INFR 2350 – Intermediate Computer Graphics

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Assignment 1 – Lighting & Color Correction

DUE: Feb 3, 2019

In this assignment, you will explore concepts related to lighting and color correction using shaders. You are required to create an assignment project in OpenGL and implement a series of shaders as described. This assignment is graded out of 70 points. The implementation is graded out of 50 and the report is graded out of 20. The assignment is worth 5% of your final grade. This assignment must be done individually or in pairs.

- **BASE:**
  - Create an interesting scene with multiple objects and be able to move the camera around the world
  - Objects should be dynamic in some way (moving around)
  - Camera must be controllable
- **Part 1: LIGHTING**
  - Implement basic lighting using shaders
    - Diffuse, Ambient, Specular (Phong Model, per pixel lighting)
  - Add a Rim term to light the edges of the objects with an appropriate color
  - TF2 Lighting
    - Modify your basic lighting to incorporate a texture warp/ramp for each term, i.e. implement a gradient 1D texture to sample multiplicative values for each term.
  - Each term must be TOGGLED using the keys below.
- **PART 2: Color Grading**
  - Color Correction and Color Grading is important to take your games to the next level and ensure that colors pop. This is achieved by using a 3D Lookup Table (LUT) in RGB space.
  - Take a representative screenshot from PART 1 and load it into Photoshop
  - In Photoshop, play with basic color correction such as hue, saturation, value, brightness, contrast to achieve a next gen look.
  - Create 3 different color lookup tables (Warm, Cool, and Custom). For Warm and Cool, you may use one of the warming/cooling Photo Filters as a start.
  - For your Custom LUT, make sure it is distinct from the warming/cooling filters.
  - Export the LUTs to file and implement a loader into your assignment code.
  - Implement the shader code to apply the LUT to the screen and toggle it with the keys below.
- **Toggle Keys:**
  - Ensure that your project toggles the following modes appropriately
    - ‘1’ = No Lighting
    - ‘2’ = ambient lighting only
    - ‘3’ = specular lighting only
    - ‘4’ = specular + rim lighting
    - ‘5’ = Ambient + specular + rim
    - ‘6’ = TOGGLE diffuse warp/ramp
    - ‘7’ = TOGGLE specular warp/ramp
    - ‘8’ = TOGGLE Color Grading Warm
    - ‘9’ = TOGGLE Color Grading Cool
    - ‘0’ = TOGGLE Color Grading Custom Effect
  - Each of these will be graded as follows::

        - 0=unacceptable, 3=acceptable, 4=looks good and is correct, 5=excellent (went above and beyond)
- **TO SUBMIT:**
    - A1.zip (should contain the following)
        - Submit a cleaned project (no garbage files) with executable
        - A1-REPORT.pdf
            - Includes your name, student ID on the cover
            - describe the math
            - describe the algorithm,
            - show and describe your shader code
            - include and describe before and after screenshots of each mode.
            - Compare the results of your Color grading to the original mode developed in Photoshop.