MS3 – GPU Animation

Student Information

Integrity Policy: All university integrity and class syllabus policies have been followed. I have neither given, nor received, nor have I tolerated others' use of unauthorized aid.

I understand and followed these policies: (•) Yes ( ) No

Name: Matthew Donald

Date: 03/25/2024

Submission Details

Final ***Changelist*** number: 220759

Verified build: (•) Yes ( ) No

YouTube Link: https://youtu.be/gIFdI0MJxUY

Required Configurations: Debug - with Memory Tracking

Discussion (What did you learn):

This quarter and this project has helped me understand how to access the gpu for shading (pixel, vertex, compute). I felt very fuzzy about shaders before, and how you could not add breakpoints since they were sent to the gpu. It felt very murky, but this exposure to shaders has helped me get a lot more comfortable with setting up connections and sending to data to shader. I was able to find ways of debugging with the shaders anyway, and I felt lot more comfortable in making more modifications to the shader code. I had to find other ways of approaching the problem such as setting up a static clip to run that would help with debugging and other ways of minimizing the problem at hand so I could focus better.

I also got more exposure to project properties in vs, and how to write and compile hlsl.

YouTube Process

- Record the YouTube demo
  - You need to record with commentary
  - PLEASE check your volume, should be loud
- Record the desktop (enough to show your directory and the visual studio and output)
  - Show your directory in recording
    - Launch the visual studio (double click solution)
  - Show off relevant parts of the code with commentary
  - Launch and demo the milestone
  - Watch your video
    - Verify that video clear and can you hear the commentary with audio in stereo?
- Note: Milestones Demo cannot be longer that 5:00 mins
  - If you go over… do it again
- Publish your YouTube recording
  - Make sure it is accessible without any login or permission to play
  - It can be private but not restrictive to play by anyone with the link
- Submit your code to perforce to the appropriate PA directory
  - Verify it

Pdf form (this document)

- *Submit this PDF to perforce*
  - *Fill in form*
    - *Name, changlelist, etc…*
  - *Submit back to perforce*
    - *Check it out*
    - *Submit it back to perforce to the same location*

Verify Builds

- Follow the Piazza procedure on submission
  - Verify your submission compiles and works at the changelist number.
- Verify that only MINIMUM files are submitted
  - No – Generated files
    - *.pdb, *.suo, *.sdf, *.user, *.obj, *.exe, *.log, *.pdb, *.db, *.user
    - Anything that is generated by the compiler should not be included

- No – Generated directories
  - /Debug, /Release, /Log, /ipch, /.vs
- Typical files project files that are required
  - *.sln, *.cpp, *.h
  - *.vcxproj, *.vcxproj.filters, CleanMe.bat

Standard Rules

Submit multiple times to Perforce

- Submit your work as you go to perforce several times (at least 5)
  - As soon as you get something working, submit to perforce
  - Have reasonable check-in comments
    - Points will be deducted if minimum is not reached

Write all programs in cross-platform C++

- Optimize for execution speed and robustness
- Working code doesn't mean full credit

Submission Report

- Fill out the submission Report
  - No report, no grade

Code and project needs to compile and run

- Make sure that your program compiles and runs
  - Warning level ALL …
  - NO Warnings or ERRORS
    - Your code should be squeaky clean.
  - Code needs to work "as-is".
    - No modifications to files or deleting files necessary to compile or run.
  - All your code must compile from perforce with no modifications.
    - Otherwise it's a 0, no exceptions

Project needs to run to completion

- If it crashes for any reason…
  - It will not be graded and you get a 0

No Containers

- NO STL allowed {Vector, Lists, Sets, etc...}
  - No automatic containers or arrays
  - You need to do this the old fashion way - ***YOU EARNED IT***

Leave Project Settings

- Do NOT change the project or warning level
  - Any changing of level or suppression of warnings is an integrity issue

Simple C++

- No modern C++
  - No Lambdas, Autos, templates, etc…
  - No Boost
- NO Streams
  - Used fopen, fread, fwrite…
- No code in MACROS
  - Code needs to be in cpp files to see and debug it easy
- ***Exception:***
  - implicit problem needs templates

Leaking Memory

- If the program leaks memory
  - There is a deduction of 20% of grade
- If a class creates an object using new/malloc
  - It is responsible for its deletion
- Any ***MEMORY*** dynamically allocated that isn't freed up is ***LEAKING***
  - Leaking is ***HORRIBLE***, so you lose points

No Debug code or files disabled

- Make sure the program is returned to the original state
  - If you added debug code, please return to original state
- If you disabled file, you need to re-enable the files
  - All files must be active to get credit.
  - Better to lose points for unit tests than to disable and lose all points

Allowed to Add files to this project

- ~~This project will work "as-is" do not add files…~~

Due Dates

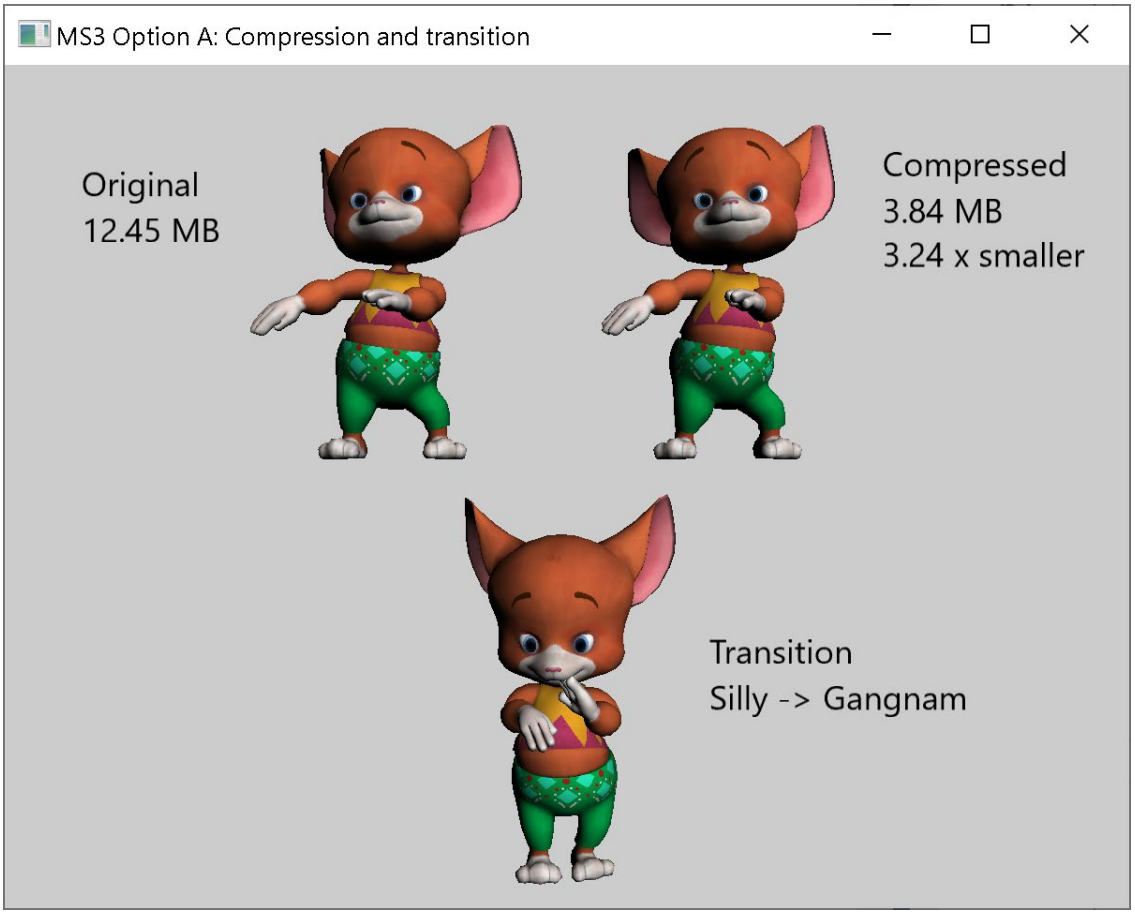
- See Piazza for due dates
- Submit program perforce in your student directory assignment supplied.
- Fill out your this ***PDF*** and ***YouTube link*** to perforce
  - ***ONLY*** use Adobe Reader to fill out form, all others will be rejected.
  - Fill out the form and discussion for full credit.

Goals

- Learn
  - Compute shaders
  - Transition with mixers
  - Compression

Assignments

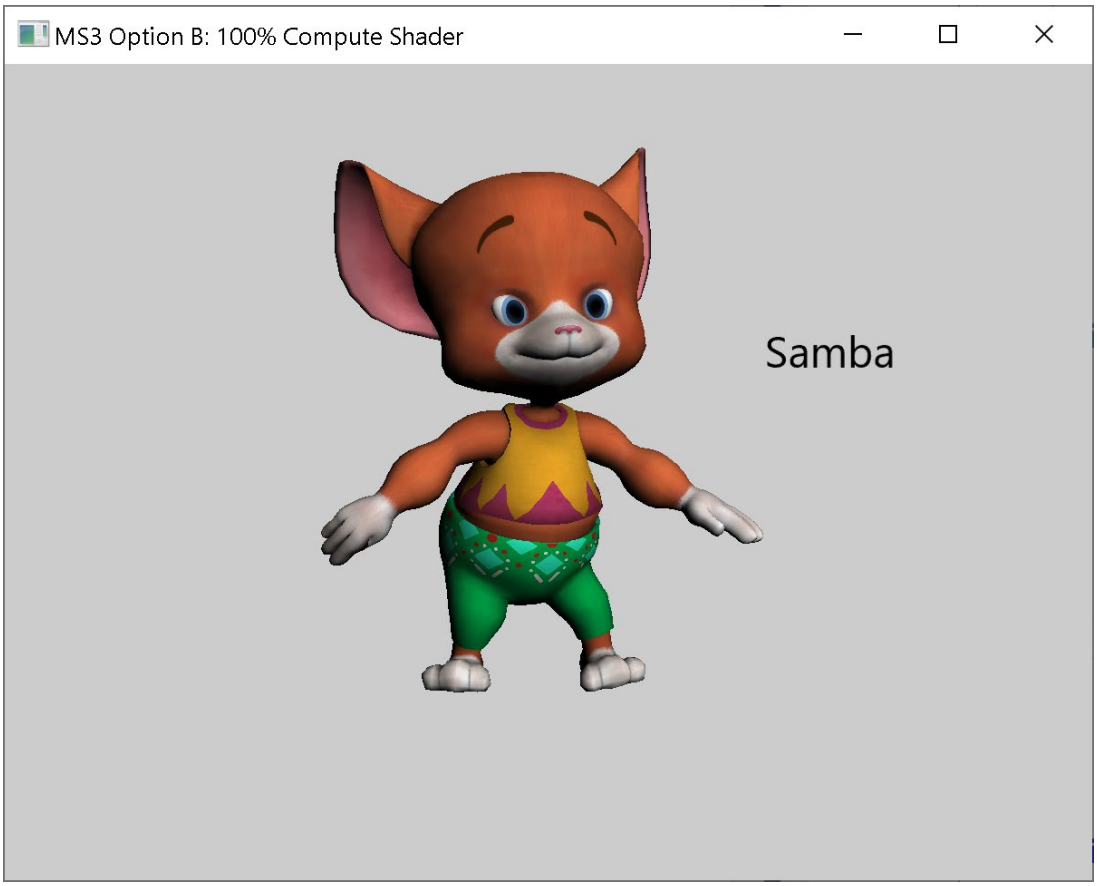
Option A



- Need to use Mouse animations
- Need compression on one animation with size displayed
  - Compression done in tool
- Need transition for 3 seconds between two different animations
  - Using 3 mixers in total

1. ***Option A***
    - *Compute Shaders*
        - *Do Blending (Mixing)*
            - *Show a transitions for 2-3 seconds*
                - *Blend of a Blend*
                - *Walking to a Running animation on Mousey only*
    - *Compression*
        - *Do the animation compression frame drop in the converter*
        - *Show the ratio on the screen 2D Font*

Option B



- 100% on Compute shader
- Show several animations… so code that proves its compute shader
- Mouse or more advanced skinned models

2. ***Option B***
    - *Do the 100% on Compute shaders*
        - *Mixer*
        - *Calculate world*
    - *Skinning on Vertex shader*
    - Cycle through several animations

3. **No MEMORY leaks**
    - Make sure your project isn't leaking at All
        - Run in Debug with the new Memory tracking enable

4. **Required Demo approx. 10 min video**
    (1) Option A
        (a) Show your code
            (i) explain compression
            (ii) explain transition
    (2) Option B
        (a) Show your code
            (i) Compute – Mixer shader
            (ii) Compute – World calculation shader
            (iii) Vertex – skinning shader

Validation

Simple checklist to make sure that everything is submitted correctly

- Submitted project to perforce correctly
    - Is the project compiling and running without any errors or warnings?
    - Is the submission report filled in and submitted to perforce?
    - Follow the verification process for perforce
        - Is all the code there and compiles "as-is"?
        - No extra files
    - Is the project leaking memory?
- Submitted the YouTube link to perforce?

Hints

- Do this assignment by iterating and slowly growing your project
  - You won't be able to finish this assignment in one day - Start now
- Just add Skinning
  - Converting, exporting the data is the hardest part
  - Follow the notes from class
- Memory Leaking
  - Use the new memory system to find your leaks