VSFX 705 / Exercise 2 Warmup / Spring 2013 / Fowler*

Exercise 2 – Mel Exercise Warmup

DATE DUE: Class 9 Informally
DATE ASSIGNED: Class 8

Goals:
This assignment will focus on the student becoming familiar with the basic programming concepts discussed in class such as flow control and functions, but now in the context of MEL.

Requirements:
Create a procedural spiral staircase in MEL.

Considerations:

Be sure to save your file in a name.mel file to ensure your script is saved.

This is an introduction to MEL scripting and requires you to use loops, arrays and curves.
There are some useful examples related to using curves in mel:

- melSeashells.ma by Sewang Kim at http://cargocollective.com/bird7king/RMS-Studies
- http://www.fundza.com/mel/expressions/curve_expression.html

Submissions guidelines
Create a directory named LastnameFirstnameExercise2Warmup – in class

Grading:
not graded – although completing in-class assignments does count toward your participation grade.

Plan:

Step1:
Create spiral stairs with a top level parameter interface controlling

- height
- rise
- turnAngle

height should control number of stairs as well as the central shaft
rise is the vertical space between each step
turnAngle is the amount each stair rotates

Hint: in MEL in order to move the pivot you may have to group your geometry.

```
$numSteps = $height / $rise;
```

Couple of notes: cylinders are different in maya than other packages in terms of shape.
Hint: you can use rotate –pivot 0 0 0 …….

Step 2:
Add a post on each step and create a railing joining the posts creating a railing.
This is a revisit to sin and cos:
To define a circle

- x = r cos theta
- y = r sin theta

In this case, r (radius from center to rail post) and theta (angle in degrees) are only changing based on the number of steps.

So the calculation will look something like this:

```
int $n;
for ( $n = 0; $n < $numSteps; $n++ )
{
        $x = $radius * cosd(  $turnAngle * $n );
        $z = $radius * sind ( $turnAngle * $n );
        $y = $heightOfPost  +  (  $rise * $n  );
}
```

This will give you the position of the post tops. You can then form a curve and create geometry in the manner of your choice. This will provide you with a banister (railing) for your staircase.

Note – in order to obtain a smooth curve you may have to sample your curve with more substeps.

Your railing should function properly with the changes in your top level parameters.