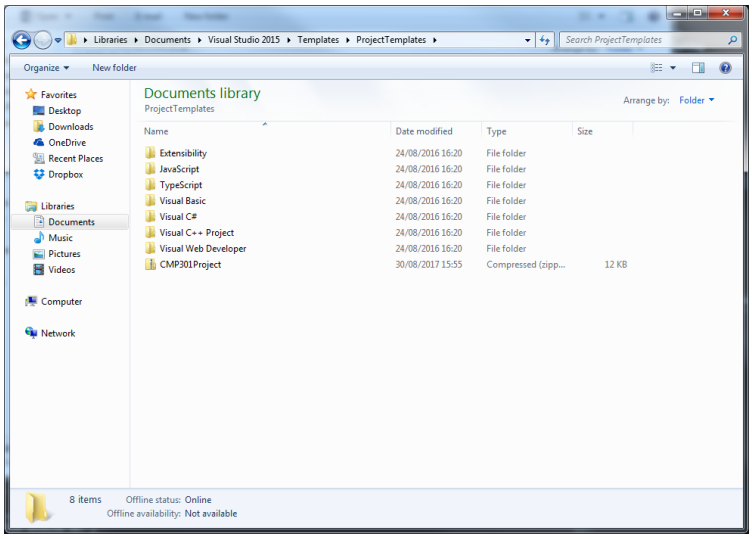
LAB 3 LIGHTING

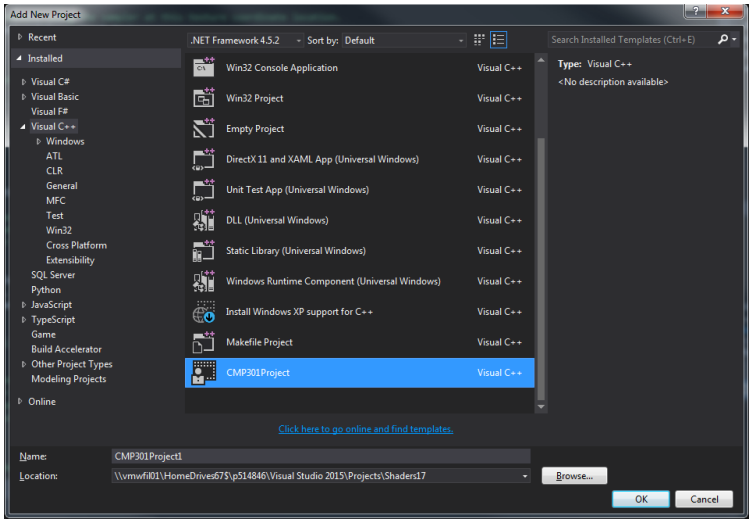
LAB TASK

Download the template from Blackboard “CMP301Project.zip”. Place the ZIP file into the Project Templates folder.

Documents >> Visual Studio 2015 >> Templates >> Project Templates.



This will add a template for creating new projects within the existing Shaders solution. When creating a new project there is now a CMP301Project. This template comes with a few needed default files, library setup and HLSL settings.



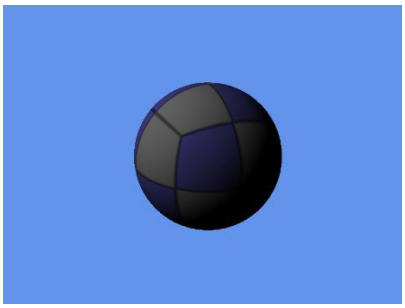
DIFFUSE LIGHT

Create a new project within the DirectX Shaders Solution, using the project template mentioned above. There is a Light Shader class, and vertex + pixel shader files provided on Blackboard; “Code.zip”. You will need to update the App1.cpp to use these file/shaders. You will need to initialise a sphere mesh (or other mesh, but sphere works best for showing lighting), initialise a light object (set diffuse colour and direction) initialise the

light shader object. Example light setup,

```
m_Light = new Light;
m_Light->SetDiffuseColour(1.0f, 1.0f, 1.0f, 1.0f);
m_Light->SetDirection(0.5, -0.5f, 0.0f);
```

1. Using the code (light shaders) provided make the lab 3 application render a scene with diffuse directional light. For example,



2. Once you have this working, modify the pixel shader to remove the texture, so you can view the lighting effect without the texture.
3. Change the colour of the diffuse light.
4. Change the direction of the light.

AMBIENT LIGHT

1. Update your code to handle ambient light, as discussed in the lecture.
2. Remove the diffuse light, to make sure the ambient is working. Make sure you set the ambient colour value to something sensible. Using different colours for both ambient and diffuse will make it easier to see how the light is working.

SPECULAR LIGHTING

Create another project for specular lighting. In the new project you will need to create a specular **light shader class** and a pair of vertex and pixel **shaders**. These new classes will build on what you already have. We are making new versions as we need to send more data to the shaders to handle specular lighting. This will also keep your above lighting shader safe for use if further lab exercises.

1. Using the code you have already written and that discussed in the lecture. Make this new project render a sphere mesh with Specular Lighting. It's is important to note the additions required, such as adding specular values to the LightBuffer and the addition of a CameraBuffer (to send the camera position) to the Specular Light Shaders. This information is important for calculating the specular value. For the best effect have the light's direction set to travel along the x-axis in a positive direction.
2. Change the specular colour to see the effect it has. This makes it easier to see what the specular calculation is doing.

RESEARCH TASK

What are the differences between Phong/Blinn-phong and other Bidirectional Reflectance Distribution Functions (BDRFs) such as Lambert and Cook-Torrance?