Week 8
GRASSHOPPER

This week we will be exploring Grasshopper, which is the visual programming language and environment runs as a plug-in for Rhinoceros 3D.

Outline

01

Introduction of Grasshopper

Differences between modelling in Grasshopper and in Rhino 3D.

02

Links to tutorial

Suggested resources platforms and links to tutorial on YouTube will be presented.

03

Design precedents

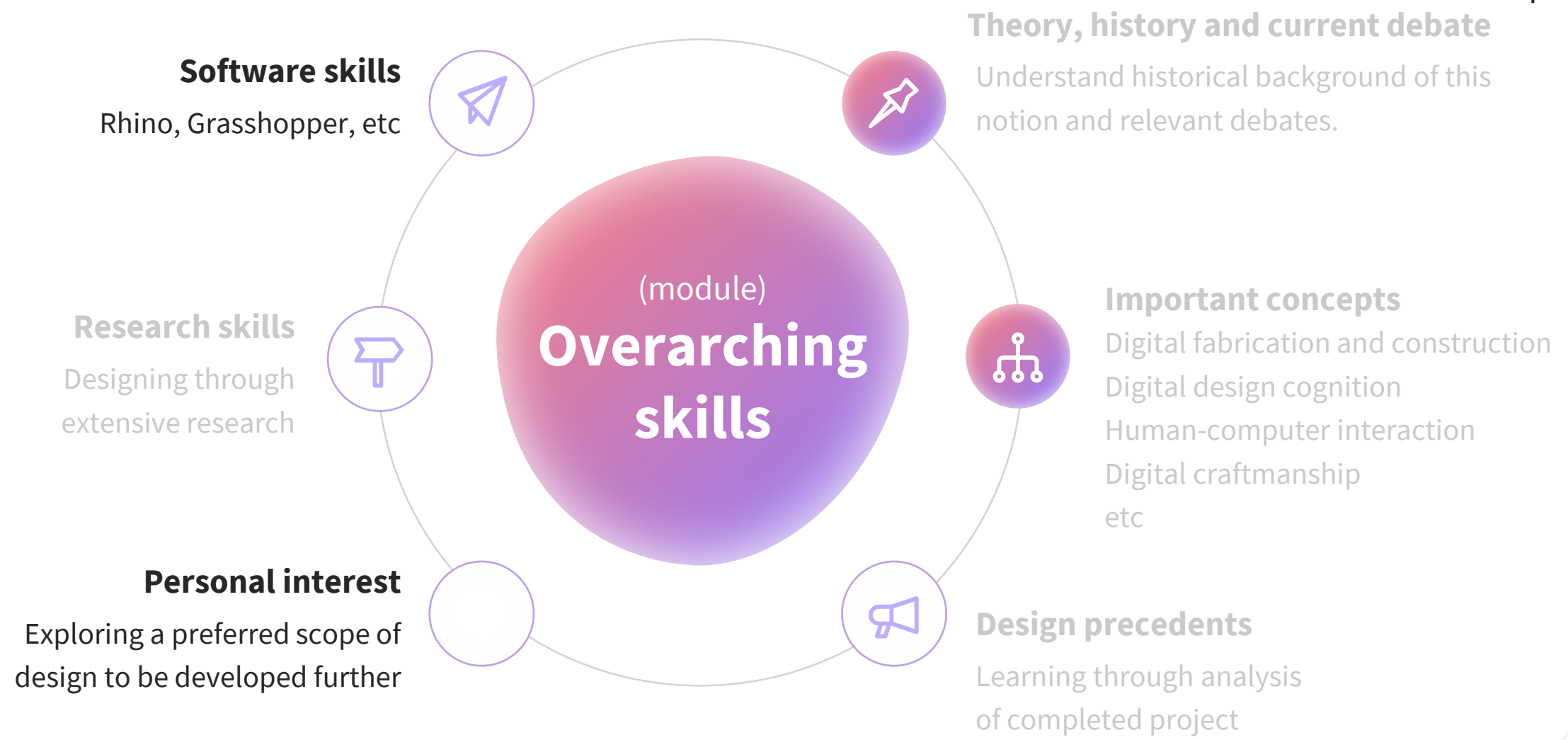Sitting pod design precedents which might be useful for the assignment.

Aims and objectives

- To reiterate the relation between Rhino 3D and Grasshopper
- To elicit other related parametric software
- To inform other available plug-ins
- To provide alternative tutorials by using available links from the video sharing platform.
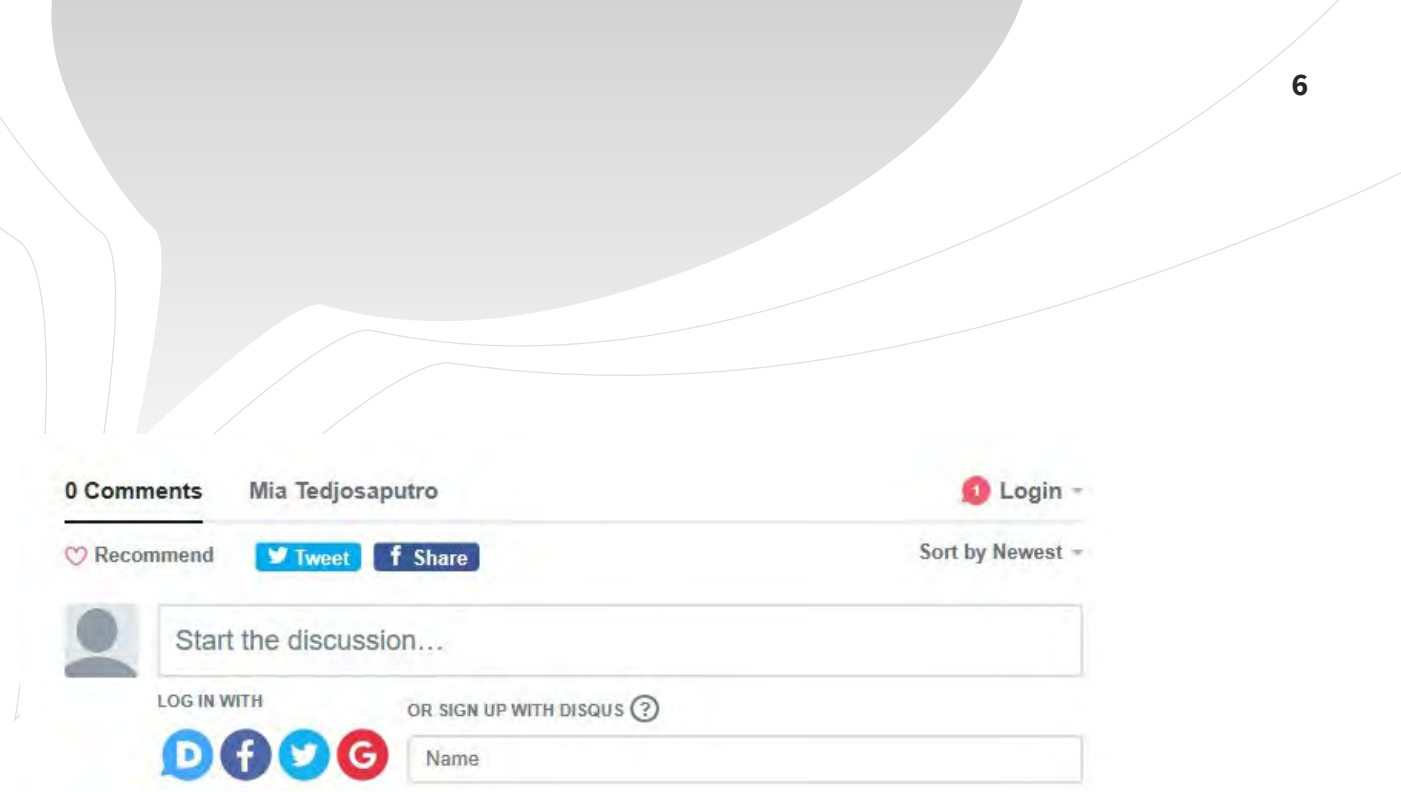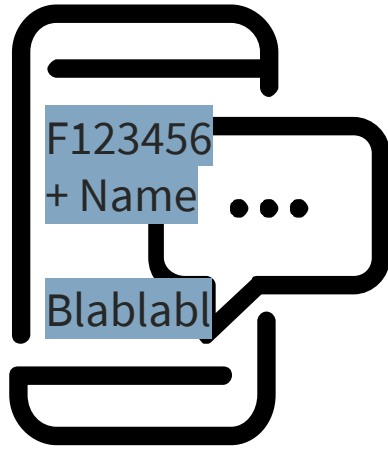- To illustrate design examples of sitting pod as required for the assessment.

Learning outcomes

Students will be able to..

01 Start to operate Grasshopper plug-in.

02 Exercise basic Grasshopper commands.

03 Be informed on where to find resources for further study.

04 Be informed on the design precedents for the assignment.

Software skills

Rhino, Grasshopper, etc

Theory, history and current debate

Understand historical background of this notion and relevant debates.

Research skills

Designing through extensive research

(module)
Overarching skills

Important concepts

Digital fabrication and construction
Digital design cognition
Human-computer interaction
Digital craftmanship
etc

Personal interest

Exploring a preferred scope of design to be developed further

Design precedents

Learning through analysis of completed project

Upload

F123456
+ Name

Blablabl

0 Comments   Mia Tedjosaputro   Login

Recommend   Tweet   Share   Sort by Newest

Start the discussion…

LOG IN WITH   OR SIGN UP WITH DISQUS (?)

Name

There is no forum discussion post this week, but it is expected that you upload one screenshot of your Grasshopper exploration.
Alternative 1: Try to utilise Rhino free trial. Grasshopper would have been there, built-in
Alternative 2: For those who do not have access to the software, I have created a virtual learning system for you to have a go. Message me if you need this.
Alternative 3: If you can't access the virtual machine, leave a 150 words of comment on the software based on tutorials, or your friends' uploaded try-outs.

https://miatedjosaputro.com/2020/04/21/week-9-upload/

Grasshopper

Developed by:
David Rutten, **at**
Robert McNeel & Associates

https://www.grasshopper3d.com/
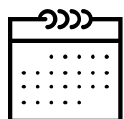
2007

FIRST RELEASED

Grasshopper

https://www.grasshopper3d.com/forum/topics/gh-s-origin

According to David Rutten, GH was developed for Rhino customers as a way to automate task without the need to write textual code. Originally called *explicit History* because it was a different approach to Rhino's history feature which is implicit. Means that Rhino history is recorded while we model and can be played back, whilst GH history is defined from scratch while model is created as an afterthought.

Other parametric software

Solidworks
CATIA
FreeCAD
Creo Parametric
Siemens NX
Fusion 360
Inventor

https://www.sculpteo.com/blog/2018/03/07/top-8-of-the-best-parametric-modeling-software/

Direct modelling:
On-the-fly design modification

RHINOCEROS 3D

VS

Parametric modelling:
Associative relationship

PLUG-IN FOR RHINOCEROS 3D
SUCH AS GRASSHOPPER

Previously in Week 5 and 8..

Visual scripting
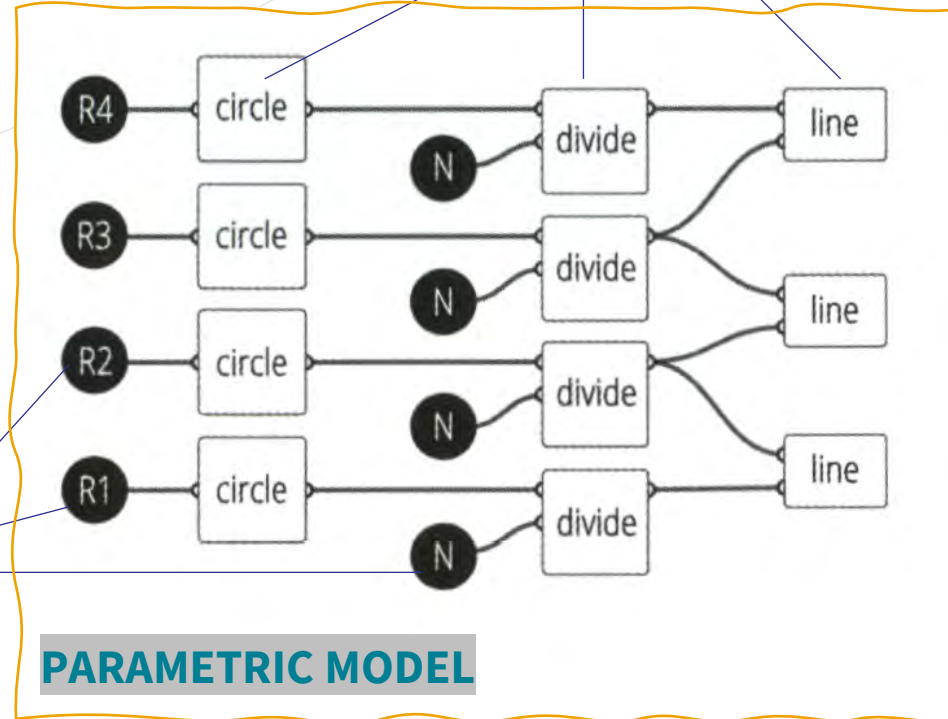
Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*, Le penseur publisher.

There are two
working environments:
Visual Editor (A)
3D Modelling Environment (B)

Producing two outputs:
Node diagram, called *parametric diagram*
Output of *parametric diagram* constituted
by parametric 3D or 2D geometry.

A

Start Point

Line

End Point

B

A   B

# Visual scripting

Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*, Le penseur publisher.

**There are two
working environments:
Visual Editor (A)
3D Modelling Environment (B)**

A IS GRASSHOPPER PLUG-IN

B IS RHINOCEROS 3D

A
Start Point
Line
End Point

B
A   B
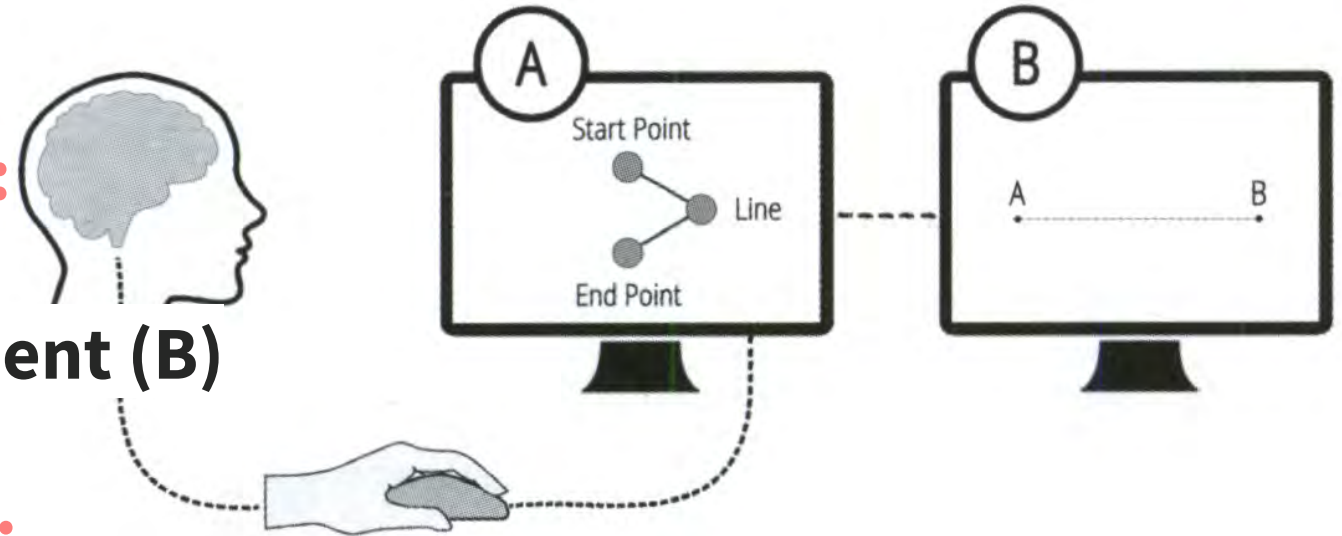
Producing two outputs:
Node diagram, called *parametric diagram*
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Previously in Week 5 and 8..

Visual scripting

Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*, Le penseur publisher.

0. *Draw four circle*
1. *Subdivide the four circles into N parts, we get N points for each circle*
2. *Connect the corresponding points*

PARAMETERS

A IS GRASSHOPPER PLUG-IN

MAIN FUNCTIONS

PARAMETRIC MODEL
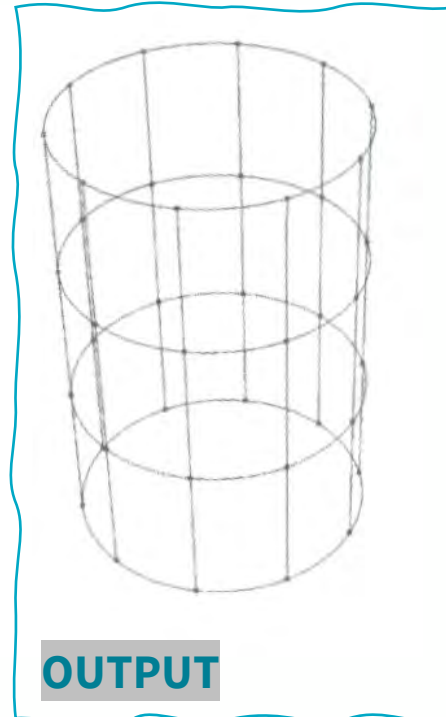
VISUAL TRANSPOSITION OF THE ALGORITHM

The advantage of the *parametric diagram* is in the intuitive logic, which allows designers to manipulate parameters.

B IS

RHINOCEROS 3D

OUTPUT

Previously in Week 8..

Example of Rhino and Grasshopper relation

Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*, Le penseur publisher.

TOP: GRASSHOPPER PLUG-IN

BOTTOM: RHINOCEROS 3D

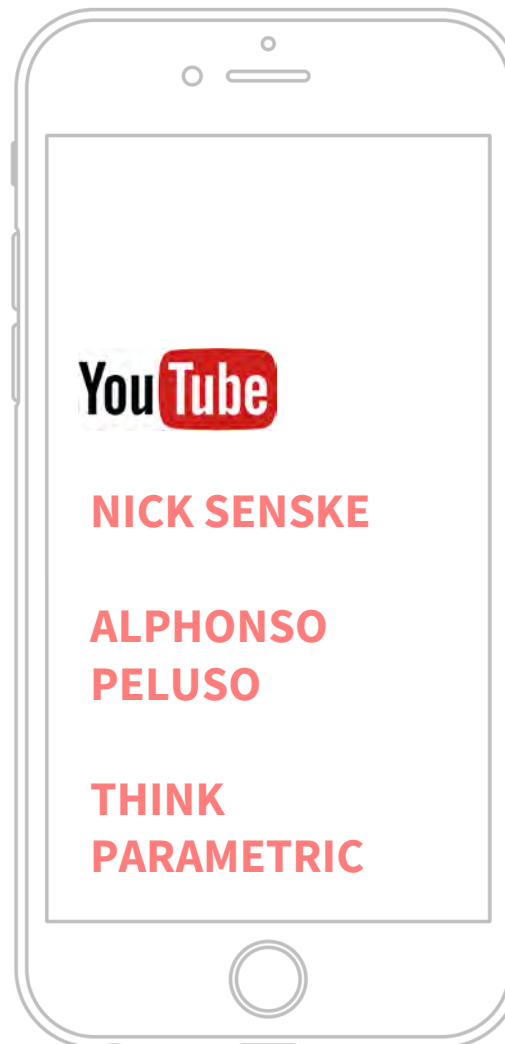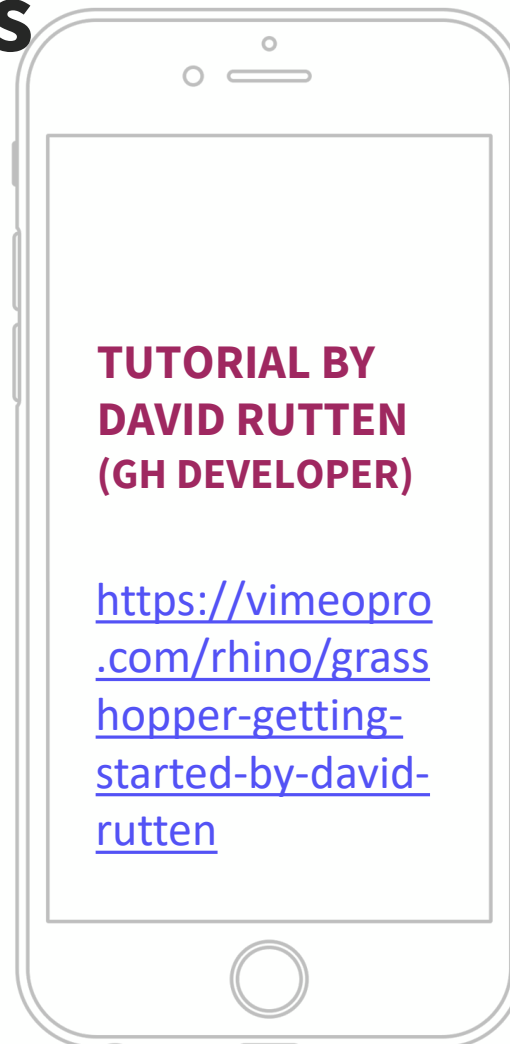STEP A   STEP B   STEP C   STEP D   STEP E

STEP F   STEP G
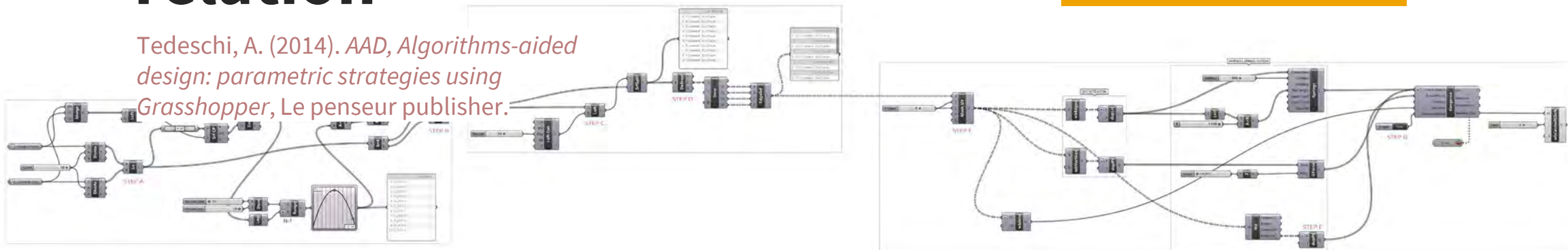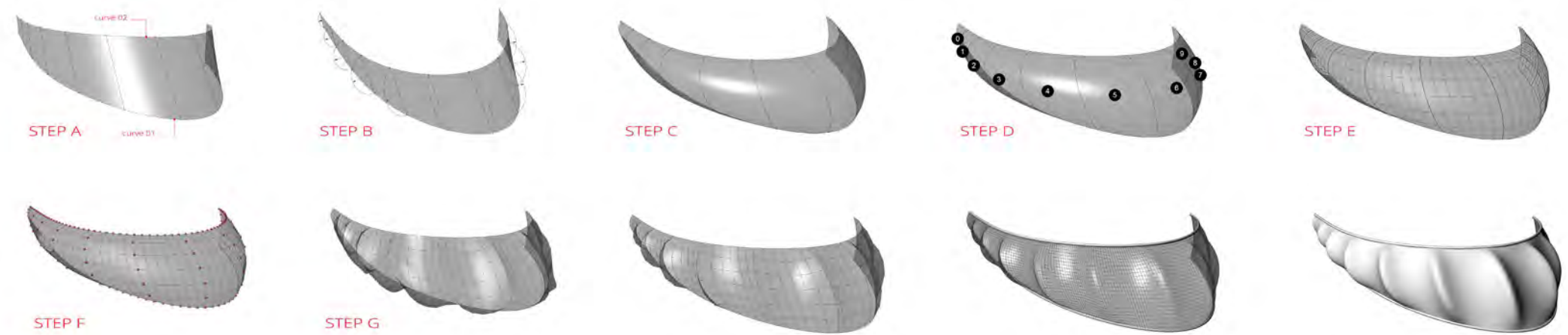
Review on Grasshopper (for Rhino 5)

- **The ease** of basics of software programming is grasped and used.
- Encourages user to **work directly** on the definition of rules and procedures.
- GH was designed specifically for **non programmer.**
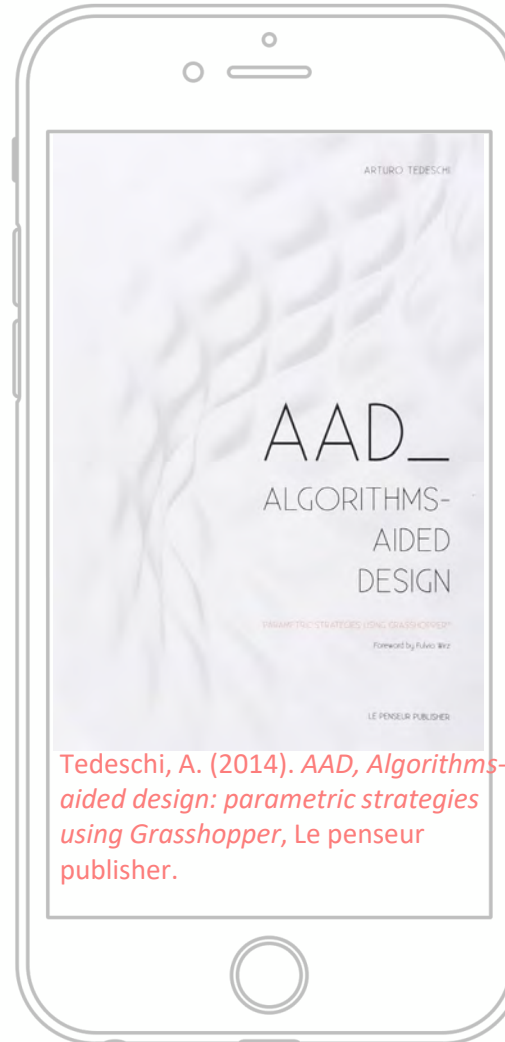- GH is **inexpensive** *(although Rhino isn't)* and resources are abundant.

- **Learning curve** quickly **steepens** as one approaches more complex problem.
- User soon **reach a limit** imposed by lack of understanding of the way information is stored and sorted.
- **Multiple readings of a problem** due to computation's ability to produce alternatives rapidly and inexpensively.

Grasshopper online resources

TUTORIAL BY DAVID RUTTEN (GH DEVELOPER)

https://vimeopro.com/rhino/grasshopper-getting-started-by-david-rutten

NICK SENSKE

ALPHONSO PELUSO

THINK PARAMETRIC

SUDOHOPPER3D (DOWNLOADABLE GAME)

https://mcneelmiami.com/inc/sdetail/7654

Grasshopper resources

Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*, Le penseur publisher.

https://www.modelab.is/grasshopper-primer/

http://www.liftarchitects.com/blog/2009/3/25/grasshopper-primer-english-edition

Other parametric plug-ins: Bridging architecture with other disciplines

ENVIRONMENTAL ANALYSIS:
Ladybug
Honeybee
Geco
Heliotrope-Solar

STRUCTURAL ANALYSIS:
Kangaroo Physics
Karamba
BullAnt
Hummingbird
Mantis

https://www.arch2o.com/10-parametric-plugins-every-architect-should-know/

How do you get started?

- Try to download Rhino **90 days trial.** I have tried and it was pretty straightforward.
- From Rhino 6, Grasshopper is built-in. So you do not have to install anything else.
- Alternative option: if for some reasons you **can't install the trial**, I have established a virtual machine. Message me if you need this.
- If you absolutely **cannot gain access** to software, take notes of your group member who has the access and submit the reflections in Assignment 1 and 2.

Grasshopper tutorial 1:

Get familiar with the interface

BEGINNER'S GUIDE
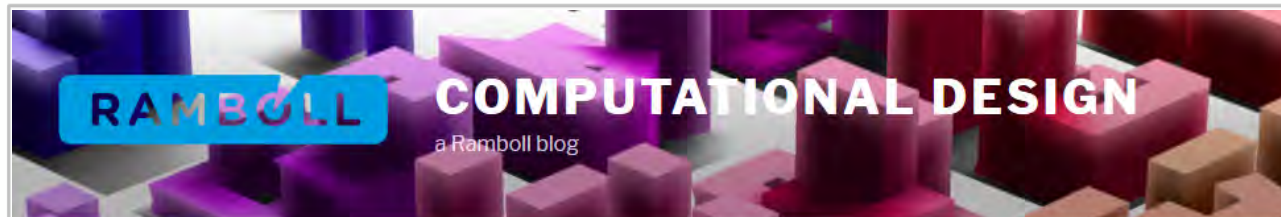
https://blog.ramboll.com/rcd/tutorials/a-beginners-guide-to-visual-scripting-with-grasshopper.html

RAMBOLL

Grasshopper tutorial 2:
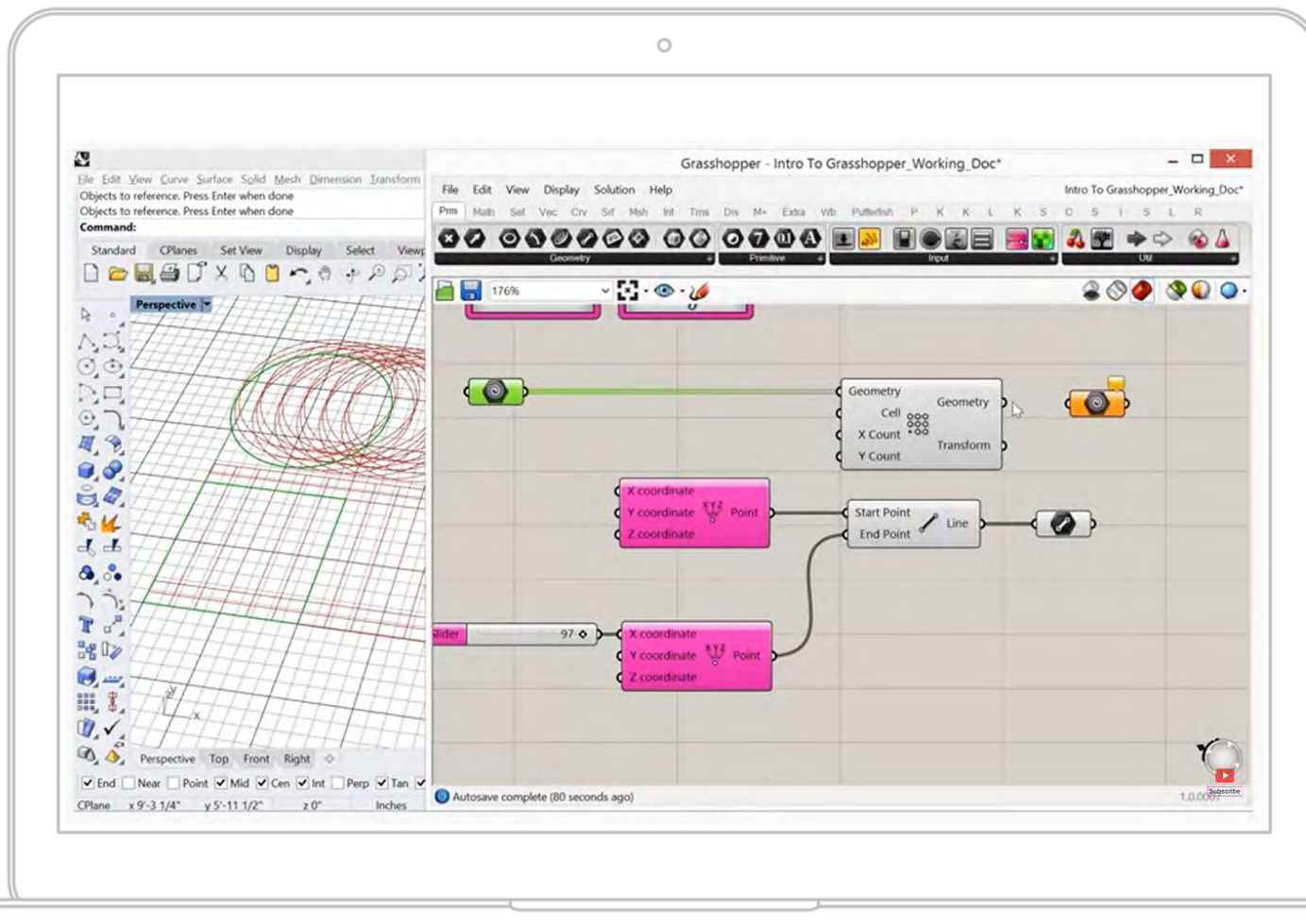
Basic concepts of GH

WHAT IS GH

https://youtu.be/CPKSV8JAMX8

Duration: 32 minutes

ALPHONSO PELUSO

Grasshopper tutorial 3:

Basic function of GH

GETTING STARTED WITH GH
13 parts

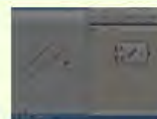https://vimeopro.com/rhino/grasshopper-getting-started-by-david-rutten

DAVID RUTTEN

Grasshopper tutorial 3:

Basic function of GH

GETTING STARTED WITH GH

13 parts

https://vimeo.com/channels/basicgh

DAVID RUTTEN

GO THROUGH 13 VIDEOS
David Rutten developed Grasshopper, and perhaps the best way to learn GH is from him. Videos are varies in terms of duration, roughly 10 minutes each.
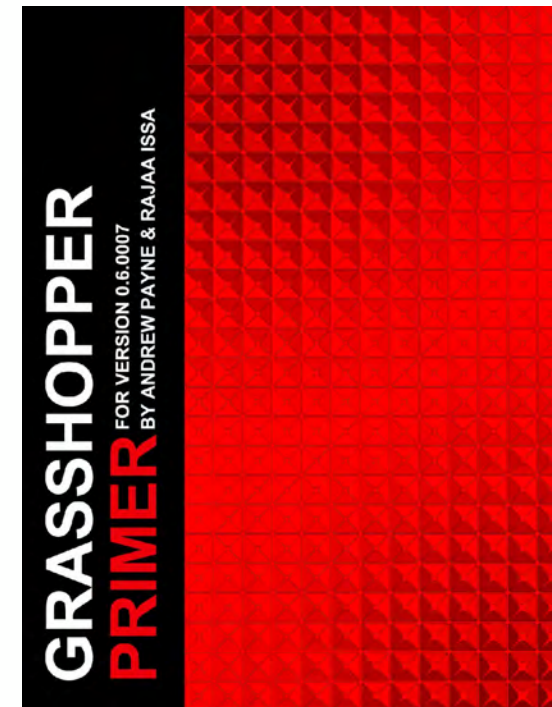
grasshopper

Tips for
Grasshopper

Grasshopper is not the easiest plug-in, and the learning curve is quite steep. You will notice very quickly that we need to understand the basic array of components' function to know what GH can do, to be able to think algorithmically. I also suggest to have a look at this **primer.** It was published in 2009 but still relevant.

http://www.liftarchitects.com/blog/2009/3/25/grasshopper-primer-english-edition

Sitting pod design precedents

Ebb (and Flow) Installation

https://www.archdaily.com/936395/eco-sistema-installation-ramiro-carro-lucas-ibarra-arquitectos

Eco-Sistema Installation

https://www.archdaily.com/933378/ebb-and-flow-installation-i-thee

Nesting Plan

https://www.archdaily.com/937238/nesting-plan-i-gray-cheeked-fulvetta-cheng-tsung-feng

Shrine of Whatslove

https://www.archdaily.com/913684/shrine-of-whatslove-wutopia-lab

Re-iterating aims and objectives

- To reiterate the relation between Rhino 3D and Grasshopper
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