CIS565 Final Project: Procedural Terrain Generation with Vulkan

Mauricio Mutai and Rudraksha Shah

Last Week’s Progress

- Met our goal of implementing a basic deferred pipeline and the paper’s visibility-buffer pipeline
- Added fog
- Since deferred and visibility pipelines let us do post-processing, we added FXAA as well

G-buffer (Deferred) vs. Visibility

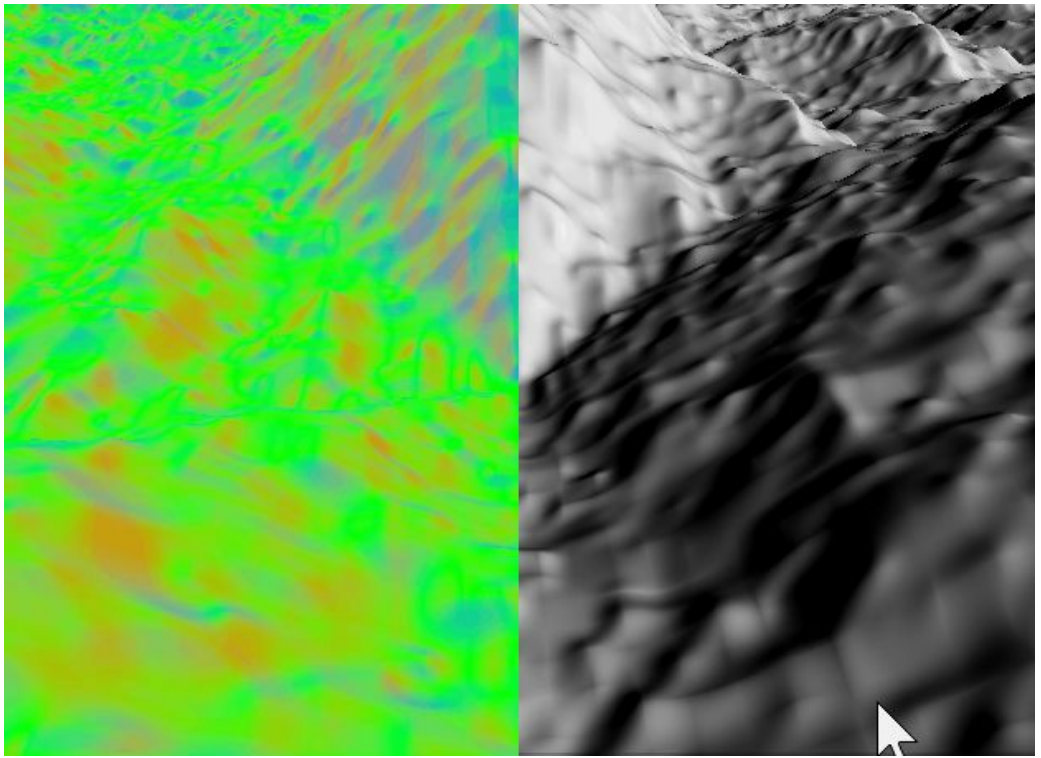
- G-buffer:
  - Position (XYZ)
  - Albedo (RGB)
  - Normal (XY)
  - 8 - Floats
- Visibility:
  - Position (XZ)
  - Texture UV (defer texture read)
  - 4 - Floats

Last Week's Challenges

- It took a while to understand how to add another render pass to get the deferred pipeline working in Vulkan
  - Sascha Willems' Vulkan examples helped a lot
- Implement FXAA anti aliasing using the final image buffer.
  - Reference: https://blog.codinghorror.com/fast-approximate-anti-aliasing-fxaa/
  - Original paper: http://developer.download.nvidia.com/assets/gamedev/files/sdk/11/FXAA_WhitePaper.pdf
- Environmental Fog.
  - Reference: http://www.iquilezles.org/www/articles/fog/fog.htm

Current Progress

- This is a debug view of the paper’s pipeline
  - Left half shows normals
  - Right half shows final fragments
- Live demo



Timeline

- ~~11/27: Add deferred pipeline, add paper's pipeline~~
- 12/04: Add textures, work on extra aesthetic features
- 12/11: Work on extra aesthetic features, do performance analysis

Possible extra aesthetic features:

- ~~Distance-based fog~~
- Water simulation
- Shadow mapping
- Support for heightmaps

Thank you!