Yagmur Ilgen
CS Senior Project Proposal
February 6, 2009

A Detailed Cityscape: Using MEL to Create a More Realistic City Model
Advisor: Holly Rushmeier

Background

Maya Embedded Language (MEL) is a scripting language used to simplify tasks in Maya, a 3D modeling and animating program. Many animators create MEL scripts to group together and speed up repetitive tasks, such as modeling various objects that might need to be created many times in a large scene. For example, a MEL script might be written to create trees in a forest. Instead of modeling each tree by itself, the animator might write a script to automatically and randomly create a tree at specific x- and z- coordinates, and could run this script until the forest is full. Of course, with a tool like MEL and scripts that fill in scenes quickly, detail and customizability are always an issue. How much of the scene can a user customize without the script getting too complicated to use? How detailed can the scene become without the script taking too much time to run? How much detail is needed to make the scene look life-like enough without having to make the script over-complicated? These questions on efficiency and detail are important aspects of modeling that animators must face with every scene they create.

I have been fascinated with computer graphics ever since watching the making of the Lord of the Rings movies. Recently I have begun creating my own models and little animations in Maya, and I came to realize the importance of being able to write MEL scripts. MEL scripts are also useful in grouping together more complicated tasks and making them simpler for novice users to understand. After attending a summit on expanding computer
science to children in K-12 grades, I have begun to think about how to make computer science more interesting and accessible to young children, particularly in elementary and middle school. With scripts that create trees, buildings, creatures, etc. with easy to use GUI’s, it would be much more enjoyable for first-time users to create animations than if they had to learn all the Maya commands on their own.

Project

Patrick Paczkowski, a Graduate student in computer science here at Yale, has written a fascinating script that creates a cityscape with different types of buildings. When the script runs, it prompts the user for a city name, and size. Then a new window comes up, with buttons to create primitive or complex buildings. Primitive buildings are residential buildings, and can be customized in reference to the base shape, roof type, color, size, and number of floors. Complex buildings are commercial buildings and skyscrapers, which can be customized in reference to size, color, and number of floors. With these attributes, this tool creates a fairly detailed cityscape easily in a matter of seconds.

For my senior project, I would like to take Patrick’s code and create more elements of detail in the cityscape and on the buildings themselves. For example, I would create windows, doors, and various other decorative elements that would lend themselves to creating a more life-like and believable city scene. Once I have created those details, I plan to add in an option to add trees, lampposts, and possibly even cars to the scene. These elements will not be as customizable as the buildings, but their color and placement in the city will be up to the user.

Since Patrick has created a very easy to use script with a straightforward GUI, his script is perfect for helping young students create city models without confusing them with the various nuances of Maya. In adding details to Patrick’s code, I hope to make the script more customizable while still maintaining its ease of use, so that children would be able to
make more realistic models, and in the process learn more about Maya and computer science.

**Deliverables**

- I have two books on MEL, *MEL Scripting for Maya Animators* by Mark R. Wilkins and Chris Kazmier and *Maya Scripting for 3D Artists* by David Stripinis which I will read to learn how to code in MEL.

- I will read, understand, and comment Patrick’s code to make it easier to navigate while I add to it. I will make it obvious which part of the code is mine and which part is Patrick’s, and will give him due credit in my final report.

- I will begin the first part of my project, the detailing of the various building types. To do so I will add new menus and buttons to the current GUI to allow the user to customize where the doors and windows might be placed on the building.

- Given the time constraints I face, I will add as much of the remaining details as I can. These include a simple looking tree, lampposts on the street, and a simple looking car. These items will be modeled in Maya and then exported so that they may be added by the user on the coordinates and in the direction of the user’s choice.

- Once these three extra city details are added, I will work on making the texture of the trees and cars customizable by the user.

Once these deliverables have been completed, I hope to have written code that will help users model a realistic city scene without requiring them to go through the rigorous process of learning how to model in Maya, and also instilling an interest in learning more about computer graphics through the use of this script.