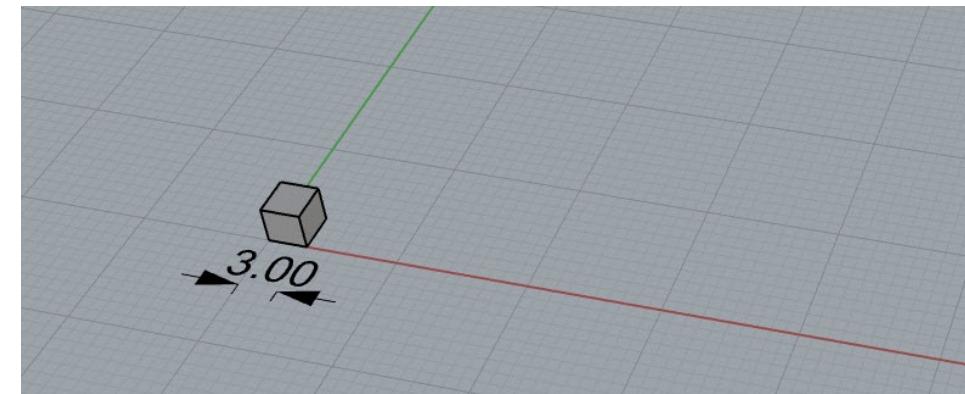
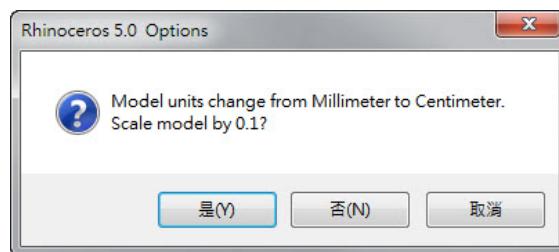
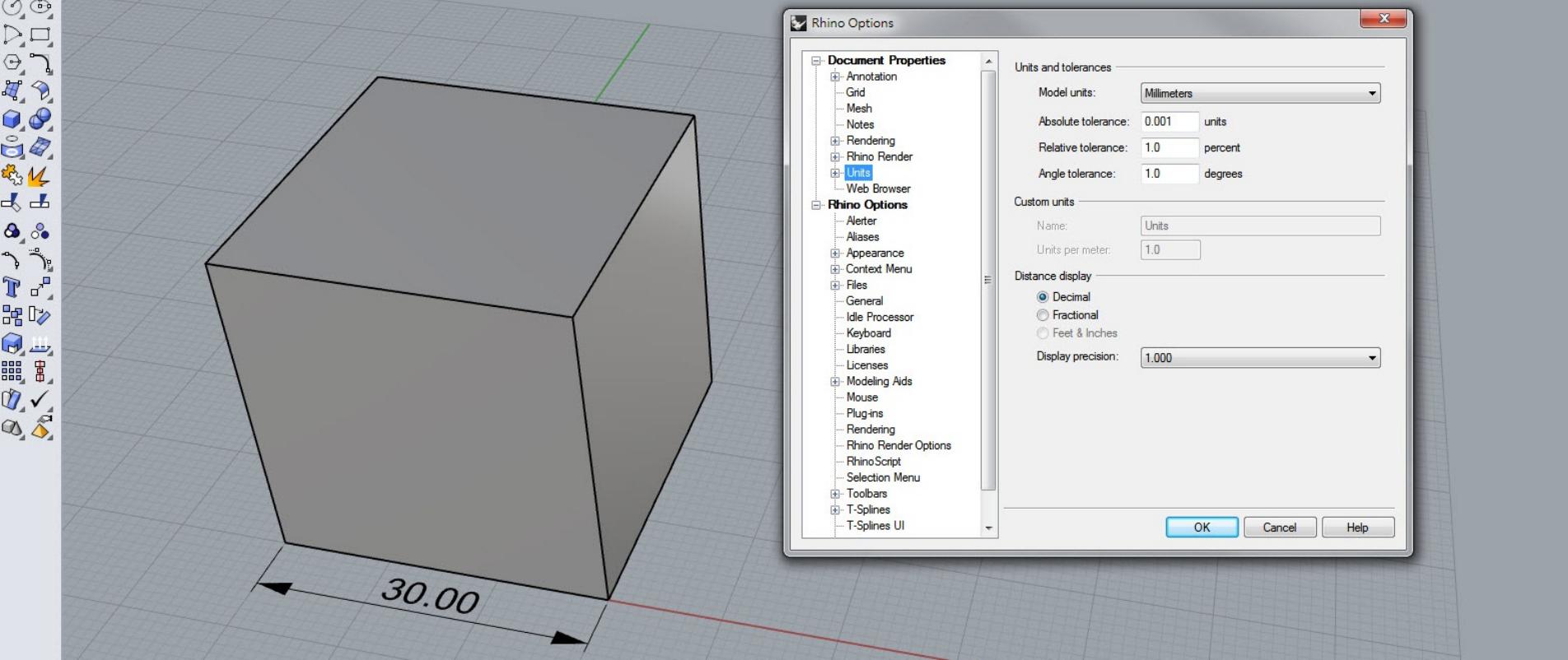
Help / About Rhinoceros



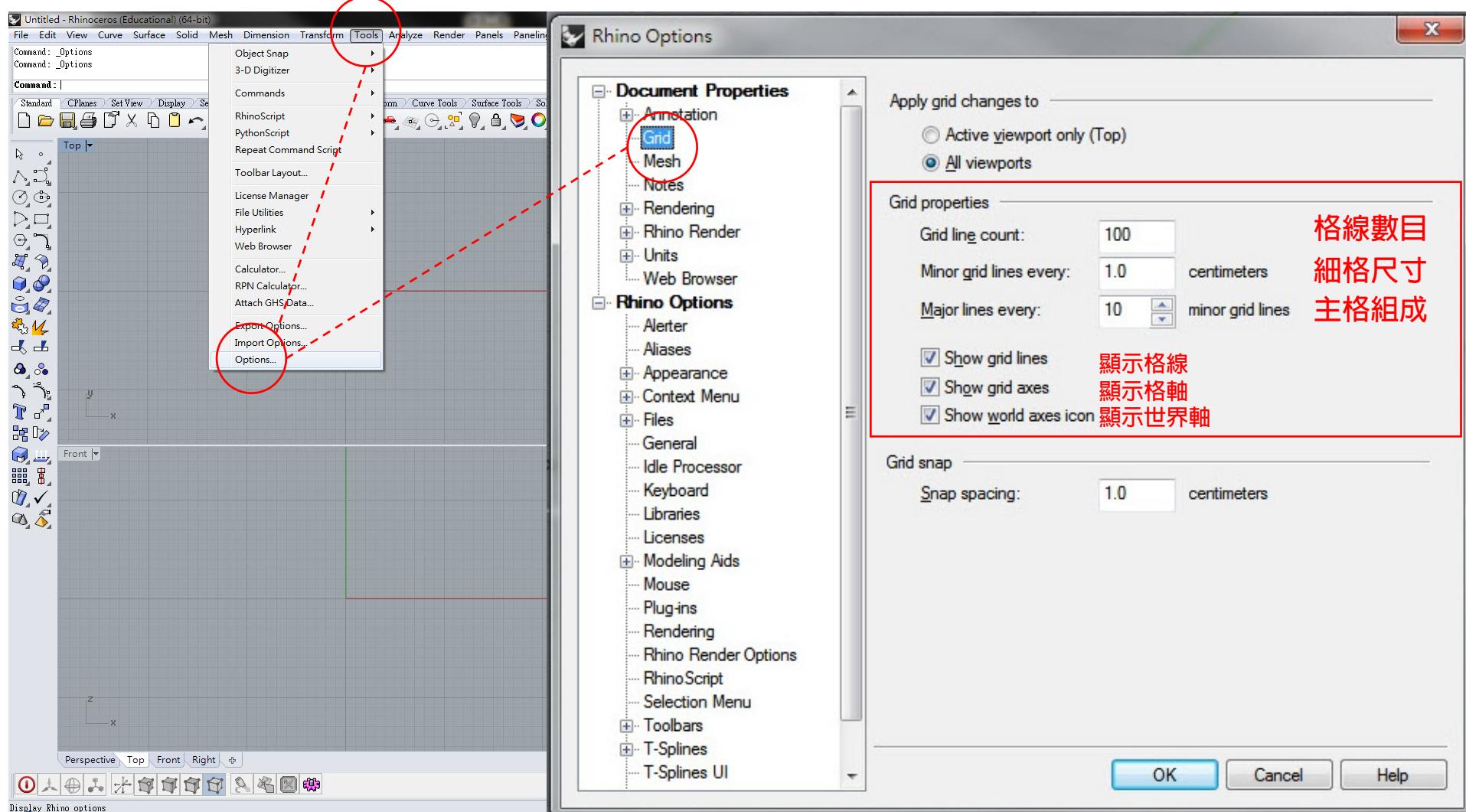
Command: about

Unit





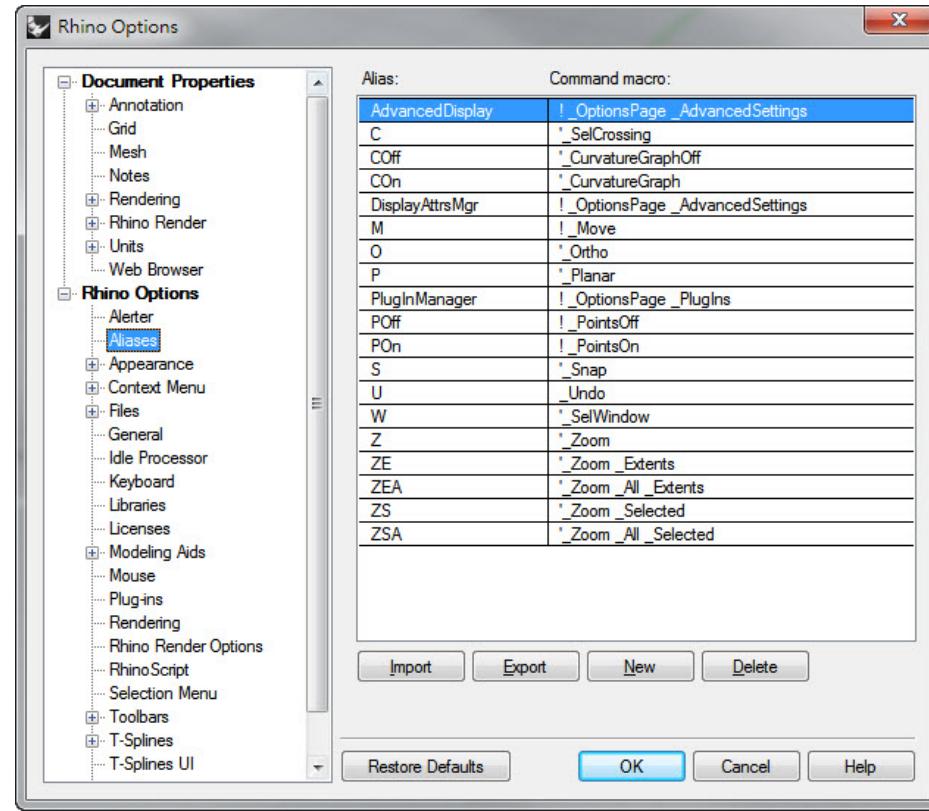
Grid



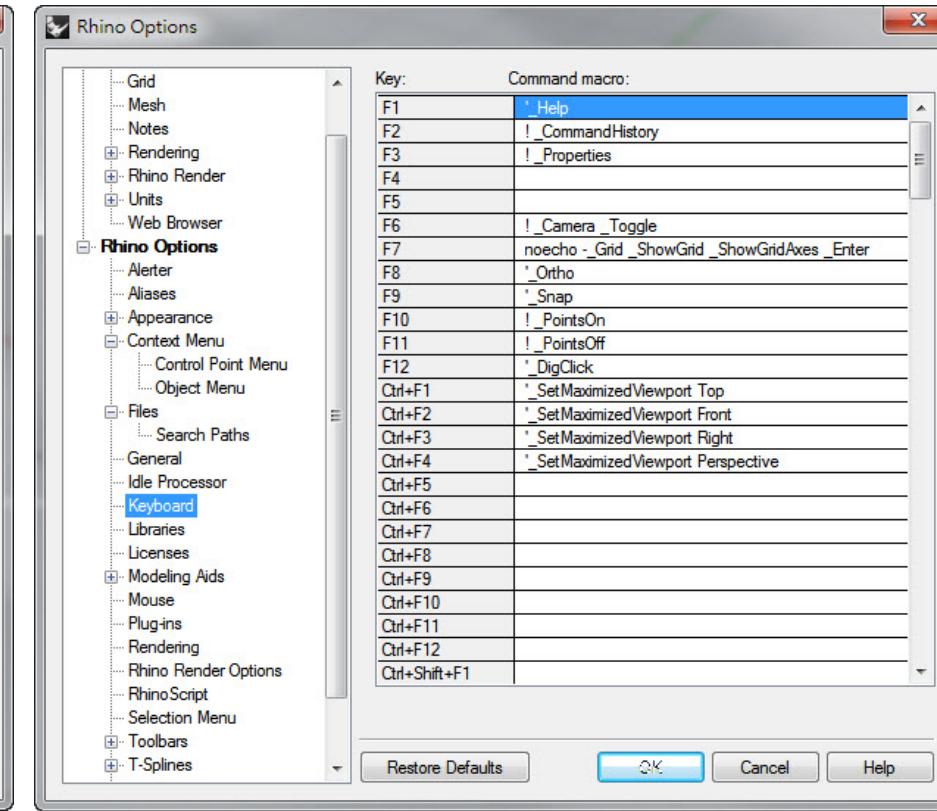
Command: Grid

Choose grid property (SnapSpacing= / MinorLineSpacing= / MajorLineInterval= / Extents= / ShowGrid= / ShowGridAxes= / ShowWorldAxes= / ApplyTo= / ActiveViewport):

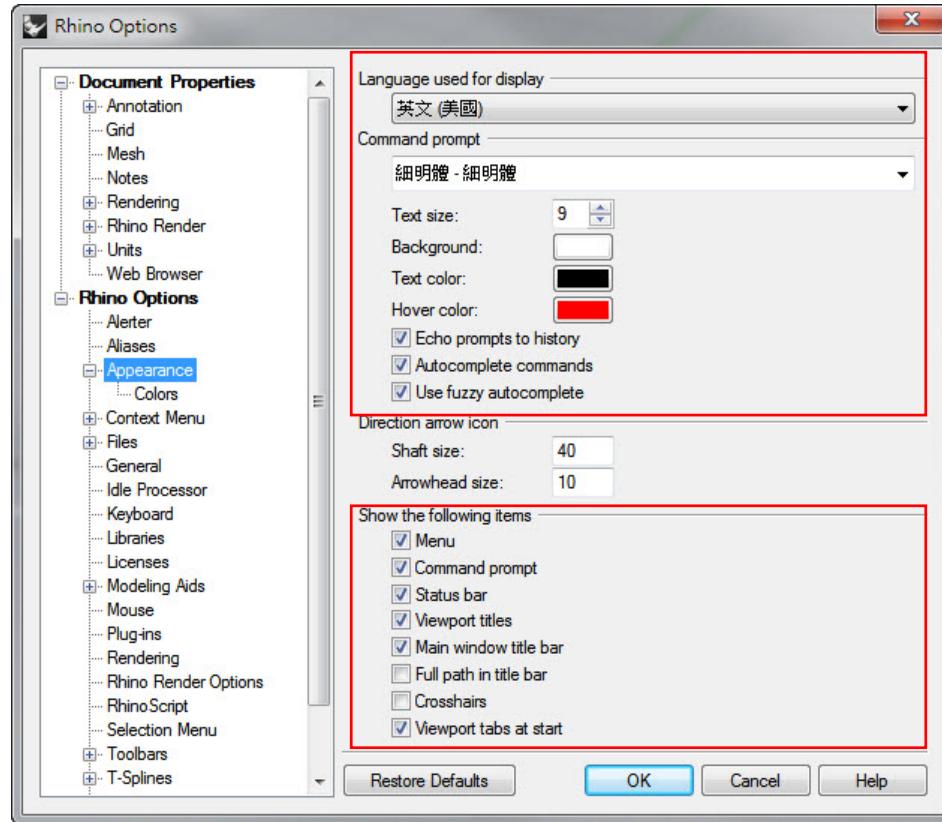
shortcut



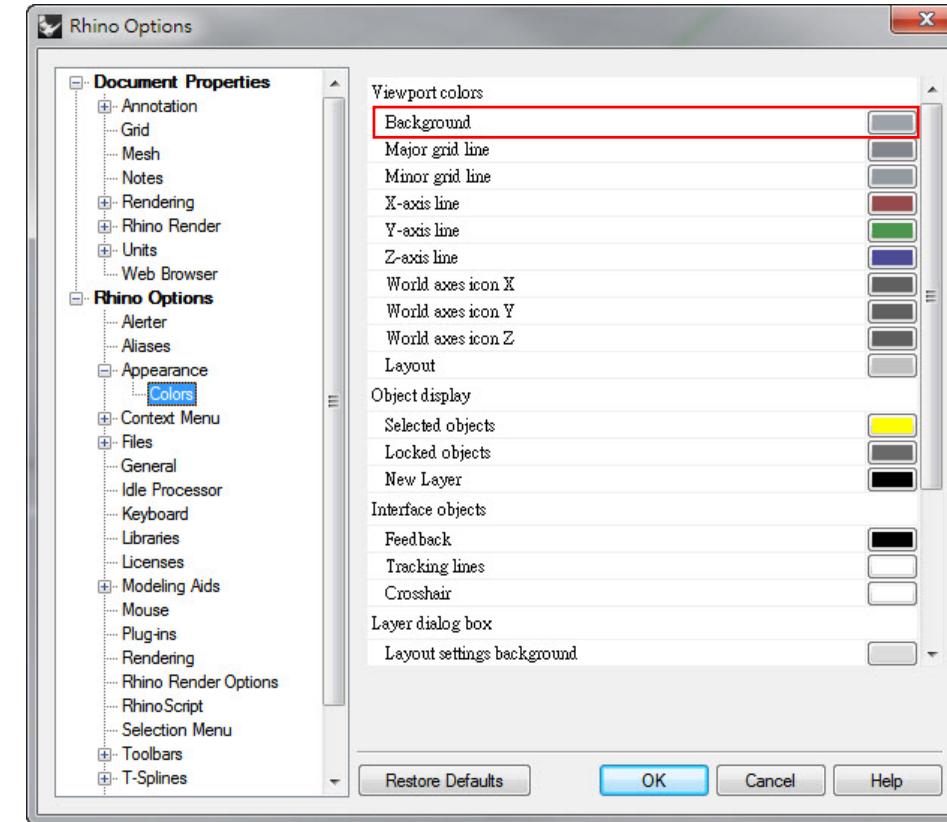
keyboard



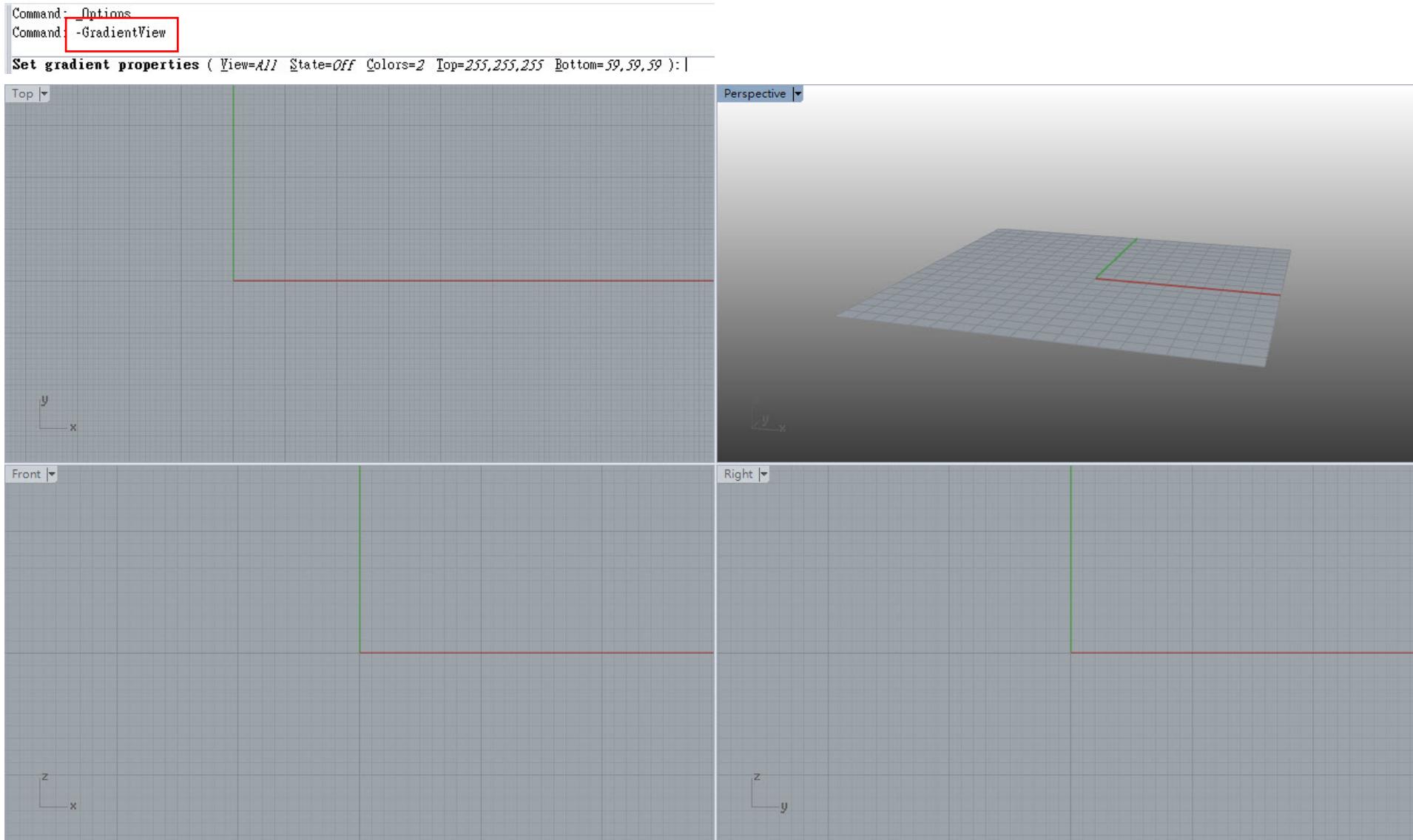
appearance



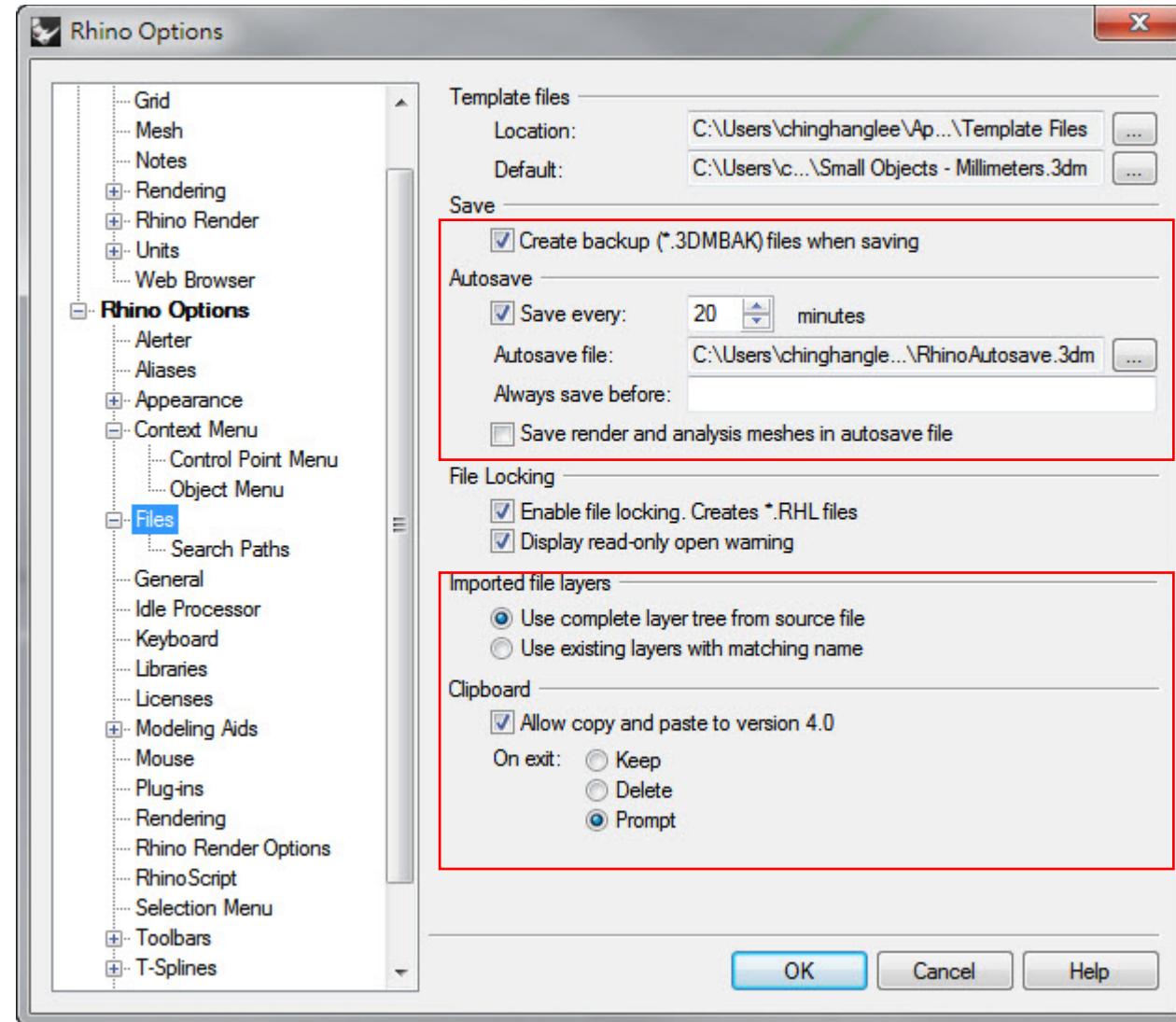
colors



Gradient View



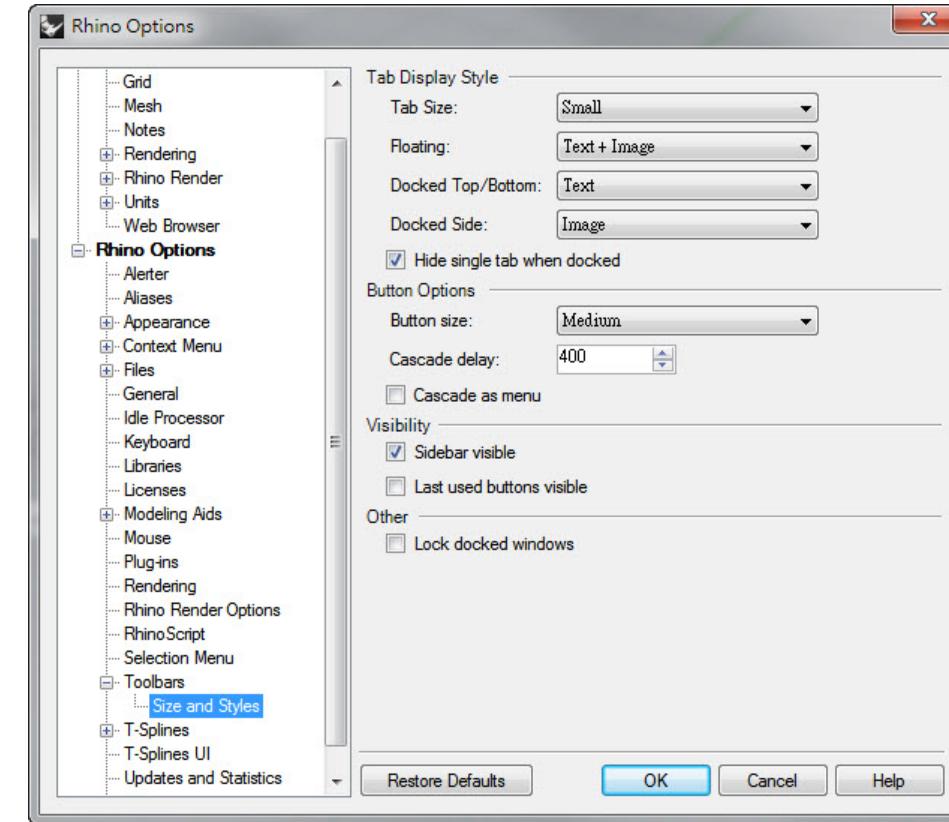
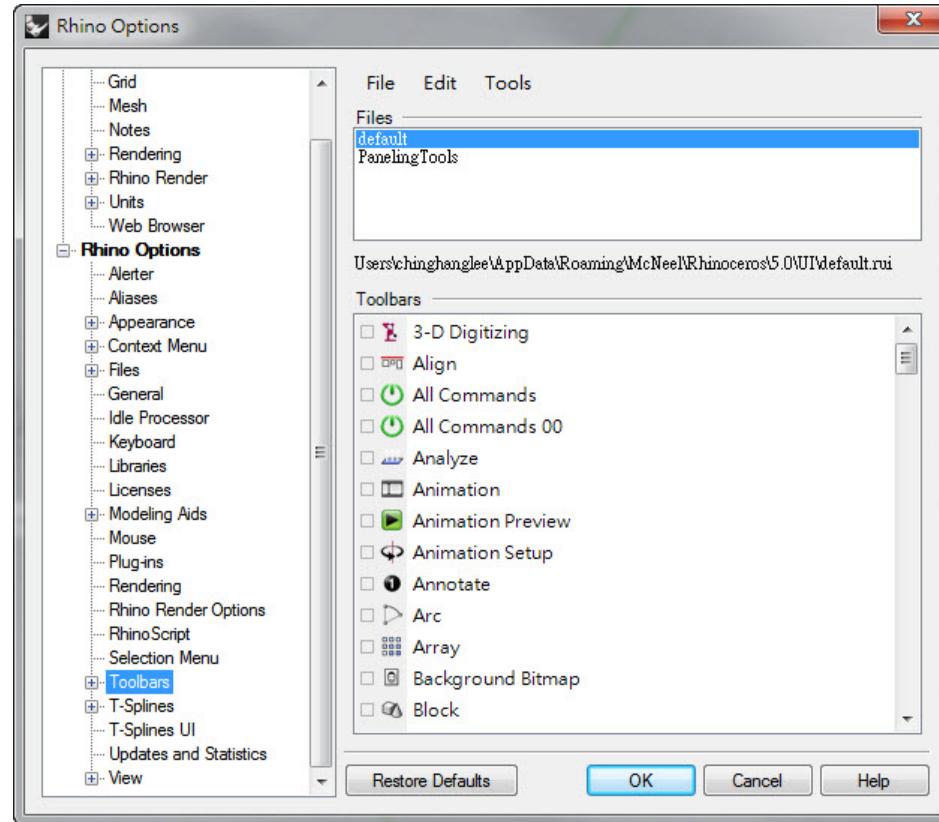
Files Setting



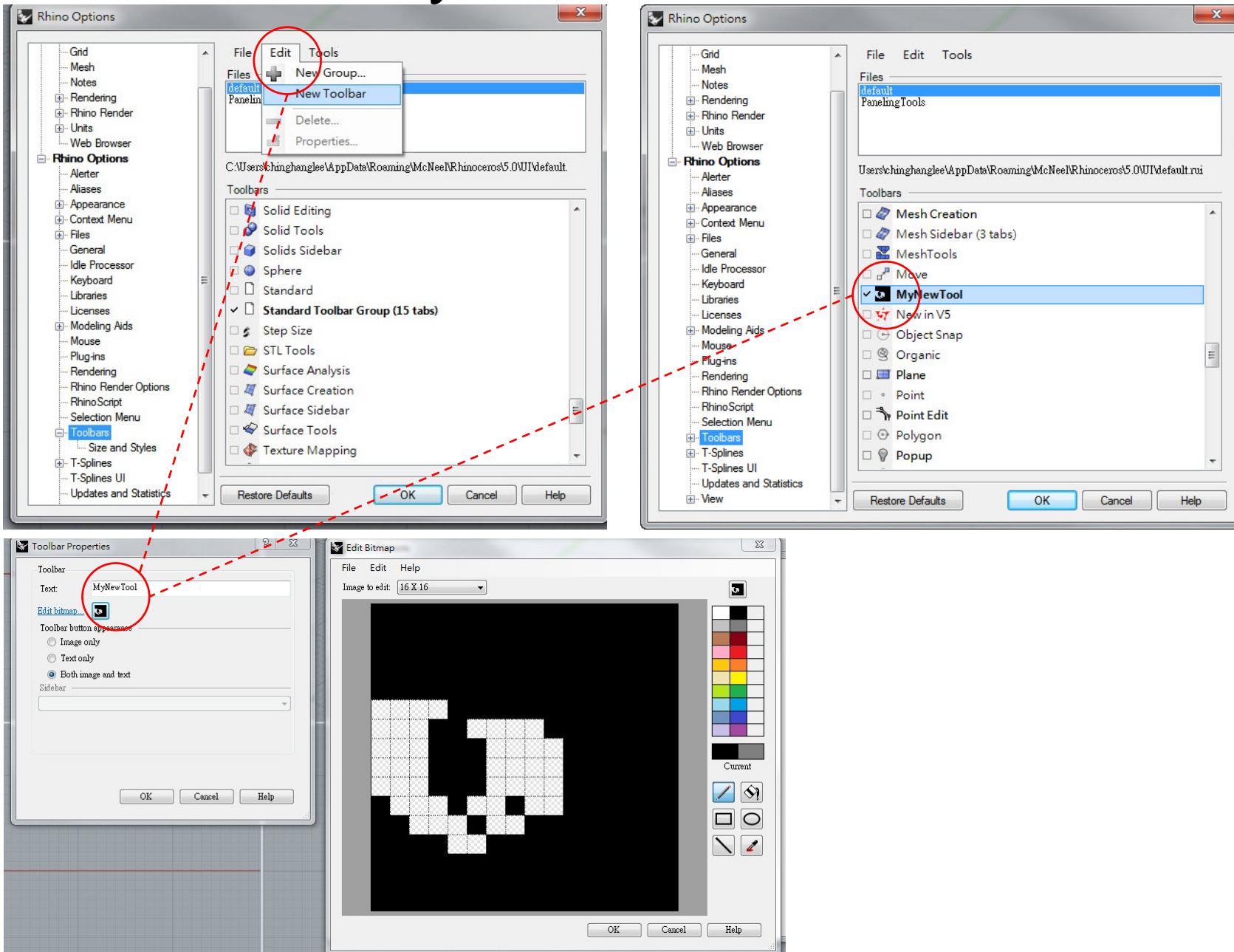


- | | |
|-----------------|--------------------------------|
| Save | 儲存模型並維持模型的開啟狀態。 |
| SaveSmall | 儲存模型但不儲存彩現網格與分析網格，減少檔案占用的磁碟空間。 |
| IncrementalSave | 以連續的編號儲存不同版本的模型。 |
| SaveAs | 以不同的檔案名稱、路徑與類型另存模型。 |
| SaveAsTemplate | 另存為範本檔案。 |
| Revert | 復原檔案在上一次存檔以後的所有變更。 |

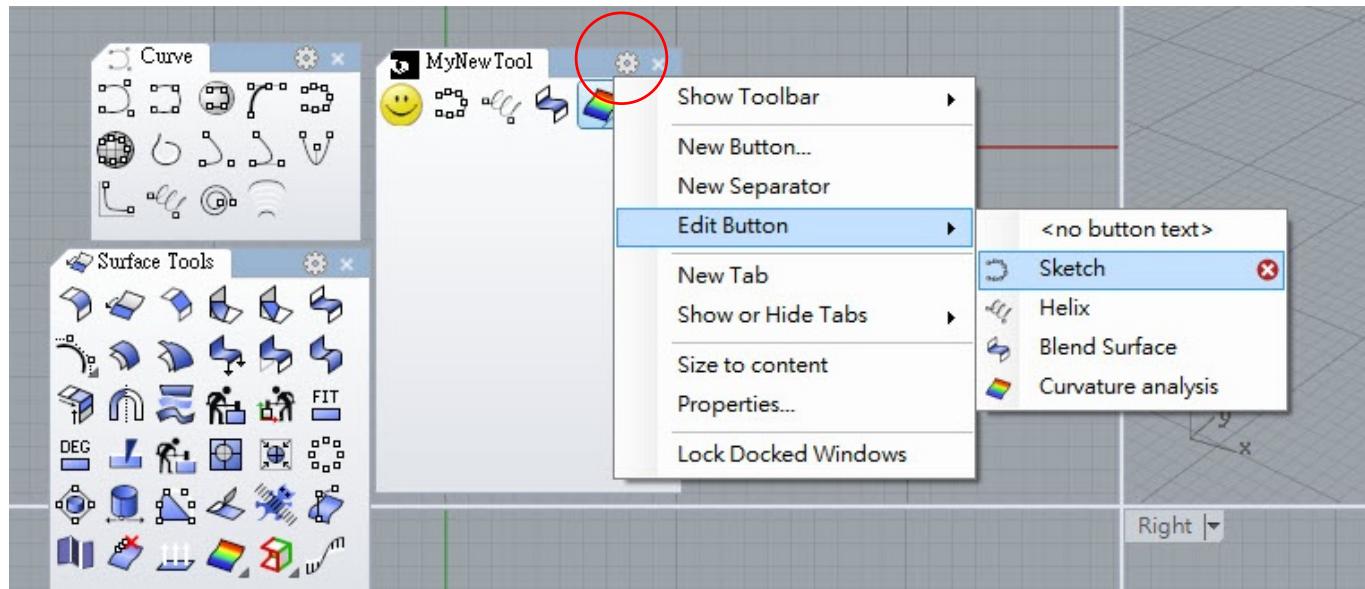
Toolbars



MyNewToolBar



MyNewToolBar

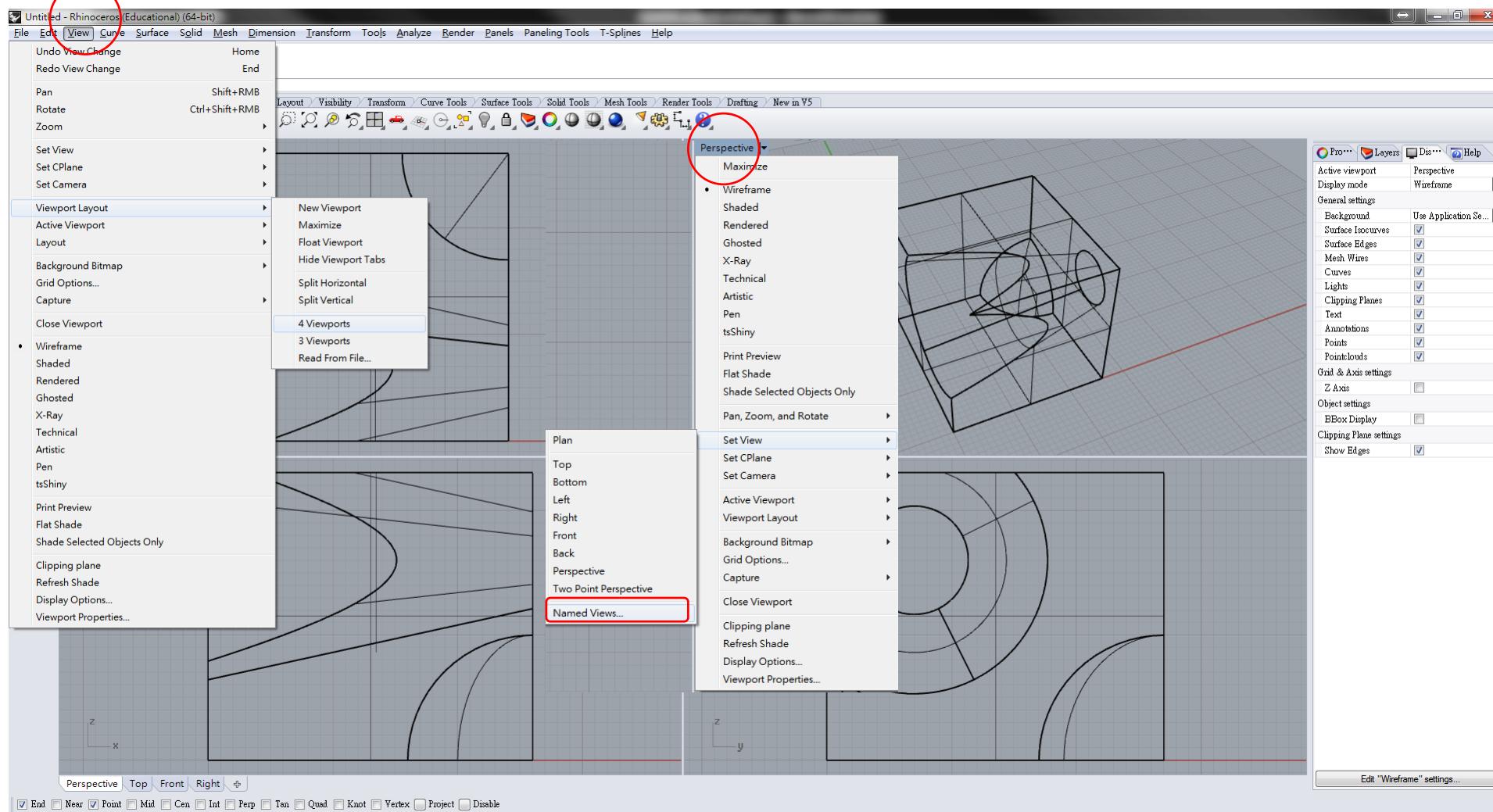


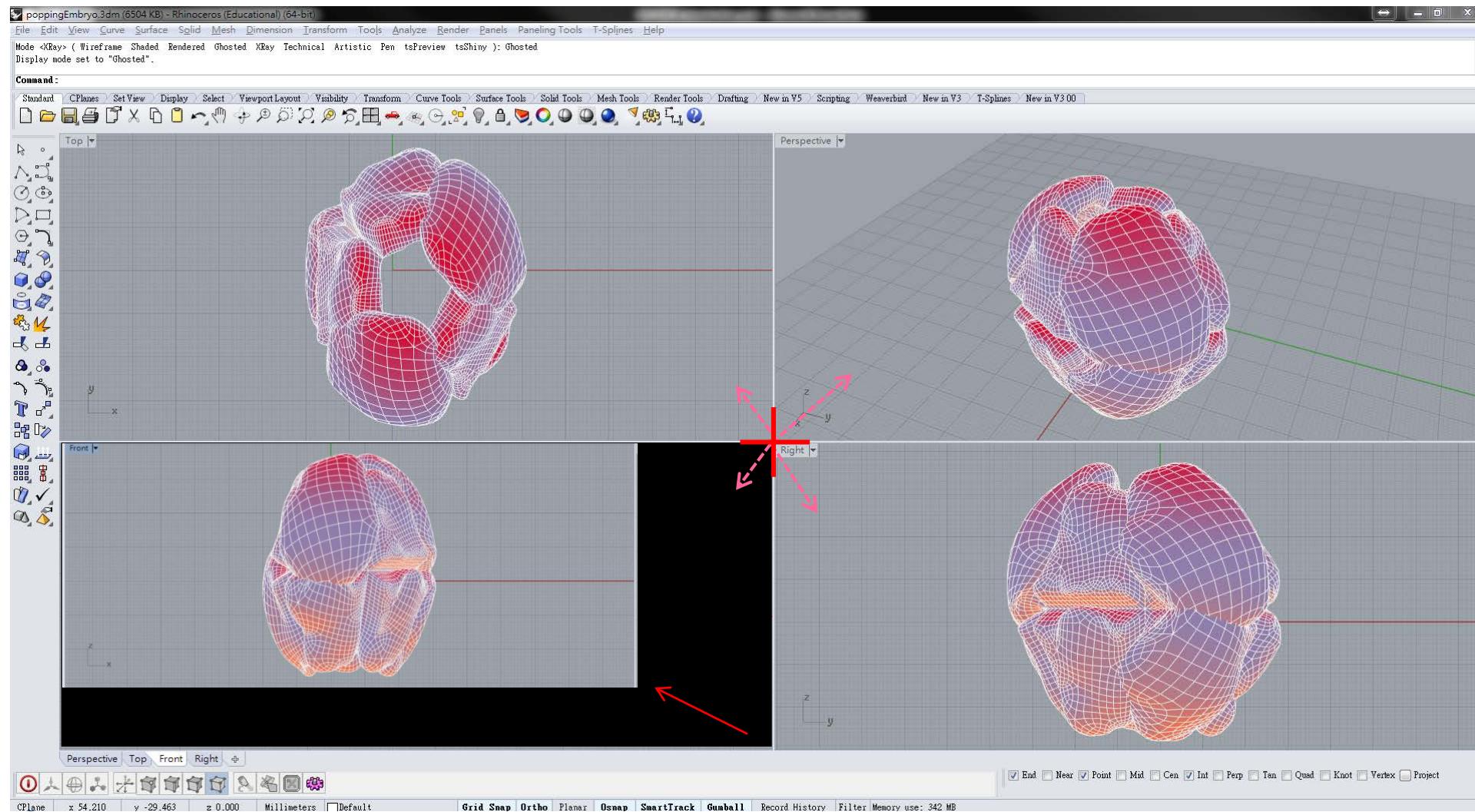
Ctrl + mouse drag to add tool icon
Shift + mouse to edit and delete

	透視投影	平行投影
滑鼠右鍵	旋轉視窗	平移視窗
滑鼠右鍵+Shift	平移視窗	平移視窗
滑鼠右鍵+Ctrl	縮放視窗	縮放視窗
滑鼠滾輪	縮放視窗	縮放視窗
滑鼠右鍵+Ctrl+Alt	移動鏡頭	

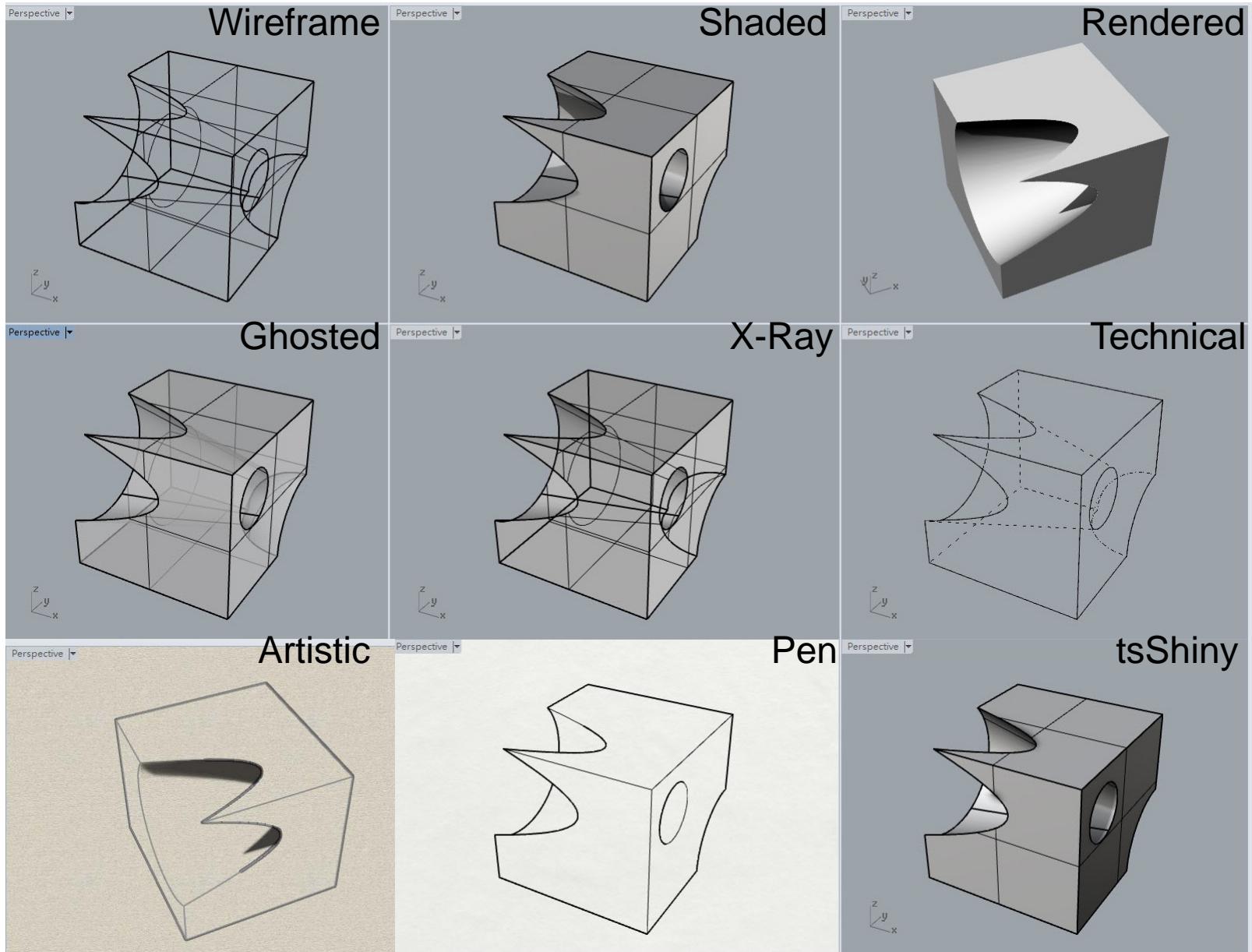
左方向鍵	順時針旋轉	向左平移
左方向鍵+Ctrl	向左平移	
右方向鍵	逆時針旋轉	向右平移
右方向鍵+Ctrl	向右平移	
上方向鍵	向前旋轉	向上平移
上方向鍵+Ctrl	向上平移	
下方向鍵	向後旋轉	向下平移
下方向鍵+Ctrl	向下平移	
Page Up	放大	放大
Page Down	縮小	縮小
Home	復原視圖變更	復原視圖變更
End	重做視圖變更	重做視圖變更

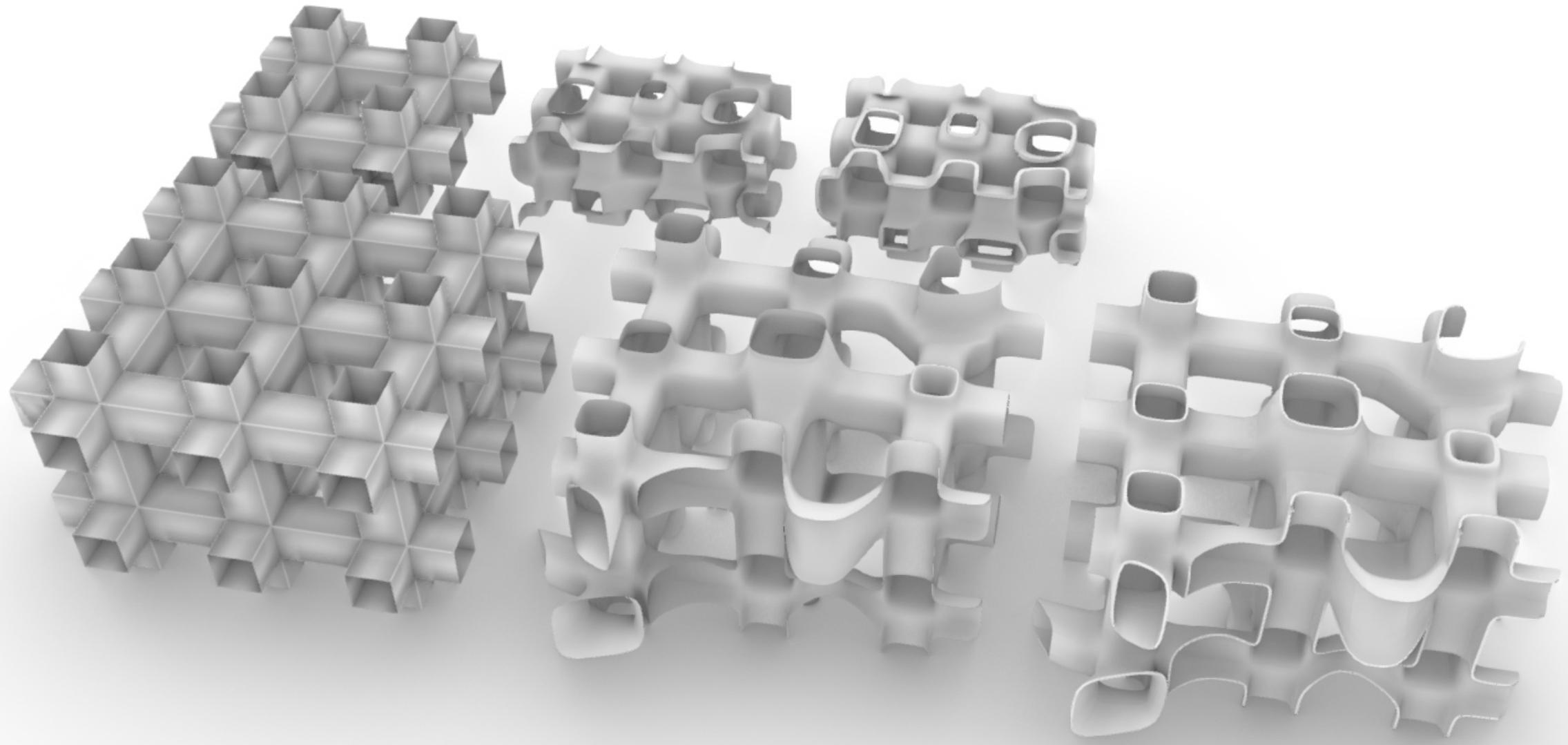
Viewport



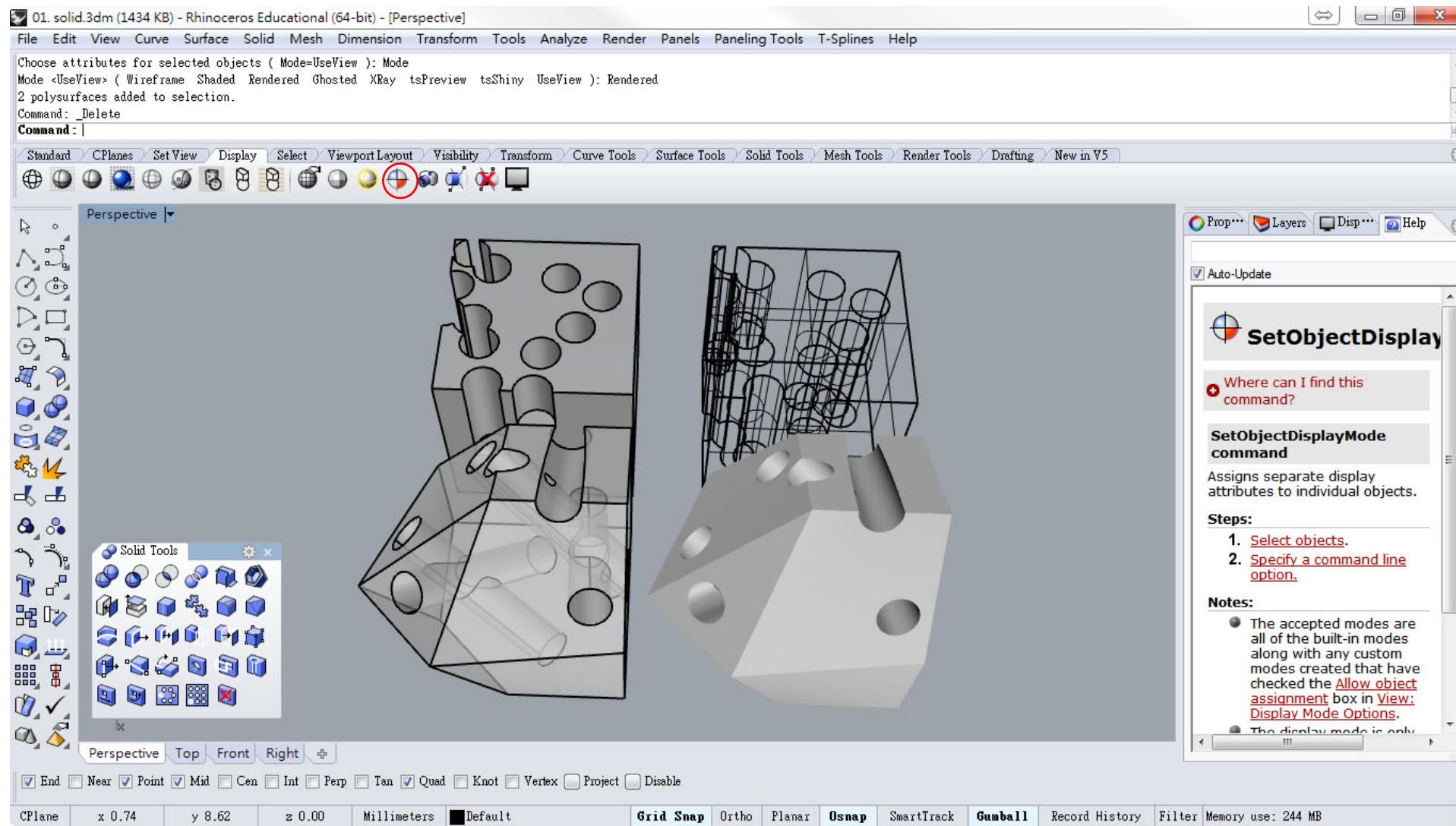


Display Mode



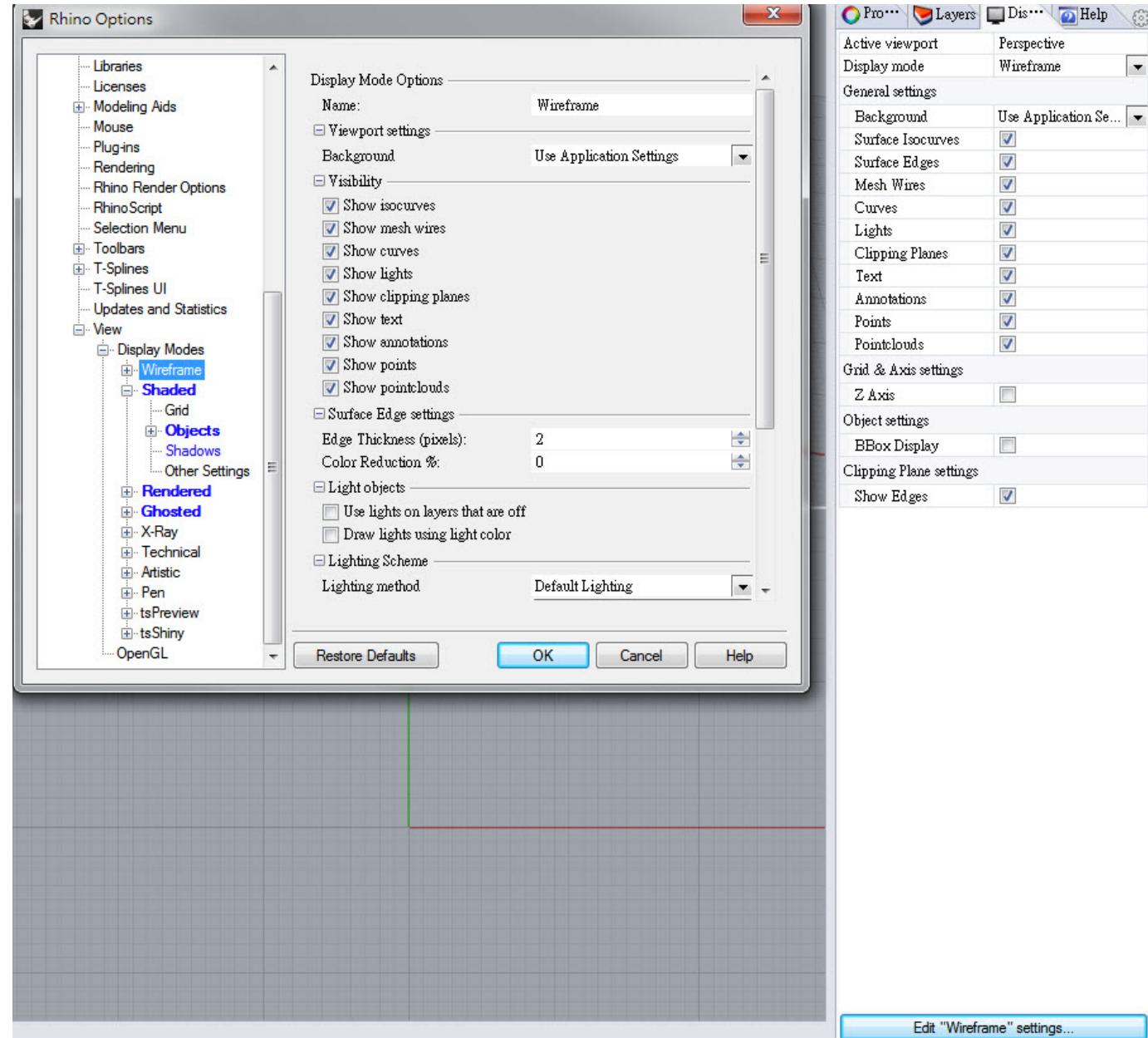


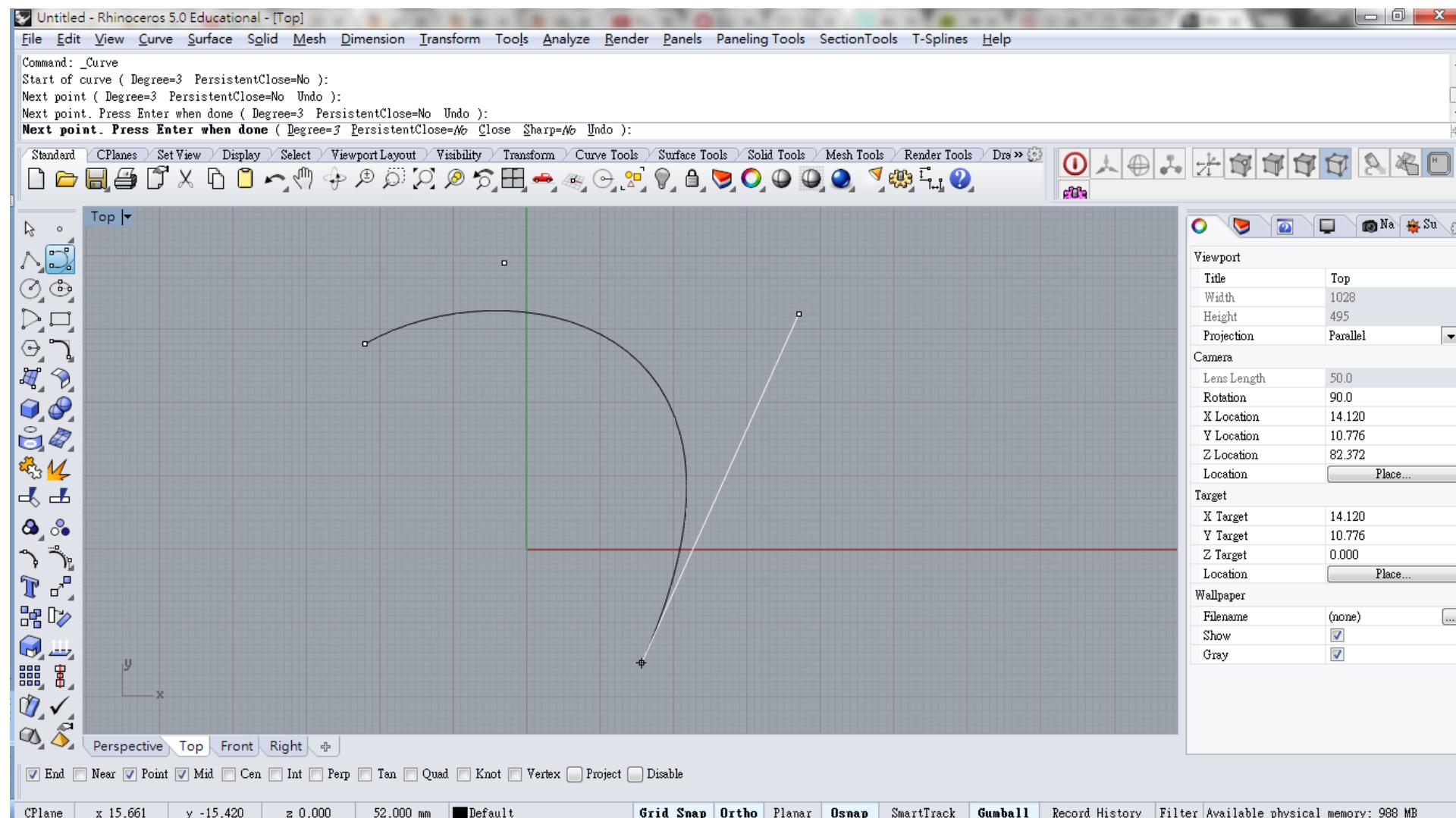
Arctic



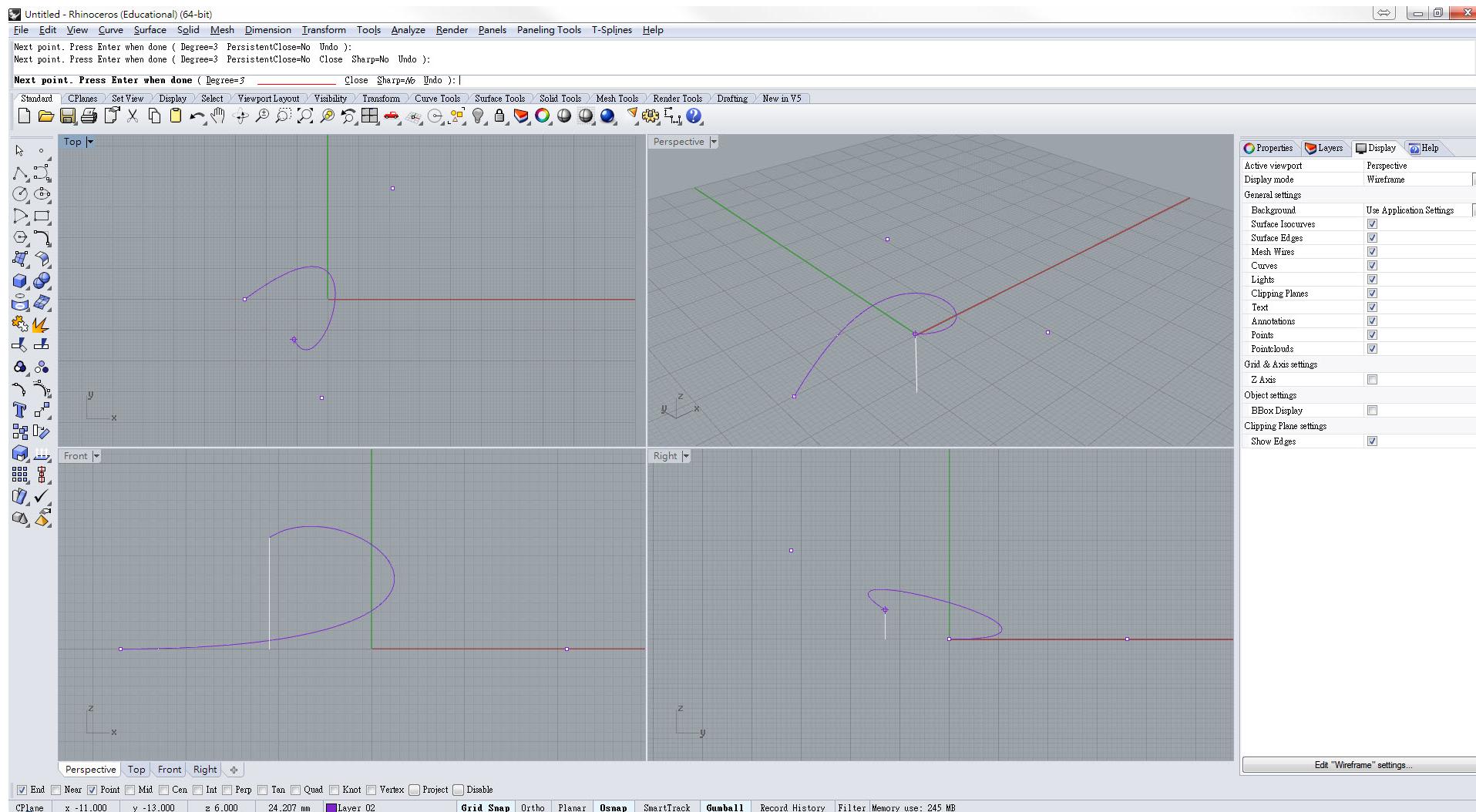
Set Object Display

Display Setting

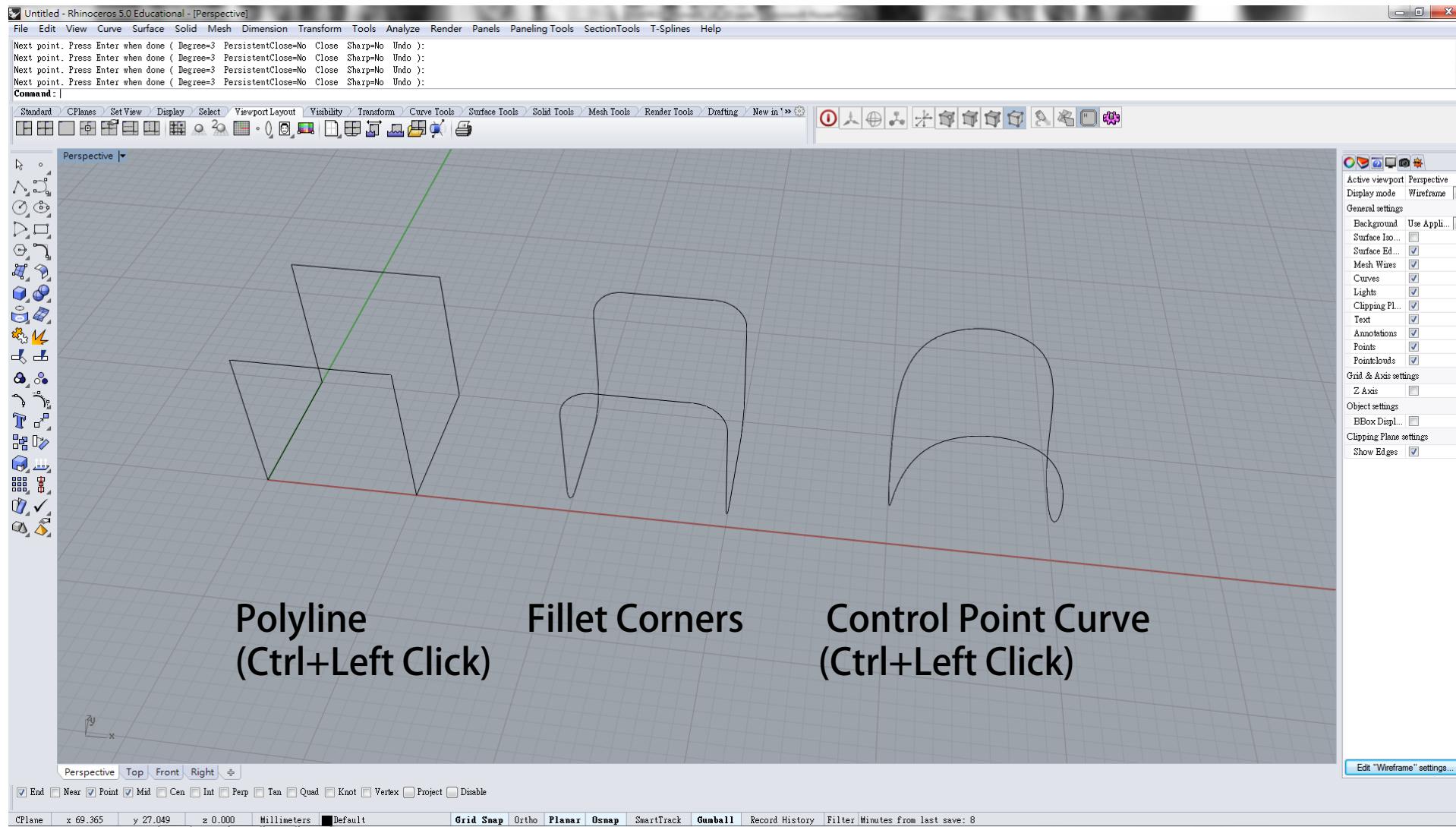


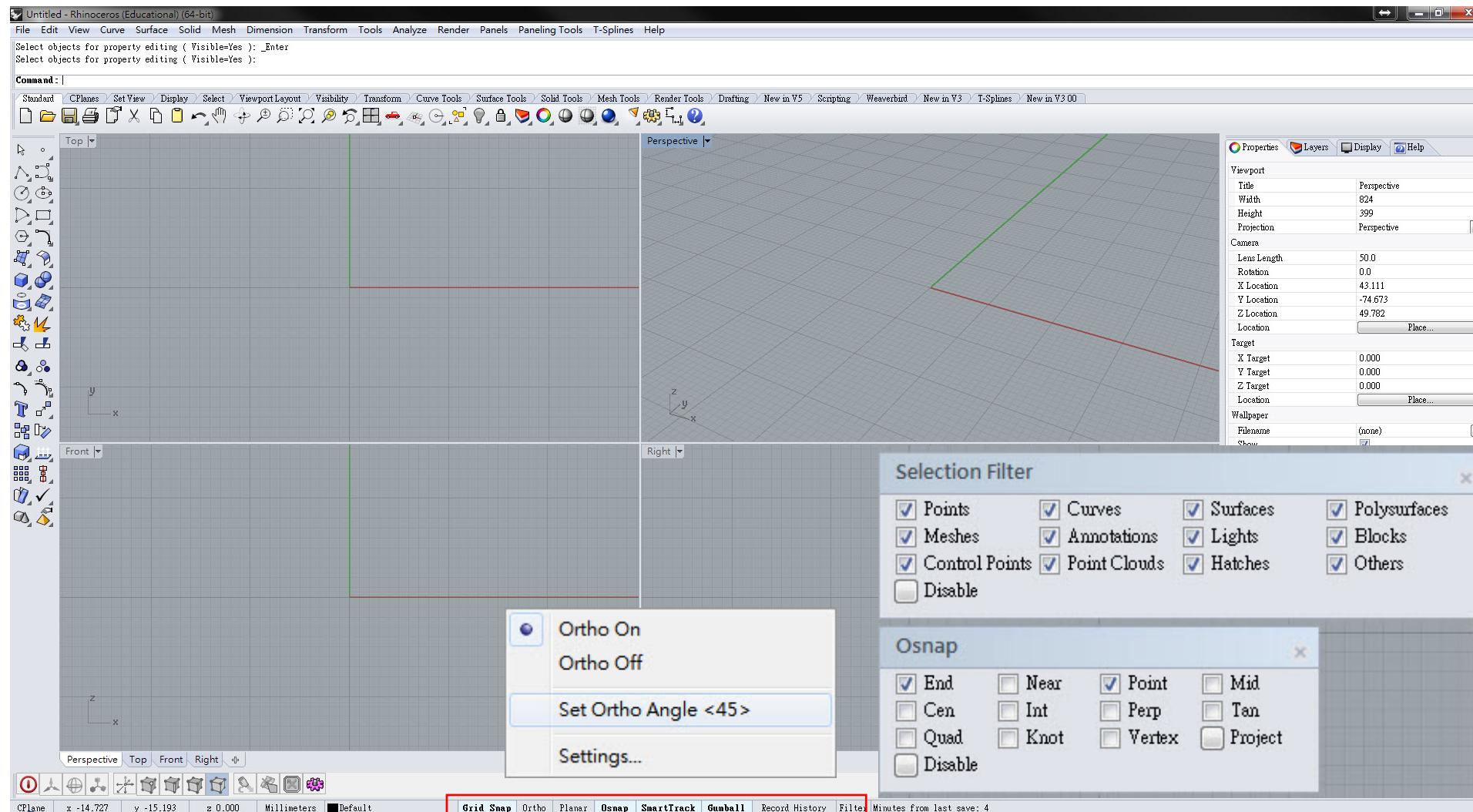


TAB 維持軸向



指令可橫跨視窗點擊作業
Ctrl+Left Click為該平面另一軸動作



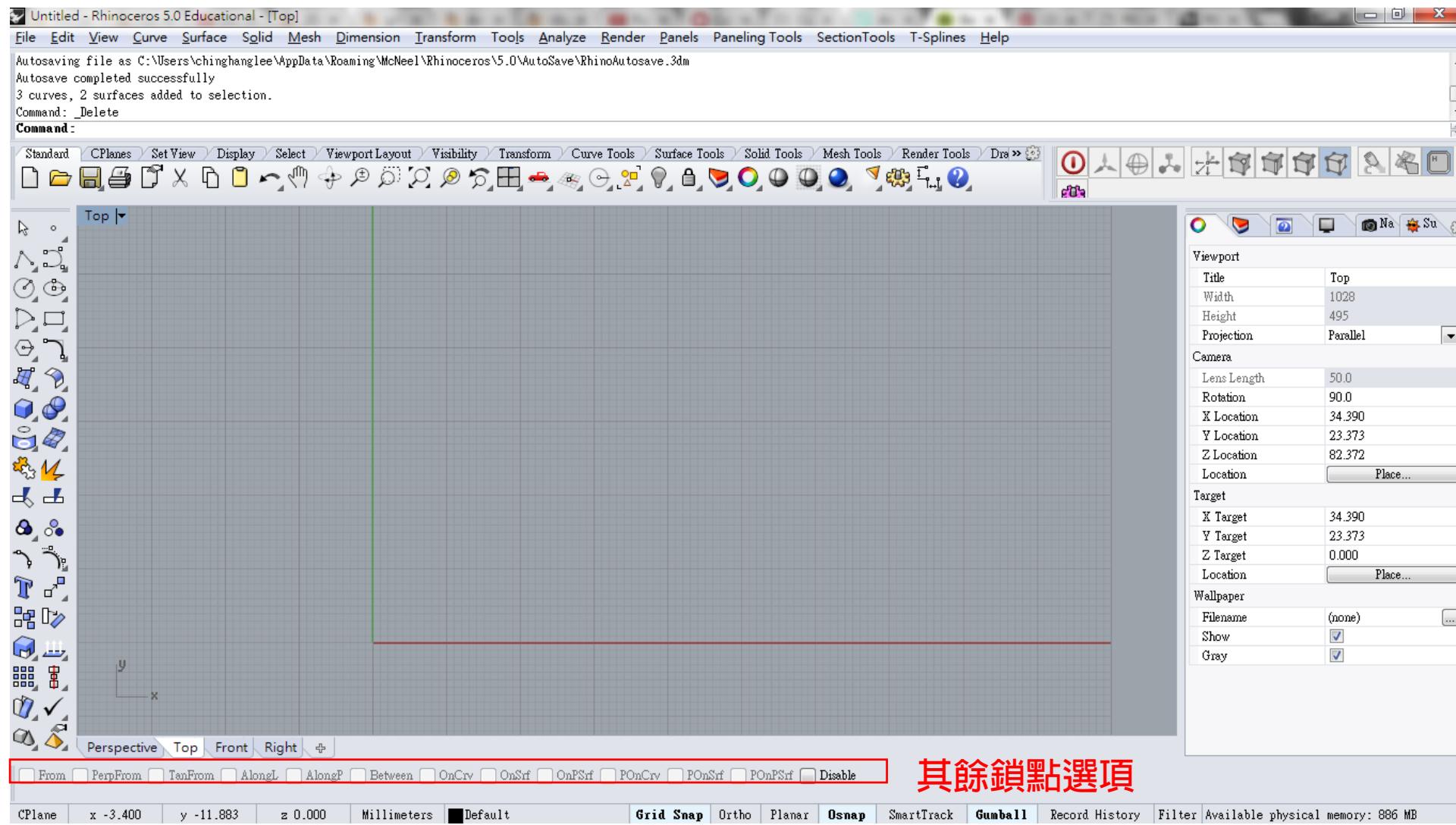


鎖定格點、正交、平面模式、物件鎖點、智慧軌跡、操作軸、記錄建構歷史、篩選器

F9

F8 P/Enter

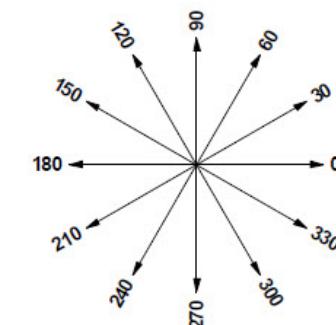
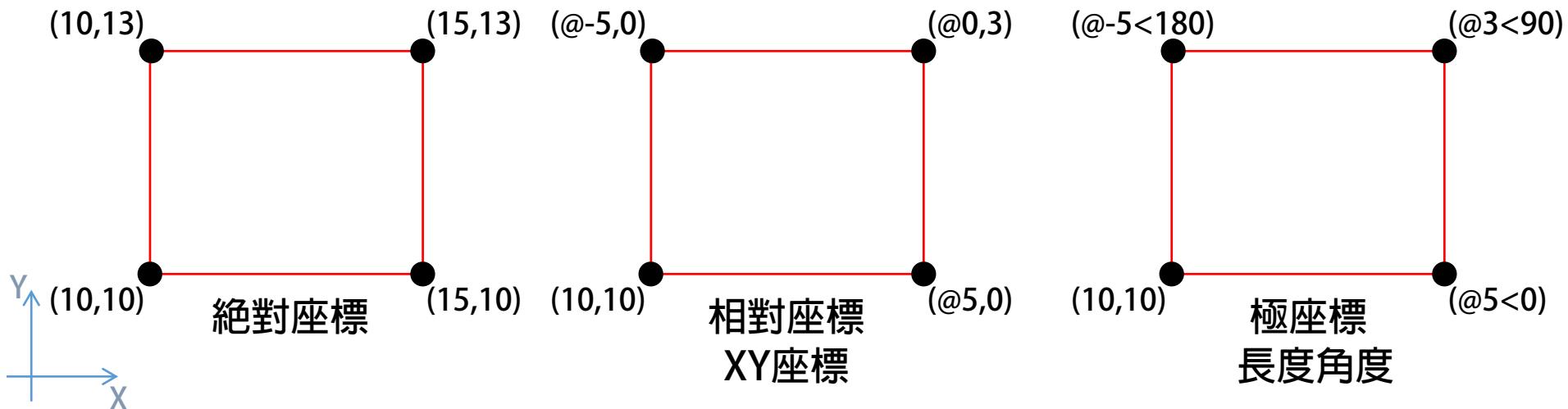
End		端點物件鎖點可以鎖定曲線的端點、曲面邊緣的角或多重曲線的線段端點。
Near		最近點物件鎖點可以鎖定曲線或曲面邊緣距離滑鼠游標最近的點。
Point		點物件鎖點可以鎖定控制點、編輯點、雲點或點物件。
Mid		中點物件鎖點可以鎖定曲線或曲面邊緣的中點。
Cen		中心點物件鎖點可以鎖定曲線的中心點，這個物件鎖點通常用於圓與圓弧。
Int		交點物件鎖點可以鎖定兩條曲線的交點。
Perp		垂直點物件鎖點可以鎖定曲線上的某一點，該點與上一點形成的方向與曲線垂直 這個物件鎖點無法在指令提示指定第一點的時候使用。
Tan		切點物件鎖點可以鎖定曲線上的某一點，該點與上一點形成的方向與曲線正切 這個物件鎖點無法在指令提示指定第一點的時候使用。
Quad		四分點物件鎖點可以鎖定四分點，四分點是一條曲線在工作平面 X 或 Y 軸座標最大值或最小值的點。
Knot		節點物件鎖點可以鎖定曲線或曲面邊緣上的節點。
Project		將鎖定的點投影至工作平面上。
Vertex		可以鎖定網格物件的頂點。
停用		關閉持續性物件鎖點但保留設定。

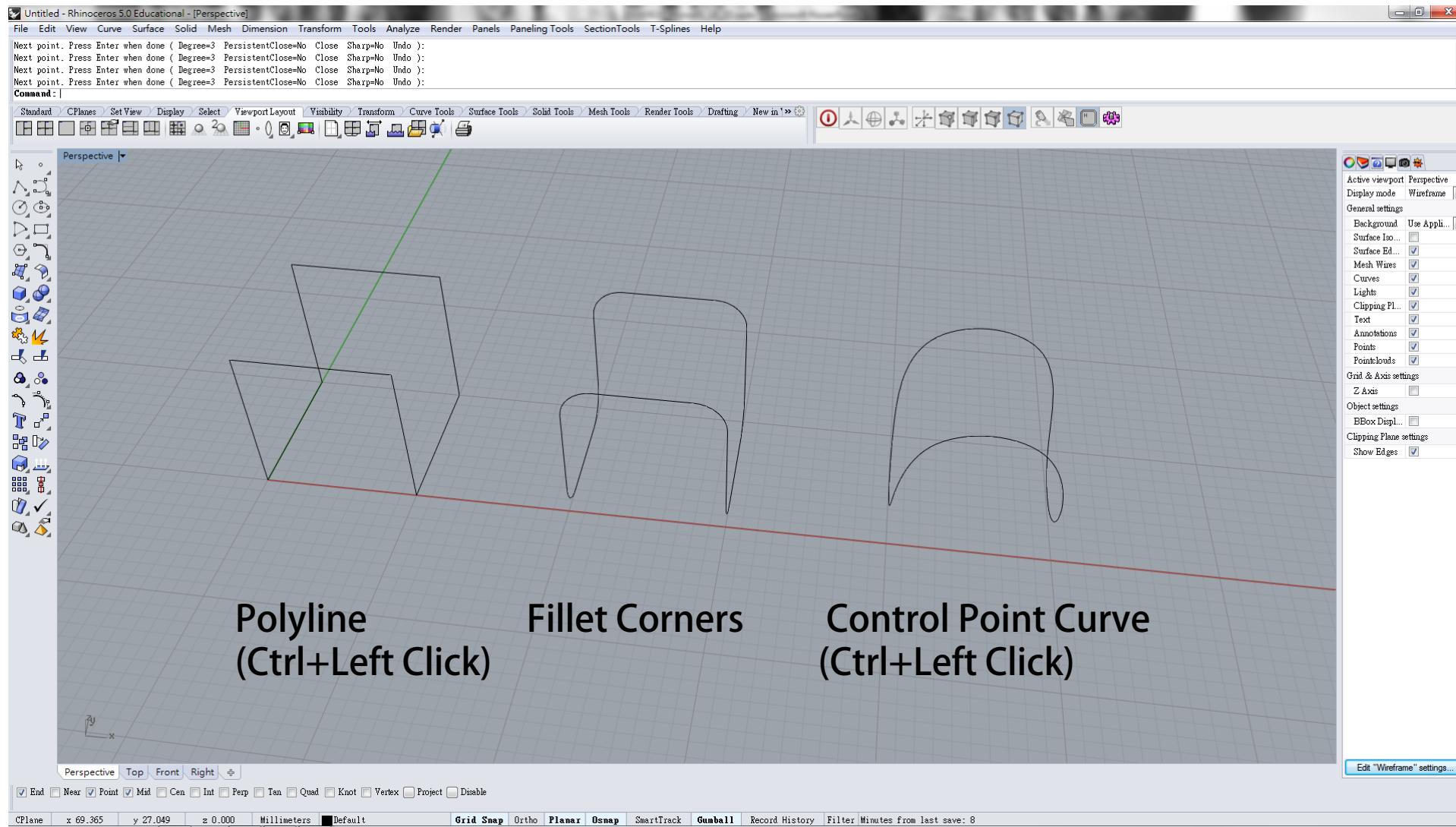


其餘鎖點選項

物件鎖點 區域按下Shift + Ctrl(v5 Ctrl)

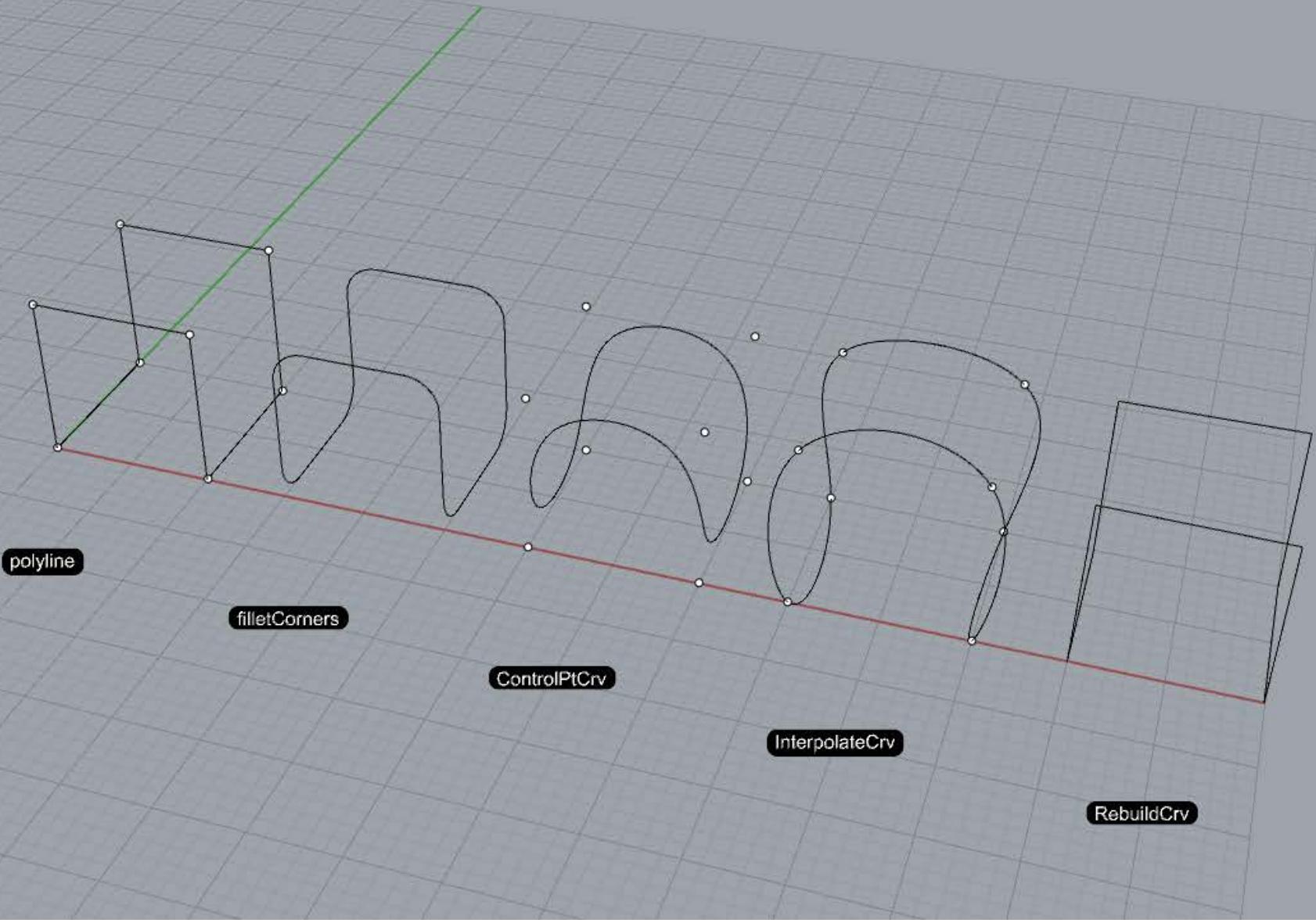
Coordinate



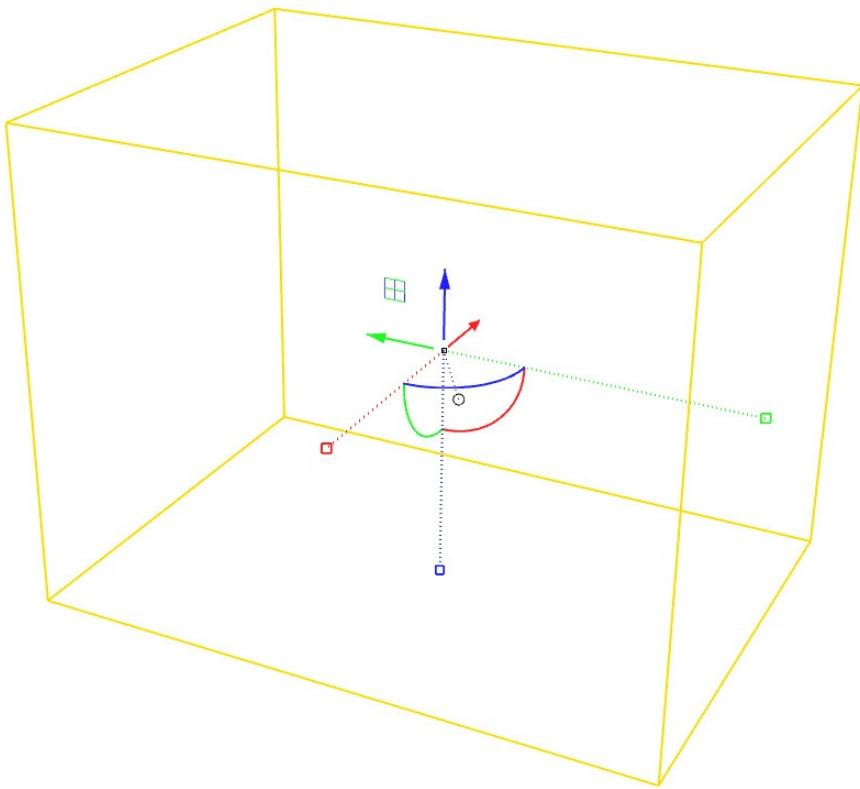


Perspective ▾

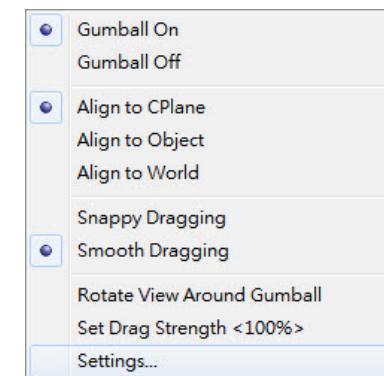
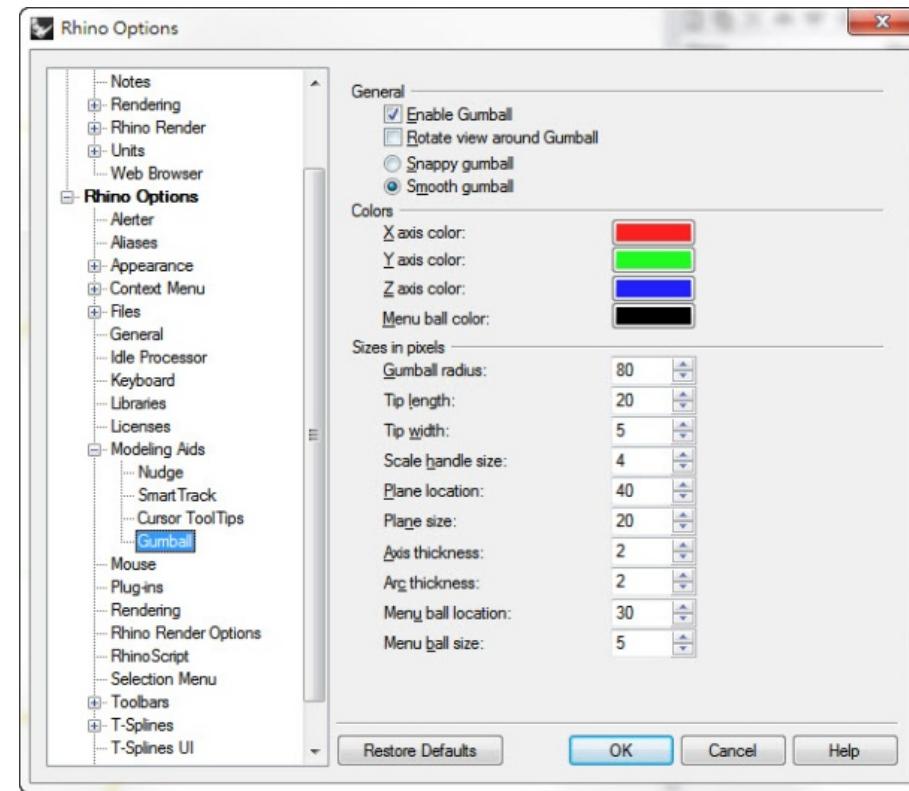
(0,0,0)
(0,0,10)
(10,0,0)
(10,0,10)
(10,10,0)
(10,10,10)
(0,10,0)
(0,10,10)

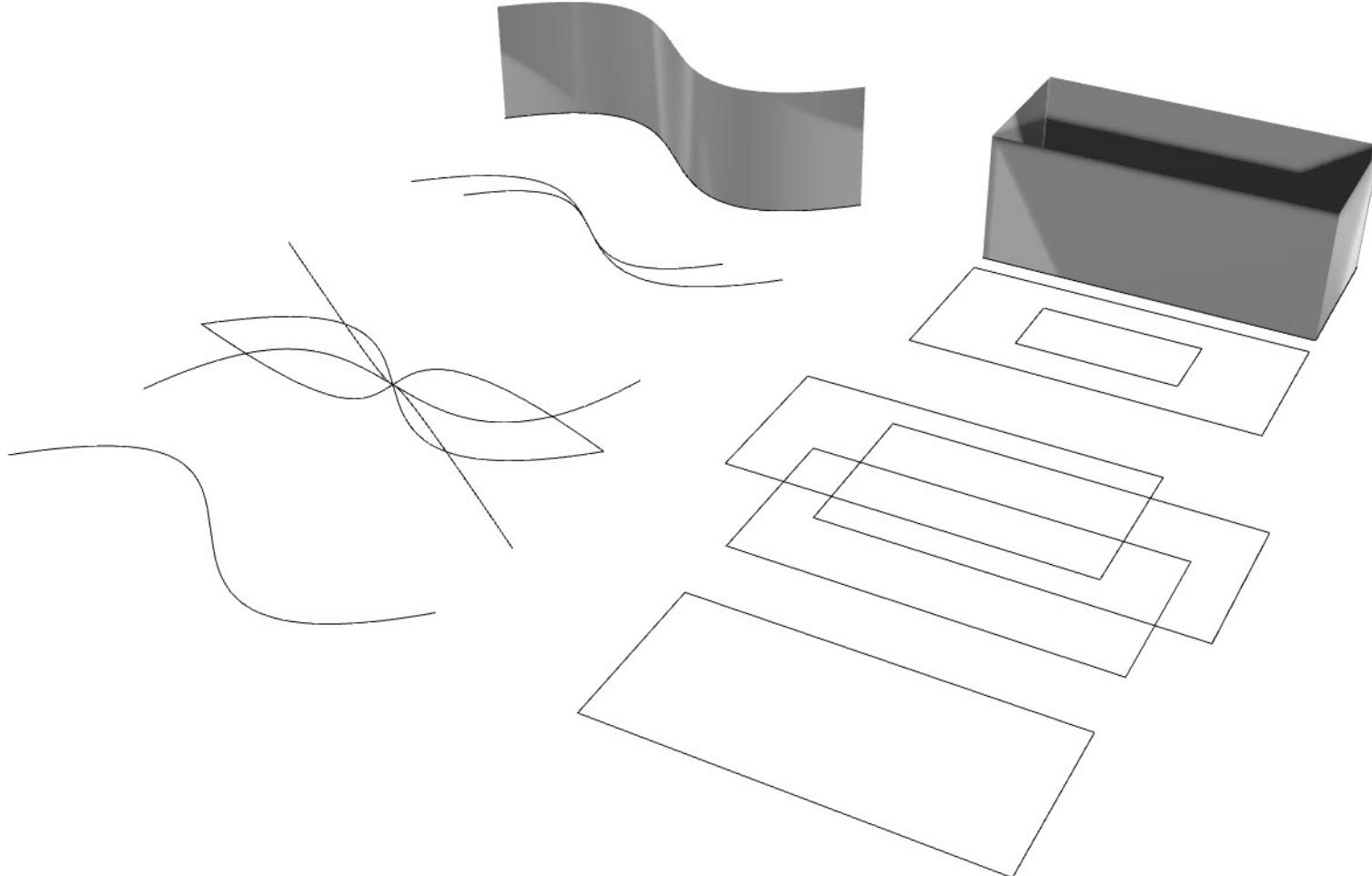


Gumball

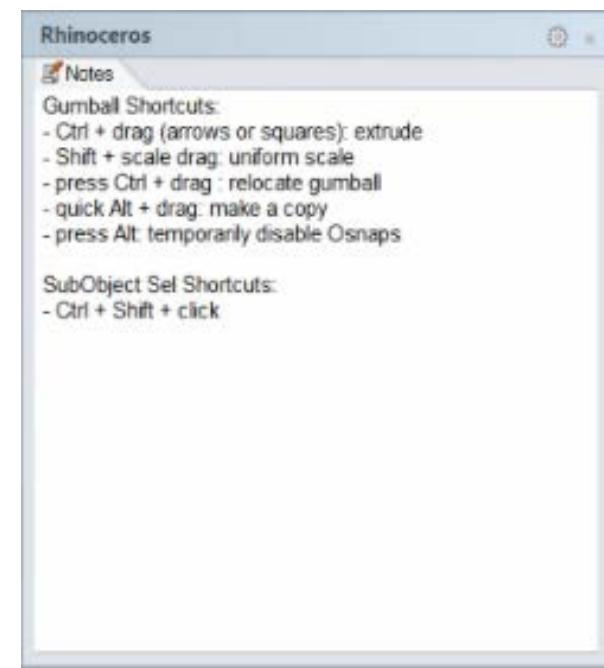
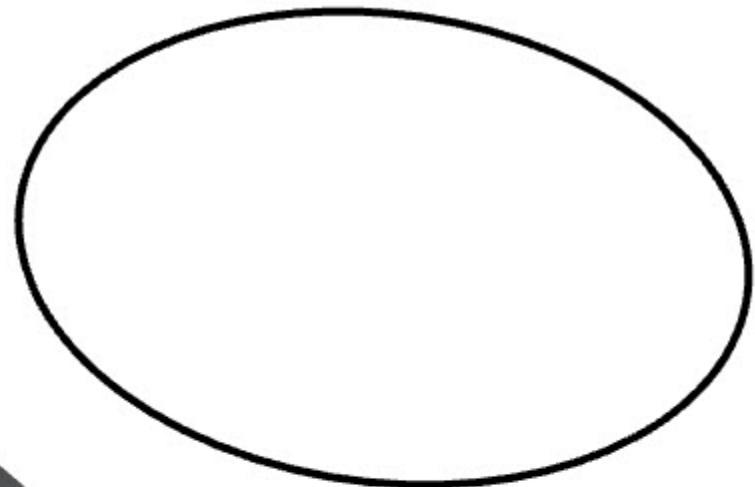
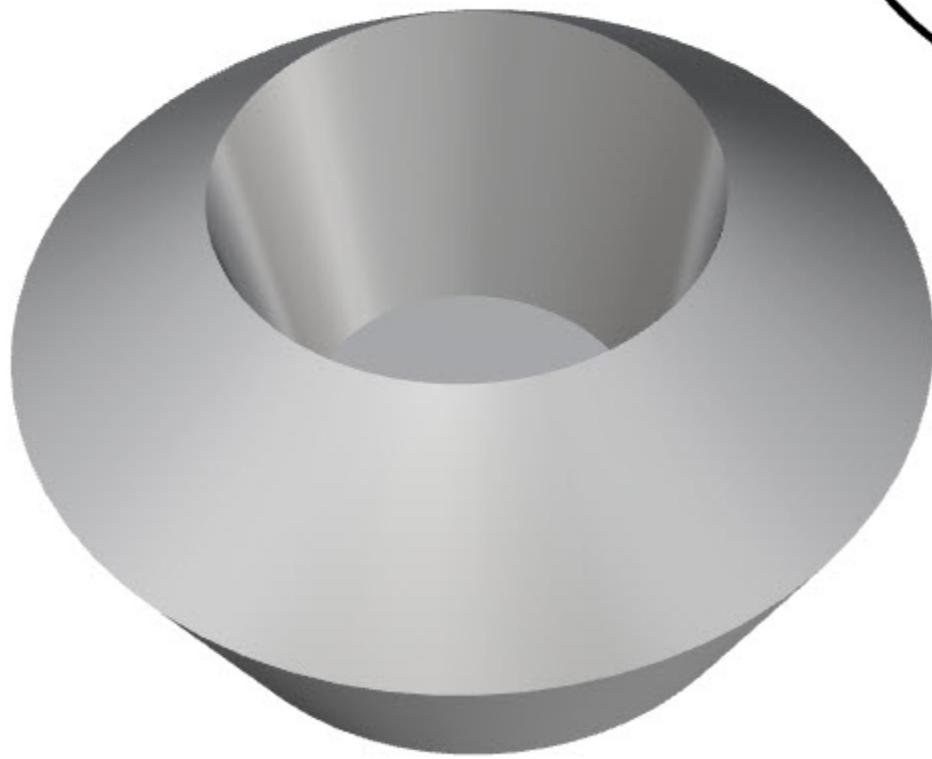


- 移動
- - - 縮放
- 旋轉
- 平移
- 設定
- 原點





點按Alt + 動作可複製物件
長按Shift+ 縮放為三軸縮放
先按Ctrl + 動作可定義原點
先按動作 + Ctrl可擠出曲面
先按Shift +Ctrl+左鍵可選子物件



Rhinoceros

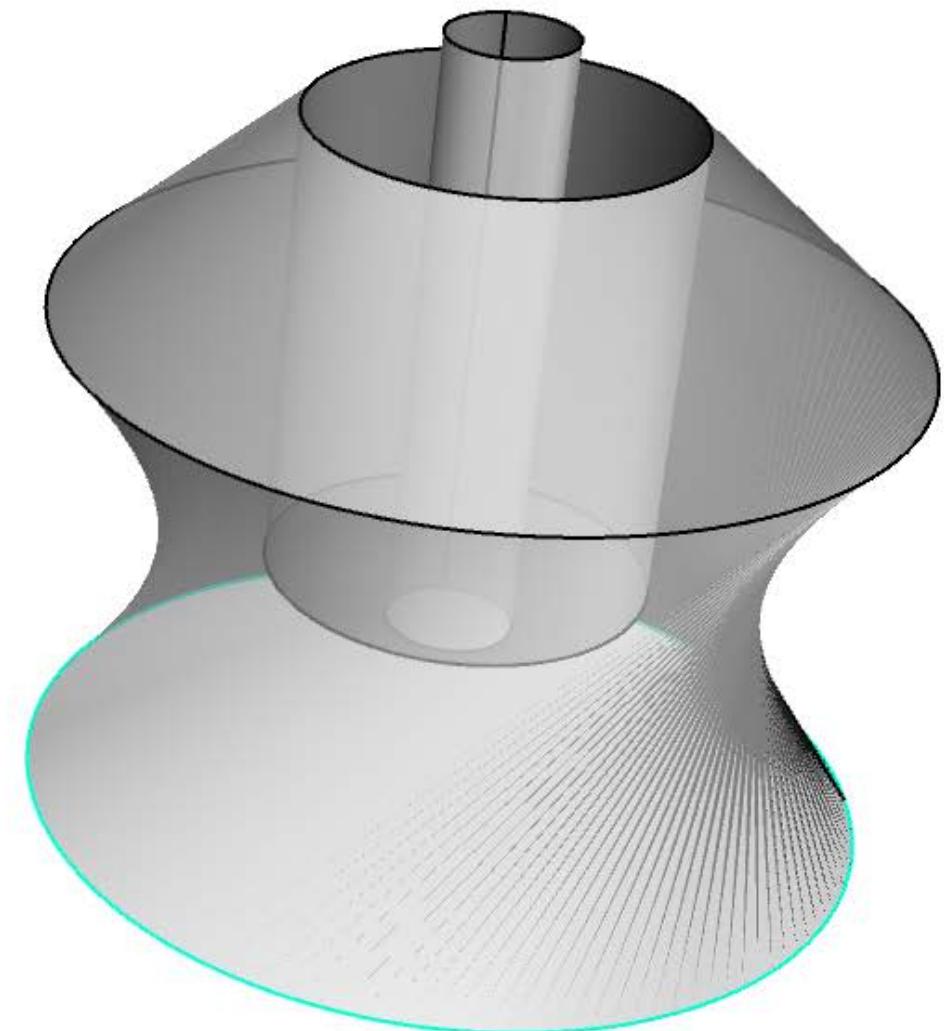
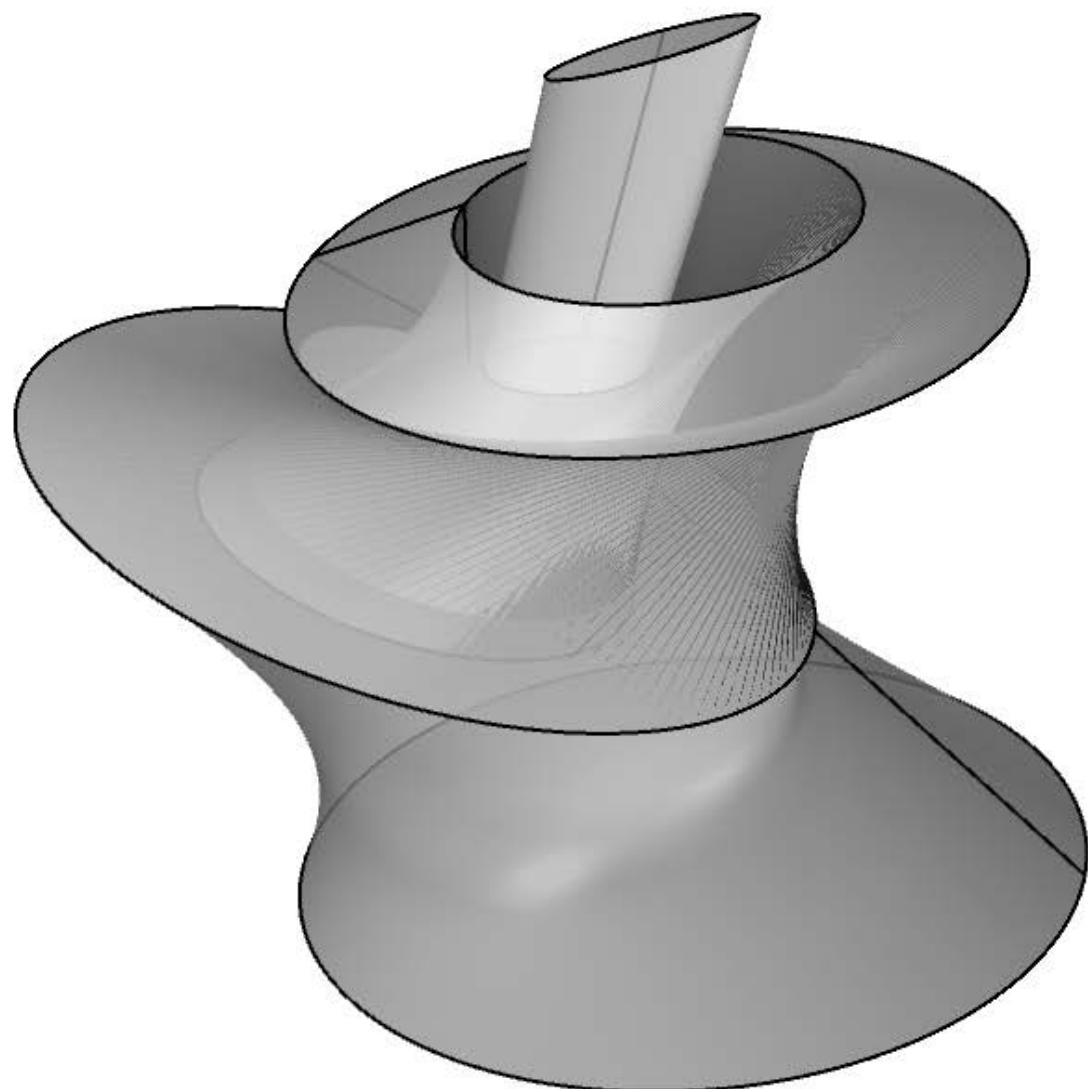
Notes

Gumball Shortcuts:

- Ctrl + drag (arrows or squares): extrude
- Shift + scale drag: uniform scale
- press Ctrl + drag : relocate gumball
- quick Alt + drag: make a copy
- press Alt: temporarily disable Osnaps

SubObject Sel Shortcuts:

- Ctrl + Shift + click

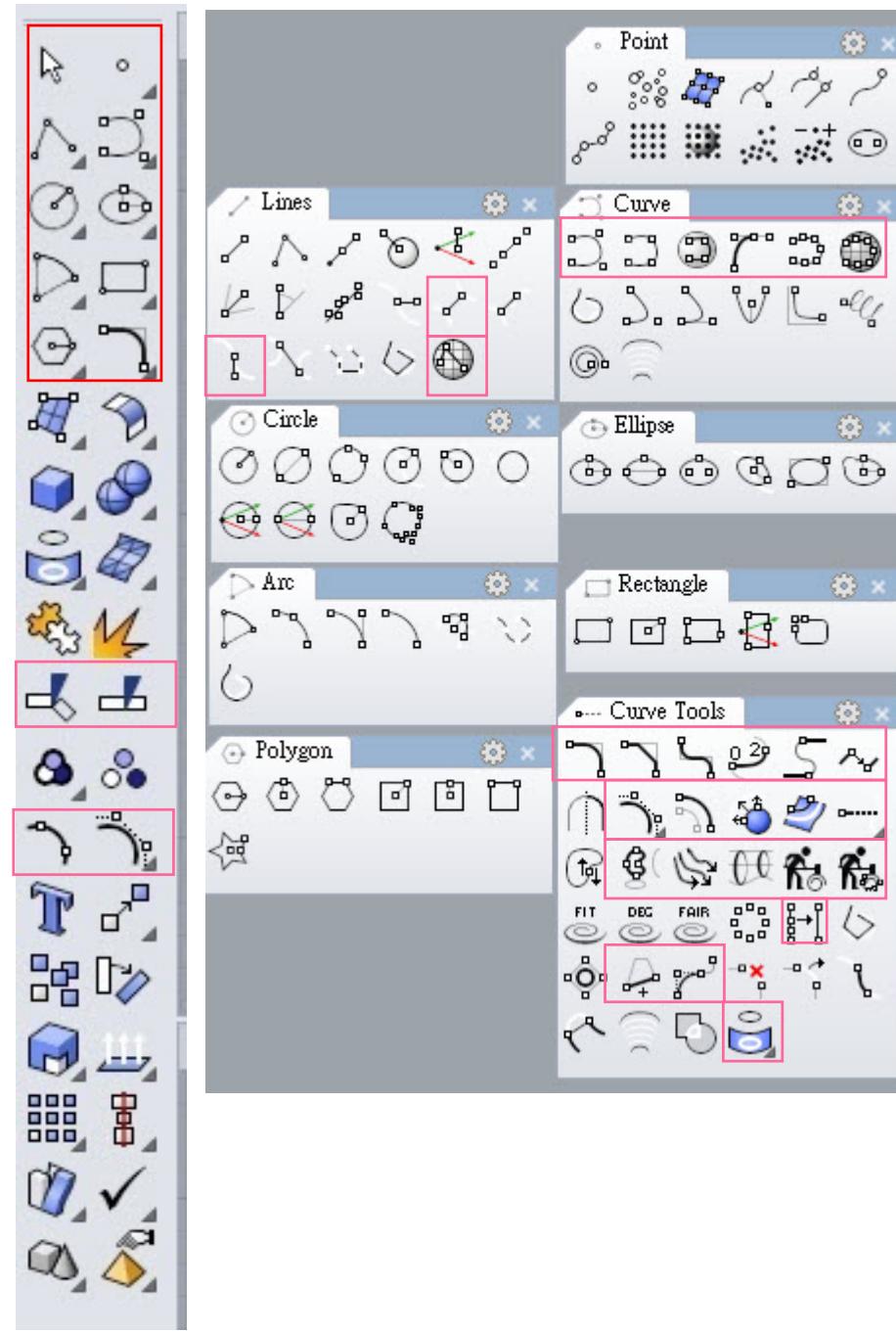


Rhinoceros

NURBS-Based Modeling System

Non-Uniform Rational Basis Spline

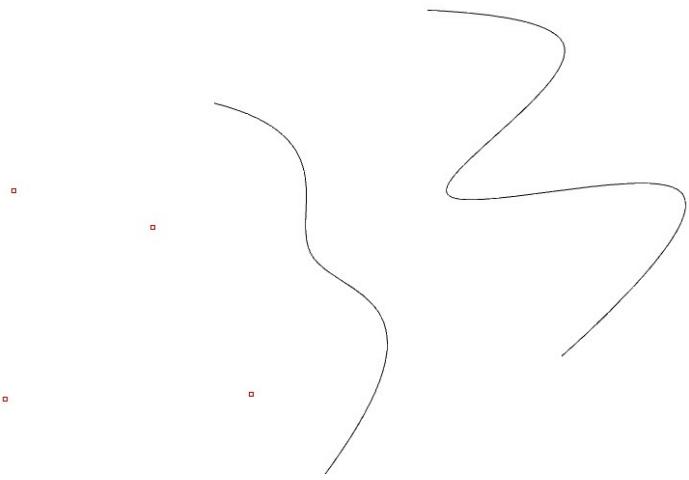
CP 控制點
EP 編輯點
Knot 節點
Degree 階數



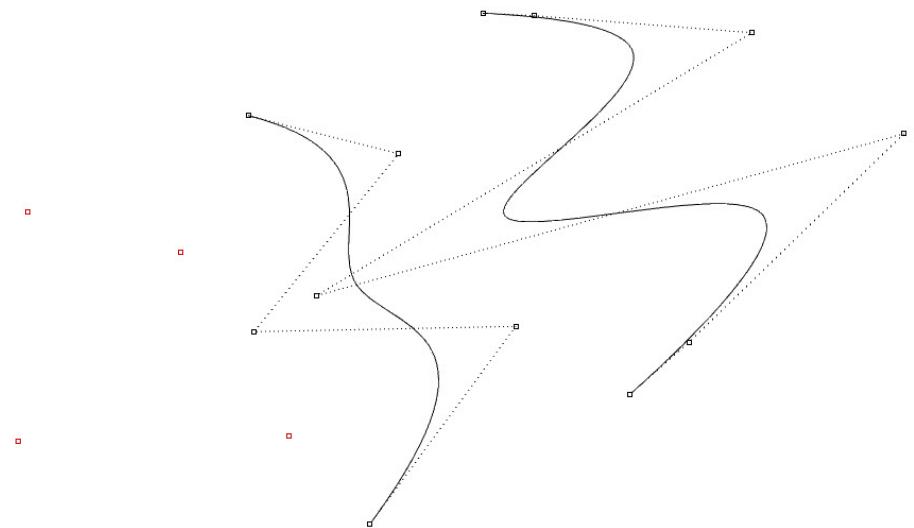
NURBS Curve

直線 Line 曲線 Curve
(polyline)

開放曲線
封閉曲線

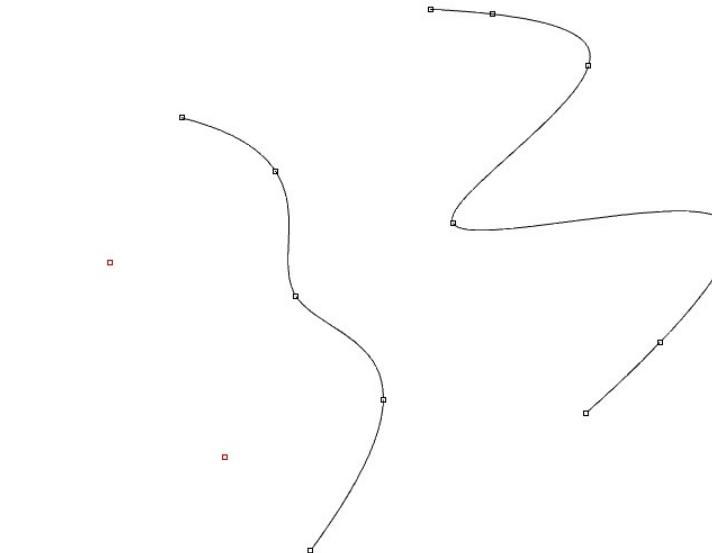


Curve InterpCrv



CP控制點

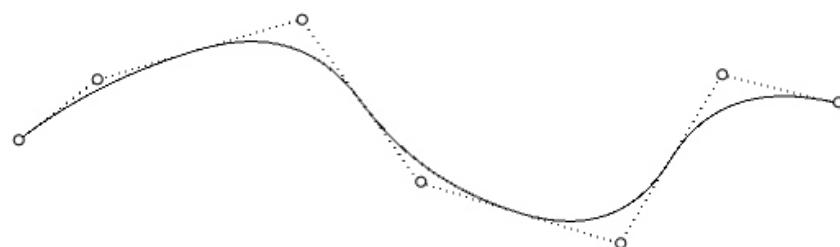
CP權重不同
相同
Knot值均匀
不均匀
理性曲線
非理性曲線
制式曲線
非制式曲線
階數越高越圓滑



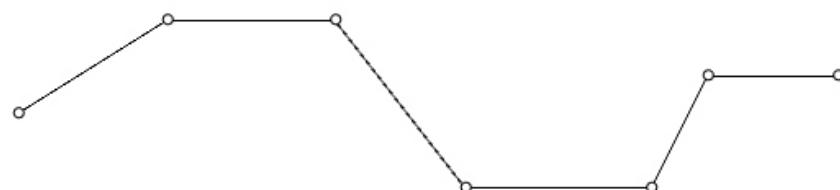
EP編輯點

CP 控制點
Knot 節點
Degree 階數

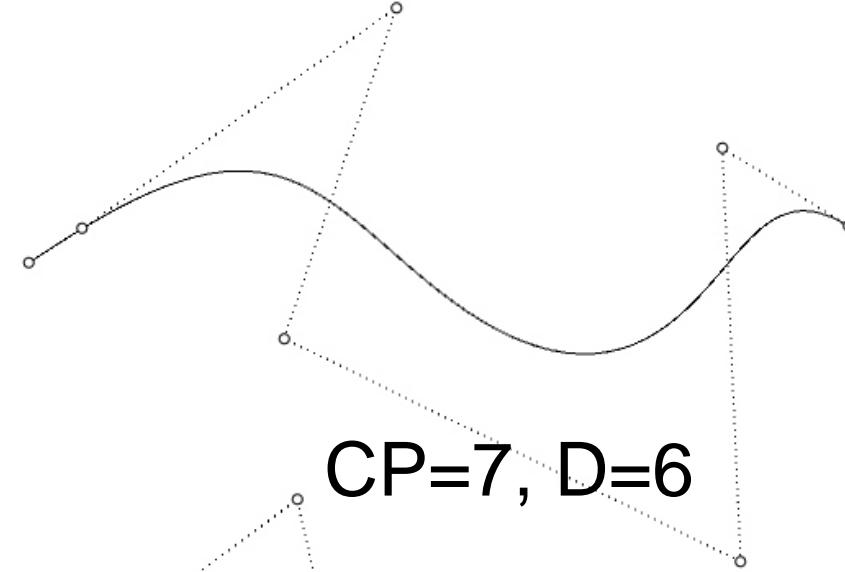
CP=D+1
 $K=CP+D-1$



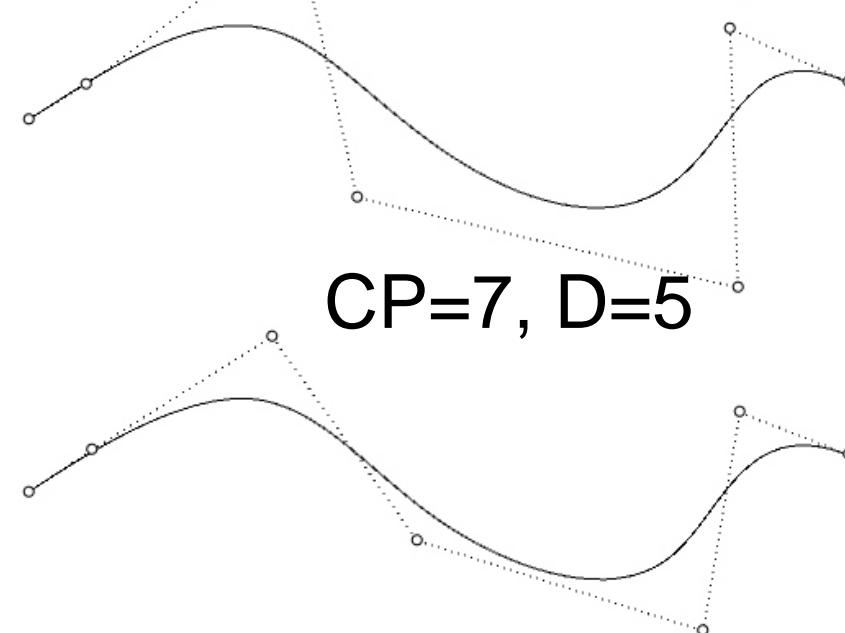
CP=7, D=3



CP=7, D=2

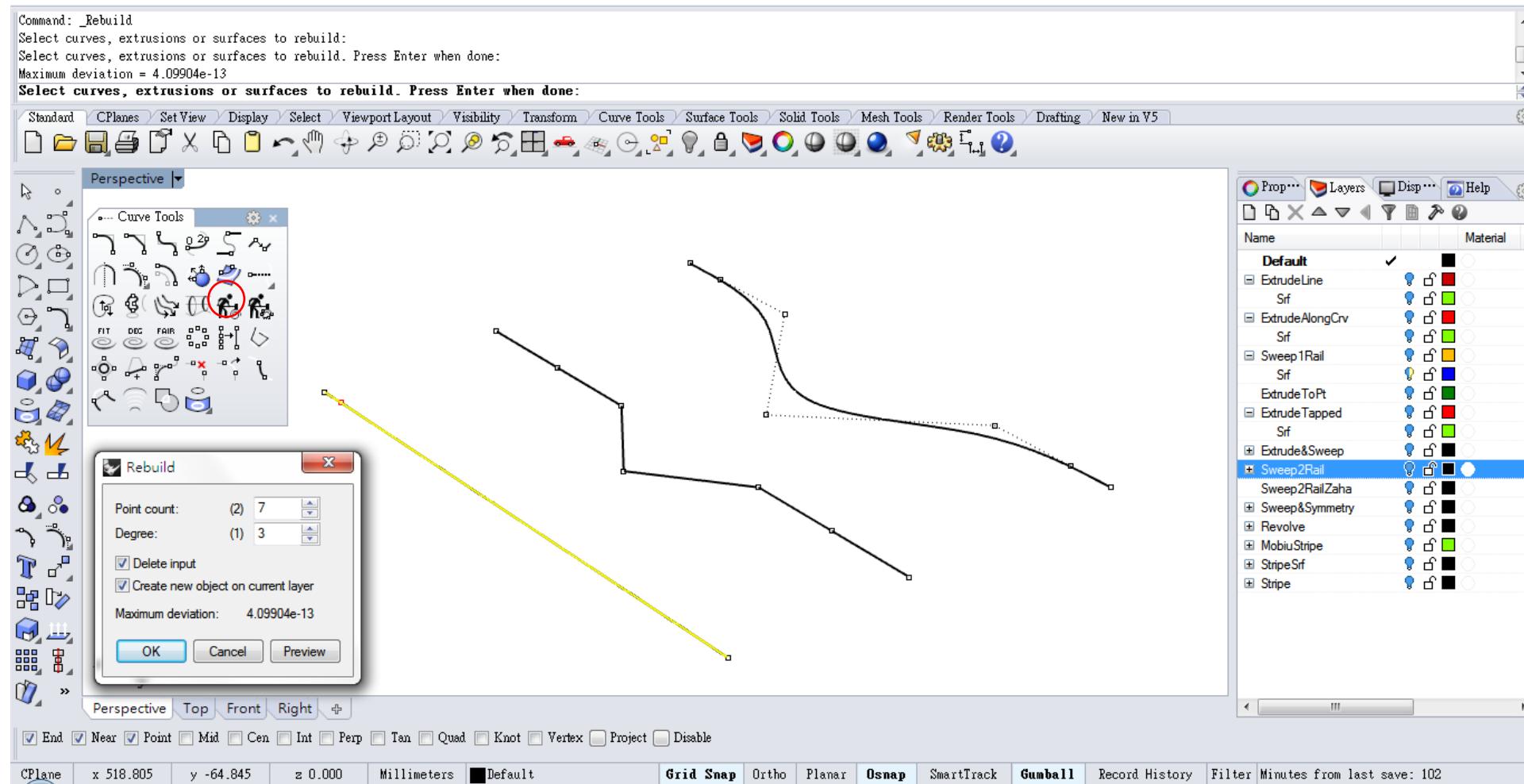


CP=7, D=6



CP=7, D=5

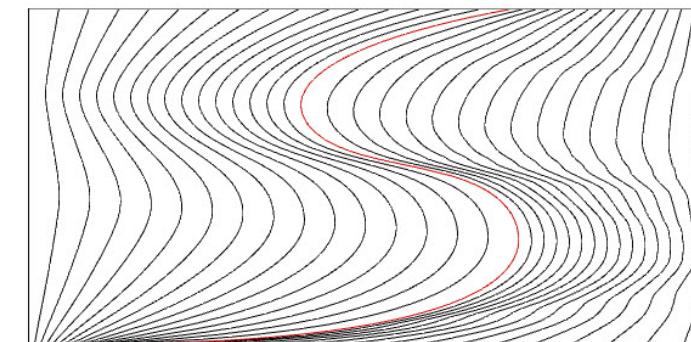
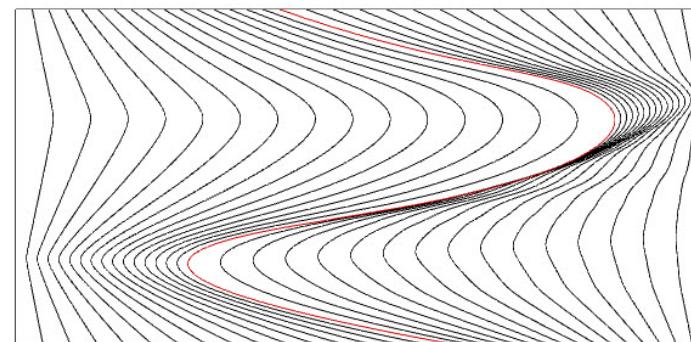
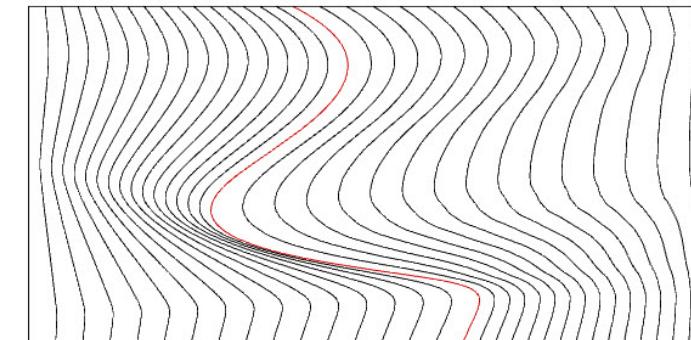
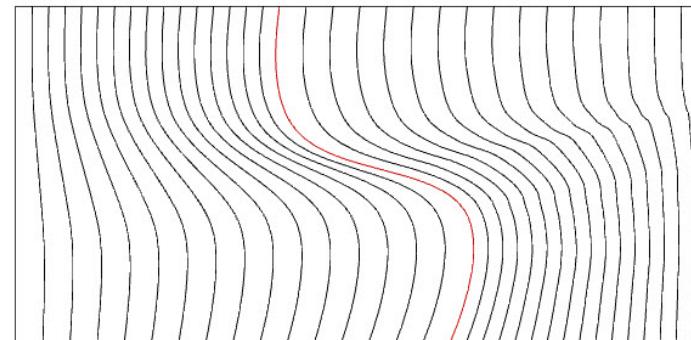
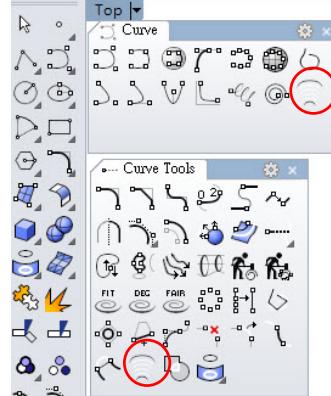
CP=7, D=4



Rebuild Curve

Drag objects, tap Alt to make a duplicate, press and hold Alt to temporarily toggle osnaps:
History updated 30 objects.

Command:



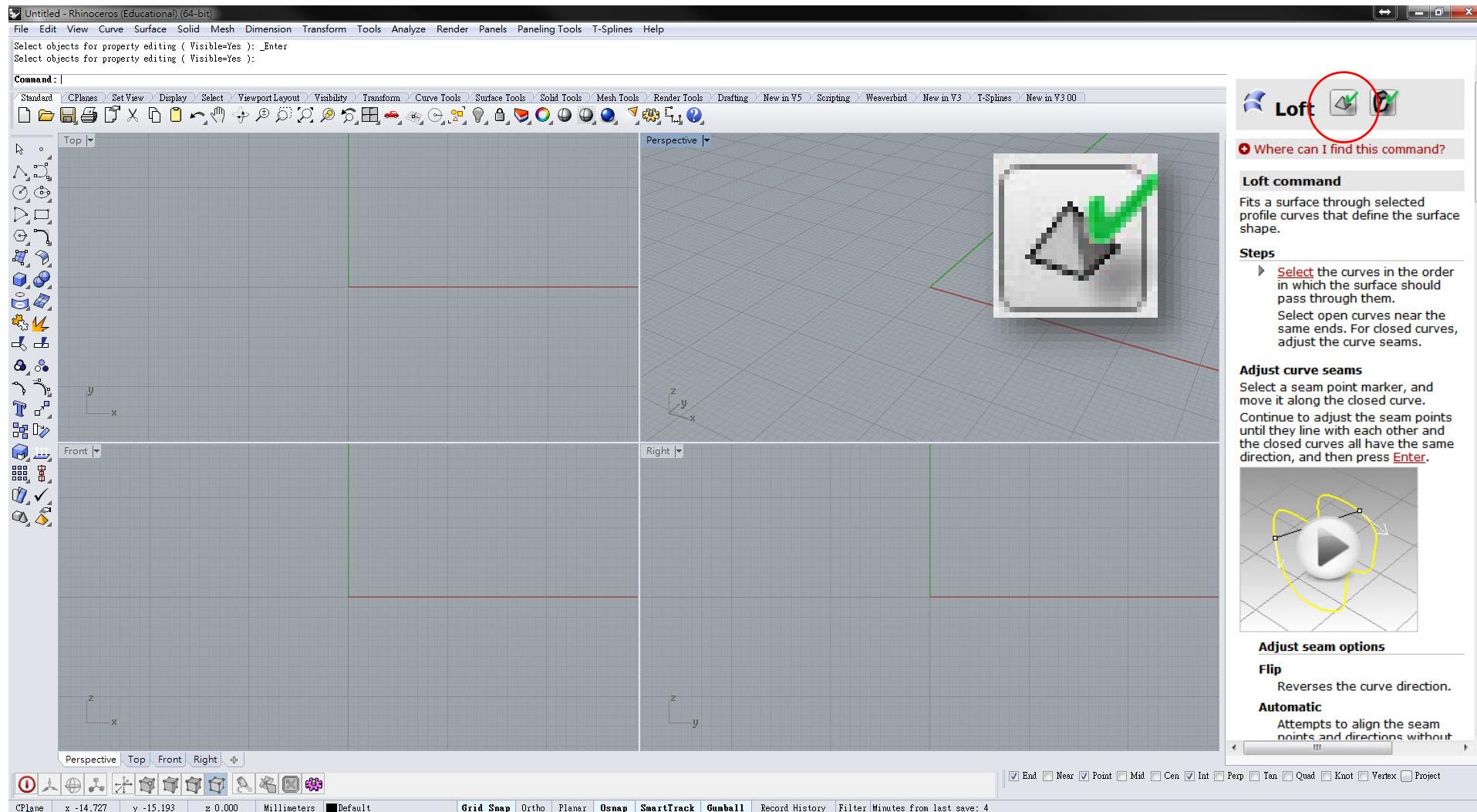
Perspective Top Front Right

End Near Point Mid Cen Int Perp Tan Quad Knot Vertex Project Disable

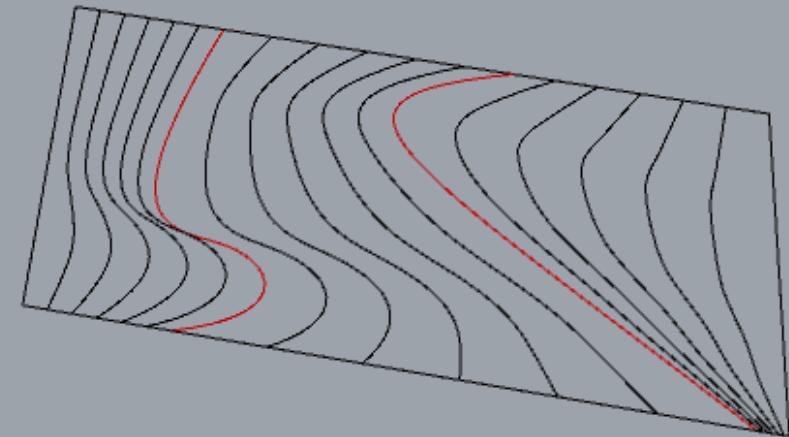
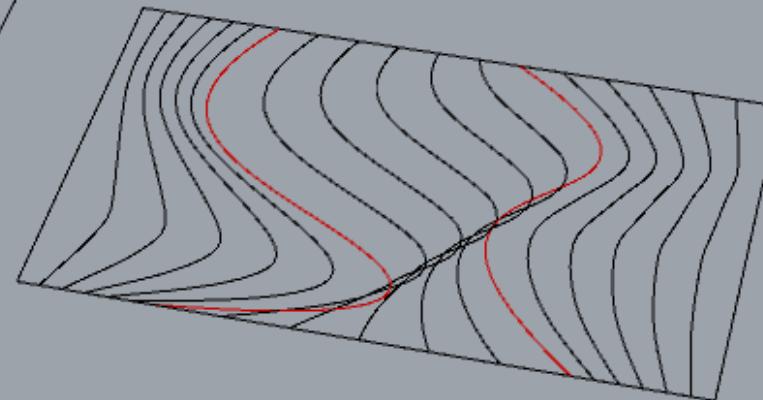
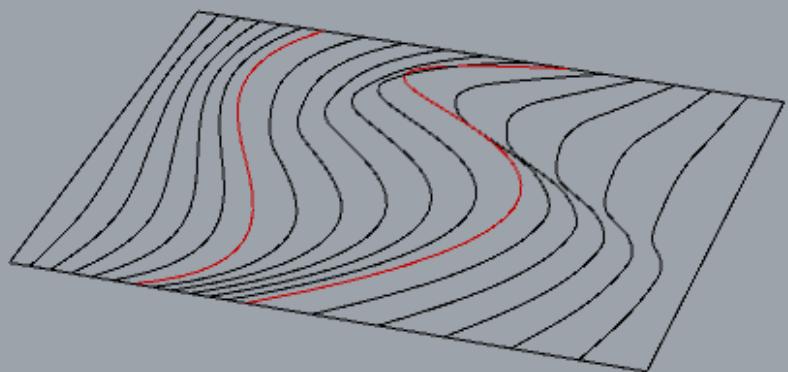
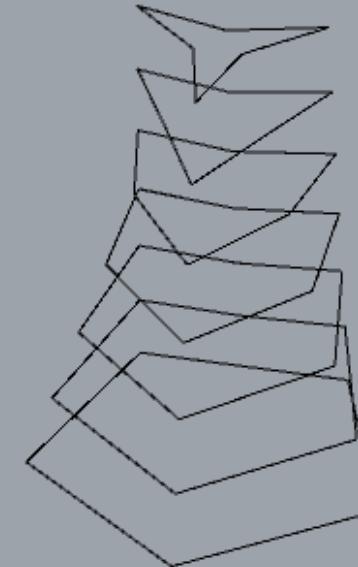
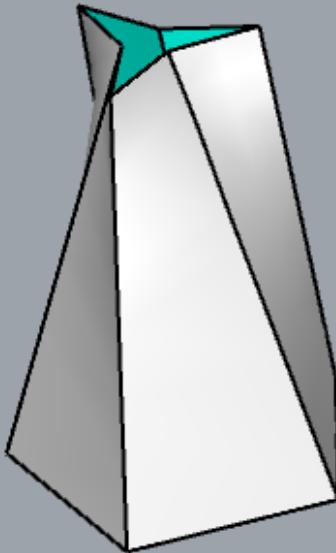
CPlane x 2006.287 y -2014.591 z 0.000 Millimeters Default

Grid Snap Ortho Planar Osnaps SmartTrack Gumball Record History Filter CPU use: 17.2 %

Tween

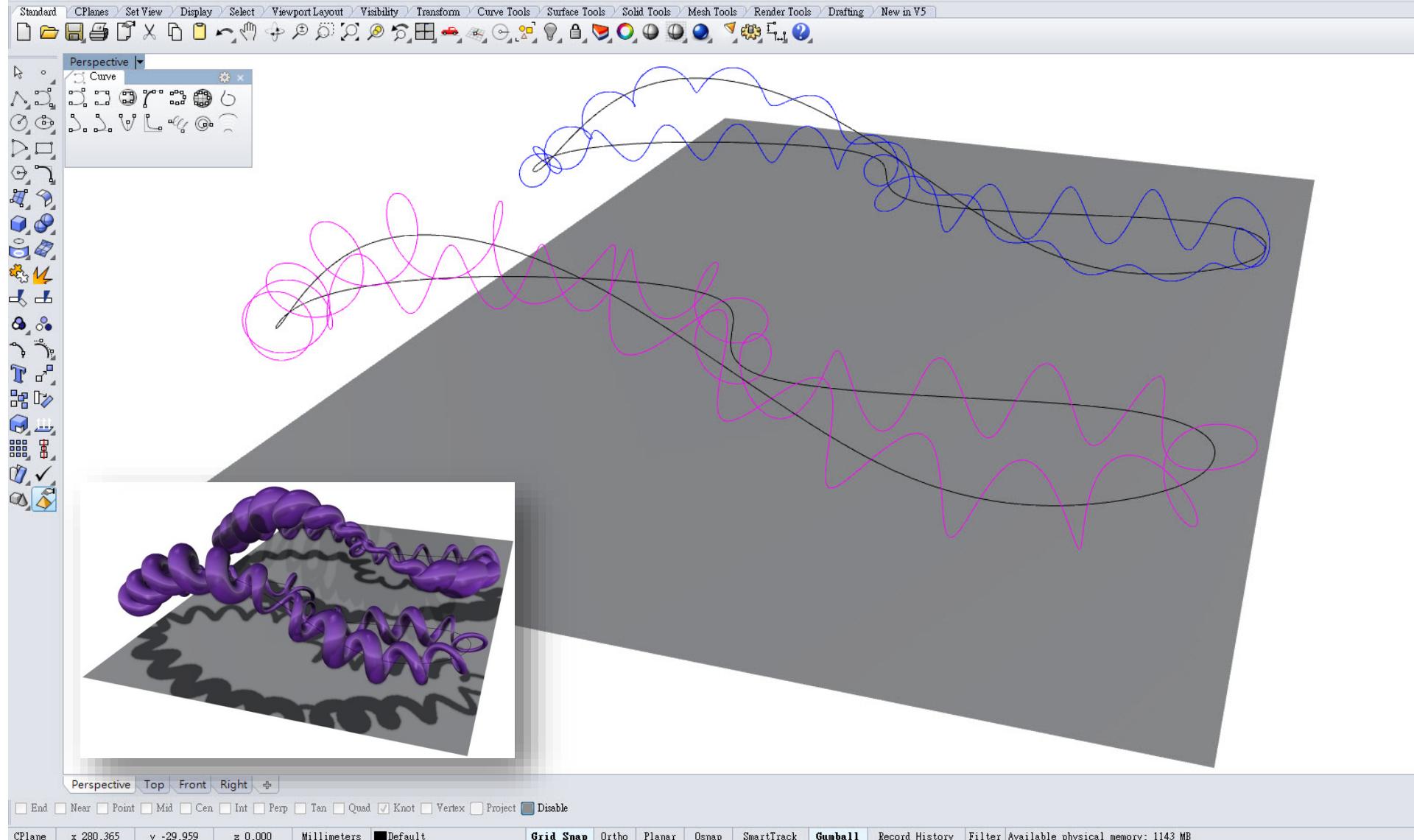


可記錄建構歷史的指令

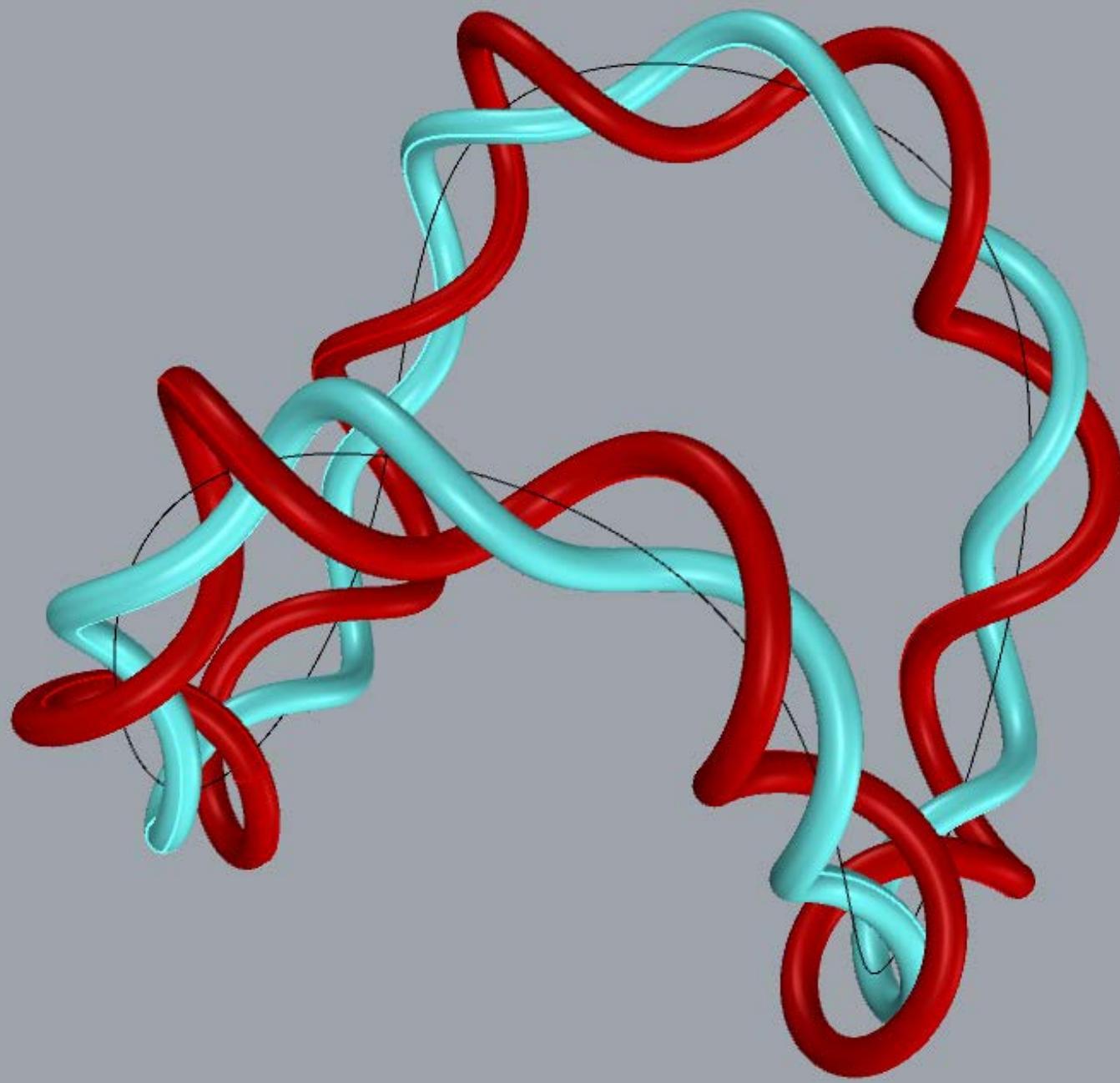


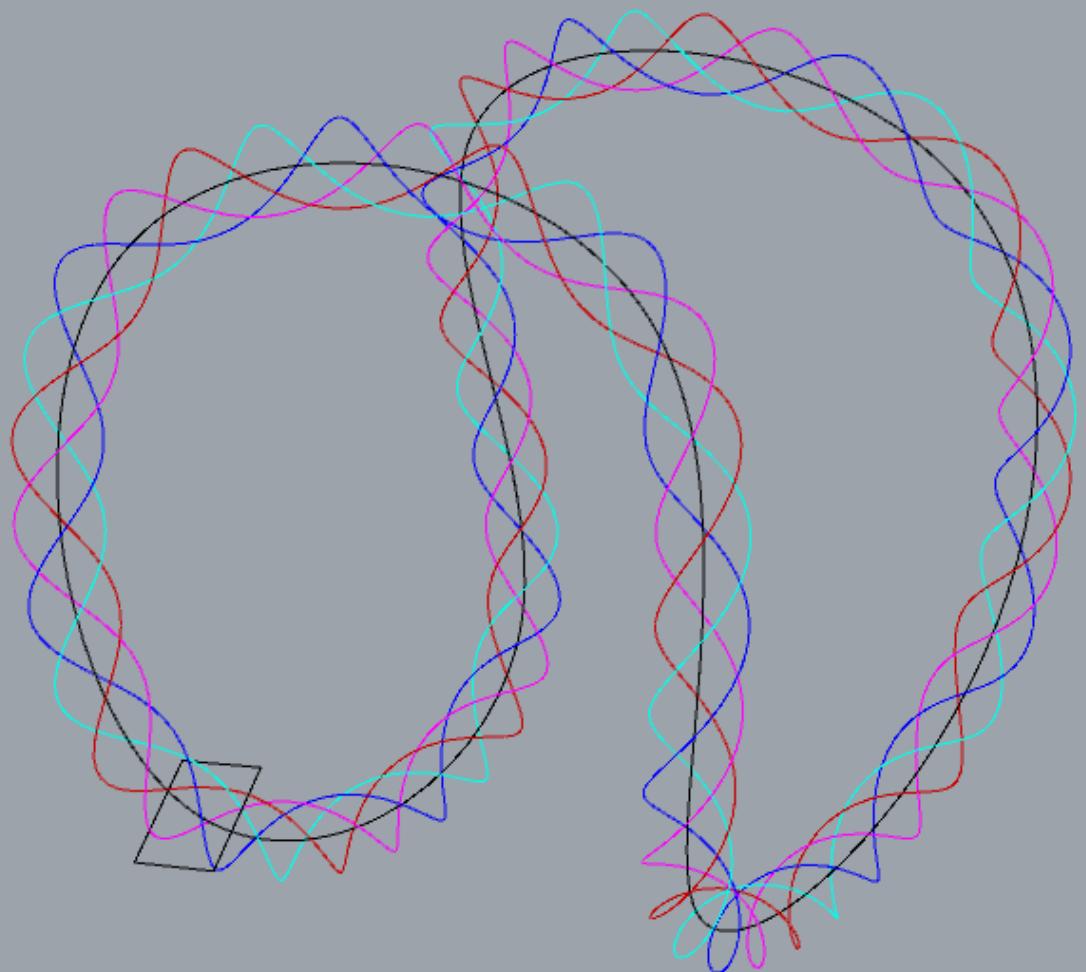
1 surface added to selection.
1 object changed to layer "Default".

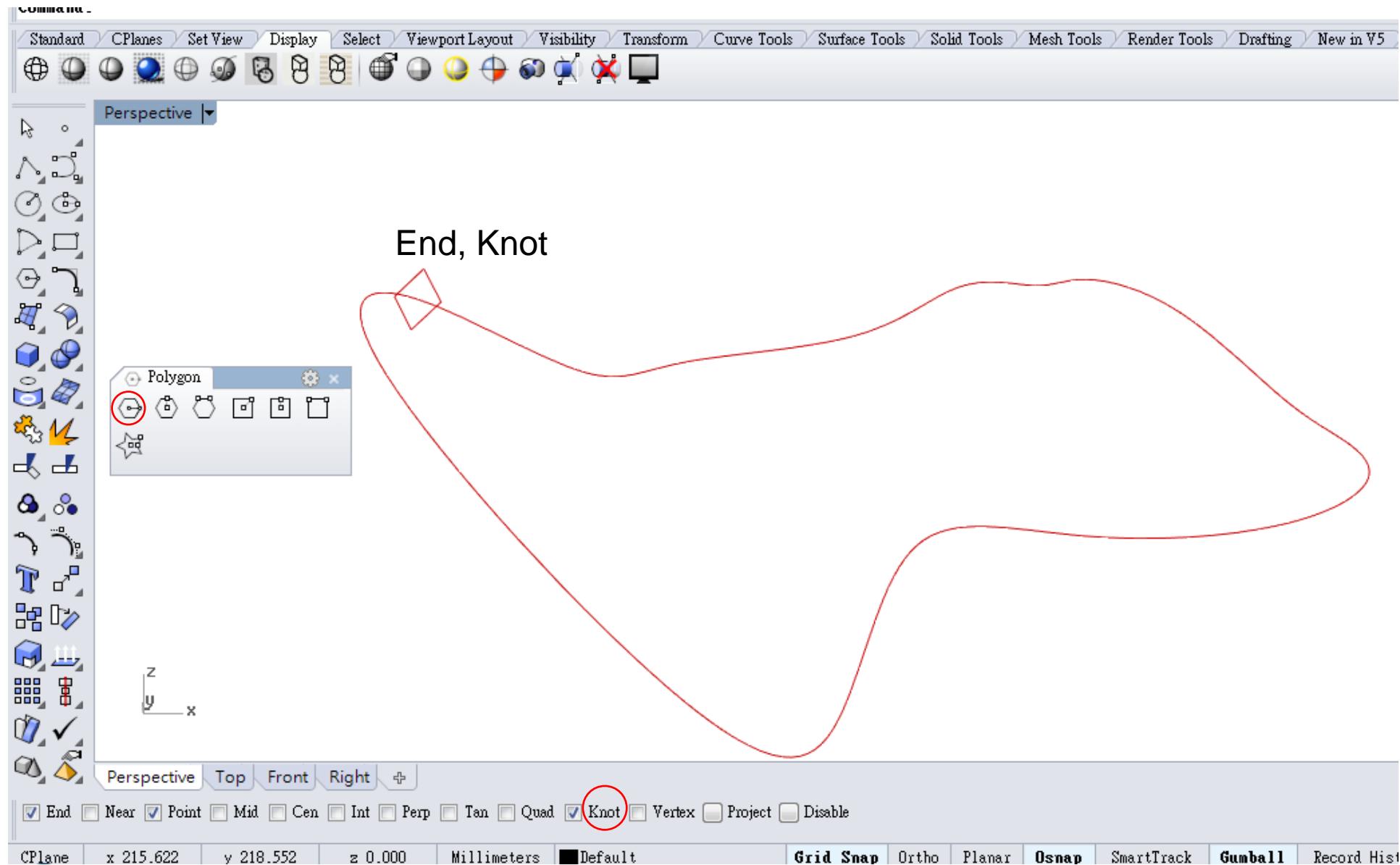
Command : |



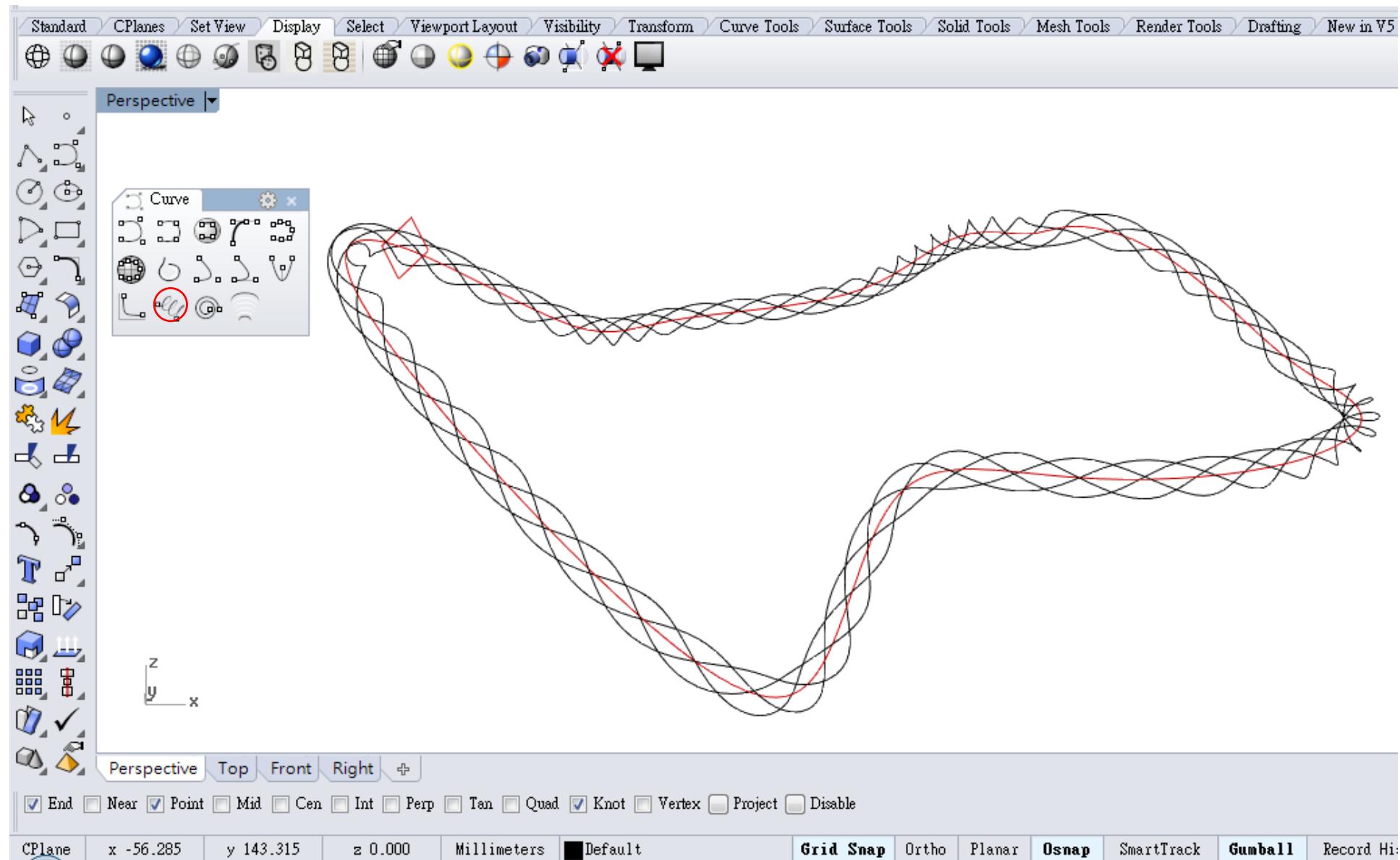
Helix & Spiral



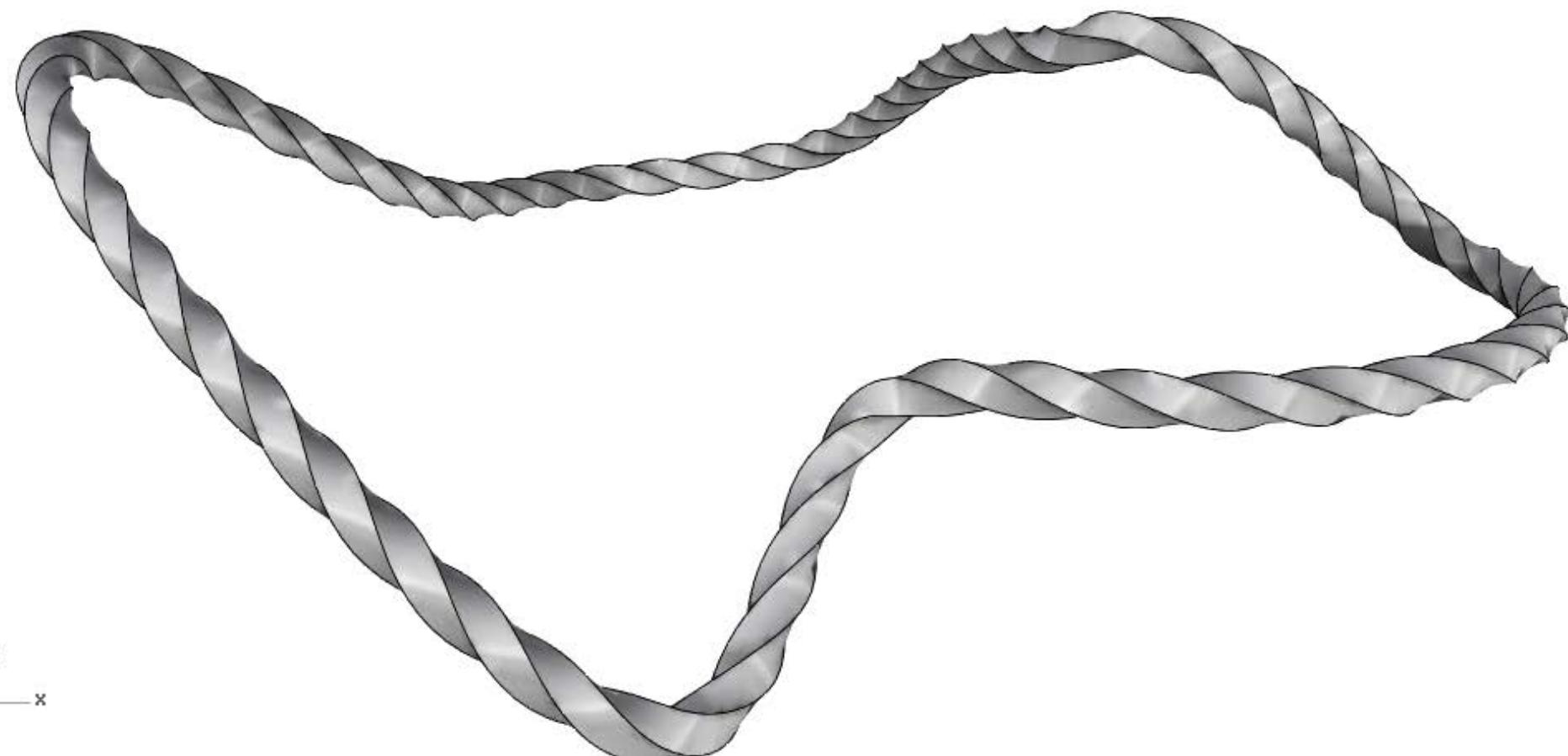




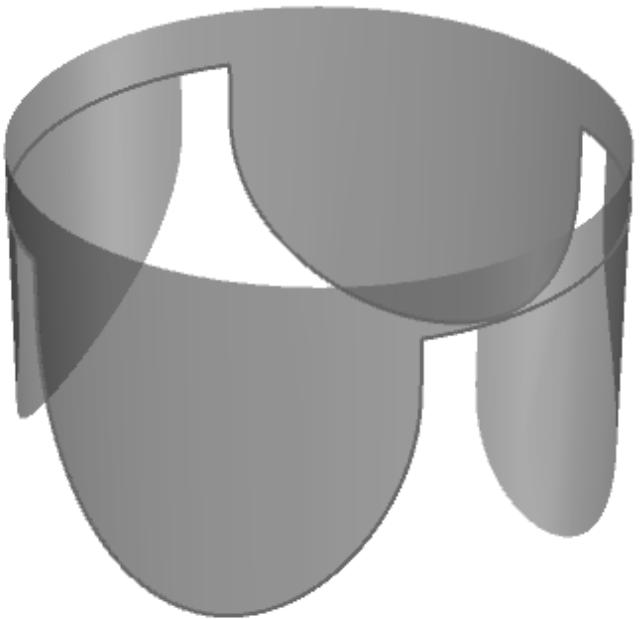
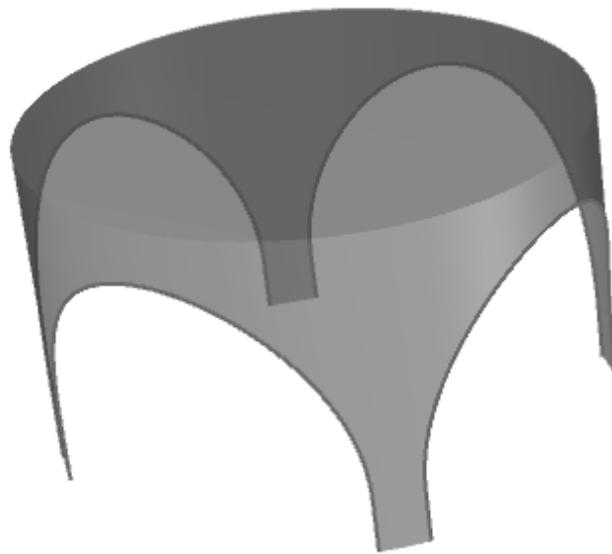
Polygon Curve(AroundCurve)



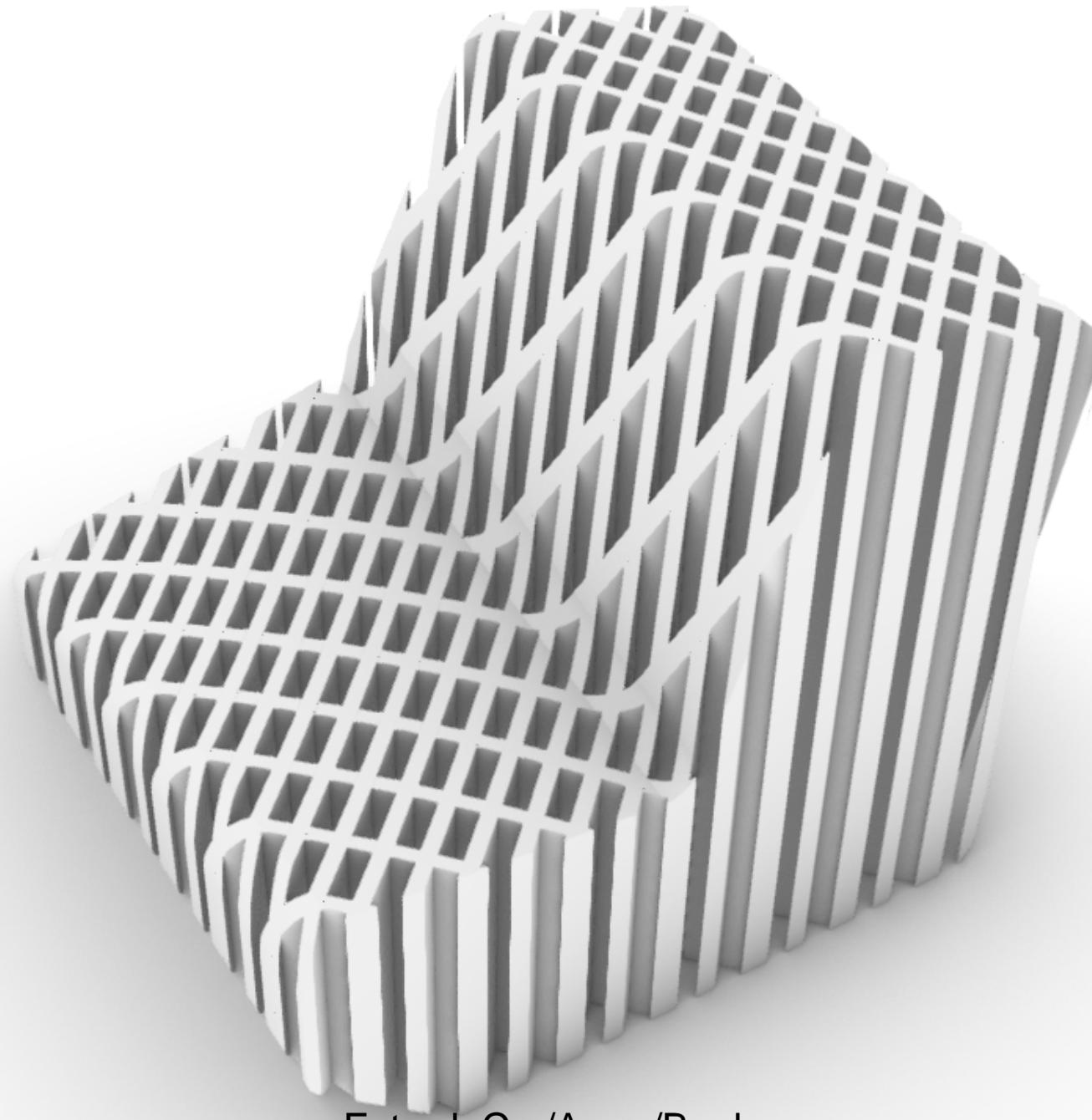
Helix(AroundCurve)



Loft



Project/Trim/Split



ExtrudeCrv/Array/Boolean

