
Procedural Rocks Generation

Asteroid project

Abdullah Al Noman

Asteroid Mining



Rocks in Asteroid Project

- To provide cover-spots
 - As barriers
 - As potential challenges
 - As enemies
 - To enhance aesthetics
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How can we generate rocks for our project?

Rock generation approaches

- Approach for rock piles
 - Single rock Approach
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Rock piles

- Composed of rocks
- Mixture of aperiodic tiling and erosion
- contact between neighboring rocks



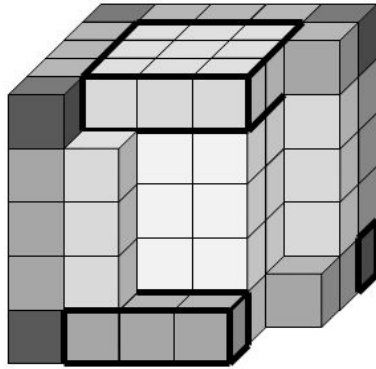
Method

Corner cube
generation

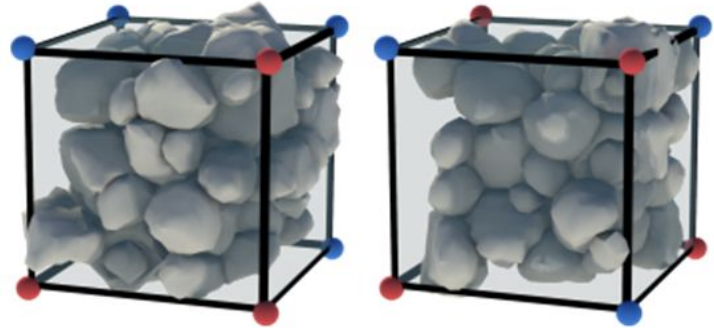
Rock volume
generation

Erosion
step

Rock mesh
creation

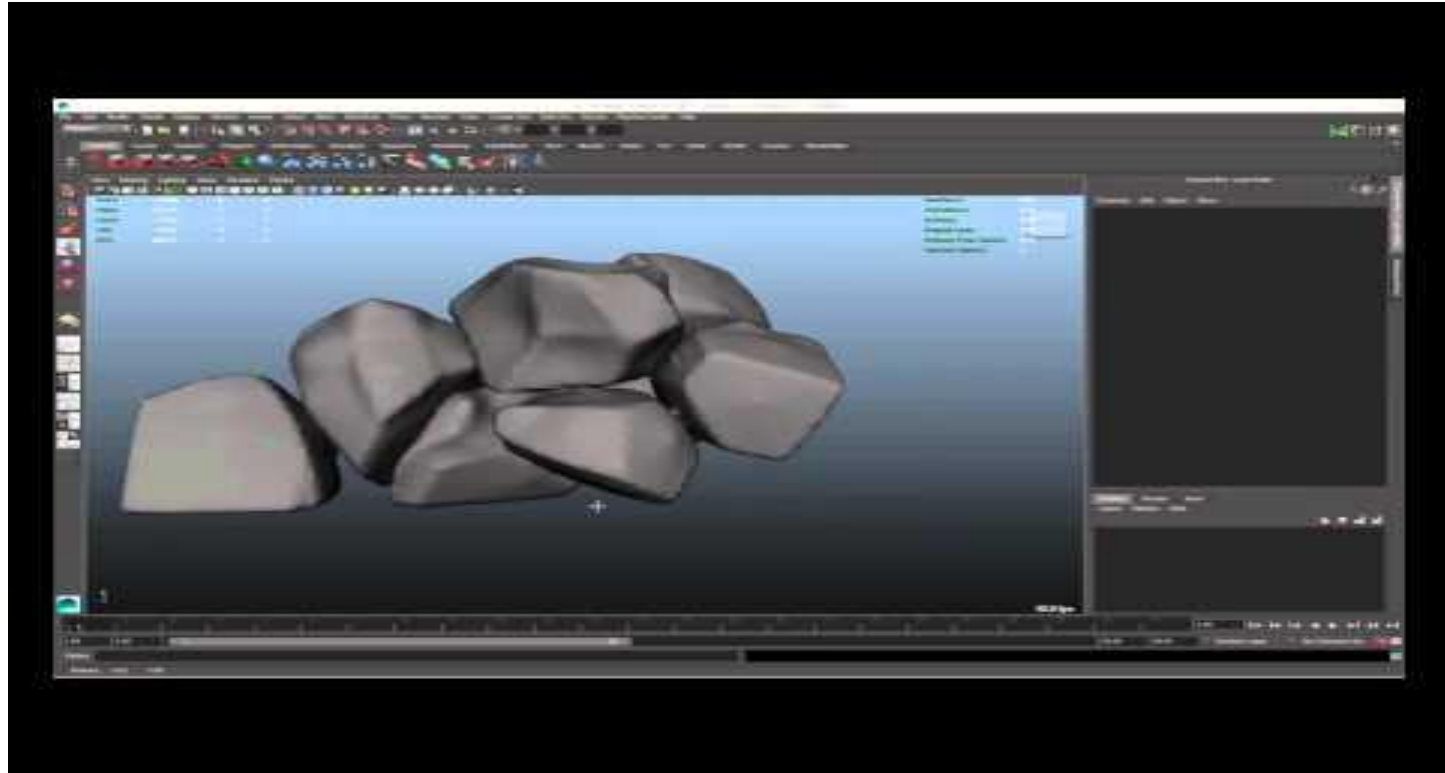


Corner cube grid



Set of 256 rock tiles

Rock piles



Single rock generator

- SpeedRock
 - independent tool
 - support mainstream modelling program
 - control over the rock shape
 - generate diverse and believable(!) rocks
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Speed Rock

Methods

- 3D L-systems
 - rock implosion
 - rock evolution
 - rock erosion(optional)
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3D L-systems

Aristid Lindenmayer, 1968

axiom:

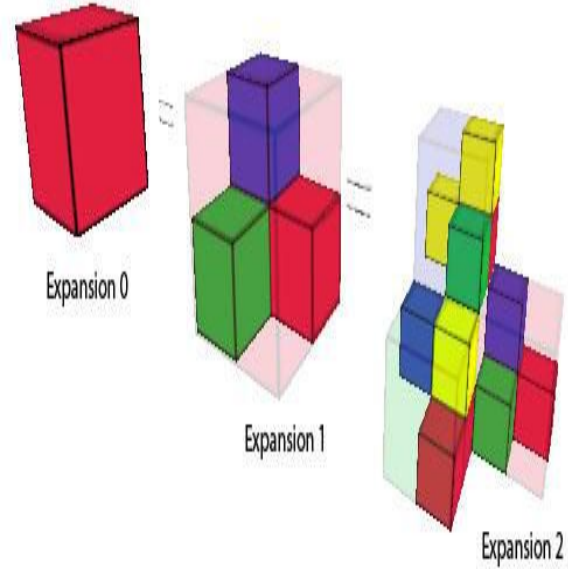
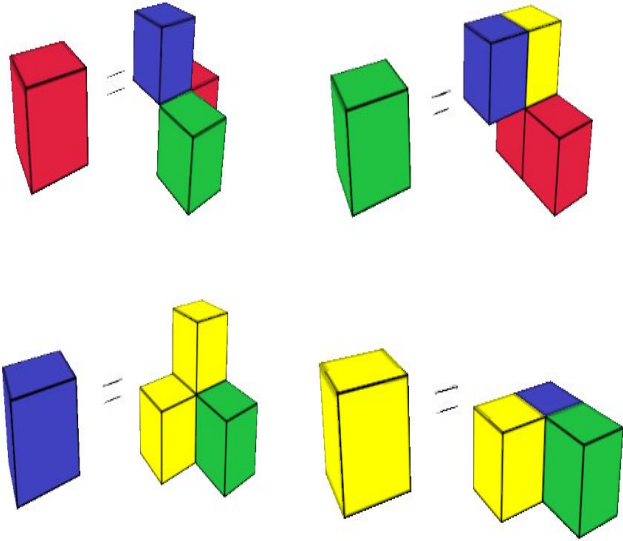
string of symbols

production rules:

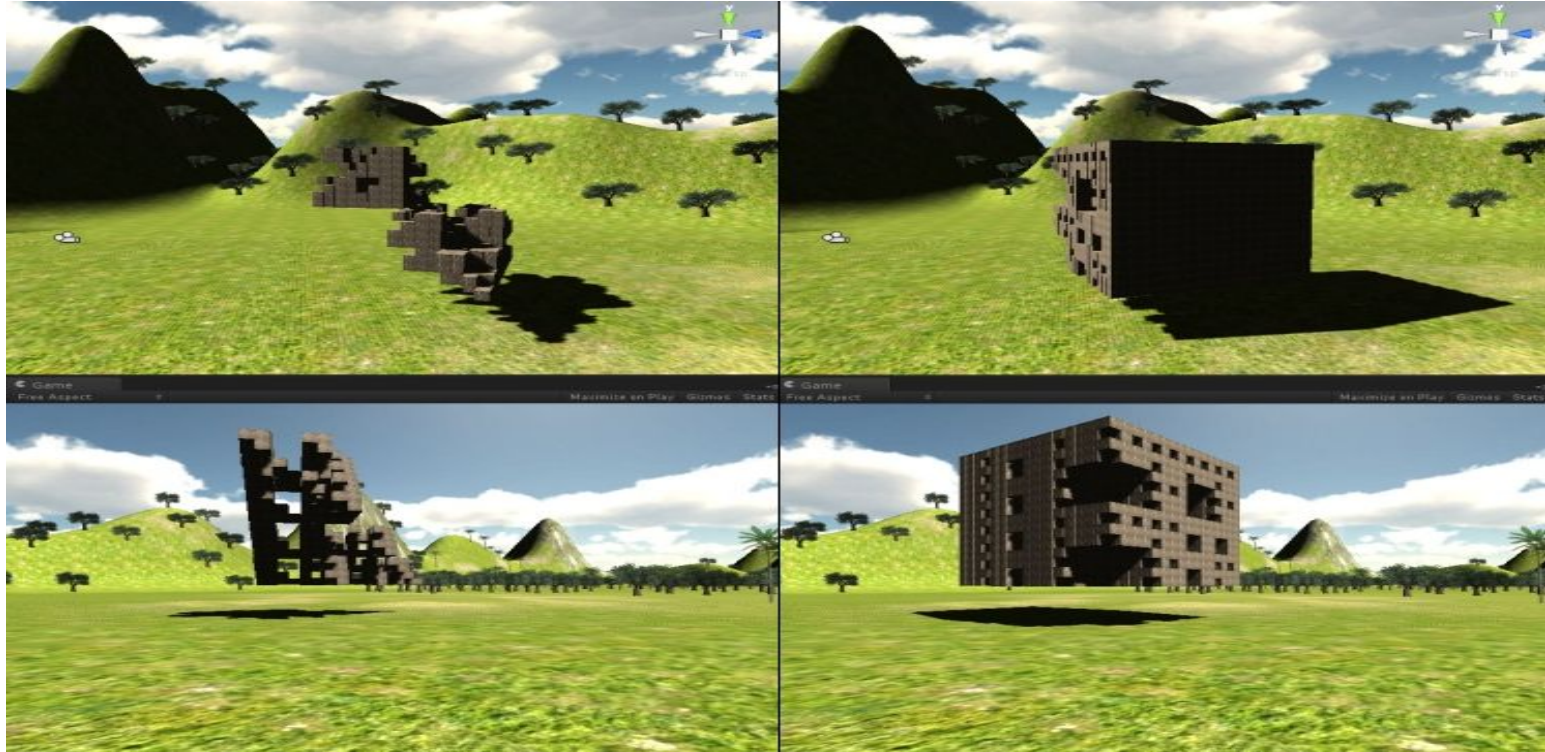
used to rewrite the axiom

Recursive L-System	
axiom:	peg
rules:	$e = eie$
generation 1:	peieg
generation 2:	peieieieg
generation 3:	peieieieieieieieg

3D L-systems

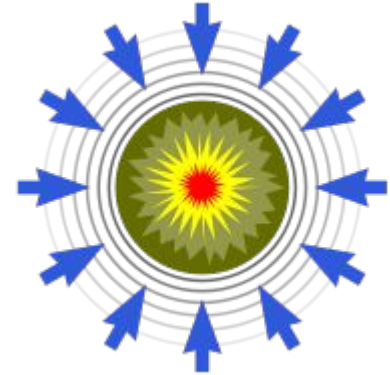


3D L-systems

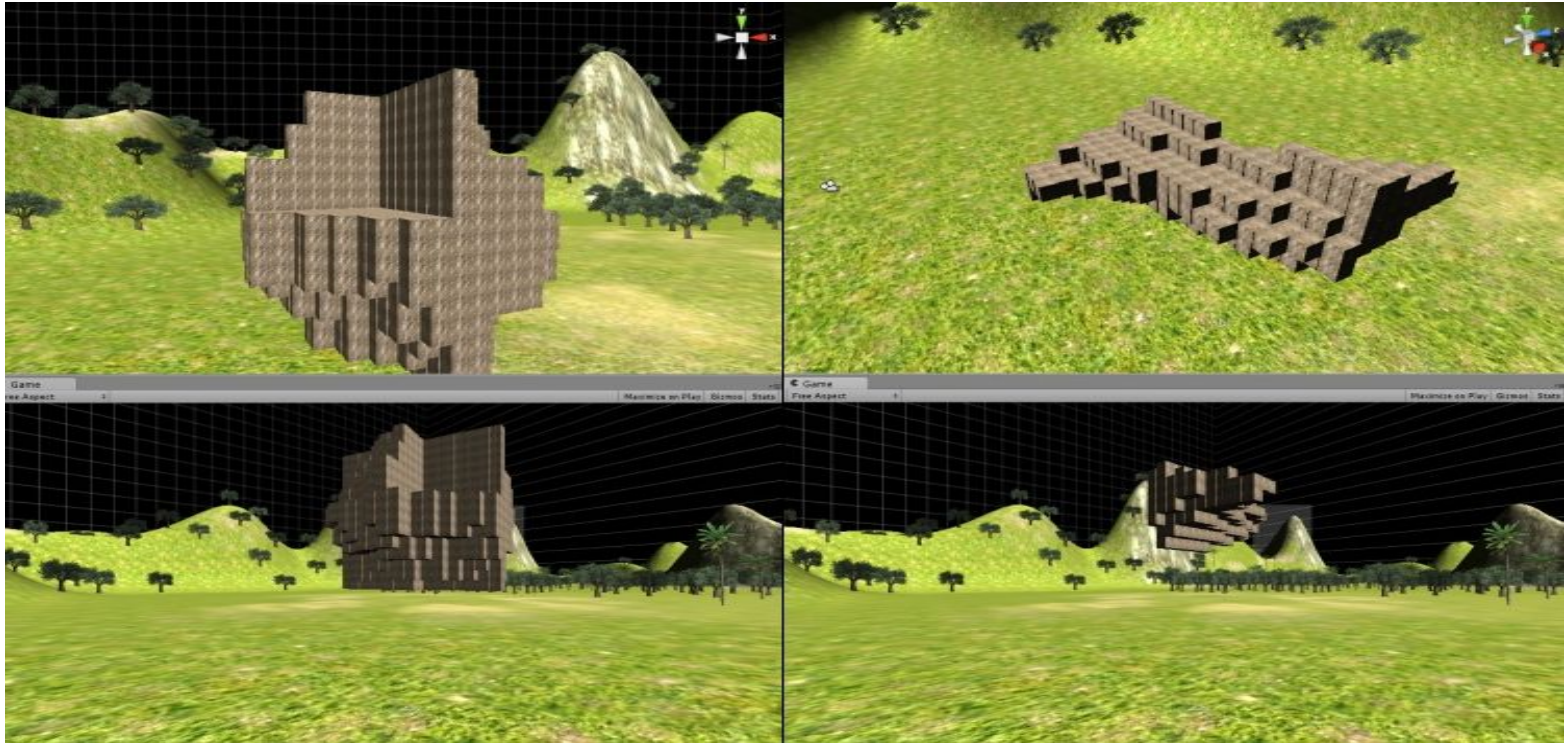


Rock implosion

- destroyed by collapsing or being squeezed in on themselves
- opposite of explosion



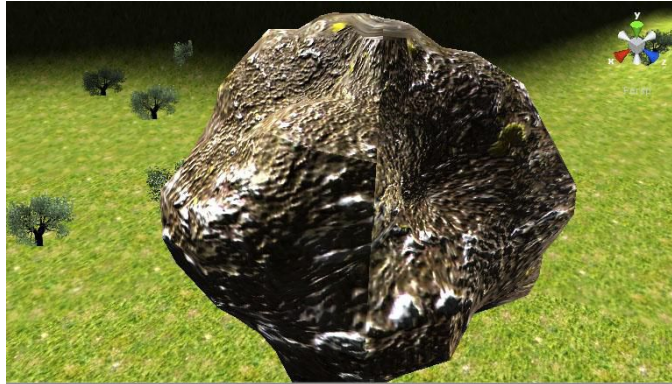
Rock implosion



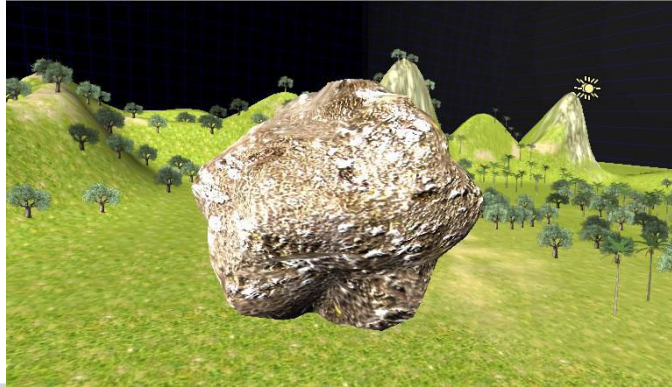
Criteria for rock evolution

- Chunkiness value
 - Shape (cubic/spherical)
 - Erosion
 - Implode or not
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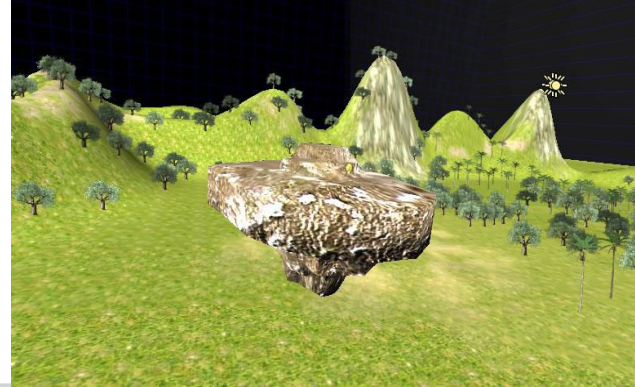
Speed Rock



Game
Free Aspect
Maximize on Play Gizmos Stats



Game
Free Aspect
Maximize on Play Gizmos Stats



Rock generator

- plug-in for modelling programs
 - preset rock
 - tweak-able parameters
 - low poly mesh generation
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Question

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References

- <https://grassovsky.wordpress.com/2014/06/06/procedural-rock-piles-into-contact-3/#more-184>
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 - <http://uu.diva-portal.org/smash/get/diva2:817559/FULLTEXT01.pdf>
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 - A. Peytavie, E. Galine, J. Grosjean, and S. Merillou. Procedural generation of rock piles using aperiodic tiling. Computer Graphics Forum, pages 1801–1809, 2009.
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