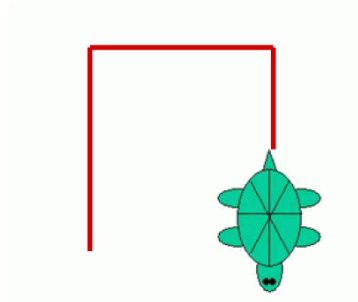


Practical: L-systems modelling in GroIMP

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WUR – SDAU Course
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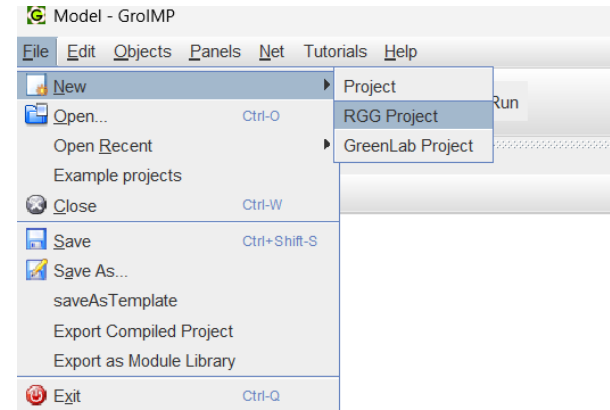
F(1) RU(90) F(1) RU(90) F(0.5)



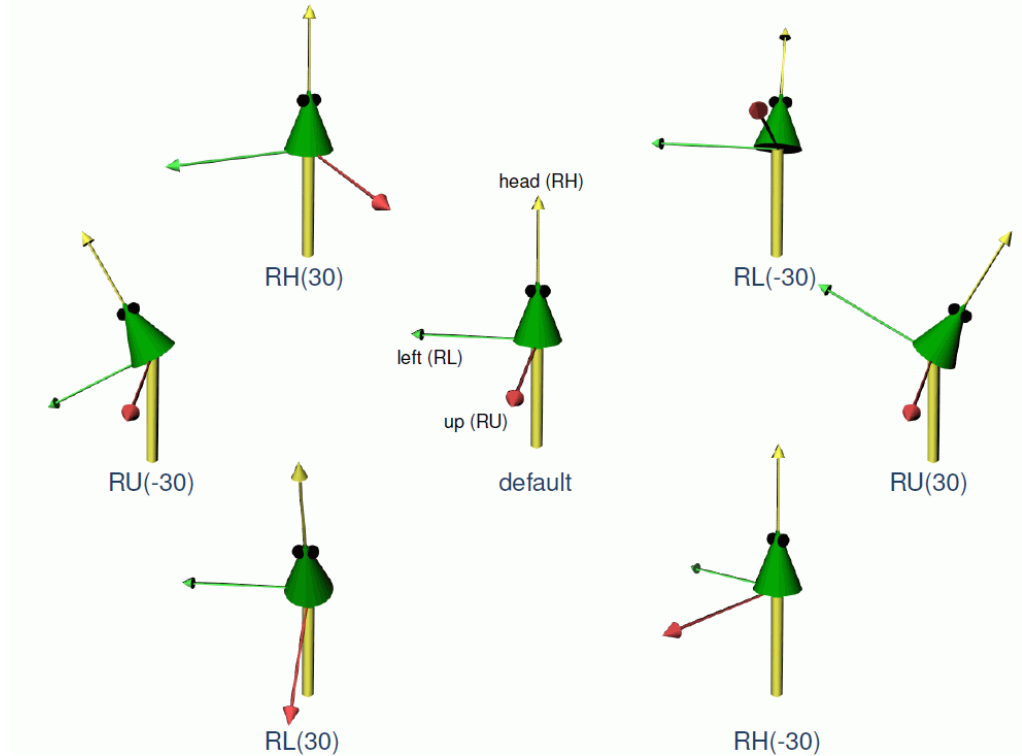
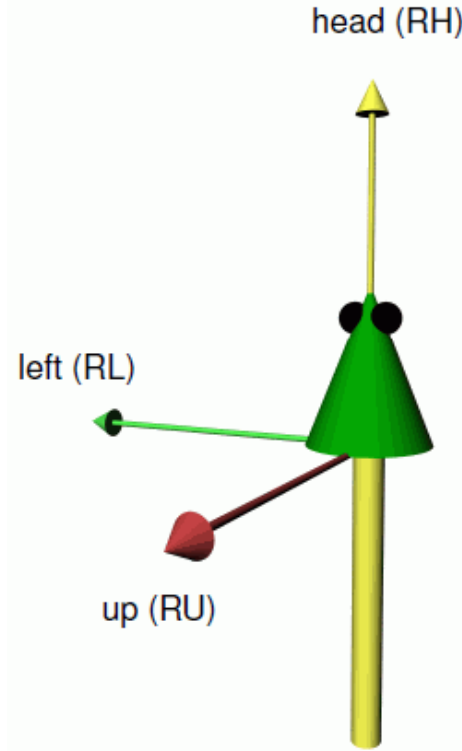
Outline

We will learn

- How to use turtle commands to create structures and plants
- How to let them grow with L-systems
- We will start with an empty **RGG Project**

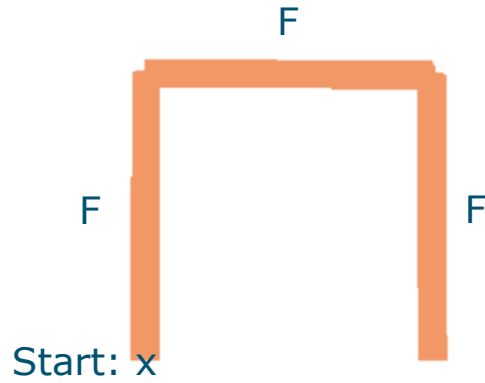


Turtle commands for 3D rotations

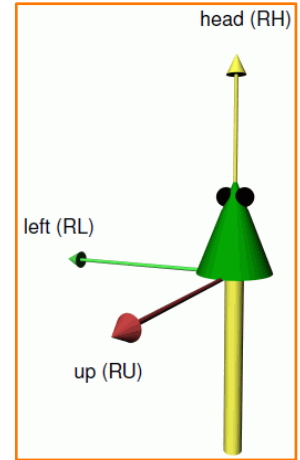


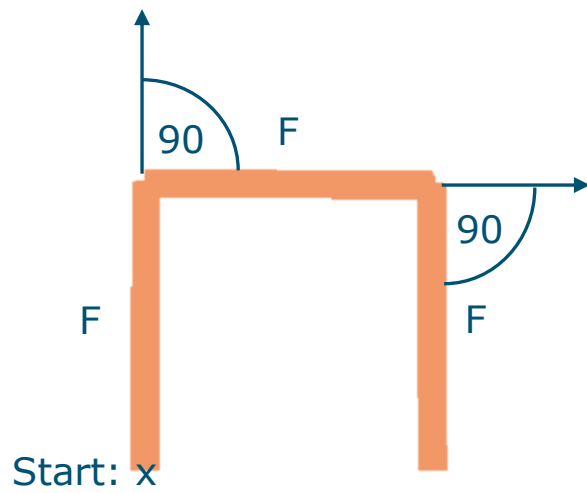
Basic turtle commands:

https://wiki.grogra.de/doku.php?id=groimp-platform:turtle_commands



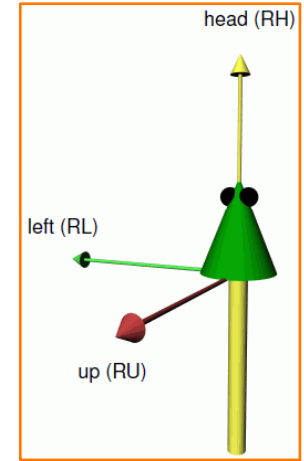
```
protected void init ()  
[  
    Axiom ==> F(1) RU(90) F(1) RU(90) F(1);  
]
```

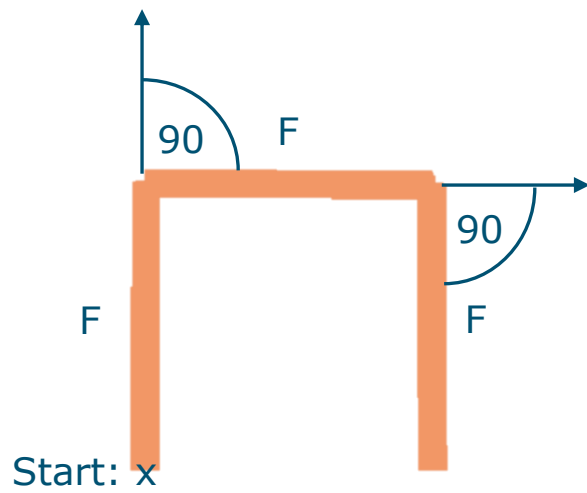




Turtle commands are in local coordinates!

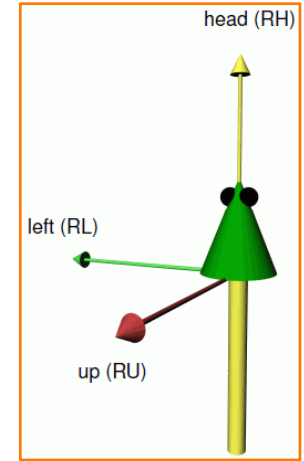
```
protected void init ()
[
    Axiom ==> F(1) RU(90) F(1) RU(90) F(1);
]
```



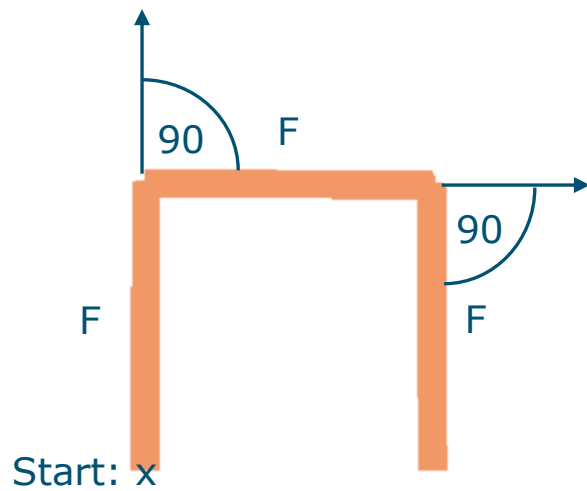


Turtle commands are in local coordinates!

```
protected void init ()
[
    Axiom ==> F(1) RU(90) F(1) RU(90) F(1);
]
```

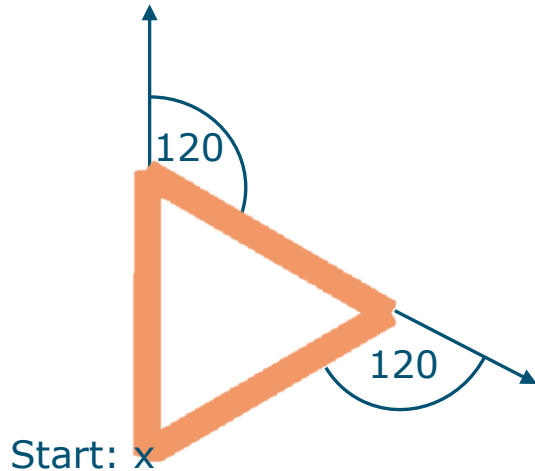
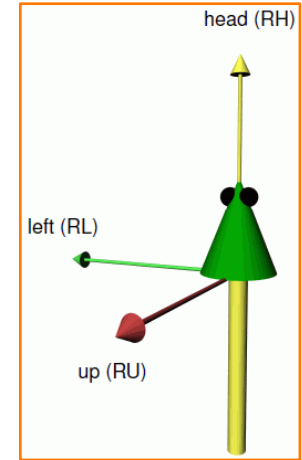


code?

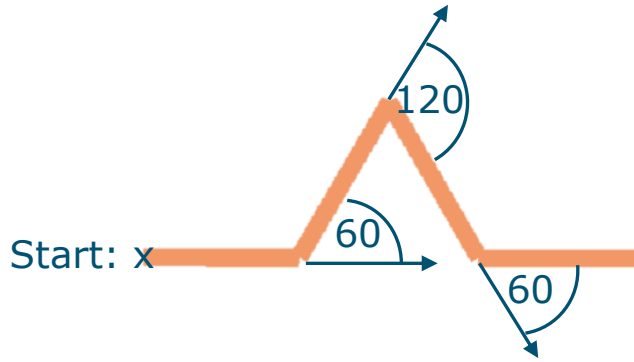


Turtle commands are in local coordinates!

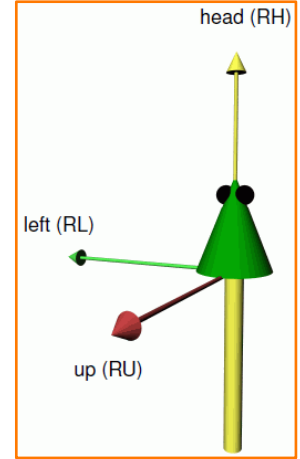
```
protected void init ()
[
    Axiom ==> F(1) RU(90) F(1) RU(90) F(1);
]
```

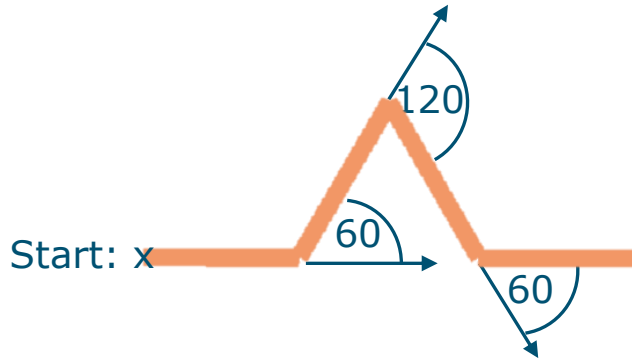


```
protected void init ()
[
    Axiom ==> F(1) RU(120) F(1) RU(120) F(1);
]
```

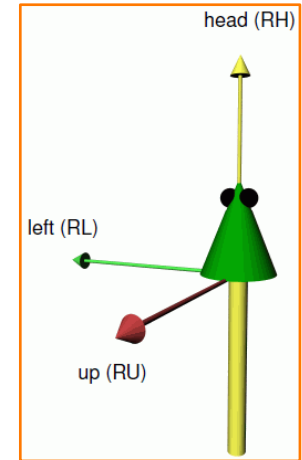


code?



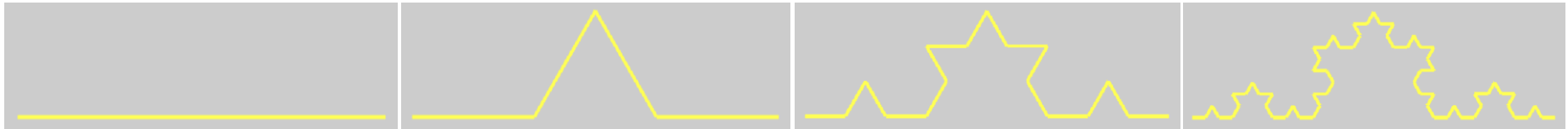


```
protected void init ()
[
    Axiom ==> RU(90) F(1) RU(-60) F(1) RU(120) F(1) RU(-60) F(1);
]
```



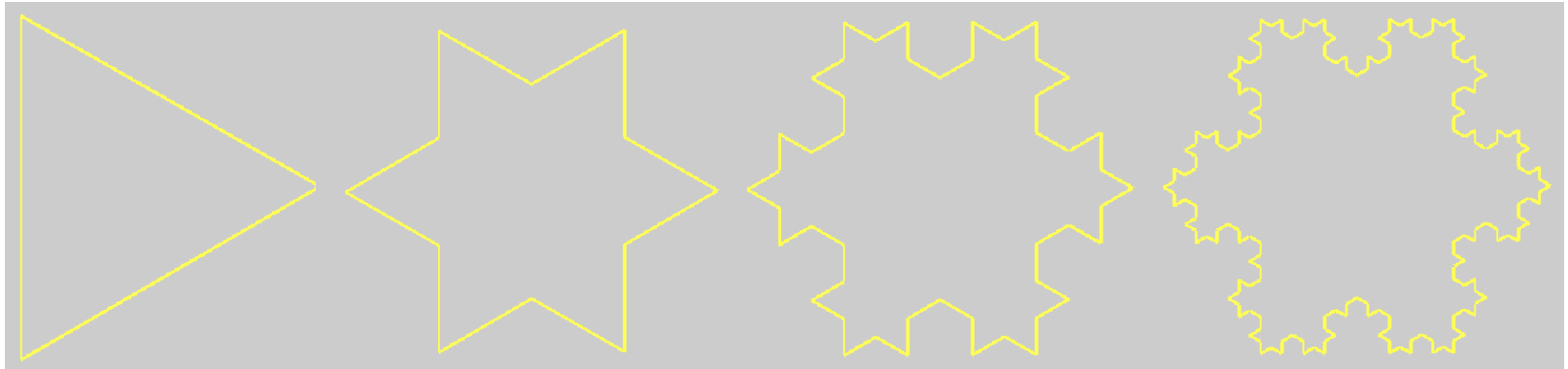
Koch curve

```
protected void init ()  
[  
    Axiom ==> RU(90) F(10);  
]  
  
public void run ()  
[  
    F(x) ==> F(x/3) RU(-60) F(x/3) RU(120) F(x/3) RU(-60) F(x/3);  
]
```



Closed Koch curve

```
protected void init ()  
[  
    Axiom ==> F(10) RU(120) F(10) RU(120) F(10);  
]  
  
public void run ()  
[  
    F(x) ==> F(x/3) RU(-60) F(x/3) RU(120) F(x/3) RU(-60) F(x/3);  
]
```

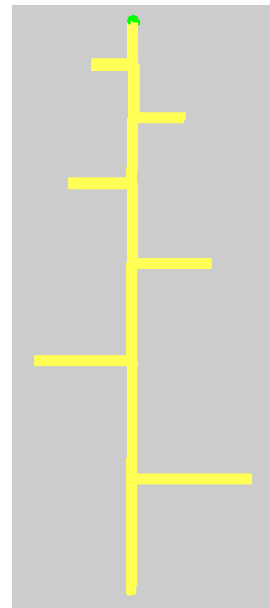


Branching structure

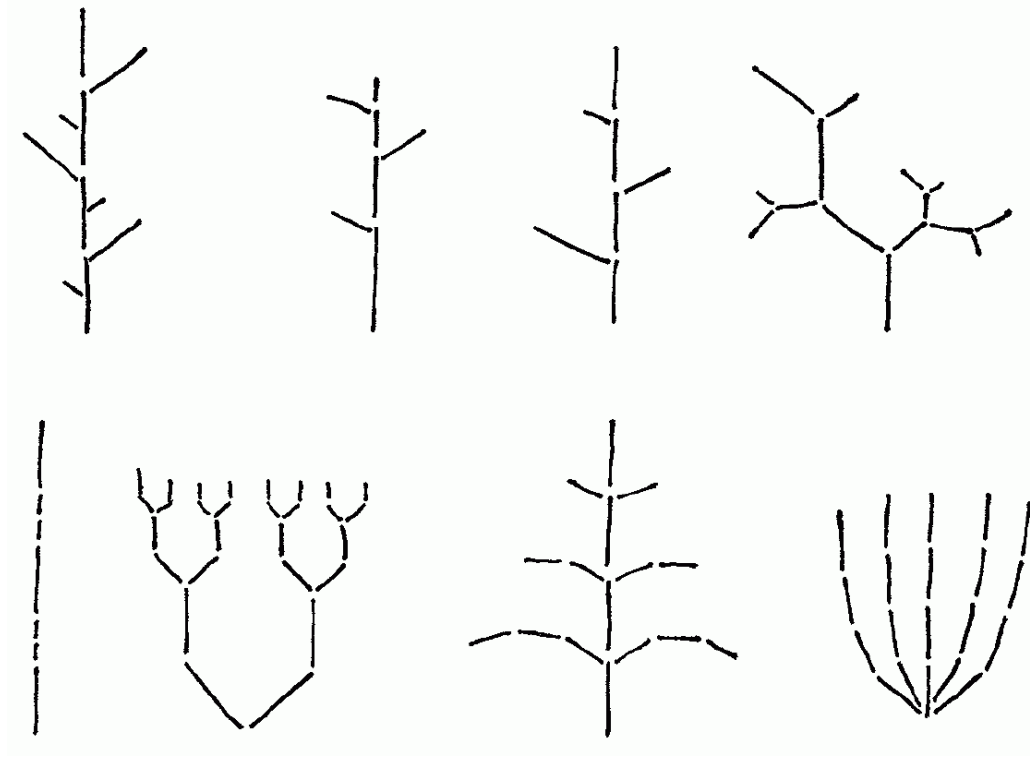
```
module A(float len) extends Sphere(0.05)
{
    {setShader(GREEN);}
}

protected void init ()
[
    Axiom ==> F(1) A(1);
]

public void run ()
[
    A(x) ==> [RU(90) F(x)] F(x) RH(180) A(x*0.8);
]
```

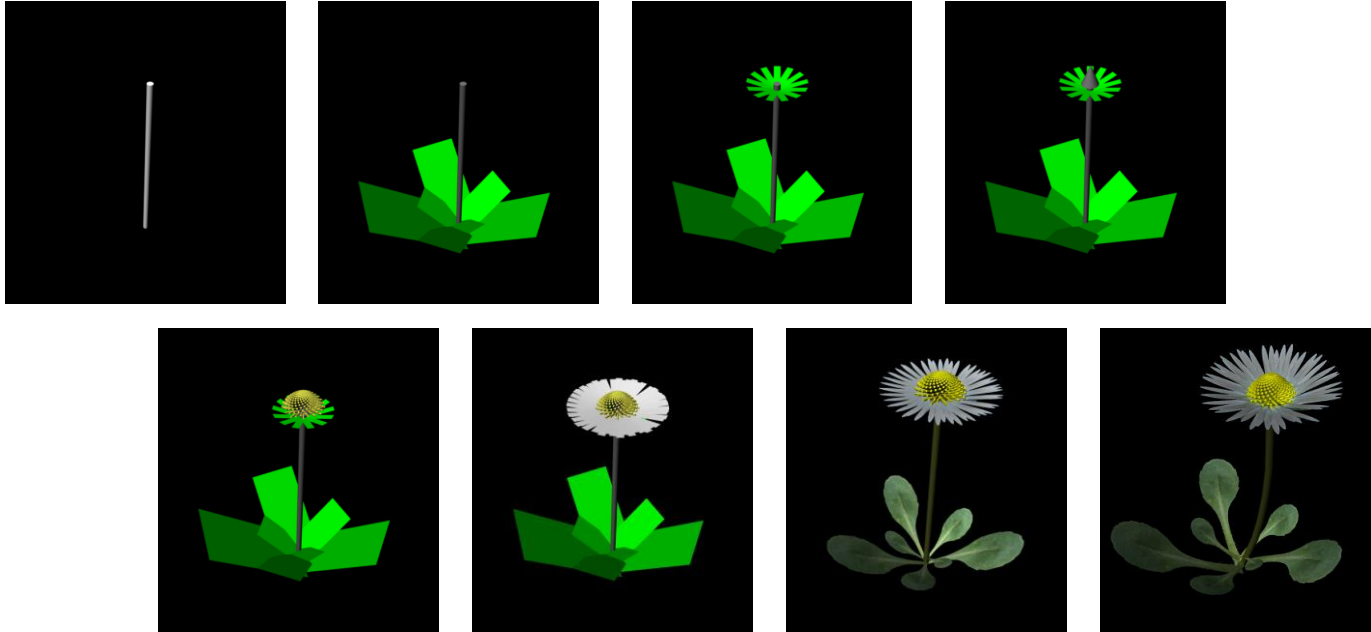


Create simple branching structures with L-systems



Model example: Daisy

- Plant architecture reconstruction



Instructions for texture mapping

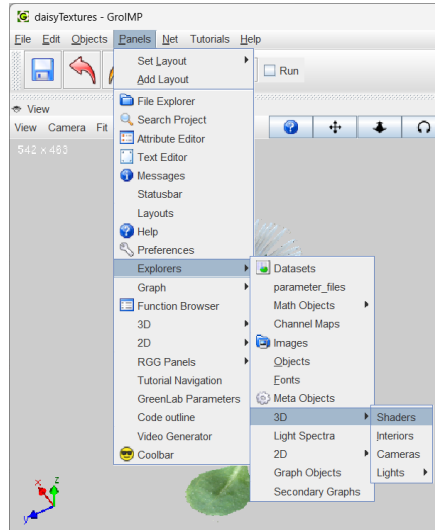
Optional

Menu: Panels > Explorers > 3D > Shaders

Shaders: Object > New > Lambert (2 clicks or F2 to rename)

Attribute Editor: Diffuse colour > Surface Maps > Image;

Image > From File

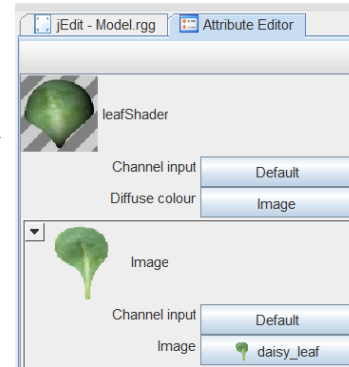
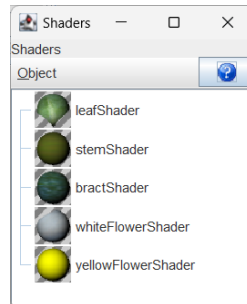


gimp.org

Photographs with removed background
(with alpha channel, png file format)



Daisy model:
File > Example
projects > FSPM >
daisyTextures



Create a reference in XL:

```
const ShaderRef leafSh =  
    shader("leafShader");
```

Modifications to the daisy model

- Make your own changes to the daisy model

Daisy model:

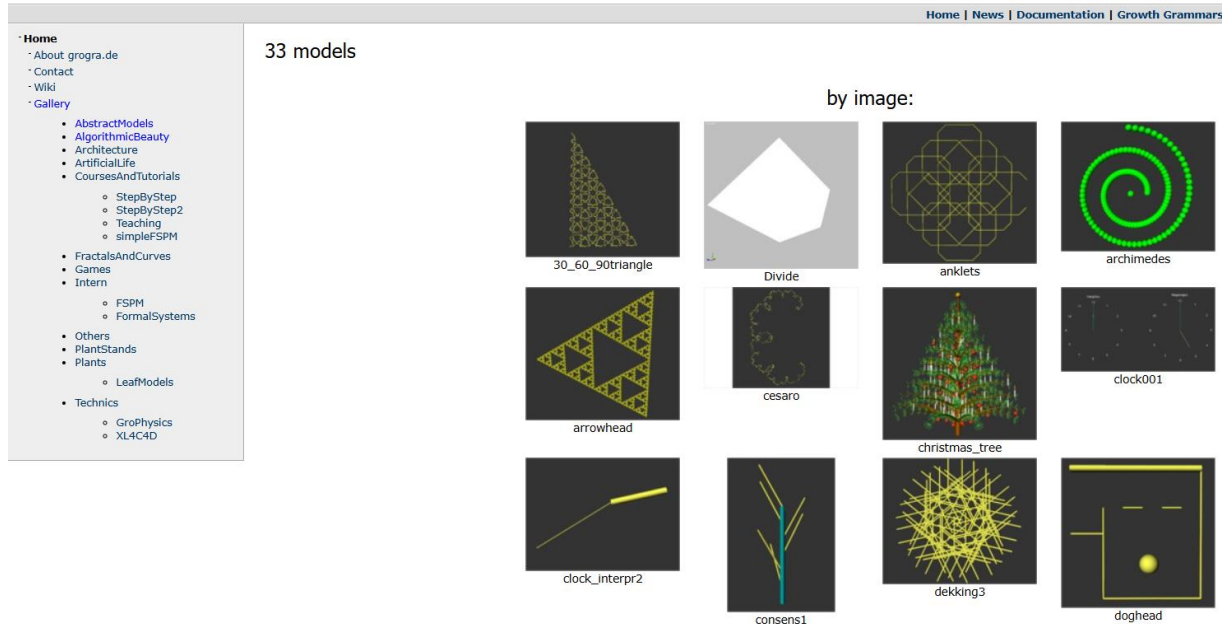
File > Example projects
> FSPM > daisyTextures



Learn from existing models

- Old example gallery: [Link](#)

grogra.de



Inside GroIMP, go to:
File > Example projects

