

CMSC498W

Lecture 5

2016-02-11

Generating virtual worlds – I
Procedural modeling

Derek Juba
Amitabh Varshney

Noise Functions

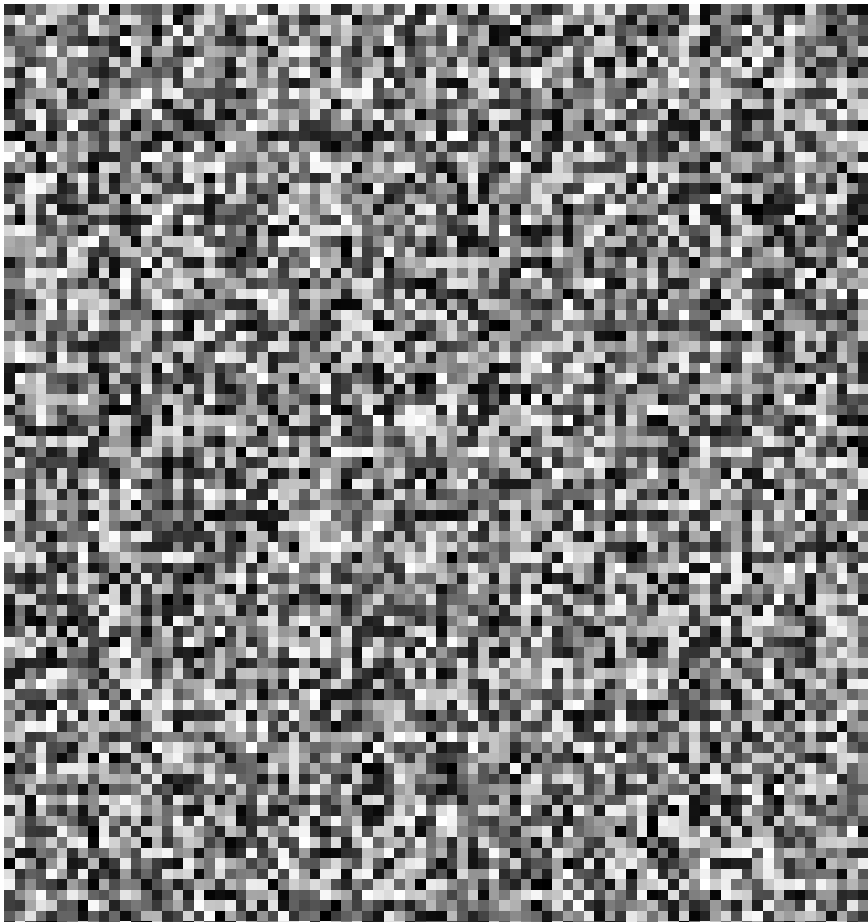


Image from
https://en.wikipedia.org/wiki/White_noise

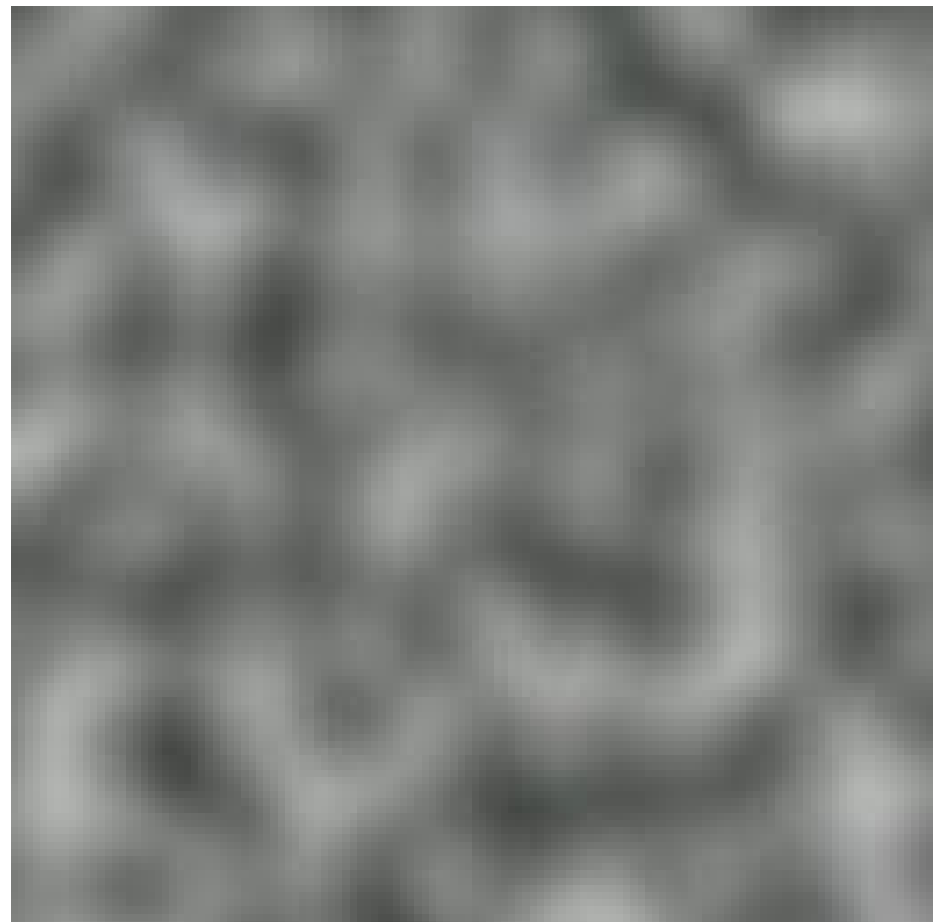


Image from
https://en.wikipedia.org/wiki/Perlin_noise

Fractal Noise

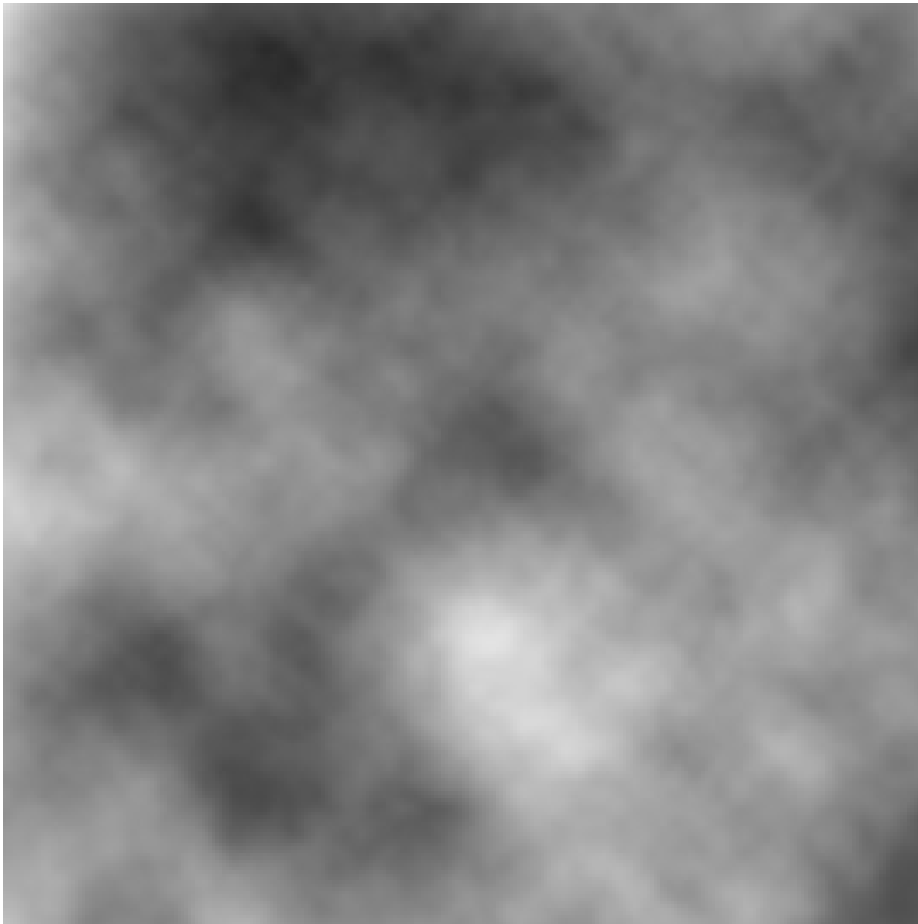


Image from
https://en.wikipedia.org/wiki/Value_noise

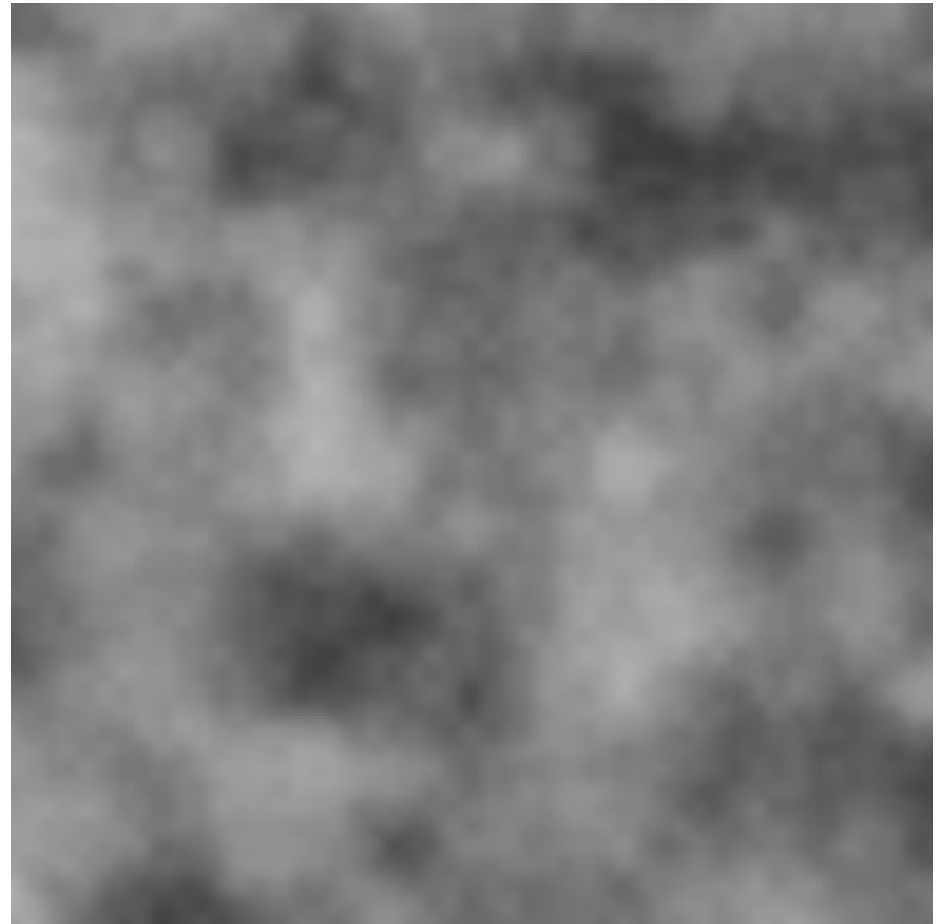
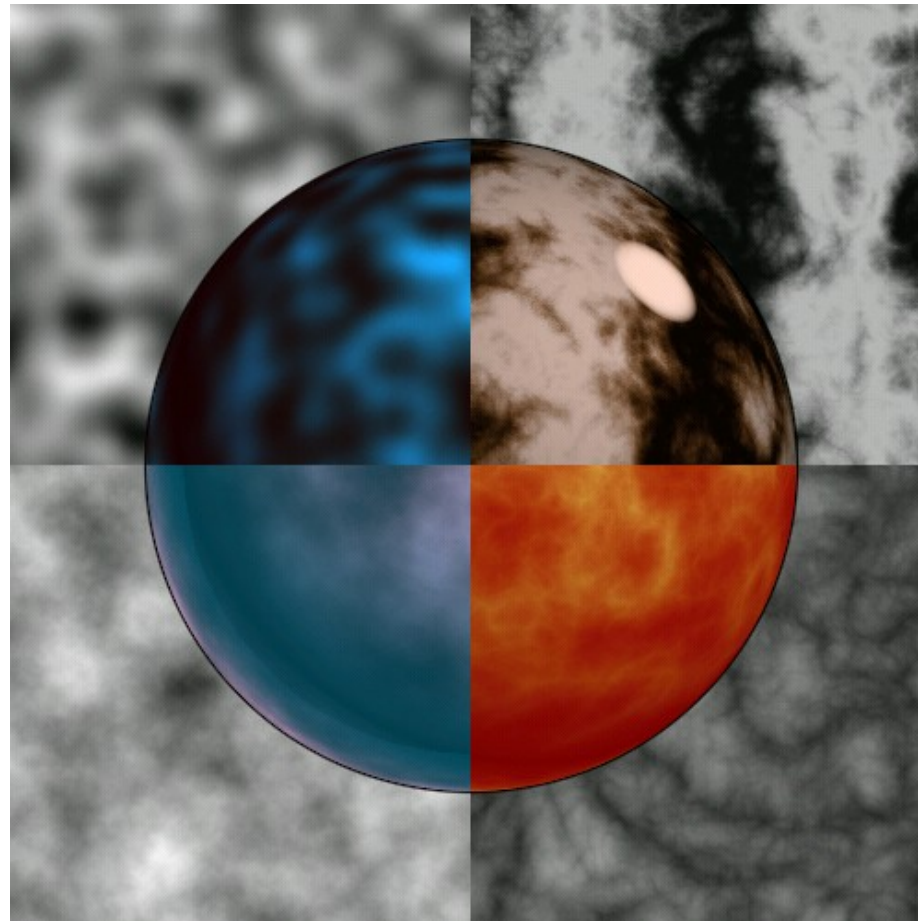


Image from
https://en.wikipedia.org/wiki/Perlin_noise

Variations on Noise

Noise



$\sin(x + \text{Fractal} |\text{Noise}|)$

Fractal Noise

Fractal $|\text{Noise}|$

Image from
<http://www.noisemachine.com/talk1/19.html>

2D Terrain

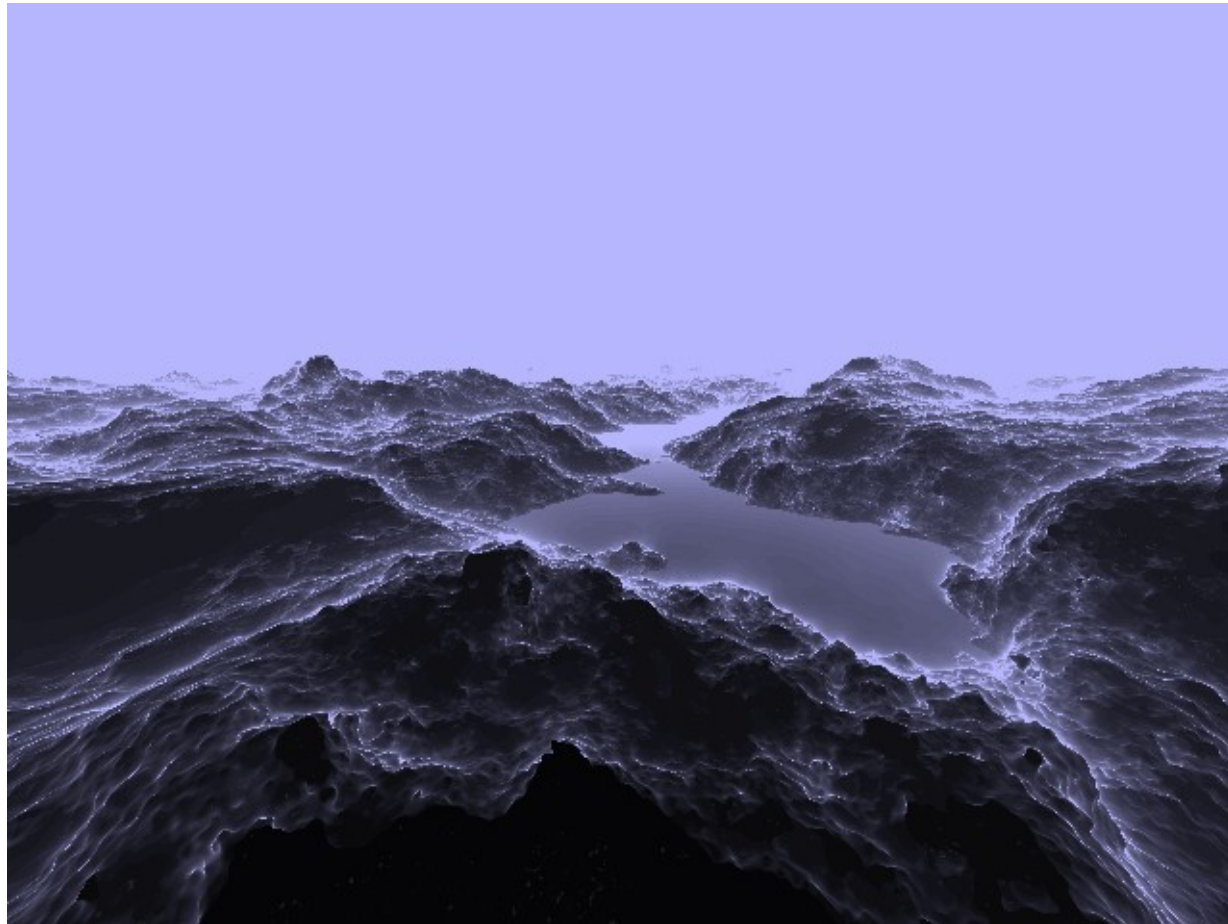


Image from

<https://digitalerr0r.wordpress.com/2011/05/25/procedural-landscapes-using-perlin-noise/>

Minecraft Beach Biome

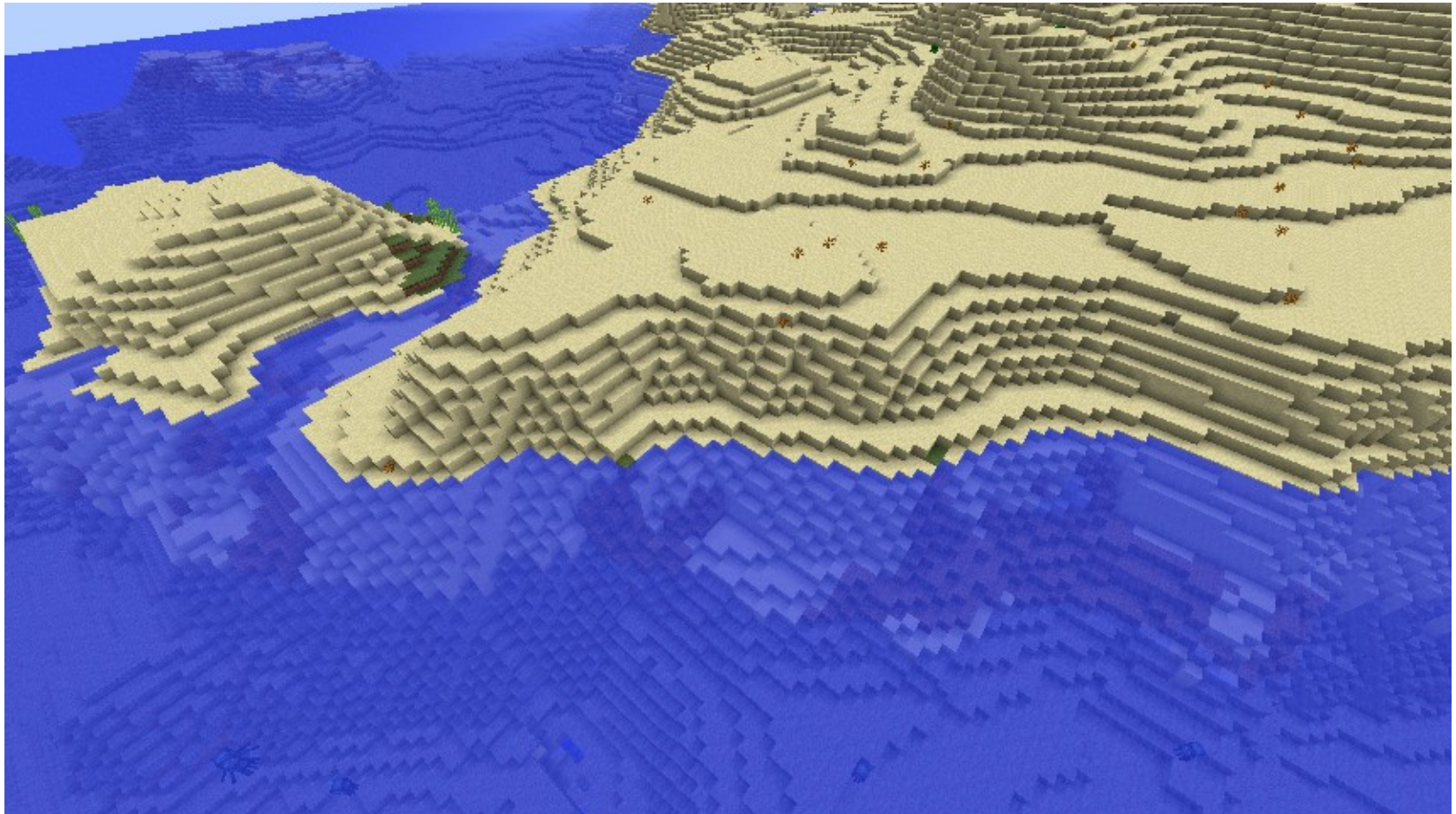


Image from
<http://minecraft.gamepedia.com/Biome>

Minecraft Forest Biome



Image from
<http://minecraft.gamepedia.com/Biome>

3D Texture



Image from
<http://mrl.nyu.edu/~perlin/experiments/hypertexture/vase.html>

L-System Trees



Iteration 0

- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Iteration 1

Y

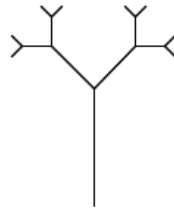
- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Iteration 2



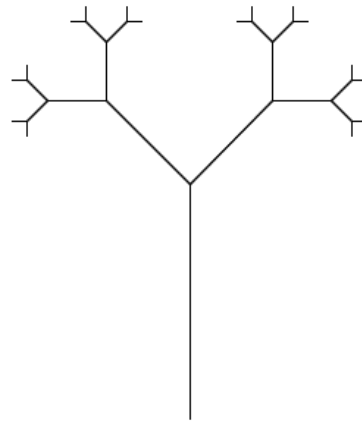
- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Iteration 3



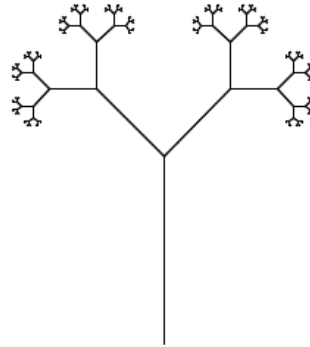
- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Iteration 4



- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Iteration 7



- Leaf \rightarrow Stem + 2 Leaf
- Stem \rightarrow 2 Stem

Procedurally generating planets in Spore

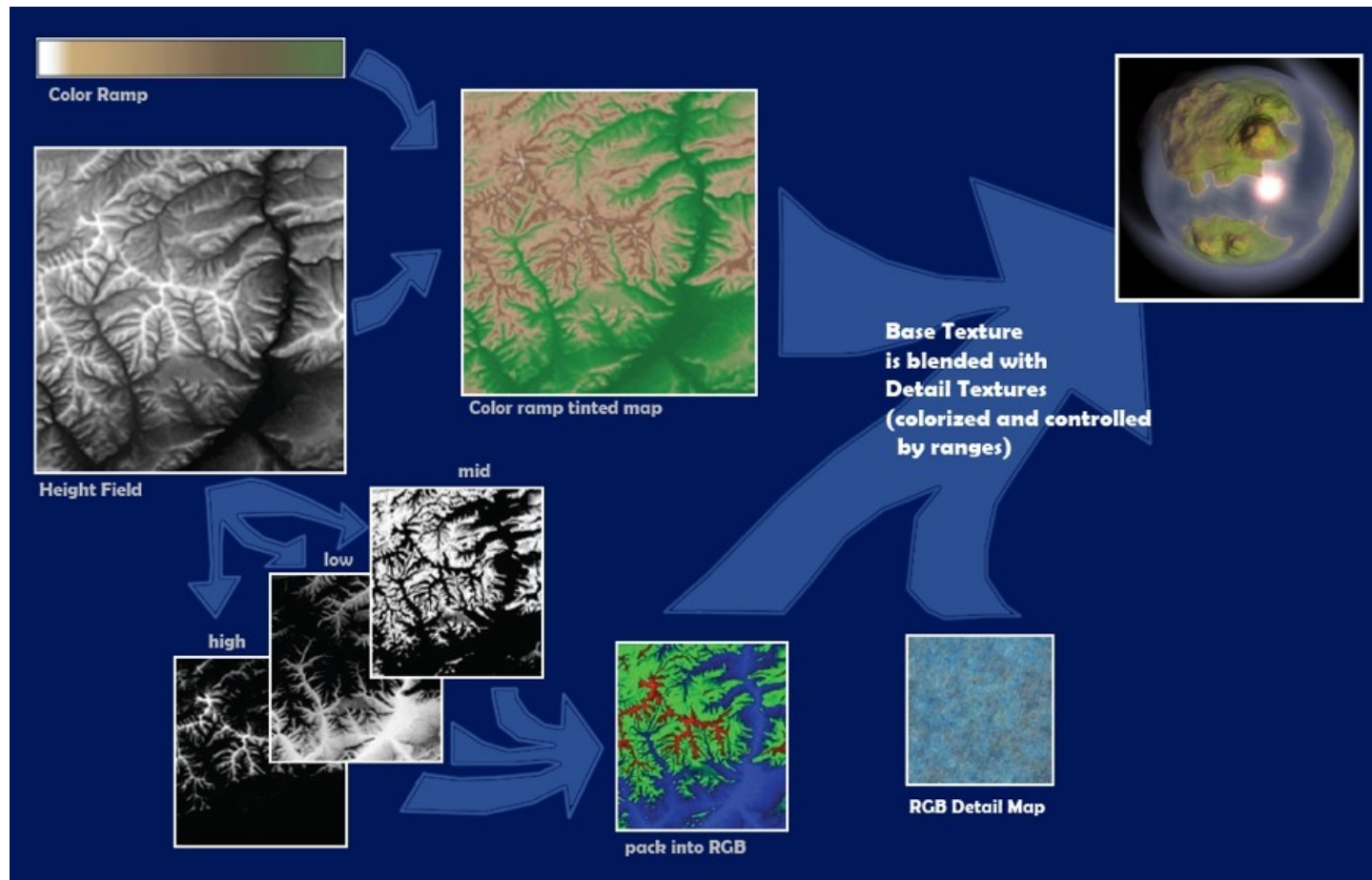


Image from
<http://www.andrewwillmott.com/s2007>

Procedurally-textured creature from Spore



Image from
<http://www.andrewwillmott.com/s2007>

Pure Data script used for music in Spore

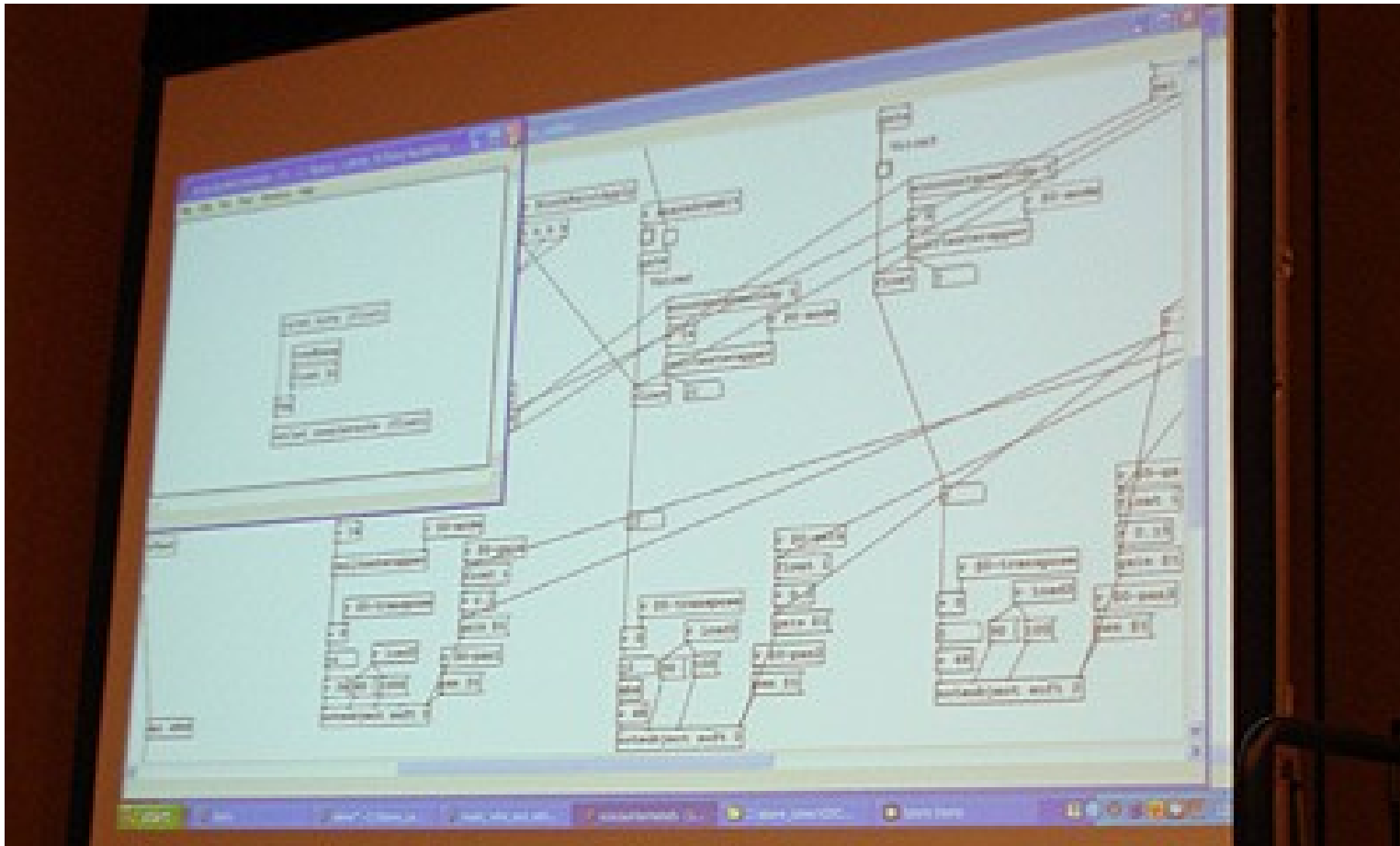


Image from
<http://uk.pc.gamespy.com/pc/spore/853810p2.html>