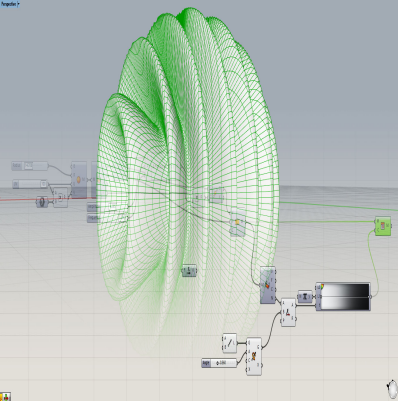




Rhino Grasshopper: How to start

Description

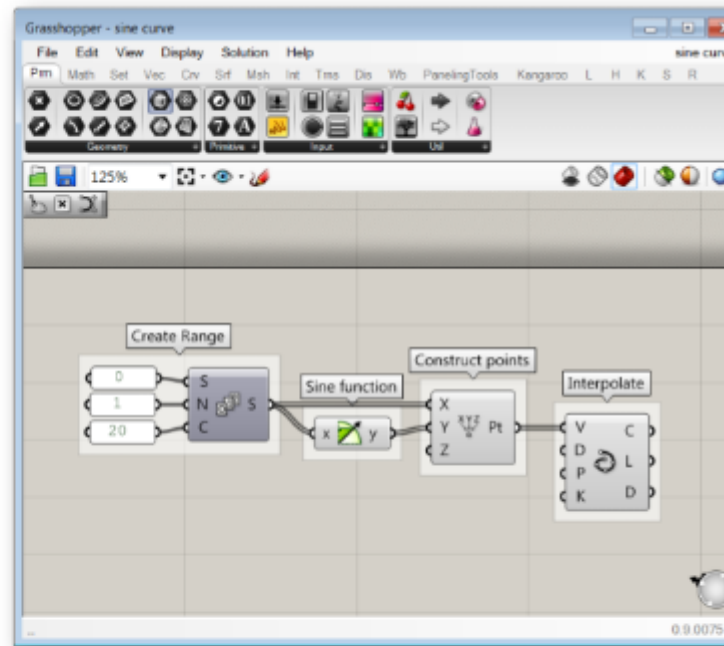
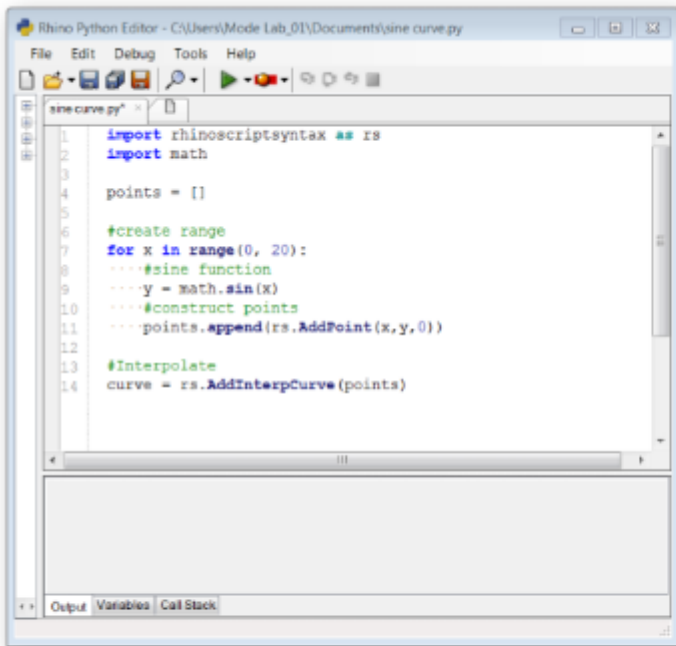
New to Rhino Grasshopper? Welcome to some basic instructions on how to get started! In short, I'll tell you ...

- [What Grasshopper basically is all about](#)
- [About Grasshopper's relation to Rhino3D](#)
- [How to start Grasshopper](#)
- [How to customize Grasshopper](#)
- [How to use Grasshopper](#)
- [How to save Grasshopper Files](#)

This is really a quick summary of information you'll find more thoroughly explained elsewhere, e.g. in Mode Lab's [Grasshopper Primer](#). For more background sources also check [my own article here](#).

What is Grasshopper? <

Grasshopper is a *Rhino3D* plugin that allows you to model things that can't be done in *Rhino3D* alone. It is a built-in programming tool. In contrast to other built-in programming tools however that demand code scripting (e.g. *Python*), *Grasshopper* offers a more designer-friendly, visual, object-style approach for basically the same ends. The basic idea is to plug data inputs into components that produce geometry output. This illustration from the [Grasshopper Primer](#) shows the difference:



This image show the process for drawing a sine curve in python and in Grasshopper.

Other than some marketing lyrics proclaim this does not mean Grasshopper is always easy to use. You still have to think like a programmer when utilizing it – but then, at least you won't have to struggle with code syntax. For an architect, this makes a hell of a difference.

You want to see more information? Check my article on [Grasshopper learning resources](#).

Grasshopper and Rhino3D ≤

Grasshopper is a *Rhino3D* plugin which means you can't use it standalone. Until short, you had to download and install it yourself but today it comes pre-installed with *Rhino3D V6 (WIN)* and *Rhino3D V5 (MAC)*.

You need *Rhino3D*'s viewports to preview *Grasshopper*'s geometry output – *Grasshopper*'s canvas itself can only display your component composition:

Rhinoceros 6 Educational Lab License - [Perspective]

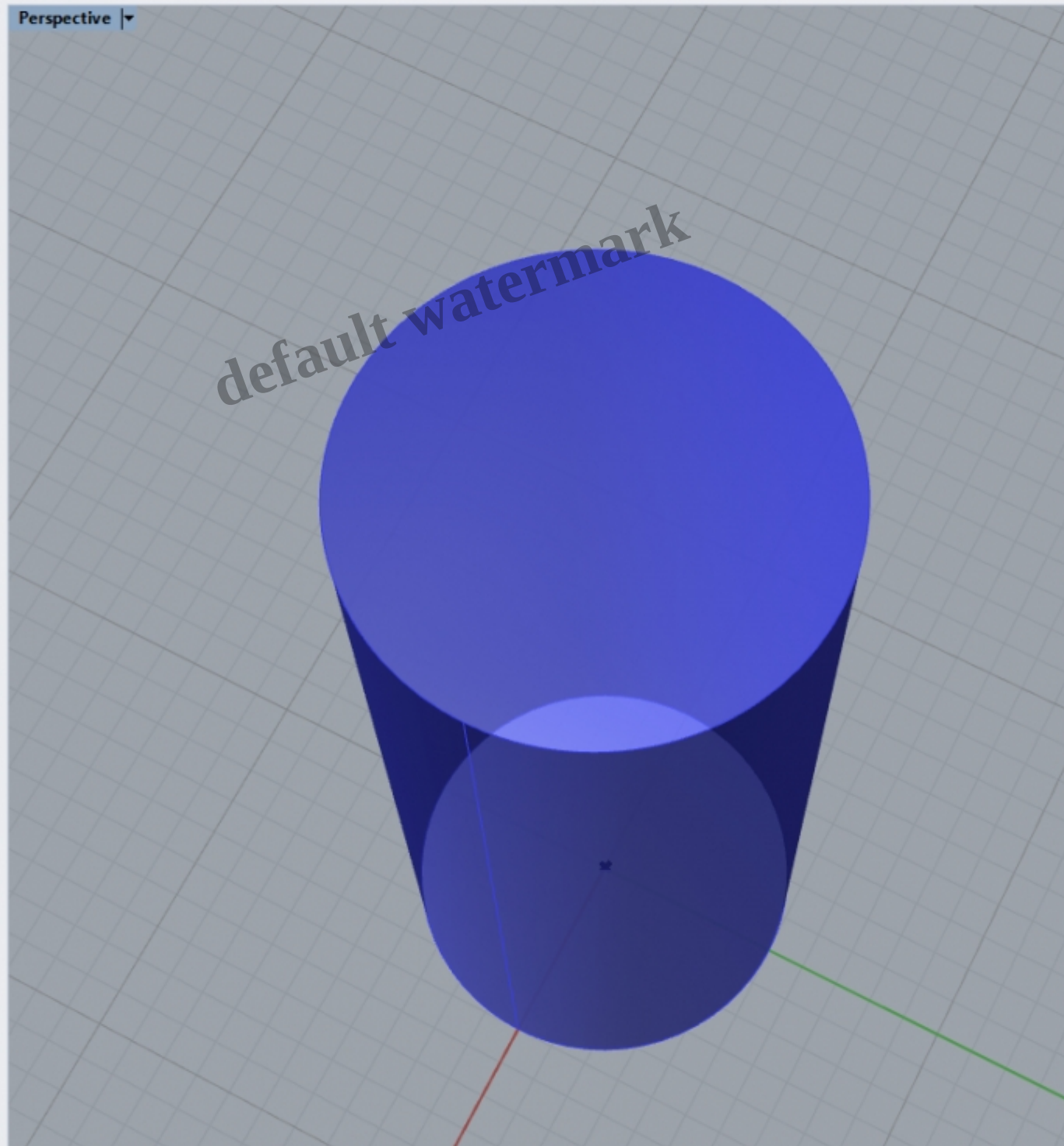
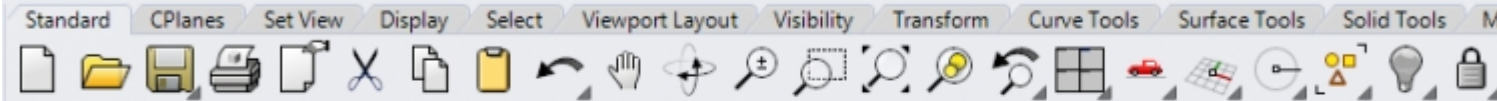
File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Panels Help

Loading Rhino Render, version 1.50, Sep 28 2018, 21:43:56

Command: _Grasshopper

Command: Grasshopper

Command:



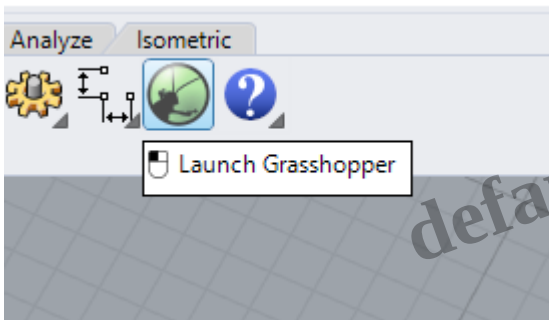
A *Grasshopper* definition (that's what a working set of components is called) has to be saved to stay with you and the world. Other than *Rhino3D*'s generic files the format is *.gh*. Theoretically, *Grasshopper* files are independeant from *Rhino3D* files. In practice, there are 2 scenarios, though:

When building up definitions in *Grasshopper* you can either reference *Rhino3D* geometry or construct everything directly in *Grasshopper*. When you input *Rhino3D* points, curves etc. you have to make sure that you always keep 2 files to save your work: The *Rhino3D* file (*.3dm*) and the *Grasshopper* file (*.gh*). When you develop your geometry in *Grasshopper* without any reference to existing *Rhino3D* geometry you may only keep the *Grasshopper* file.

You want to see more information? Check my article on [Grasshopper learning resources](#).

How to start Grasshopper ≤

That's simple: Type *grasshopper* into *Rhino3D*'s command prompt. Or click the *Grasshopper* icon in *Rhino3D*'s *Standard* toolbar:



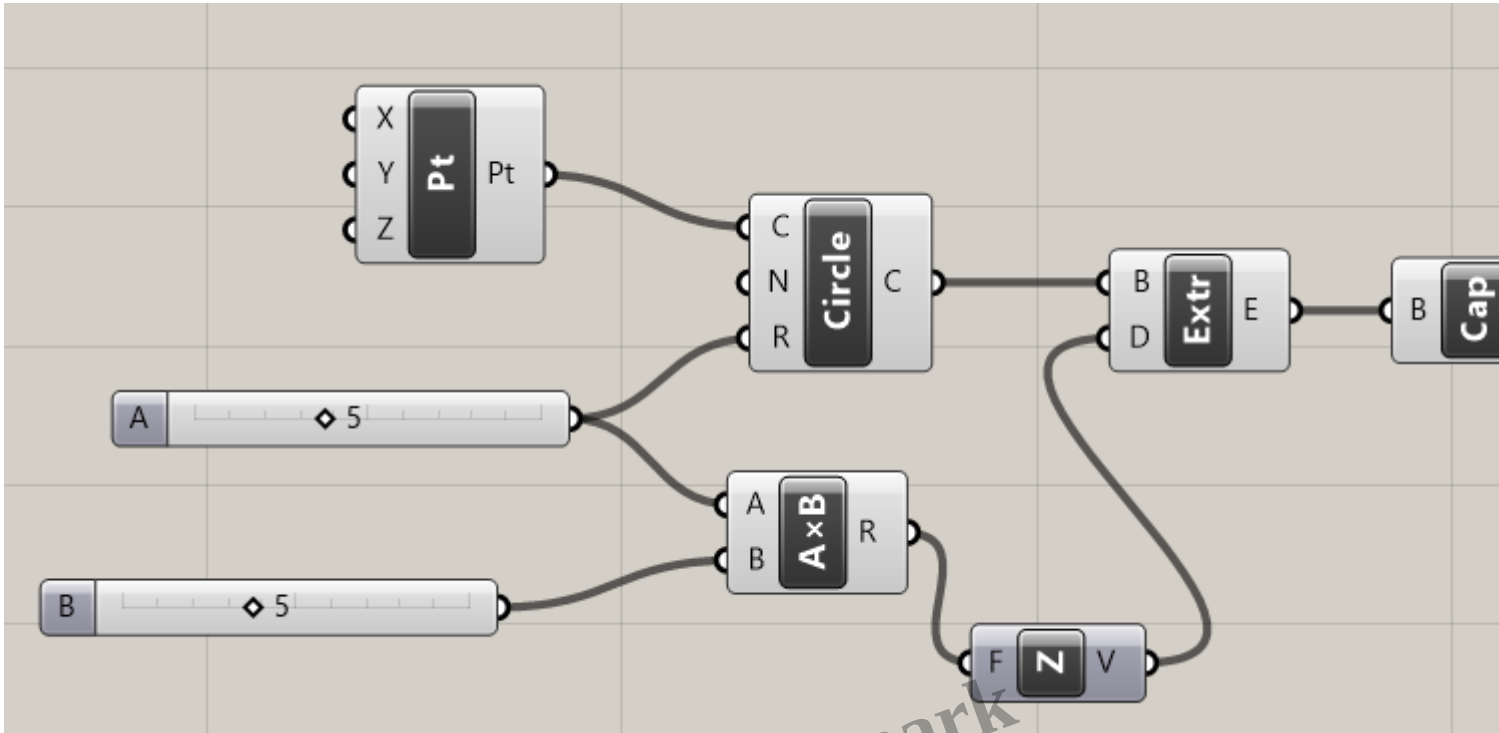
Either way, *Grasshopper* opens up. If you have more than one screen, pull *Grasshopper*'s window onto one of them. If you have only one screen, press the [Windows key and the Right-Arrow-key](#) so the *Grasshopper* window fills the right half of your screen. Do the same for your *Rhino3D* window, but – of course – put that one on the left half of your screen (*Windows-Left Arrow*). On *Mac*, you have a [similar way](#) to split your screen for two apps.

You want to see more information? Check my article on [Grasshopper learning resources](#).

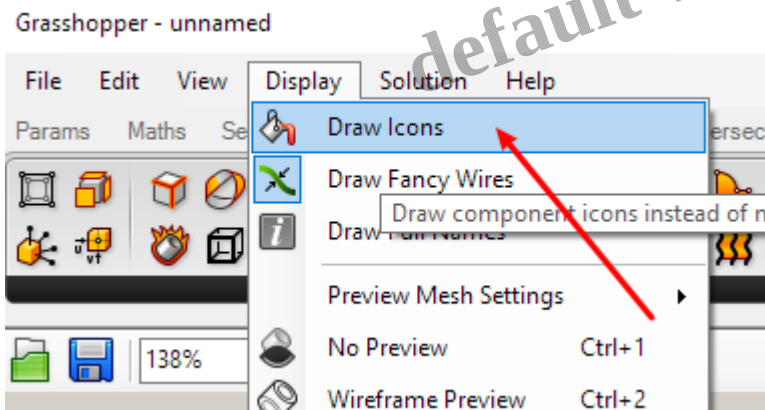
How to customize Grasshopper ≤

There's not much to customize in *Grasshopper* compared to larger software suites. Let me show you my favorite changes.

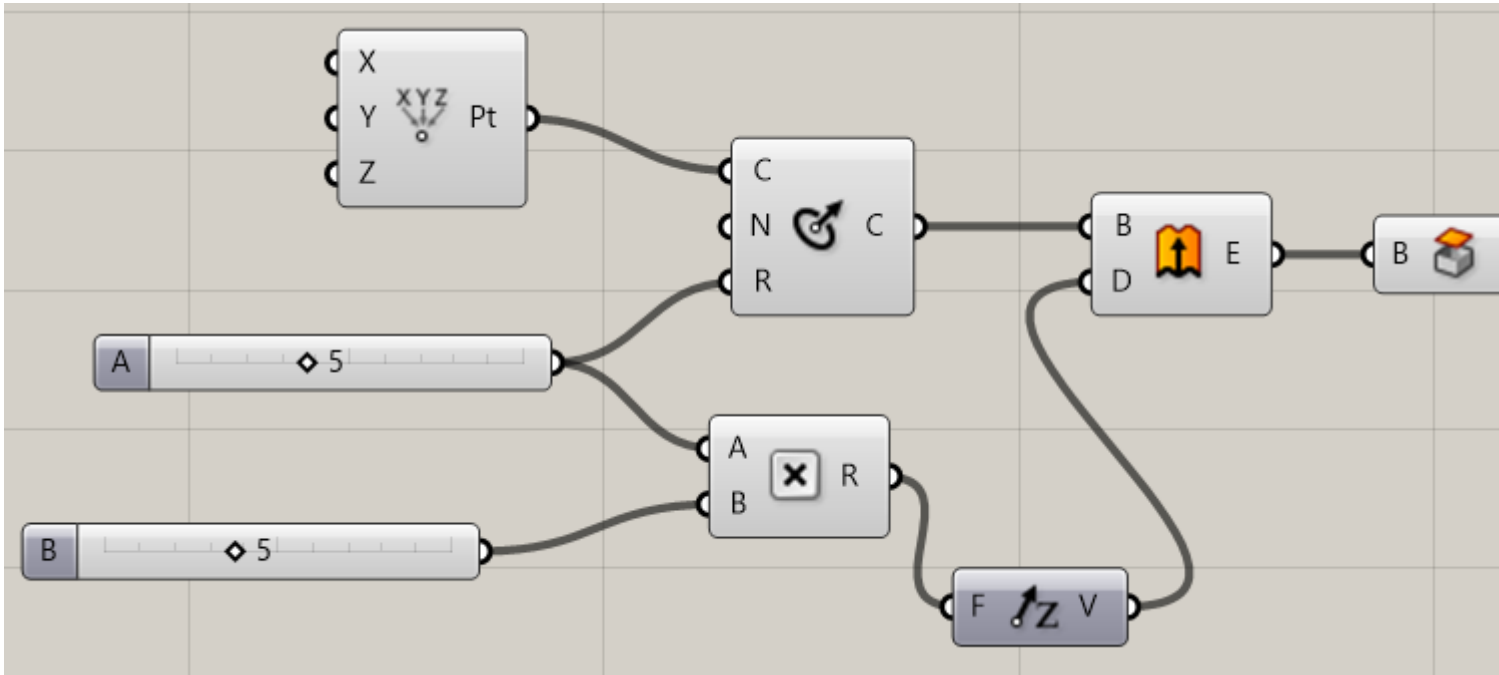
First of all, per default *Grasshopper* components are displayed with their names on it:



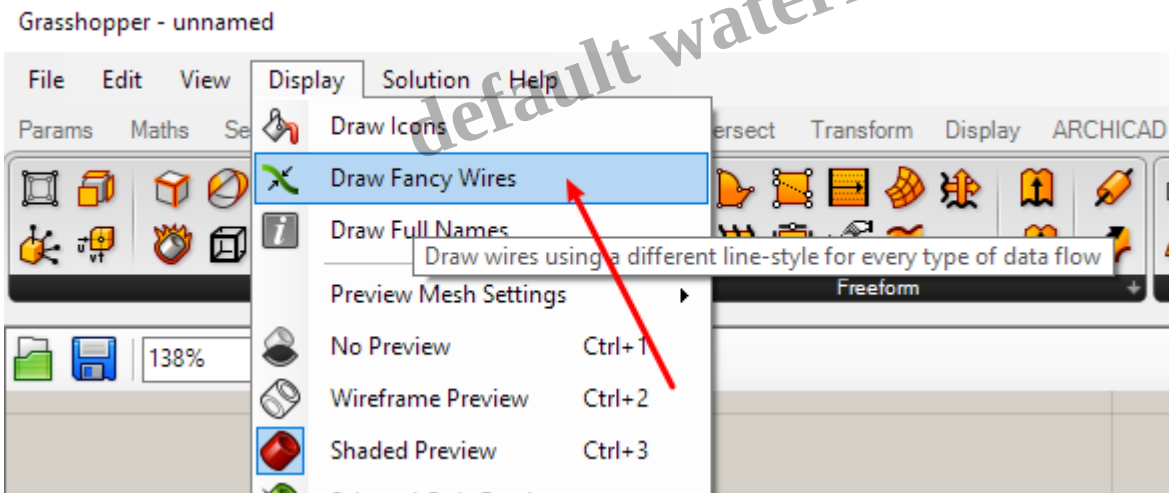
Let's change the *Display* settings to *Icon*:



Now it's easier to identify (or guess) the component's function:



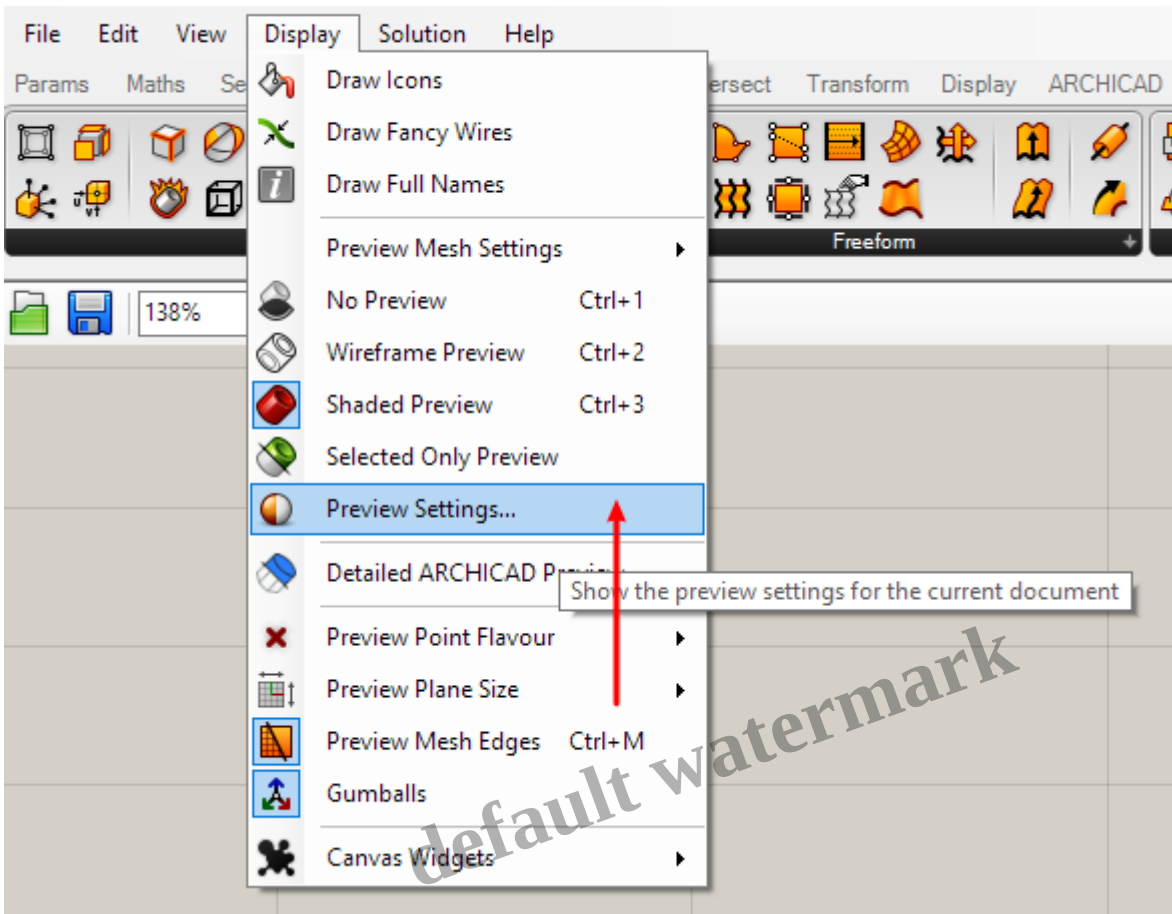
At the same location, choose *Fancy Wires* for connection display:



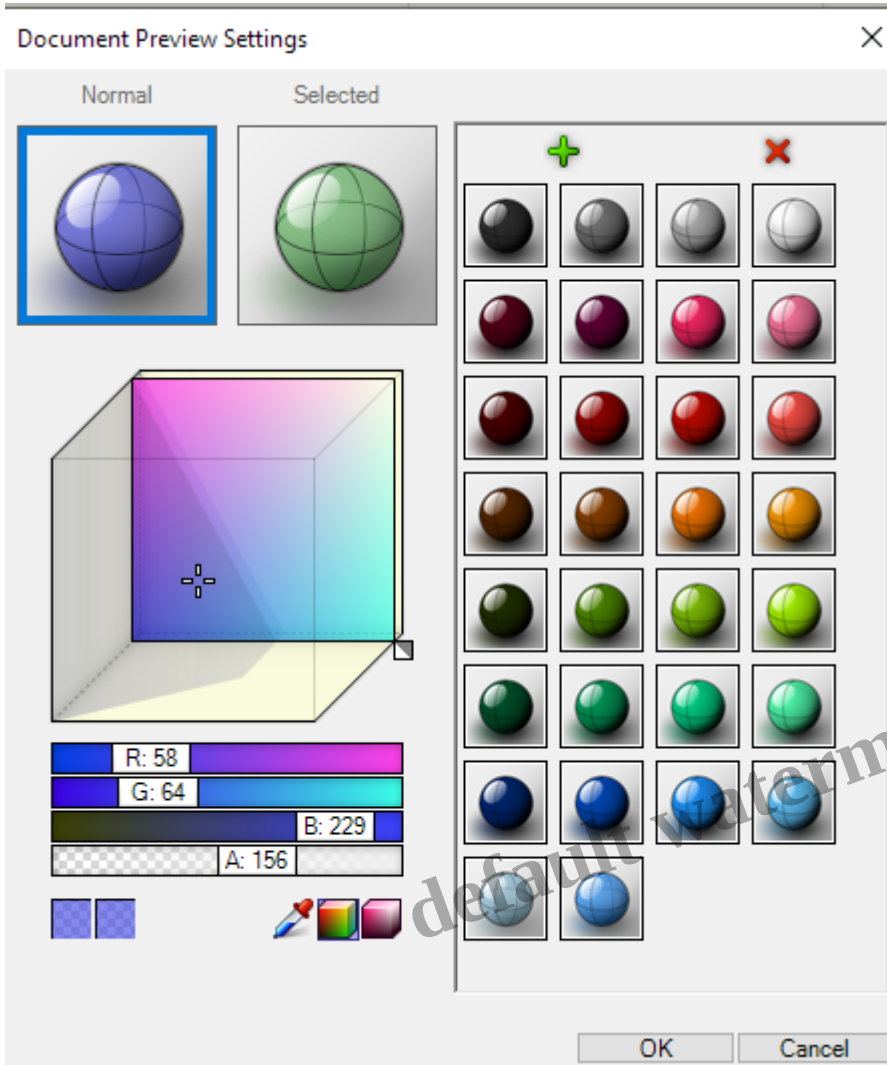
This helps you understand the type of data flow between components later on.

If you want to see distinct colors for *Grasshopper*-induced geometry previews in *Rhino3D*, choose the according settings under *Display – Preview Settings*:

Grasshopper - unnamed



Here you may set colors for the unselected and selected geometry:

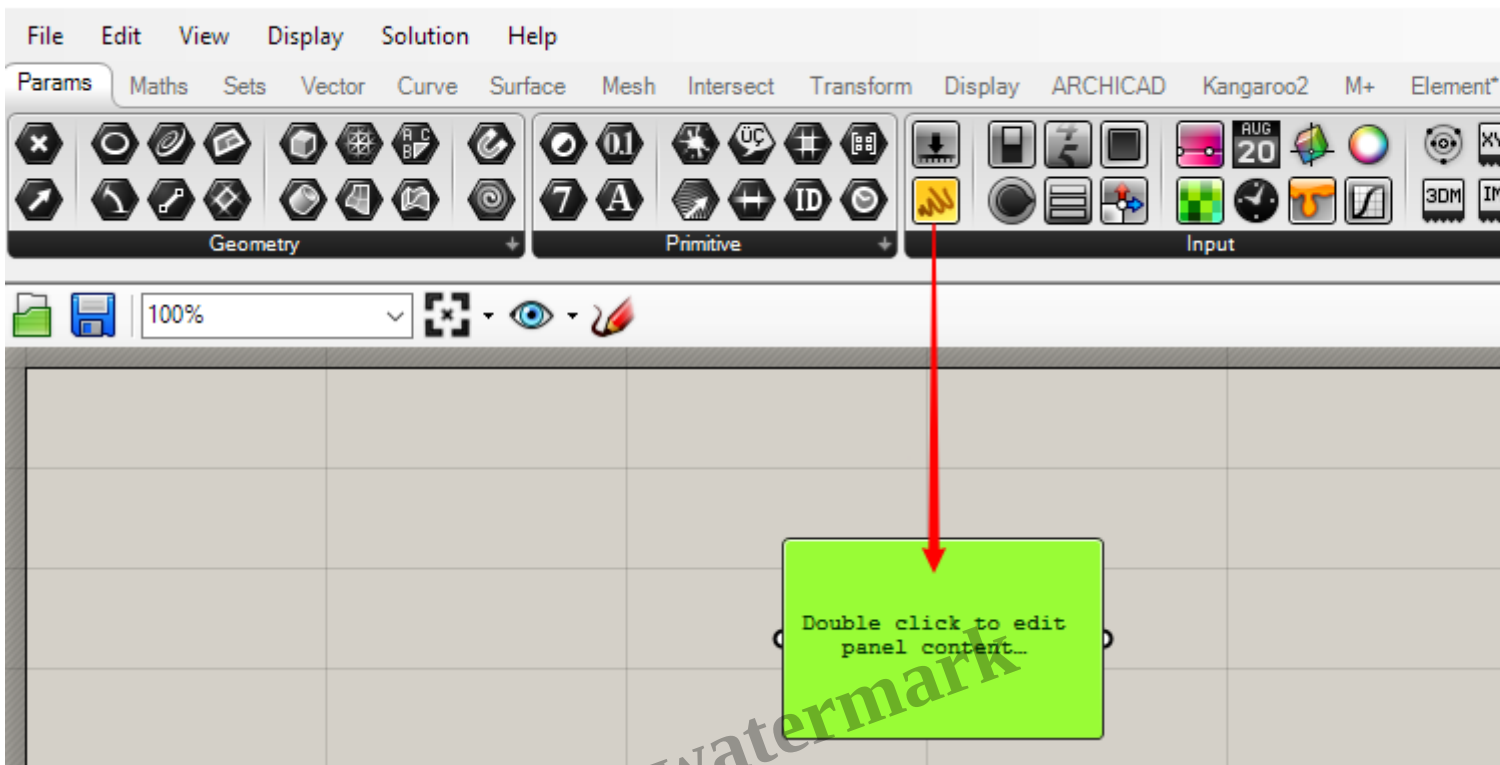


That's all, no more things to customize for the moment. You want to see more information? Check my article on [Grasshopper learning resources](#).

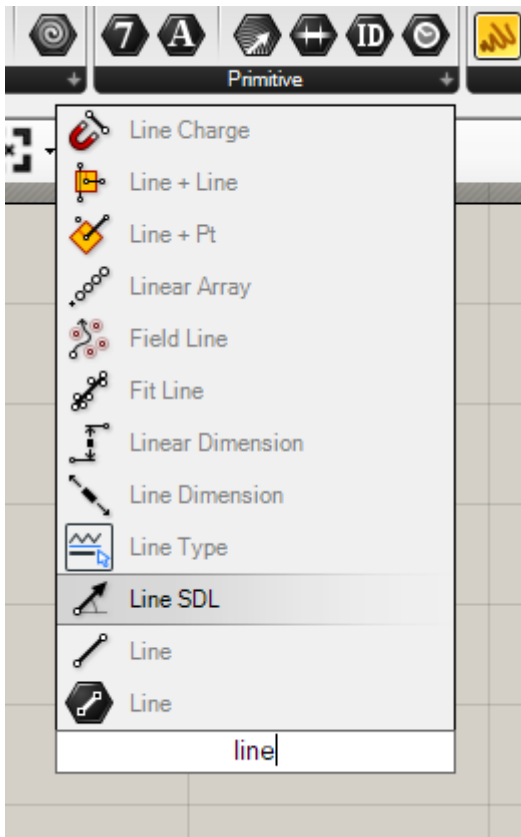
How to use Grasshopper ≤

To use *Grasshopper* you will place lots of components on your canvas and connect them. The main problem is always to find the right component. You can browse through the icon sets on top of the canvas, pick the right component and drag it onto the canvas, like this *Panel* component:

Grasshopper - unnamed

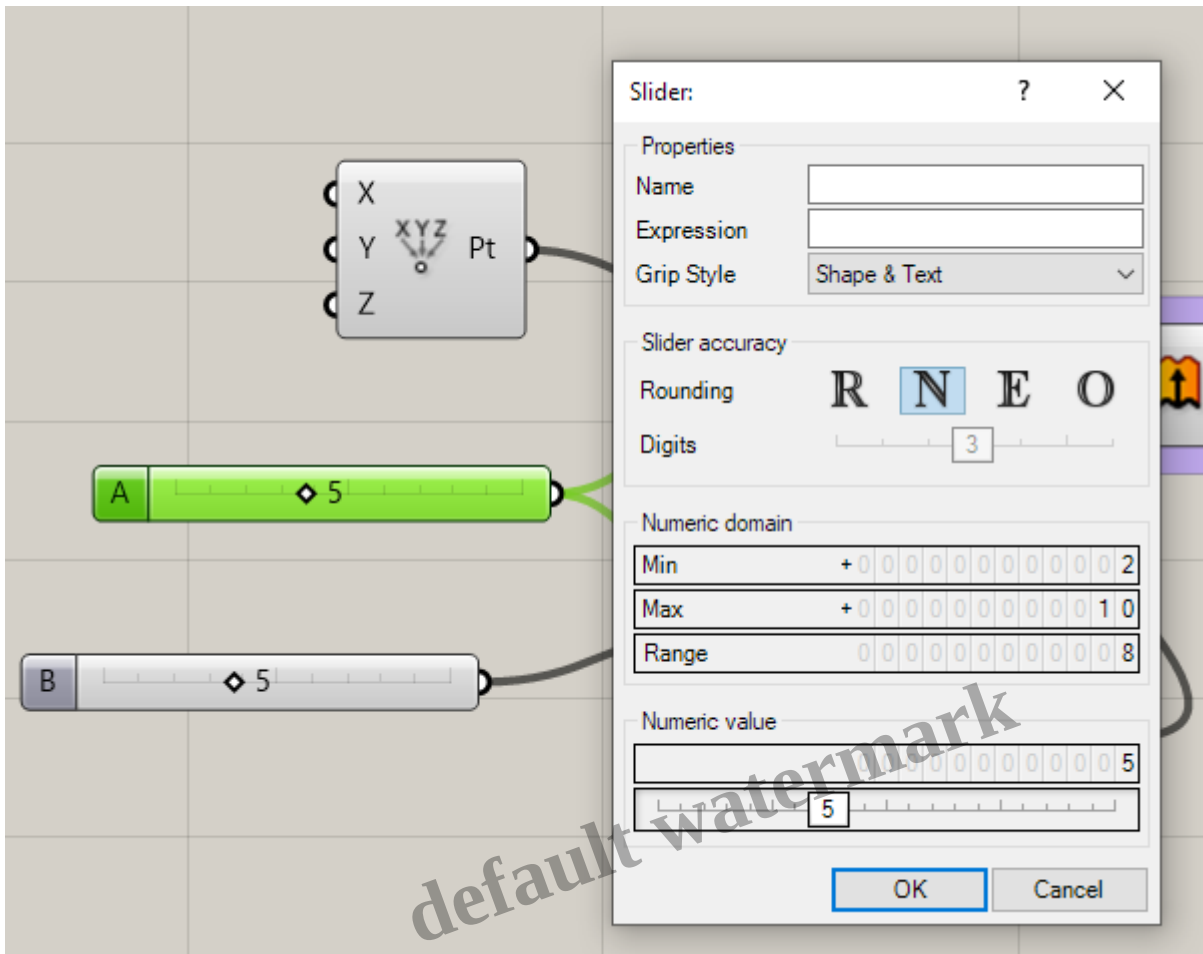


Browsing the panels on top of the canvas in order to find an appropriate component is one way. Another way is to double-click on the canvas and type some command you guess would be the right one. Mostly, *Grasshopper* will make suggestions along your typing that you can choose from:



If you get more than one suggestion (as here for *Lines*), choose the right one (or take a guess, at least) using the arrow keys and press *Enter* when done deciding. The component will appear on the canvas.

To get a *Number Slider* with numbers you wish, just double-click on the canvas and type, e.g. $1 < 10 < 20$ – a *Number Slider* will appear with integers ranging from 1 to 20 showing 10 as default. If you type a number like 0.200 the *Number Slider* will carry real numbers with 0.200 as default. You can always double-click on the left segment of a *Number Slider* to reset it's values:



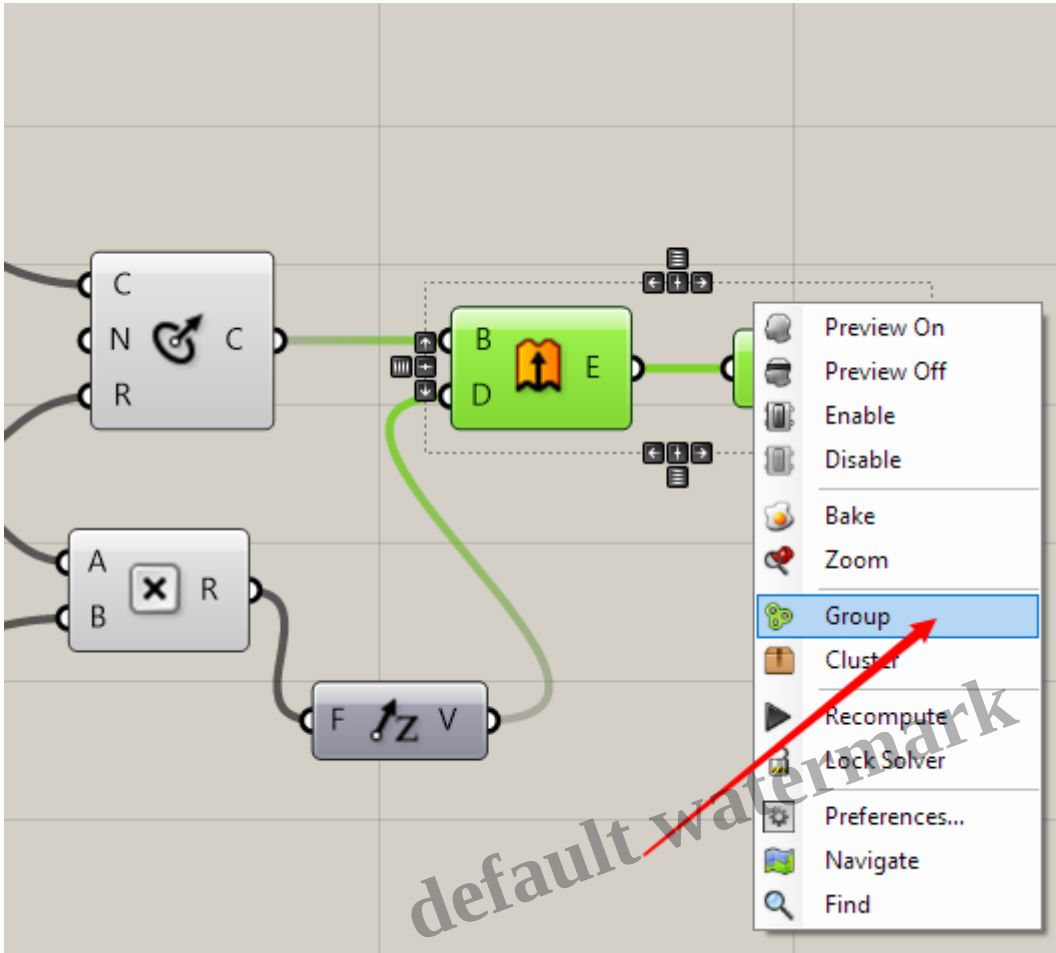
When you have developed some basic routine in *Grasshopper* you'll find this is the most fluent way to get a new component onto your canvas.

If you find a component unfit though you can delete it using one of the according keys on your keyboard.

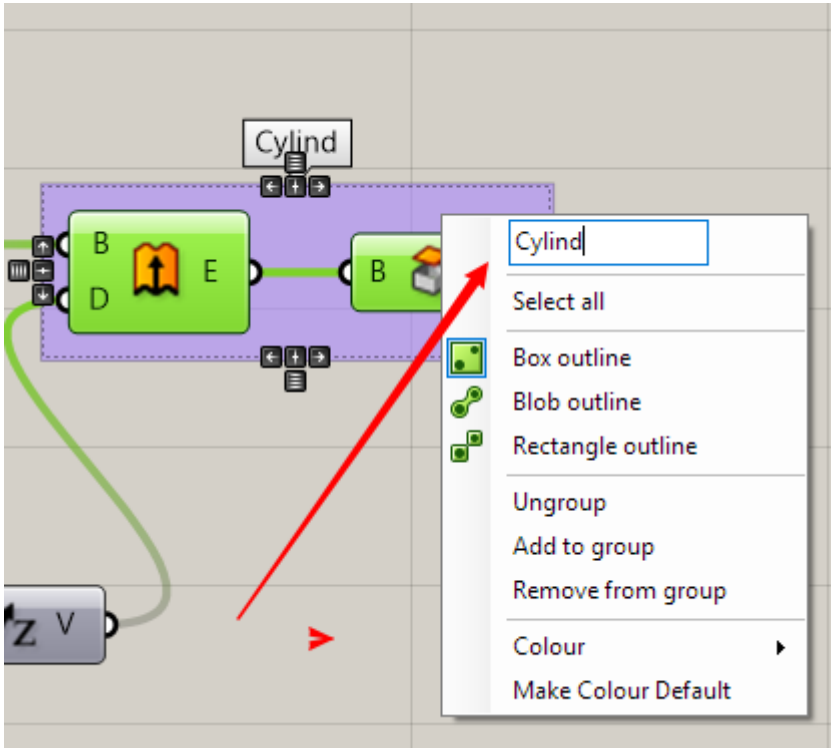
If you need a component you already have on your canvas (and within reach) you can get it via duplication. There are 2 ways of duplicating. *STRG-C + STRG-V* produces a disconnected copy. *ALT-drag* produces a connected copy. (Mind you: First drag, then press *ALT* on the way. If you press *ALT* before dragging you'll space up your canvas. This is a feature, not a bug – doing this allows you to create space for new components between existing ones. It's called the *Moses* tool.)

You can select components the way you do it in *Rhino3D*: Draw a selection rectangle from left to right and you will add only components that are completely inside the rectangle. Draw a selection from right to left and you will add all components touched by the rectangle. Of course you may also click-select objects.

You can group selected components (right-click – *Group*):



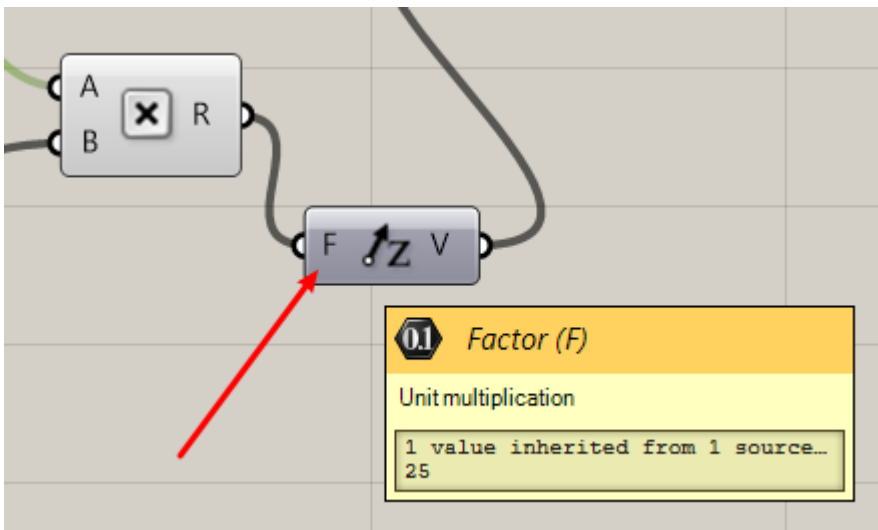
And you can name the group:



This grouping feature is a real life-saver, being the only way to not get lost in your component pasta.

Connect component outputs and inputs via mouse-dragging. You can plug wires from various outputs into one input by holding *Shift*. You can disconnect by right-clicking an input and choose *Disconnect...* or by pressing *CTRL (STRG)* and drag the wire from the input back to the output.

Hovering your mouse cursor over anything will produce a display with more or less meaningful information:



To find out which menu a canvas component comes from you just press *CTRL (STRG)-ALT* and click on the component. *Grasshopper* will indicate (showing creepy hand-drawn arrows) where this component comes from.

Want to find a certain component in your crowded definition? Just right-click on the canvas and choose *Find* (or press *F3*) – type the first letters of your component and *Grasshopper* will find and mark it.

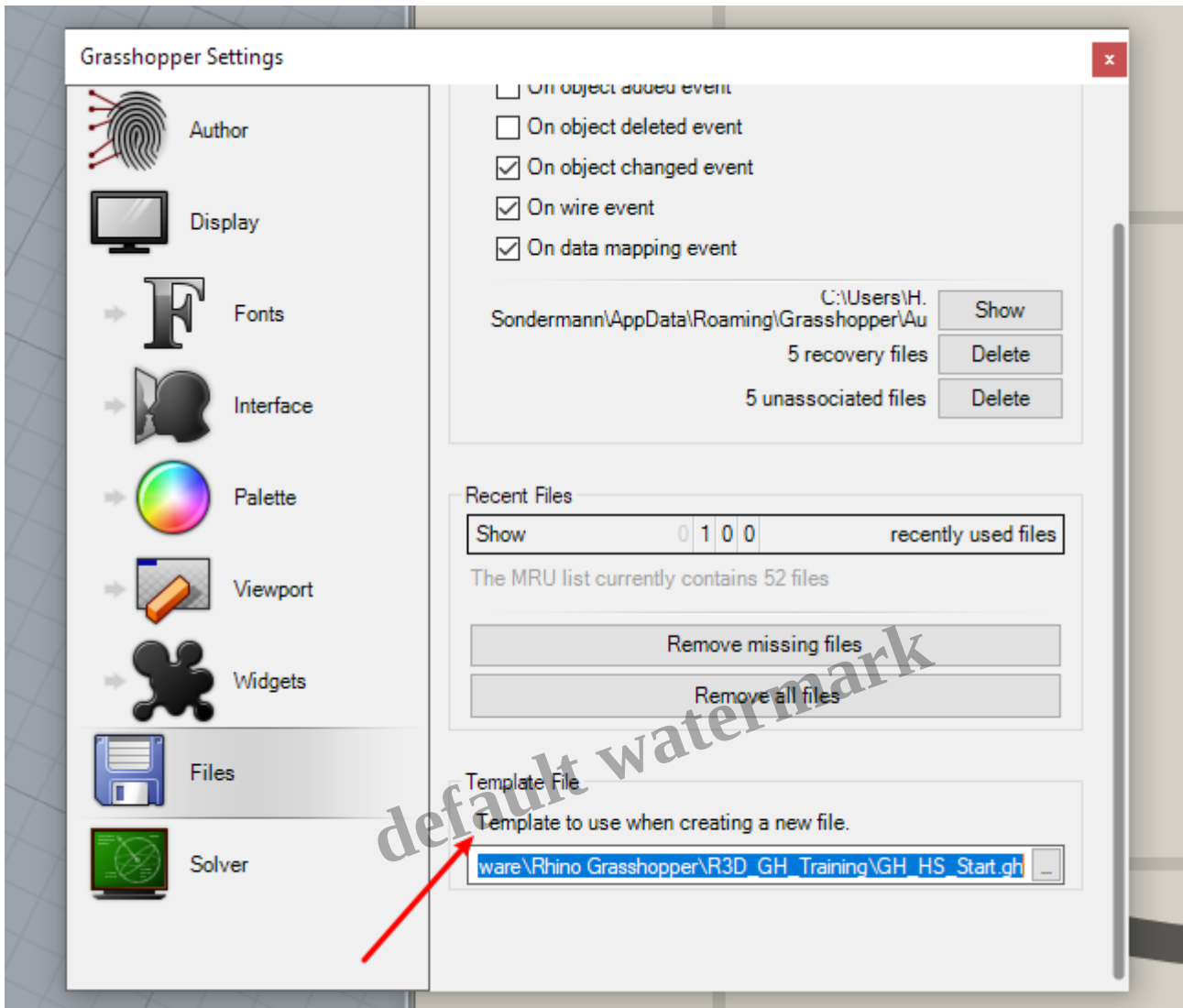
Last not least: If you like to keep your component array tidy and aligned you may select a subset of them and use the align and distribute buttons that appear. I do this all the time, especially before grouping the whole bunch.

You want to see more information? Check my article on [Grasshopper learning resources](#).

How to save Grasshopper Files ≤

That's easy, just choose the *Save* command from the *File* menu.

If you want to configure a *Grasshopper* file the way you like it (with your own preview colors for example) and use it whenever you start a new *Grasshopper* project you'll just have to create a template file. First, save your configured file as a normal *Grasshopper* file but choose a folder that's suitable for a template file (i.e., not a normal project folder). Then, under *File – Preferences – Files* you find a slot where you can define a file to be opened as a template. Just search for your recently saved *Grasshopper* file, and you're done:



You want to see more information? Check my article on [Grasshopper learning resources](#).

Roundup ≤

Although brief this should be enough to get you started with this fascinating piece of software. Just to start training you may have a look at [my first Grasshopper project tutorial](#) here. Have fun!

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Category

1. Rhino/Grasshopper

Tags

1. BIM Model
2. Parametric Modeling

Date Created

October 2018
Author
hsondermanncom

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