REU Modeling Course - Part 2

AutoDesk Maya

More Modeling
Workshop Workflow

- Let’s Review last session
- More Modeling Features
- Organizing Scenes/Objects in Maya
- Today’s mini goal
Today’s Mini Goal Inspiration
Let’s Review

○ What’s this called?
○ Where can I find it?
○ What can I do in there?
Let’s Review

๏ What’s this called?
๏ Where can I find it?
๏ What’s it good for?
How did I create this?
How did I create this?
How did I create this?
Let’s Jump in to Maya
Polygons: Boolean Tools

Booleans: (go to MESH > Booleans)

- Can only happen between 2 objects
- Booleans let you: **subtract, add or intersect** an object's geometry onto another object (merging)
- Usually used for objects that will not be deformed (mechanical)

**Drawbacks:**
- Geometry created cannot be deformed
**Boolean Tools: Union**

- **Union**
  - Adds or connects two objects

- **Example:**
  - Select both the door and house
  - Press **Union** under booleans:
  - Both objects have merged into 1
Boolean Tools: Difference

Difference

- Subtracts or eliminates the difference in the objects
- The object’s shape you want to subtract will the second you select.

Example:

- Select both the house FIRST then the window
- Press difference under booleans:
  - Both objects have merged into 1
**Boolean Tools: Intersection**

- **Intersection**
  - Finds the intersecting parts between selected objects
  - **Order of selection does not matter**
- **Example:**
  - Insert a cube + sphere
  - Select both cube and sphere
  - Press **intersection** under booleans:
    - Both objects have merged into 1
### Polygons: Extrude Tool

- **Extrude**: (edit mesh > Extrude)
  - Commonly used on an object’s face
  - Can pull up, push in, scale, etc.
  - Can be used on edges and vertices (can select multiple of them)

- **When you extrude, a menu will pop up:**
  - Toggling on/off “keep faces together” will make a difference
Polygons: Bevel Tool

○ **Bevel: (Edit MESH > Bevel)**
  ○ Used to make objects smoother (helps)
  ○ **Mostly used on edges**
  ○ Can also be used on faces

○ **Menu will pop up:**
  ○ **Fraction** = General smoothness
  ○ **Segments** = Smoothing further the generated fractions
Polygons: Subdivision Surfaces

- **Subdivision Surfaces:**
  - Used to make objects smoother (visually)
  - **Press 1** = Current object (no smooth)
  - **Press 2** = Smooth model (smooth cage and original)
  - **Press 3** = Just smooth model

- Location of edge loops or bevels will determine the curvature of the surface
  - **To change** = manipulate the edges
  - Smoothness is better visualized in the render screen (in render view):
    - **Mental ray / Maya hardware** = Will show smoothness
    - **Maya software render** = Will not show
Polygons: Nonlinear Deformers

 côNonlinear Deformers: (Deform > nonlinear) bend, flare, since, squash, twist, wave

ôGreat for modeling or animations

ôWill manipulate an object’s shape
Nonlinear Deformers: Bend

- **Bend**: (deform > nonlinear > bend)
  - Object needs subdivisions in order to bend
  - Bend controls better seen when in wireframe mode
- **Example: (create a swing)**
  - Insert a cube and reshape into a long narrow rectangle
  - Add 3 divisions to cube faces
    - (Edit mesh > Add Divisions “box” > select linearly > division 3 in U and V)
  - Select rectangle > deform > nonlinear > bend
  - change curvature to 100 in channelbox bend object
  - Move vertices around to get the desired shape
- **AFTER DEFORMING:**
  - object selected > edit > delete by type > history
  - Now we can move the object normally
  - Duplicate and add a rectangle in the middle of both objects
Nonlinear Deformers: Flare

- **Flare**: (deform > nonlinear > flare)
  - Controls better seen when in wireframe mode
    - Can use your W,E,R keys to manipulate
- **Example: (create a vase)**
  - Insert a pipe primitive
  - Decrease thickness = 0.05
  - Select object > deform > nonlinear > flare
  - Manipulate with arrows until you have a wide opening on the top and smaller one in the bottom (cone like)
- **AFTER DEFORMING:**
  - object selected > edit > delete by type > history
  - Now we can move the object normally
Nonlinear Deformers: Sine

**Sine: (deform > nonlinear > Sine)**

- Controls better seen when in wireframe mode
  - Can use your W,E,R keys to manipulate
- Used to create curves or waves

**Example:**

- Insert a plane
- Select object > deform > nonlinear > sine
- Play around with wavelength, amplitude, offset, high bound and low bound
- Keep or delete for scene
Nonlinear Deformers: Squash

- Squash: (deform > nonlinear > Squash)
  - Controls better seen when in wireframe mode
  - Can use your W,E,R keys to manipulate

- Example: (chimney smoke clouds)
  - Insert a sphere
  - Select object > deform > nonlinear > squash
  - Manipulate low and high bound, and factor to until object looks like a torpedo

- AFTER DEFORMING:
  - object selected > edit > delete by type > history
  - Now we can move and size the object normally
Nonlinear Deformers: Twist

- Twist: (deform > nonlinear > Twist)
  - Controls better seen when in wireframe mode
    - Can use your W,E,R keys to manipulate
  - Example: (base for tree)
    - Insert a square
    - Select object > deform > nonlinear > twist
    - Change start angle = 100, end angle = 230, low bound = -2
  - AFTER DEFORMING:
    - Object selected > edit > delete by type > history
    - Now we can move and size the object normally
    - Bevel edges
Nonlinear Deformers: Wave

Wave: (deform > nonlinear > Wave)
- Controls better seen when in wireframe mode
- Similar to the SINE deformer

Example: (a water effect for a well)
- Insert a plane
- Select object > deform > nonlinear > wave
- Change amplitude = 0.2, wavelength = 1, max radius = 3
- Further manipulate with W,E,R controls

AFTER DEFORMING:
- object selected > edit > delete by type > history
- Now we can move and size the object normally
Hierarchies

- **Hierarchies**: (Window > Outliner)
  - Creates a Parent-child relationship between various objects (When you transform a parent, its children are transformed with it)
  - Great for organizing objects inside a scene, making skeletons, or animations
  - **To parent**: (In OUTLINER) select objects you want to parent, middle click then drag, release the button when the cursor appears over top of parent object
  - **Unparenting** an object removes it from under its parent’s transformation node:
    - Drag object away from parent (in outliner) or select object > edit > unparent
  - **Example**:
    - Make house parent, it’s children include the chimney and roof, the smoke clouds can the children of the chimney
Grouping Objects

Grouping: (ctrl + G or Edit > Group)

- Another way to organize objects (more like a “group of friends”)
- Different from hierarchies = ARBITRARY hierarchy (still independent inside the viewport scene, must select group in the outliner to manipulate all objects)
- Can have various groups inside groups
- Group name is independent from the objects inside that group

- **Group**: select objects > ctrl + G
- **Ungroup**: drag desired object outside of group (middle mouse button)
- **Fix pivot**: select group > modify menu > center pivot

- **Example:**
  - Select all of the objects that make one side of the fence and place them in a group (can be called back fence or fence1)
Combine or Separate Mesh

- Combine meshes into 1: **(Select all objects > Mesh > Combine)**
  - Maya keeps a record of the history, so after combining objects there will be a reference icon on the original items & a single new object is added to the bottom of the outliner.
  - Delete the references to clean up the outliner (**select the combined object > Edit > Delete by Type > History**)
  - Single combined object exists & previous reference objects are gone.

- Separate meshes into multiple: **(Select object > Mesh > Separate)**
  - Object will separate into individual projects that are not connected and be children of the original object.

**Example images:**
- Combine meshes into one object.
- Separate meshes into multiple objects.
Creating Layers

- **Found:** channel box/layer editor
- Great for organizing complex scenes, segment, and hide/show different parts of a scene quickly
- Used so that we can work around different objects without disturbing or changing other surrounding objects
- Create empty layers or layers from selected objects
- **Layers provide the following characteristics:** visible/invisible, normal/template/reference, full detail/bounding box, shaded/unshaded, textured/untextured (other options for animation)
Hide/Show Objects

- Used mostly for visualization
- Can Hide/show all objects of a specific type
- **Hide**: (display > hide OR ctrl + H)
  - Hidden objects are displayed with gray text in the Outliner
- **Show**: (display > show > show last hidden OR ctrl + shift + H)
Today’s Mini Goal

**Good:** Create 3 objects: a small house, tool shed, or barn house with a landscape or “floor” to rest on + a fence + a single object that could move (ex: animal, tumble weed, wagon)

*Use most of the tools you learned in class today.*

**Better:** Add *4 or 5 more* smaller elements = rocks, bench, bush, picnic table, bench, chairs, table, chimney, stepping stones, etc.

**Even Better:** have *6 or more different* elements in your scene that complement each other in the scene (example: tool shed, stepping stones, toolbox, garden box, fountain, etc).
Today’s Mini Goal Inspirations
Extra Tasks in Maya

• Try animating something in your scene (ex: make the smoke rise from your chimney, make a tree sway, etc.)

• Use the animation toolset to make the camera fly through your scene and render it.

• Use the content browser to import, models, visual effects, paints, and more to add to your scene.
  • Windows >> General Editor >> Content Browser
  • Search paints to find flora to add to your scene
  • Add any effects or models you want to make your scene more interesting!

• Use the XGen tool to create hair/spikes.
References/More on...

- lynda.com Provides a video playlist under “MAYA 2019 Essential Training”
- Youtube
- autodesk.com
- https://www.youtube.com/user/MayaHowTos
- https://www.youtube.com/playlist?list=PLYffAx5Cja9hoRVSXiLO_vl16Z_ZEUUnFF
- Google Search Terms, write “Maya” + :
  - Boolean tools
  - extrude tool
  - bevel tool
  - polygon subdivision surfaces
  - nonlinear deformers
  - hierarchies
  - grouping objects
  - hide/show objects
  - layers