

# Forward+ Renderer



CIS 565 Final Project  
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# Forward+: Bringing Deferred Lighting to the Next Level

- Deferred Rendering
  - Advantages:
    - Can use many lights
    - Decoupling of lighting from geometry complexity
    - Manageable shader combinations
  - Disadvantages:
    - Limited material variety
    - Lack of hardware anti-aliasing support
- Forward Rendering
  - Advantages:
    - Material variety
  - Disadvantages:
    - Fixed number of lights
    - CPU management of lights and objects

# Forward +

- Best of both worlds
  - Able to render multiple lights
  - Material variety
  - Reduces computation time
- Pipeline
  - Depth prepass
  - Light culling
  - Final Shading

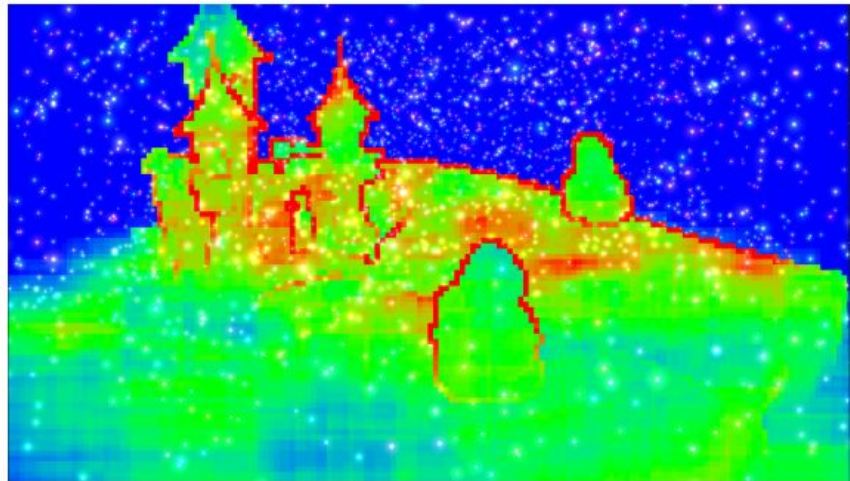
# Light Culling

- Calculated list of light indices overlapping a pixel
- Split screen into tiles
  - Reduces memory footprint and computation
  - Causes some false positives
- Implemented entirely on GPU
- 2 possible approaches
  - Gather Approach
  - Scatter Approach

# Light Culling



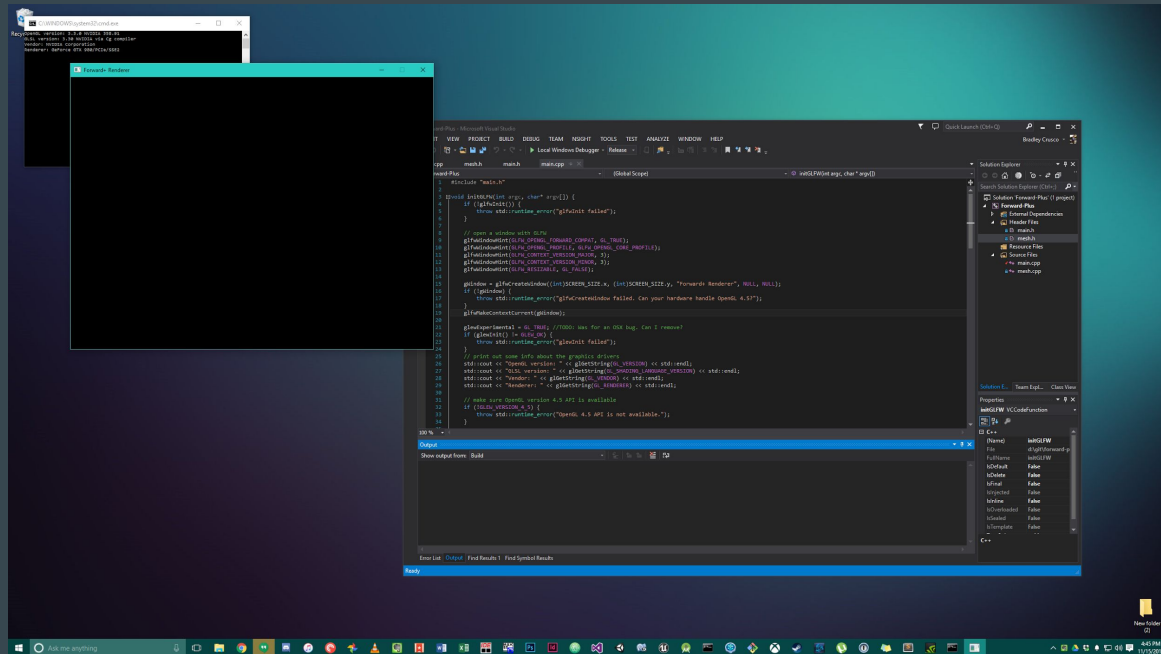
(a)



(b)

- OpenGL

- Load Textures
- Load Arbitrary Meshes
- OpenGL Window



# Week 2 Goals

- Render with BRDF's
- Ambient Shader
- Default Shader
- Shadow Map

# Week 3 Goals

- Point Culling with Forward +



# Week 4 Goals

- MSAA
- Screen Space Ambient Occlusion

# Final Project Goals

- Optimization - check different tile sizes
- Create cool scenes
- Allow for different types of lights
  - Point is default
  - Area and spot lights are extra