

Advanced Rigging on Maya

Presenter - Hyun Seung Kim

Who Am I ?

- Creature TD
 - Creatures and Digital Double Dev for Visual Effect Films
 - Variety of Simulation and Rigging
- Character TD
 - Rigging Tool and Functionality Design Dev For Feature Animations
 - Character System Design and Animation System Dev
- Technical Artist
 - Design and Dev on Character Pipeline and Effects for Game
 - Dev on Environment Asset Pipeline
- Technical Art Director
 - Design workflow and solution on asset creation process on both character and environments
 - Lighting and Rendering Tech

About Advanced Rigging

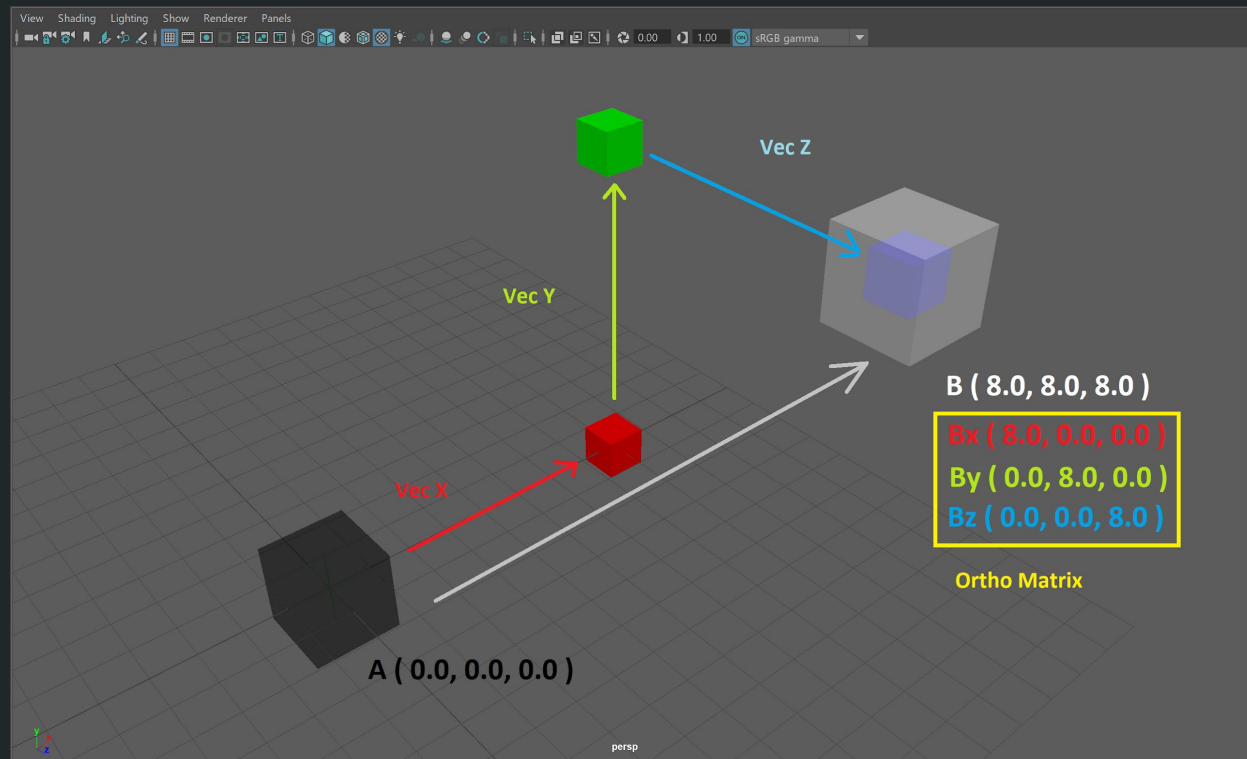
- What is?
 - Two Big Categories
 - i. *Character Asset Creation Process and Automations - Tool / Pipeline Building*
 - ii. Functionality and Complexity for character system - Rigging
- Focus on (with Limited Time)
 - Functionality and Complexity for character system - Rigging
 - i. Common Knowledge on Math
 - ii. Using Node Networks to build

Rigging

- Not Crazy Math (we learned from Middle school)
 - Vector
 - i. Point vs Vector
 - ii. Has 2 types of Data
 - Direction (called Unit Vector)
 - Length (called Magnitude)
 - $\text{Vector} = \text{Direction} * \text{Length} \rightarrow \text{Unit Vector (Direction)} = \text{Vector} / \text{Length}$
 - Matrix
 - i. Not about Movie, “red pill or blue pill”
 - ii. It is simple collection of data with some rules
 - Stacked data with 4 vectors (3X3 and 4X4 Matrix)
 - iii. “Matrix Transformation is Multiplication” - “*MultMatrix*” not “*AddMatrix*”

Rigging

- Visualization
- Vector
- Matrix



Rigging

- Not Crazy Math (we learned from Middle school)
 - Vector Math
 - i. “VectorProduct”
 - Dot (float)
 - **Using for Checking on Direction/Amounts**
 - If $\text{Dot} > 0$ means input 2 Vectors are the same direction
 - If $\text{Dot} == 0$ means input 2 Vectors are 90 degree direction
 - If $\text{Dot} < 0$ means input 2 Vectors are the opposite direction
 - Cross (vector)
 - **Using for Building Matrix often**
 - Maya use LeftHand Order
 - Given Input 2 unit vector, get 3rd vector are 90 degree to inputs
 - Output Vector might **Not** be unit vector

Rigging

- Nodes?
 - Advantage
 - i. Node is Small Function
 - ii. Already Lots of Them on Maya
 - iii. Good User Interface
 - iv. Quick Prototypes of Complexity on Rigging Behaviors
 - v. Custom design and Scalability
 - vi. Good Documentation
 - Disadvantage
 - i. Steep Running Curve
 - ii. Depending on how to use, Difficult or Easier to debug
 - iii. Require Math knowledge and deeper understanding on maya

Rigging

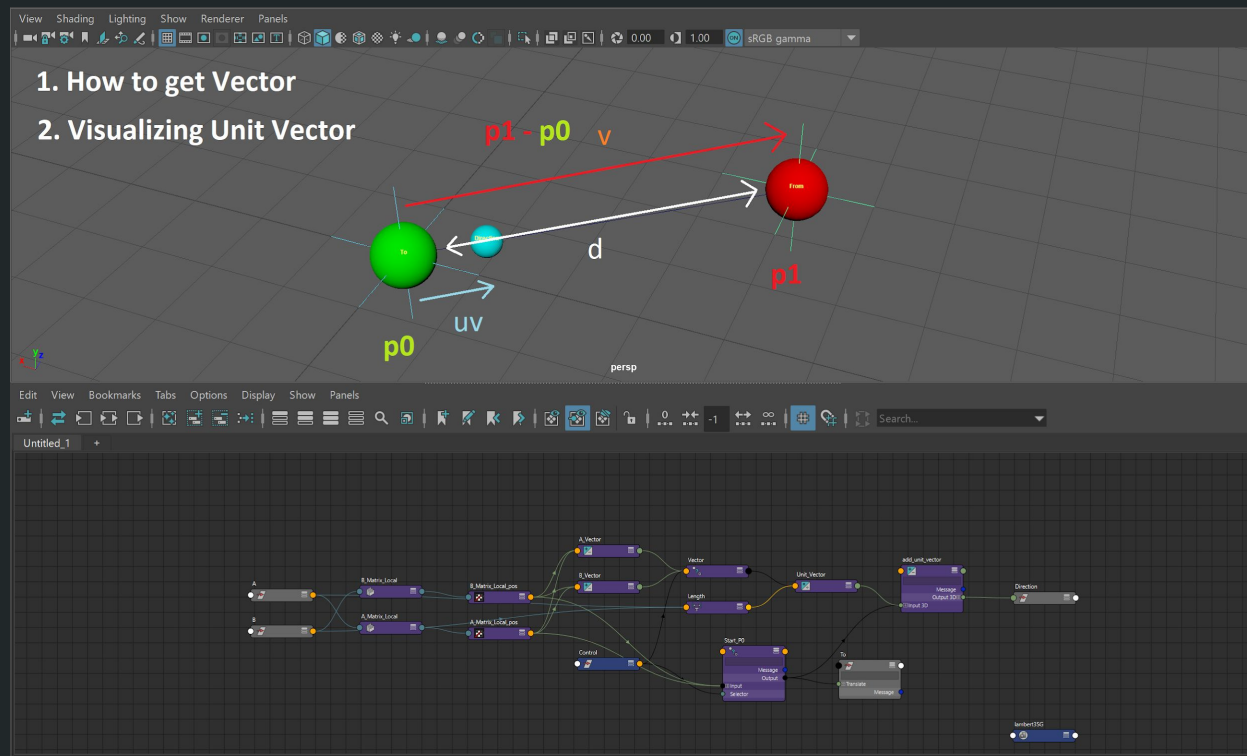
- How to learn
 - **Learn from Examples**
 - **Focus on “Understanding” and Not on “Memorizing”**
 - **Hands on Examples**
 - **Building your own samples**
 - Familiarity of Documentation

Rigging

- Examples (Scenes)
 - vector.ma
 - matrix.ma
 - interpolation.ma
 - space_conversion.ma
 - projectionVector_customConstraint.ma
 - recalculate_rotation_by_JointAxisOrder.ma
 - groundDection.ma
 - More complexed ones for studying
 - i. foot_rocker.ma
 - ii. matrixSumByWeight.ma
 - iii. fnt_quadleg.ma
 - iv. tailsystem_demo.ma

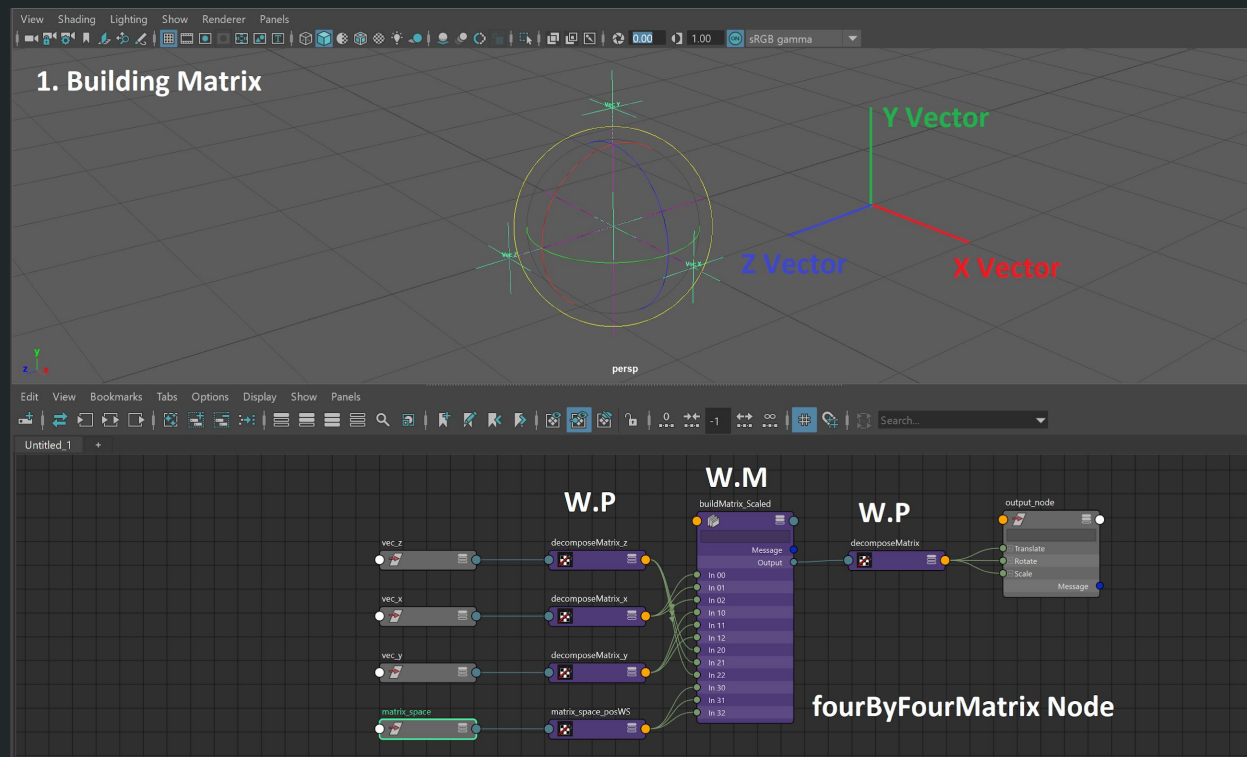
Rigging

- Vector



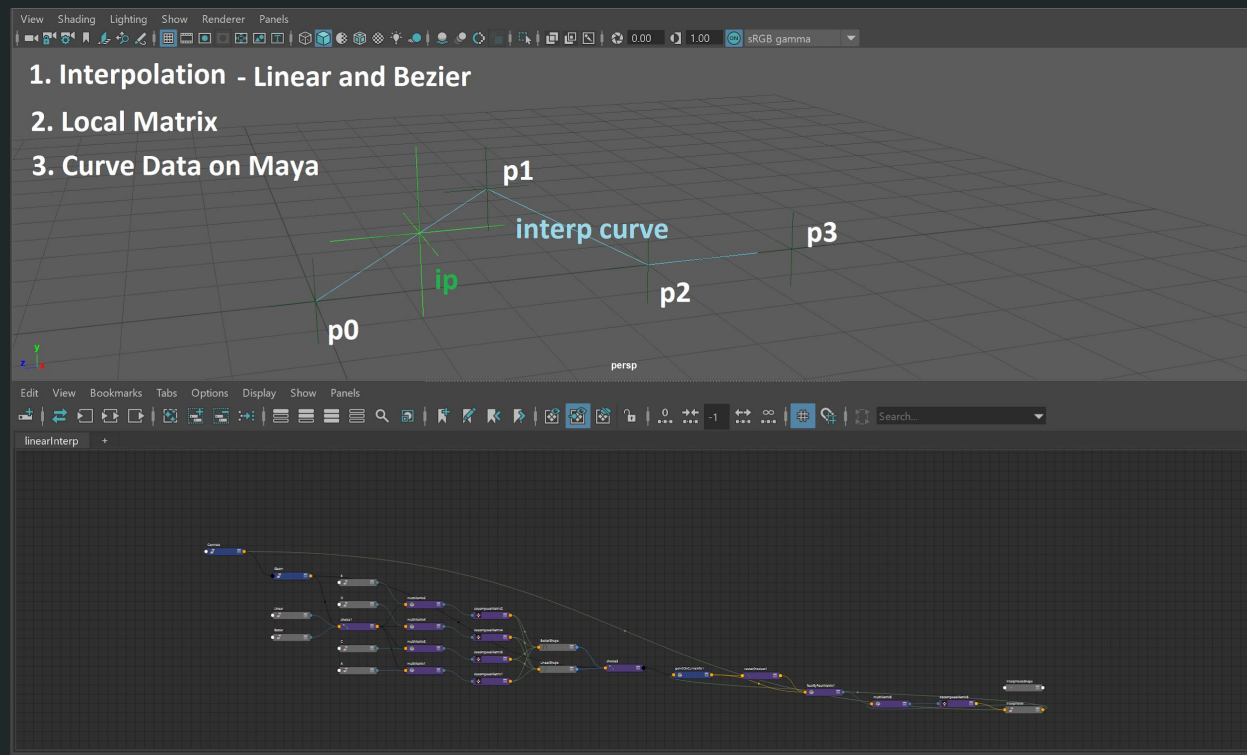
Rigging

- Matrix



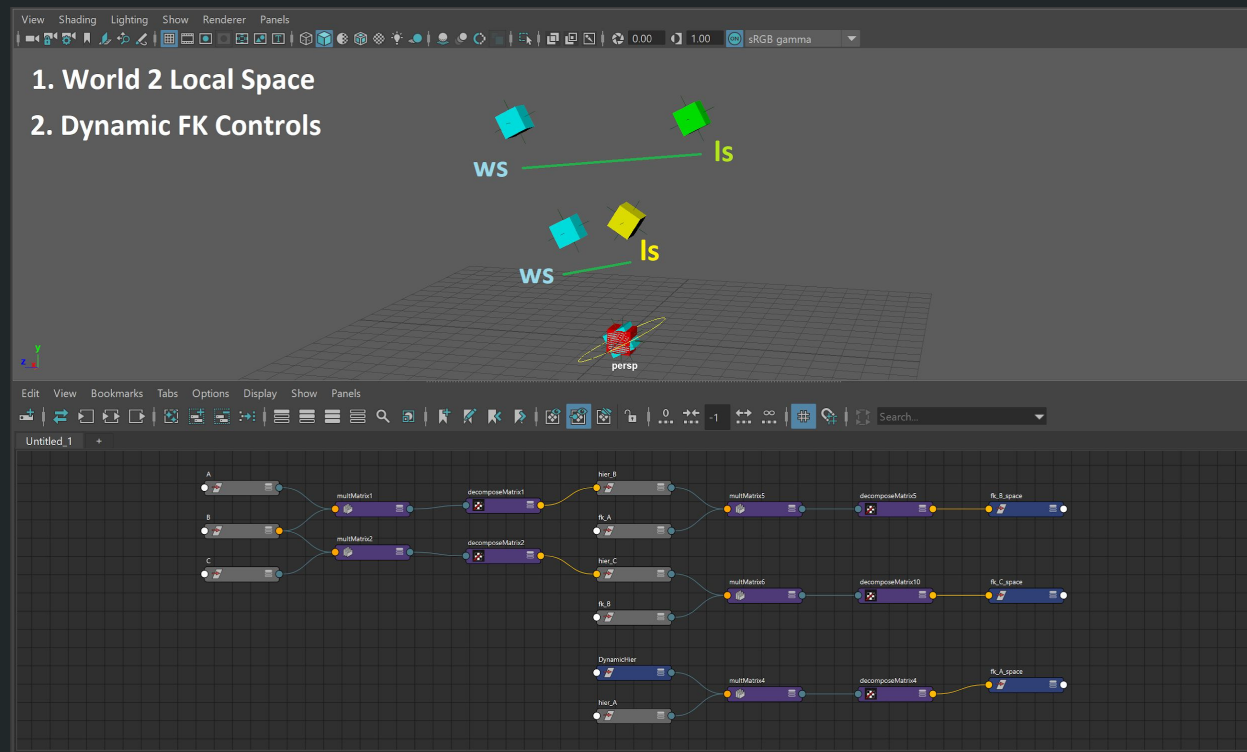
Rigging

- Interpolation



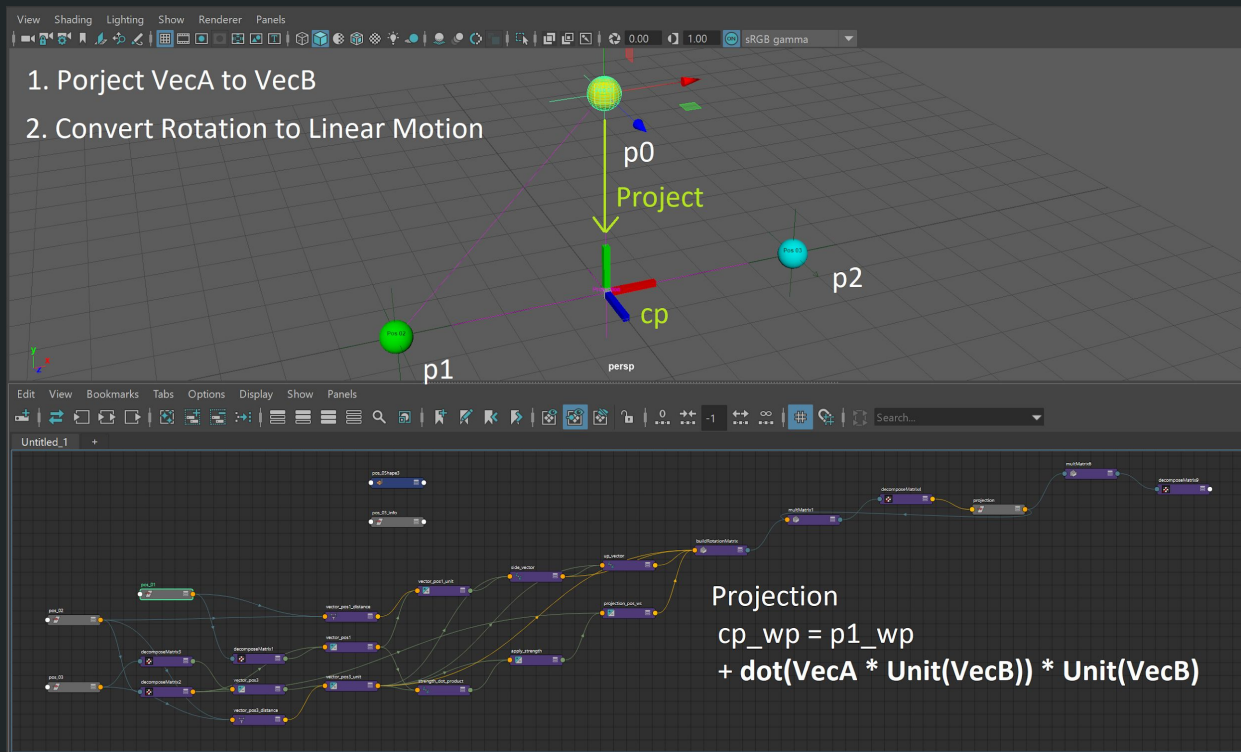
Rigging

- Space



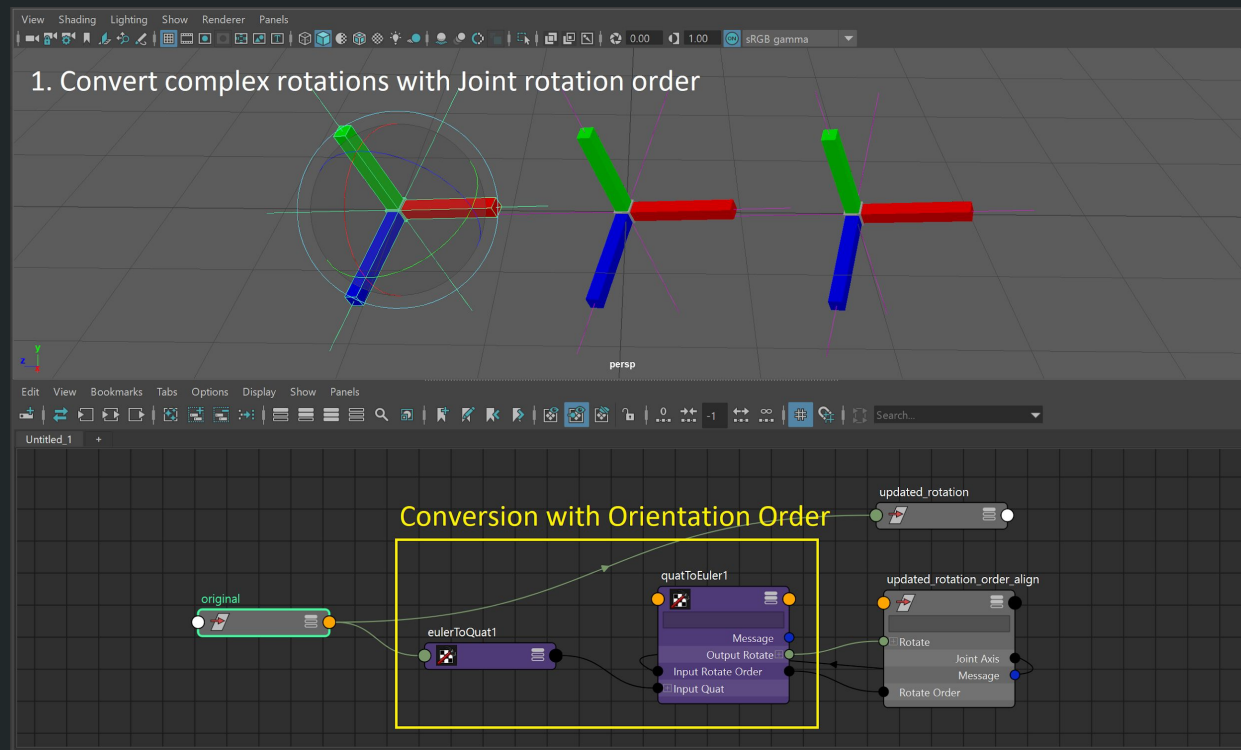
Rigging

- Project



Rigging

- Axis Order

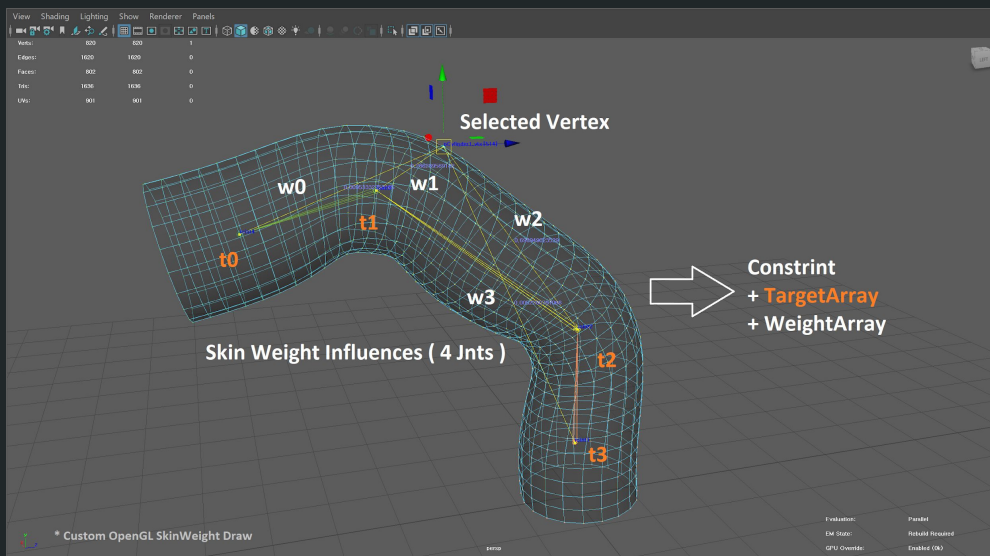


Rigging

- Ground Detect

Rigging

- Examples (Scripts)
 - Create Surface Constraint without using geometry operation
 - i. Convert SkinWeights to Constraints



Rigging

- Access Data
 - Shaded git repository - “git clone git@github.com:artigee/Maya-Rigging-Example.git”
 - Bonus
 - i. Script - convertSkinWeight2ParentConstraint.py
 - ii. Plugins - curveLength2ParamU.py (for tail system)

Questions

- Not Limited to the today's topics

Thank You

Contact

- Technical Art Director
- Hyun Seung Kim 김현승
- Email: artigee@gmail.com