CS4351 Real-Time Graphics (2018/2019 Semester 1)

Programming Assignment #2

Release Date: 21 September 2018, Friday

Submission Deadline: 7 October 2018, Sunday, 11:59 PM

TASK

You are to complete an OpenGL program to render a scene as if it is lit by an image projected from a light projector. The following images show sample views of the result that your program is expected to produce:

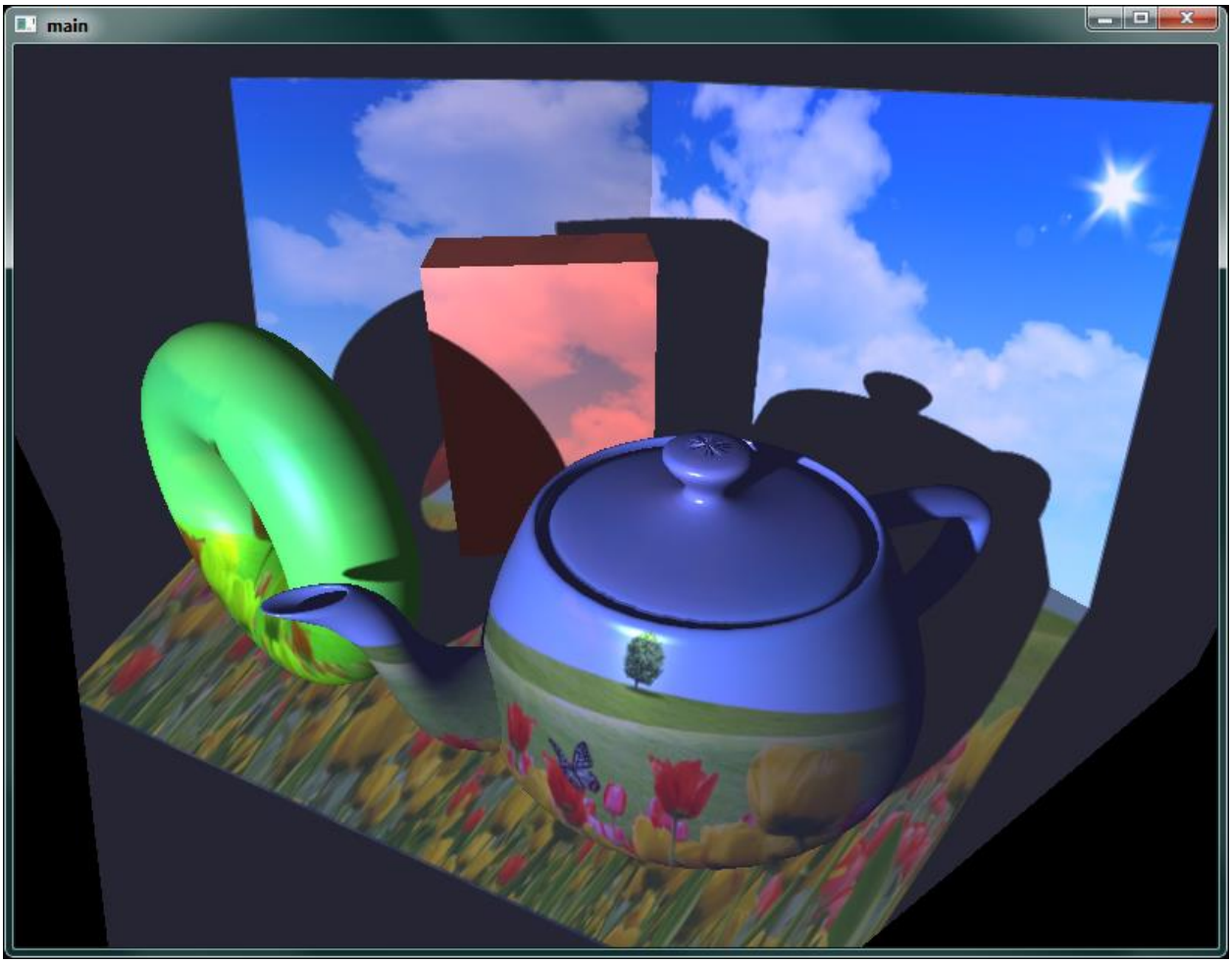

Figure 1

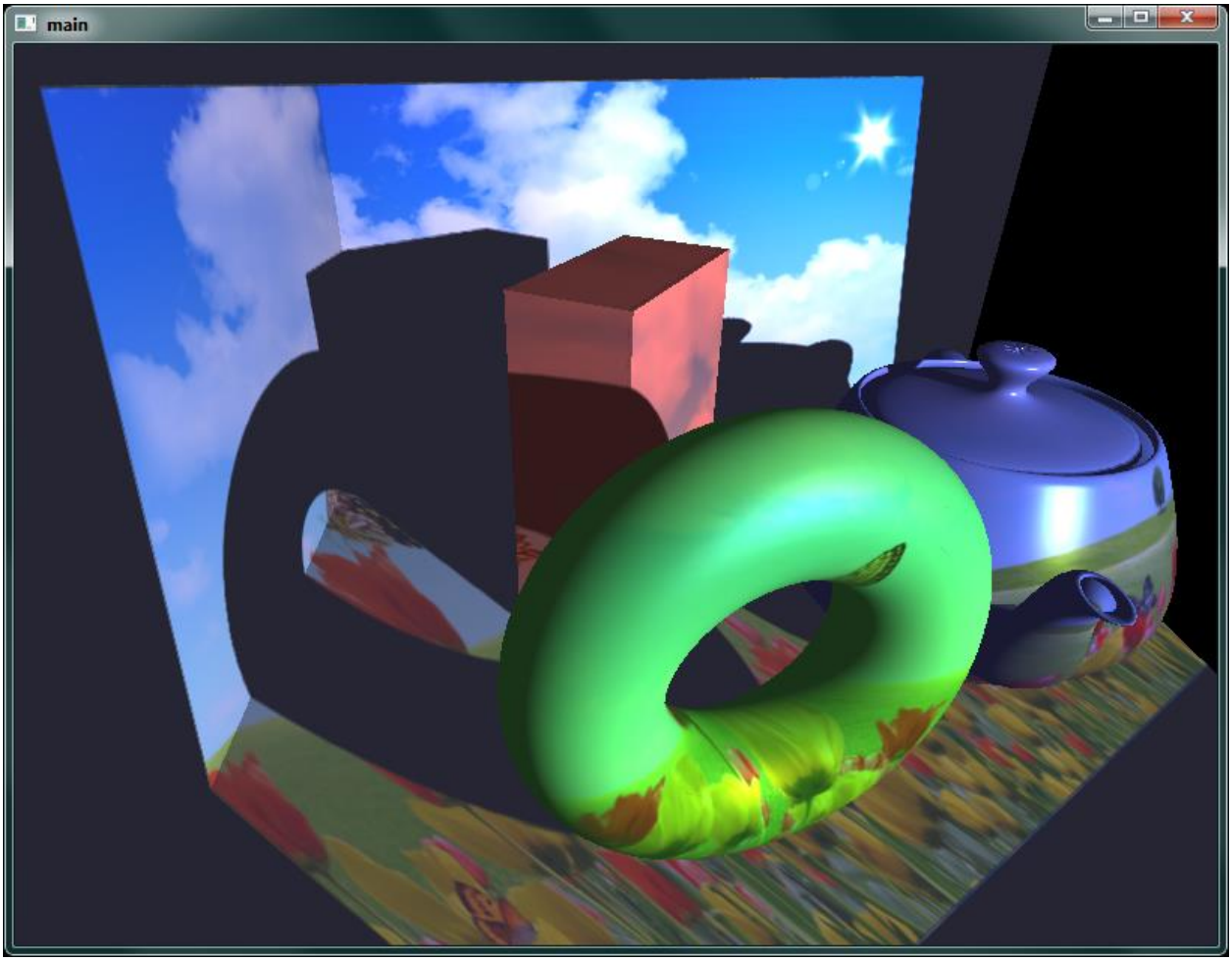

Figure 2

The shadow must be produced using the shadow mapping technique described in Topic 6. Percentage-closer filtering (PCF), as described in Topic 6, must also be applied to smooth the shadow boundaries.

Please download the ZIP file **cs4351_1819S1_assign2_todo.zip** from the **Assignments** folder in the IVLE Workbin.

You need to complete the C++ application program **main.cpp** and the fragment shader **assign2.frag**. In the fragment shader, all necessary **uniform variables**, and **global input/output variables** have already been declared, and **you must not add new ones**. You can add new functions in your shader. Note that you should adhere to the **variable naming convention** where the prefix "ec" is used to indicate that the entity is expressed in the eye space, the prefix "wc" to indicate world space, and the prefix "tan" to indicate tangent space.

A Visual Studio 2017 solution **main.sln** is provided for you to build the executable program. The application program loads the shader source files **assign2.vert** and **assign2.frag**, and use them in the rendering. It also provides the values for the **vertex attributes** and **uniform** variables to the shaders. In this assignment, **you are not required and must not change any other C/C++ source files** besides **main.cpp**.

For this assignment, you are required to

- Complete the function **`DrawSceneWithProjection()`** in **assign2.frag**. You can use the finished application program **main_done.exe** to test your shader.

- Complete the functions **`SetUpShadowMapAndFBO()`** and **`RenderShadowMap()`** in the file **main.cpp**.

The detailed requirements for each task can be found in the source code.

GRADING

The maximum marks for this programming assignment is **100**, and it constitutes **10%** of your total marks for CS4351.

Note that marks will be deducted for bad coding style. If your program cannot be compiled and linked, you get 0 (zero) mark.

Good coding style. Comment your code adequately, use meaningful names for functions and variables (adhere to the new variable naming convention), and indent your code properly. You must fill in your **name**, **matriculation number**, and **NUS email address** in the **header comment**.

SUBMISSION

For this assignment, you need to **submit only**

- Your completed **main.cpp**;
- Your completed **assign2.frag**.

You must put them in a ZIP file and name your ZIP file **<*matric_no.*>_assign2.zip**. For example, **A0123456X_assign2.zip**. All letters in your matric. number must be capitalized.

Submit your ZIP file to the **Assignment #2 Submission** folder in the IVLE Workbin. Before the submission deadline, you may upload your ZIP file as many times as you want to the correct folder. **We will take only your latest submission.** Once you have uploaded a new version to the folder, you **must delete the old versions**. Note that when your file is uploaded to the Workbin folder, the filename may be automatically appended with a number. This is fine, and there is no need to worry about it.

DEADLINE

Late submissions will NOT be accepted. The submission folder in the IVLE Workbin will automatically close at the deadline.

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