CIS 6600: Advanced Topics in Computer Graphics and Animation

Homework Assignment 1 (Spring 2024)

Developing Maya Plug-ins

Due: Monday, Jan. 29, 2024

The goal of this assignment is to help you setup your development environment for creating Maya Plug-ins and to start to familiarize you with building plugins in both C++ and Python.

Steps

1. Read the following:
   - Autodesk Maya API White Paper
   - Complete Maya Programming I - Chapters 2,3,4
   - Chad Vernon Maya API Programming Workshop
   - Consult as needed:
     - Maya Documentation
     - Video Tutorials (Autodesk, Digital Tutor, Gnomon Workshop, …)
     - MEL/Python Command Reference (available online)

2. Set up Maya 2022 with Visual Studio 2022 as per Appendix B.

3. Develop Hello Maya C++ Maya Plugin (as per Appendix A).

   Functionality of plugin to be implemented:

   a) Display a Dialog box entitled "Hello Maya" by typing the custom command "helloMaya"

   b) Provide arguments "name" and "id" to the hello Maya command, which are then printed out in the dialog box

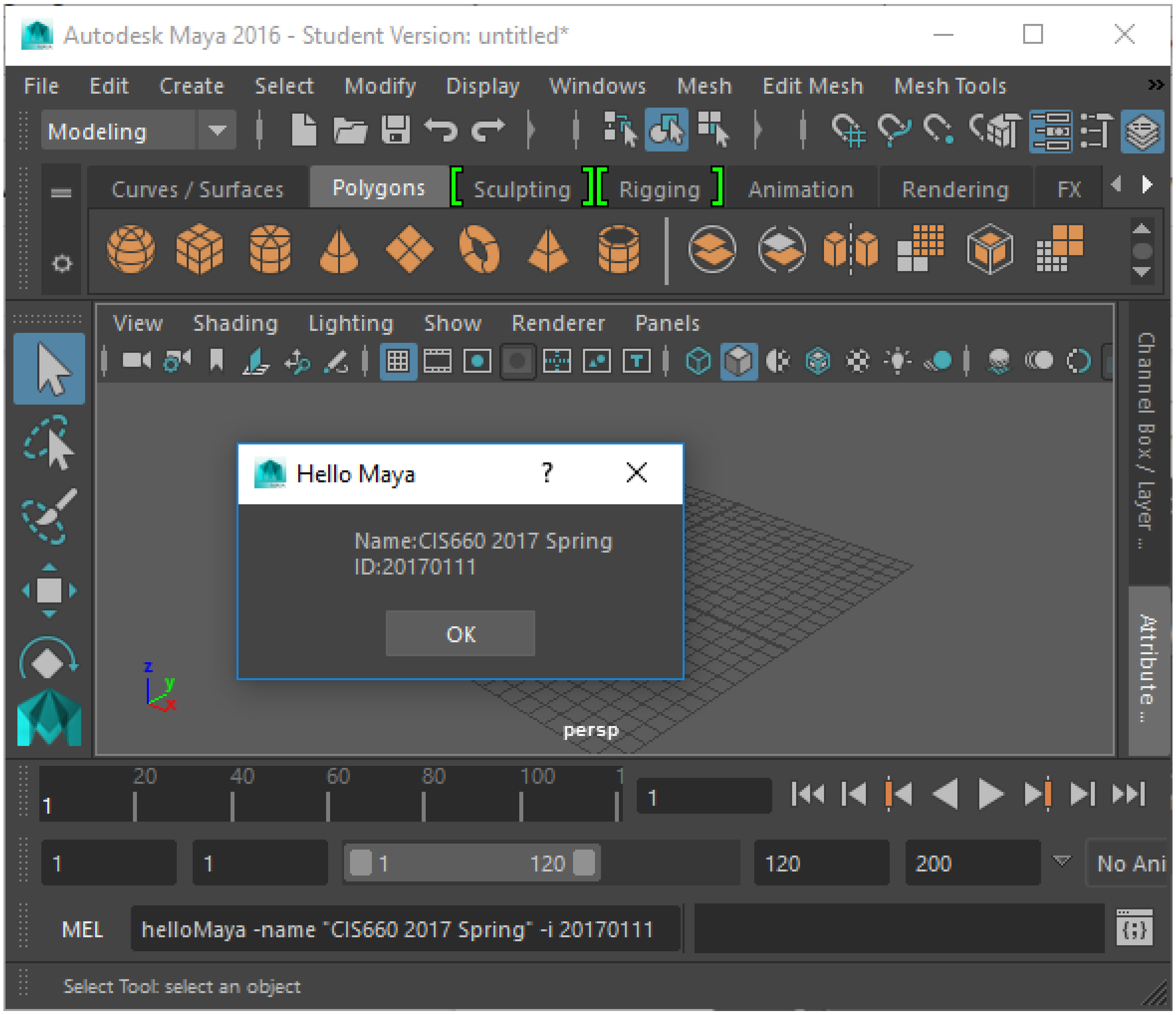
   Once written and compiled in Visual Studio, load your plugin into Maya by going to the *Window* -> *Settings/Preferences* -> *Plug-in Manager* window, browsing to the directory containing the compiled .mll file, and pressing Open. If the plugin loaded successfully, it will appear in the Plug-in Manager window with a check next to "Loaded".

4. Using the provided Python plugin framework, also develop a Hello Maya Python Plugin. The python plugin can be loaded into Maya in the same way as the C++ plugin from the *Window* -> *Settings/Preferences* -> *Plug-in Manager* window. You can write the python plugin from either within the Maya script editor itself or another editor of your choosing.

   Functionality of the python plugin should be the similar to the C++ version:

   a) Display a Dialog box entitled "Hello Maya Python" by typing the custom command "pyHelloMaya".

b) Provide arguments “name” and “id” to the command, which are then printed in the dialog box.



Autodesk Maya 2016 - Student Version: untitled*
File Edit Create Select Modify Display Windows Mesh Edit Mesh Mesh Tools
Modeling
Curves / Surfaces Polygons Sculpting Rigging Animation Rendering FX
View Shading Lighting Show Renderer Panels
Hello Maya
OK
persp
Channel Box / Layer ...
Attribute ...
MEL

Name:CIS660 2017 Spring
ID:20170111

```
helloMaya -name "CIS660 2017 Spring" -i 20170111
```

Select Tool: select an object

5. ZIP your .cpp, .h, .vcproj, .sln, .mll, and .py files and submit to Canvas. For full credit, your plug-in must build without modifications for Visual Studio 2022. To grade your assignment, the grader will compile your source, load the helloMaya and pyHelloMaya plugins into Maya, and then run them from the MEL command line.

Appendix A

Maya C++ Plugin Framework (Python framework also available on Canvas**)**

hello_maya.h file:

```
#ifndef HELLOMAYA_H
#define HELLOMAYA_H

#include <maya/MArgList.h>
#include <maya/MObject.h>
#include <maya/MGlobal.h>
#include <maya/MPxCommand.h>


// custom Maya command
class helloMaya : public MPxCommand
{

public:
   helloMaya () {};
   virtual MStatus doIt(const MArgList& args);
   static void *creator();

};

#endif
```

hello_maya.cpp file:

```
 #include "hello_maya.h"
 #include <maya/MFnPlugin.h>

 // define EXPORT for exporting dll functions
 #define EXPORT _declspec(dllexport)


 // Maya Plugin creator function
 void *helloMaya::creator()
 {
    return new helloMaya;
 }

// Plugin doIt function
 MStatus helloMaya::doIt(const MArgList& argList)
 {
    MStatus status;
    MGlobal::displayInfo("Hello World!");

    // <<<your code goes here>>>


    return status;
 }
```

```
// Initialize Maya Plugin upon loading
EXPORT MStatus initializePlugin(MObject obj)
{
   MStatus status;
   MFnPlugin plugin( obj, "CIS660", "1.0", "Any");
   status = plugin.registerCommand("helloMaya", helloMaya::creator );
   if (!status)
         status.perror( "registerCommand failed" );
   return status;
}

// Cleanup Plugin upon unloading
EXPORT MStatus uninitializePlugin(MObject obj)
{
   MStatus status;
   MFnPlugin plugin(obj);
   status = plugin.deregisterCommand("helloMaya");
   if(!status)
         status.perror( "deregisterCommand failed" );
   return status;
}
```

Note that for simple commands, it is unlikely that you will need to change the initialize and uninitialized functions.

Appendix B

Maya Devkits

Download and install the latest version of the Maya 2022 Devkit from the following link:

https://www.autodesk.com/developer-network/platform-technologies/maya

then follow the instructions at the following links:

Maya 2022
https://help.autodesk.com/view/MAYAUL/2022/ENU/?guid=Maya_SDK_Setting_up_your_build_html

Setting up Visual Studio for Maya Plugin Development

Below is the step-by-step procedure to manually set up the Maya plugin development environment for Visual Studio.

STEP BY STEP PROCESS:

1. Make a new empty Visual Studio project. Call it “helloMaya”.
2. Add a new header file to the project, Call it “hello_maya.h”
3. Add a new C++ source file to the project. Call it “hello_maya.cpp”
4. Copy the code from Appendix A into the header and cpp files.
5. Configure the helloMaya Visual Studio project property settings as follows:

Configuration
Open Configuration Manager and set the active solution platform to x64.

General
Configuration Properties -> Target Extension -> .mll
Configuration Type -> Dynamic Library (.dll)

C/C++
General -> Additional Include Directories -> [MayaInstallDir Path]\include
Preprocessor -> Preprocessor Definitions -> NT_PLUGIN
Code Generation-> Set Runtime Library to ‘Multi-threaded Debug DLL’

Linker
General -> Additional Library Directories -> [MayaInstallDir Path]\lib
General-> Set Output File to $(OutDir)$(ProjectName).mll
Input -> Additional Dependencies

- Foundation.lib;
- OpenMaya.lib;
- OpenMayaUI.lib;
- OpenMayaAnim.lib;
- OpenMayaFX.lib;
- OpenMayaRender.lib;

- Image.lib;
- opengl32.lib

Additional References for setting up Visual Studio for Maya plugins

Bees Over Dundee
https://beesoverdundee.wordpress.com/2015/04/02/tutorial-making-maya-2015-plugins-with-visual-studio/