**How to compile and run the program**:

Step 1:

Open the terminal and go to the unzipped folder (Rotate-Sphere-Shading)

Step 2:

Run the commands below to generate the Makefile ($ stands for the terminal prompt).

Note that the folder already had the build file as well as 4 sphere files in it, so you may skip the below steps and go to the build folder directly.

$mkdir build

$cd build

$make

Step 3:

To run the program in the command line below, then type in the file name when prompted:

$./RotateSphereShading

A screenshot of a computer program

Description automatically generated

The sphere is wireframe with no lighting initially, and we can draw a solid sphere, produce shadow or enable lighting based on the menu shown in the figure below.

A screenshot of a computer

Description automatically generated

For part c, when “Enable Lighting” is “Yes”, the initial lighting type is global light and distant light. Then the submenu “Light Source” allows you to switch between “Point Source” and “Spot Light”. Also, we can decide the shading effect.

A yellow ball on a green surface

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In Mac, the line “ # include <GLUT/freeglut\_ext.h>” cannot work which would cause errors. So I comment out this line in the file "Angel-yjc.h" and “glutSetMenuFont(menu\_ID, GLUT\_BITMAP\_HELVETICA\_18);” in the file “rotate-sphere.cpp”.