Prof. Dr.-Ing. Ralf Steinmetz
Multimedia communications Lab

Dr. Florian Mehm
Dipl. Inf. Robert Konrad

TECHNISCHE UNIVERSITÄT DARMSTADT

„Game Technology“
Winter Semester 2014/2015

Example Problems for Lecture 10 “Procedural Content Generation”

1. Important topics

Principles: Structure, Randomness

Classification:

- Online versus offline
- Necessary versus optional
- Degree and dimensions of control
- Generic versus adaptive
- Stochastic versus deterministic
- Constructive versus Generate-and-test
- Automatic generation versus mixed authorship

Generators

- Random
- Patterns
- Jittered Patterns
- Voronoi Diagram
- Noise - Perlin Noise

Filter

- Box Filter
- Gaussian Blur

Combinations

- Understand the concept and apply a formula

Voronoi Diagrams

- Basic properties (what is the meaning of regions, edges), use the properties
- Basics of the creation of a Voronoi diagram (Fortune’s algorithm, no implementation details)
- Events in Fortune’s algorithm

Perlin Noise

- Properties
- General steps in the calculation

- Use (including meaning of frequency and amplitude)

C++

- Virtual Classes
- Casting

2. Example Problems

2.1 Categorization

a) What is the difference between online and offline PCG? Explain in your own words.

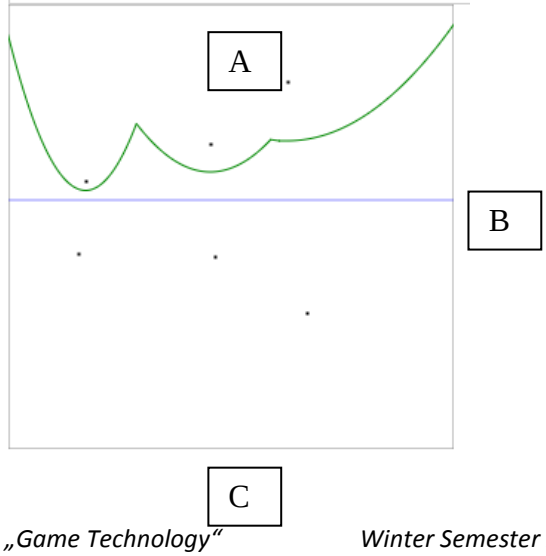
2.2 Filters

a) How is a filter specified by a kernel applied to an image?

2.3 Fortune's Algorithm

a) What is the difference between the beach line and the sweep line in Fortune's algorithm? Explain in your own words.

b) For which region in the following diagram showing an intermediate step in Fortune's algorithm can the full Voronoi diagram be computed? Explain why this is the case.



2.4 Perlin Noise

a) Explain the effects of changing the frequency and amplitude of Perlin Noise.