WebGPU GLTF Viewer

Milestone 2 Presentation

Team 6

Progress

- Metallic-roughness PBR rendering model ✅
- Scenes and nodes hierarchy (✔ *partially implemented*)
- Interactive camera ✅
- Refactoring code framework using OOP paradigm ✅

Metallic-roughness model

- https://www.khronos.org/registry/glTF/specs/2.0/glTF-2.0.html#appendix-b-brdf-implementation
- linear interpolation of metallic BRDF and dielectric BRDF
- https://github.com/shrekshao/minimal-gltf-loader

Blinn-Phong

Metallic-Roughness

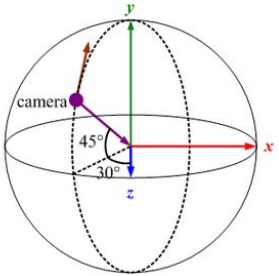
Scenes and nodes hierarchy

- Partially working
  - Computes the global transformation matrices and displays meshes following the scene graph
- Known issues:
  - Interleaved buffers
  - Mesh with multiple instances present in the scene

Root (rotation)
- Translation1
  - Body
- Translation2
  - Chain
- Translation3
  - Lantern

Interactive Camera

- Polar spherical camera
  - Polar coordinates: radius, theta, phi
- Mouse drag for rotation, mousewheel for zoom



OOP Paradigm

Before:

first: glTF loading:
a
bunch
of
code
then: interact with WebGPU API:
a
bunch
of
code
finally: render
a
bunch
of
code

OOP Paradigm

Now:

Renderer

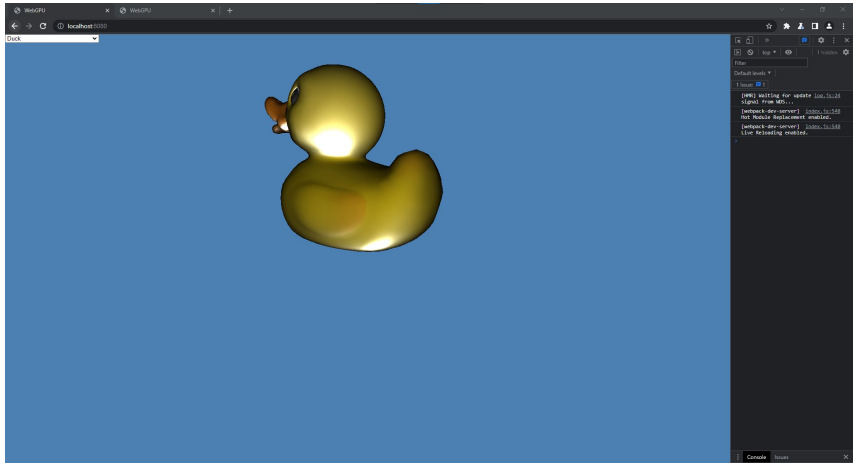
- Basic info
- User camera
- GLTF
  - Mesh arrays
  - Image bitmaps
  - Other info
- Resource (for interacting with WebGPU)
  - Per Primitive Resource
    - GPUBuffers
    - Pipeline
    - Uniform bind groups
  - GPUTextures
  - Pipelines
  - Camera buffers and bind groups
- Render loop

Live Demo

Next Milestone

- Support more texture types
- Loading interleaved buffers
- Properly display meshes with multiple instances in the scene
- Support transparent and cutout materials
- Looking into animation and skinning

Bloopers


WebGPU
WebGPU
localhost:8080
Duck
[HMR] Waiting for update signal from WDS...
[webpack-dev-server] Hot Module Replacement enabled.
[webpack-dev-server] Live Reloading enabled.
Console
Issues


WebGPU
localhost:8080
ToyCar