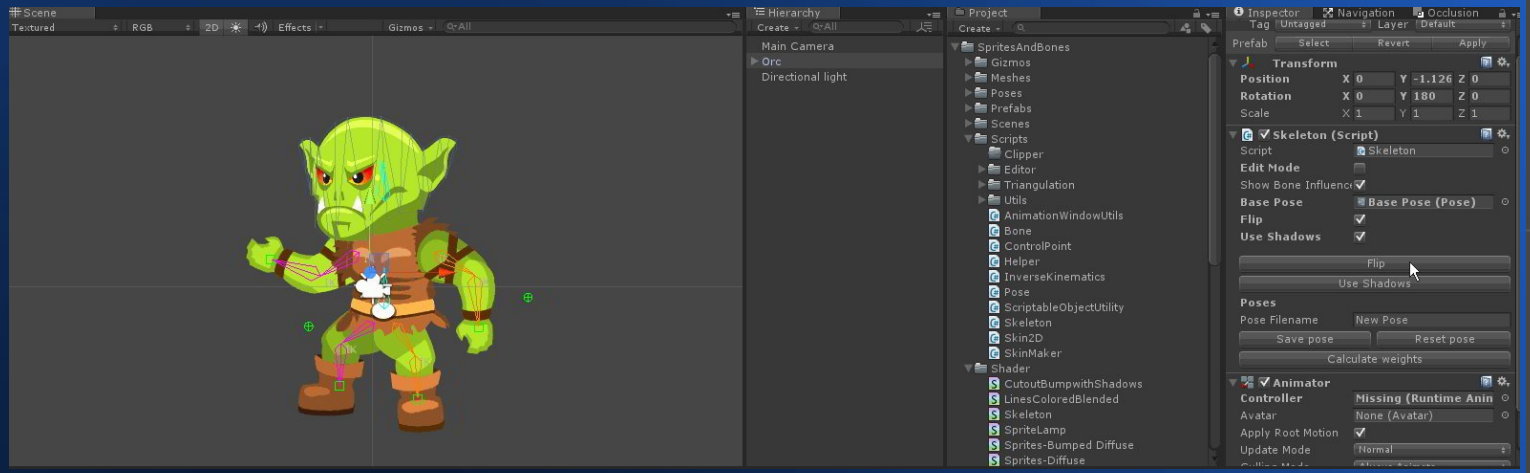
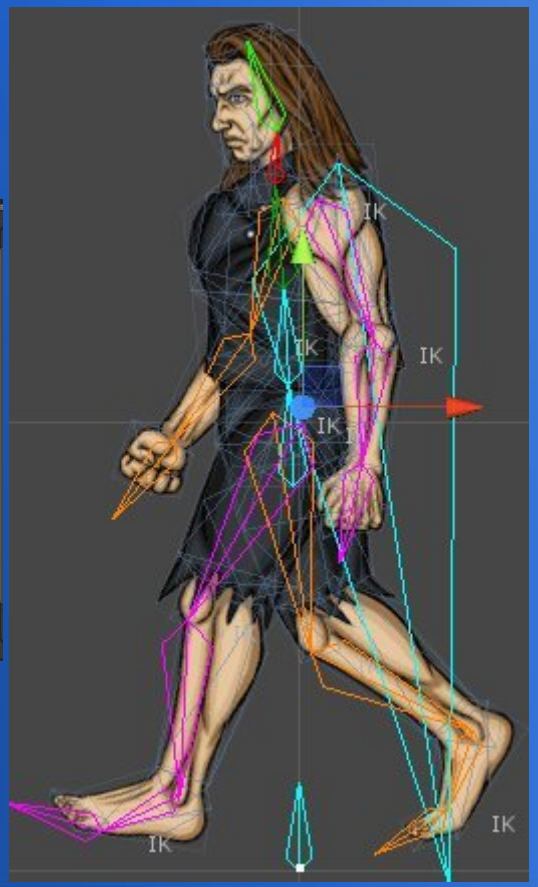
2D Skeletal Animation with Unity

Using Unity as an Animation Tool





Unity PSD Importer

- Create layout in Photoshop and import layers as sprites to save time manually positioning layers
- Download the DLL and drop in editor folder or follow manual installation instructions on Github page

https://github.com/ChemiKhazi/UnityPsdImporter

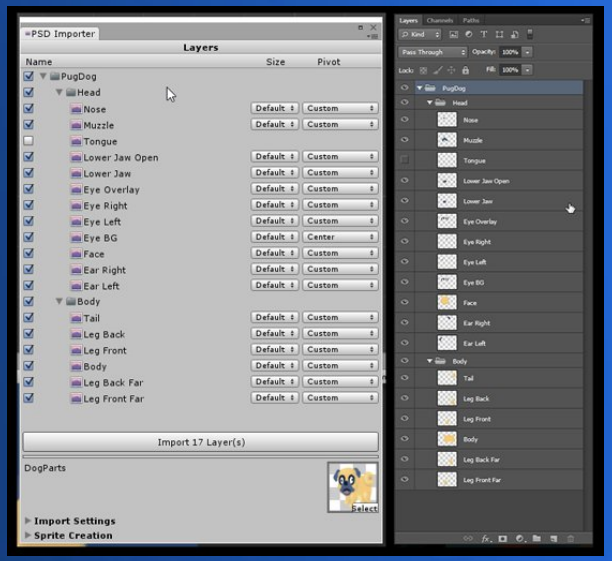
- Import your PSD file and drag it to the

PSD Importer window

- Set the pivot points and size

and any other settings

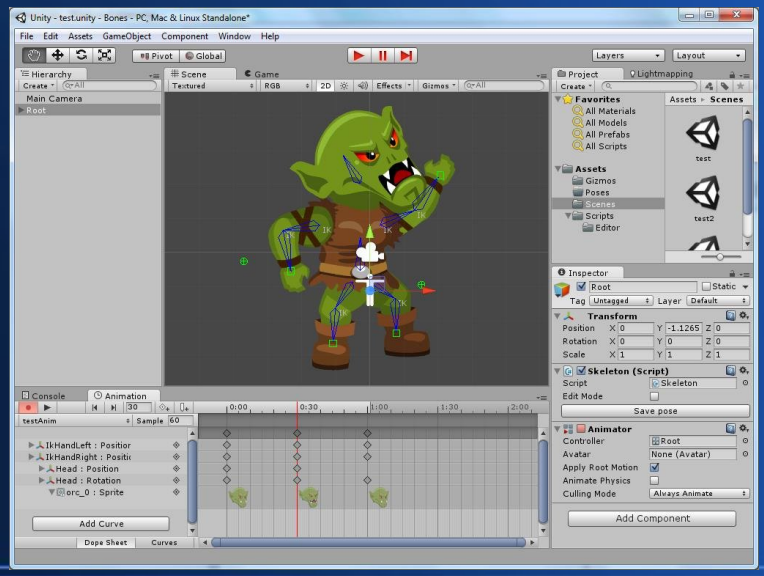
- Import the layers as sprites



Unity Sprites and Bones

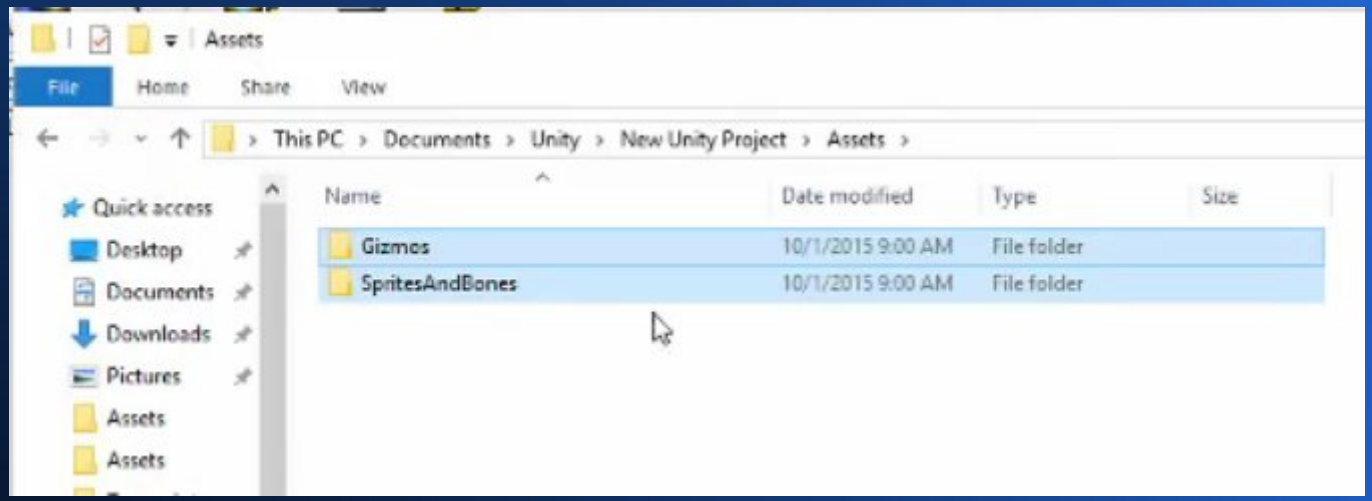
- Get Unity Sprites and Bones an Open Source 2D Skeletal system to create animations
- Unity Sprites and Bones features include IK, Angle Constraints, Free Form Mesh Deformation, Export Poses, Undo Support, and lots of customization and helper tools

https://github.com/playemgames/UnitySpritesAndBones



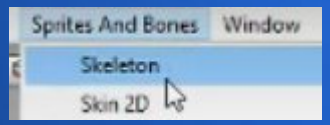
Setting up the Project

- Download the zip file from Github
- Open the zip file and drag and drop into your project folder

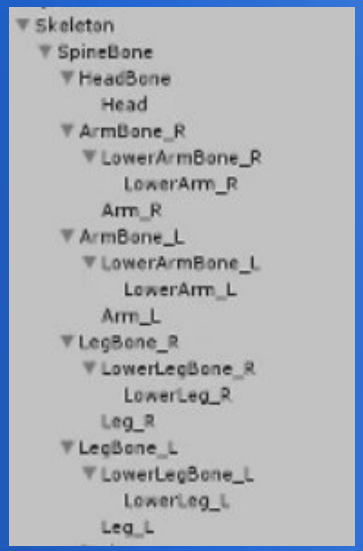


Setting up the 2D Rig

- Set up the sprites in a hierarchy in which the parts will move.
- Add the Bones by going to Sprites and Bones/Skeleton.

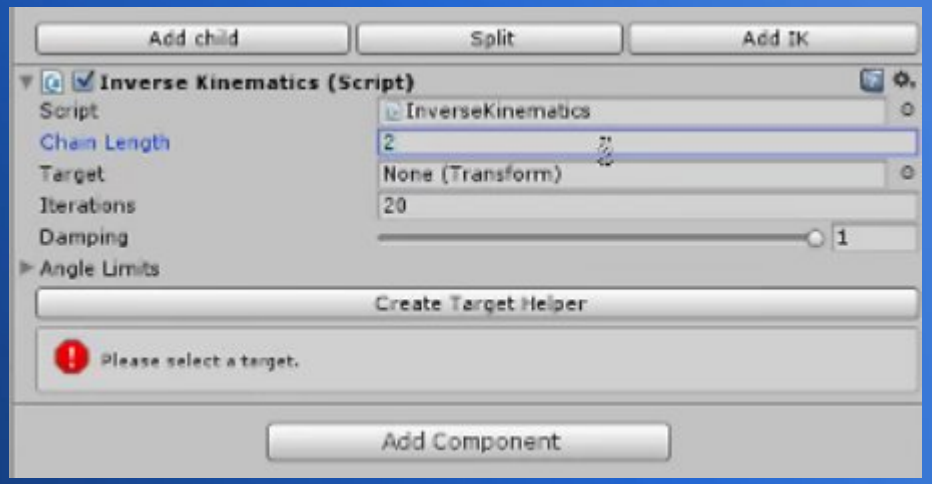


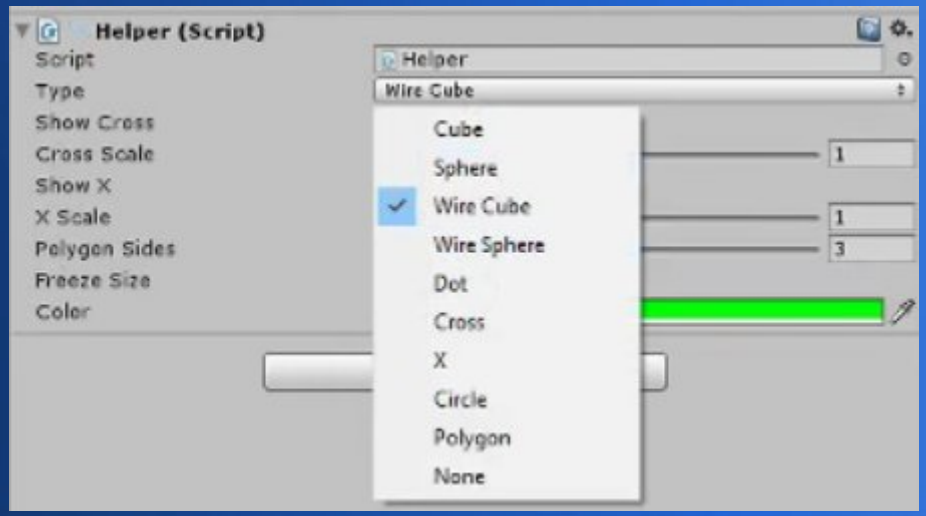
- Ctrl + Left click on the Scene View or the Add Child or Split button in the first Bone Component to create new bones in the Skeleton.
- Move the Bones into the placement of your sprites.
- Drag Sprites into the Skeleton and Bone hierarchy.
- Make sure all bones have a unique name!



IK Rigging

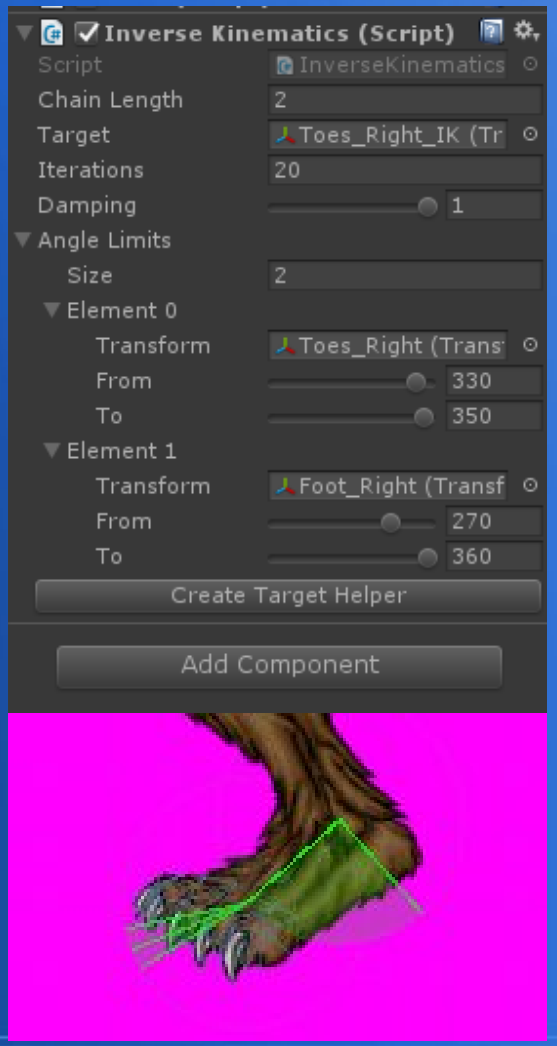
- Select the bone you want to set up an IK chain on and click on the Add IK button
- Change the chain length to match the number of bones you want to influence with the IK
- Click on Create Target Helper to add an IK Target Transform to control the IK Chain
- You can customize the look of the Helper to differentiate them from each other





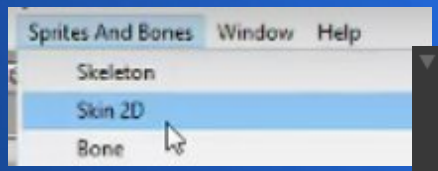
IK Angle Constraints

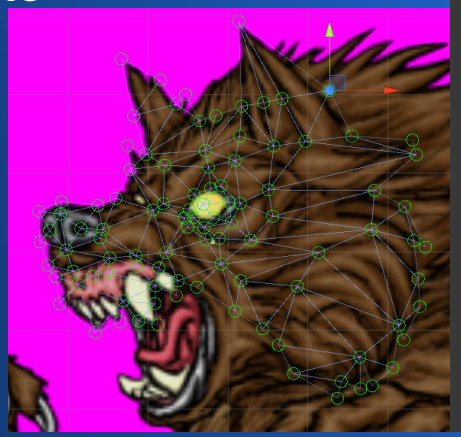
- Select the Bone with the InverseKinematics component you want to limit the angle of.
- Change the size of the Angle Limits to how many constraints you want to have.
- Add each Bone to the Transform fields that you want to constrain
- Change the From and To sliders to constrain the angle to that Bone transform



Free Form Deformation

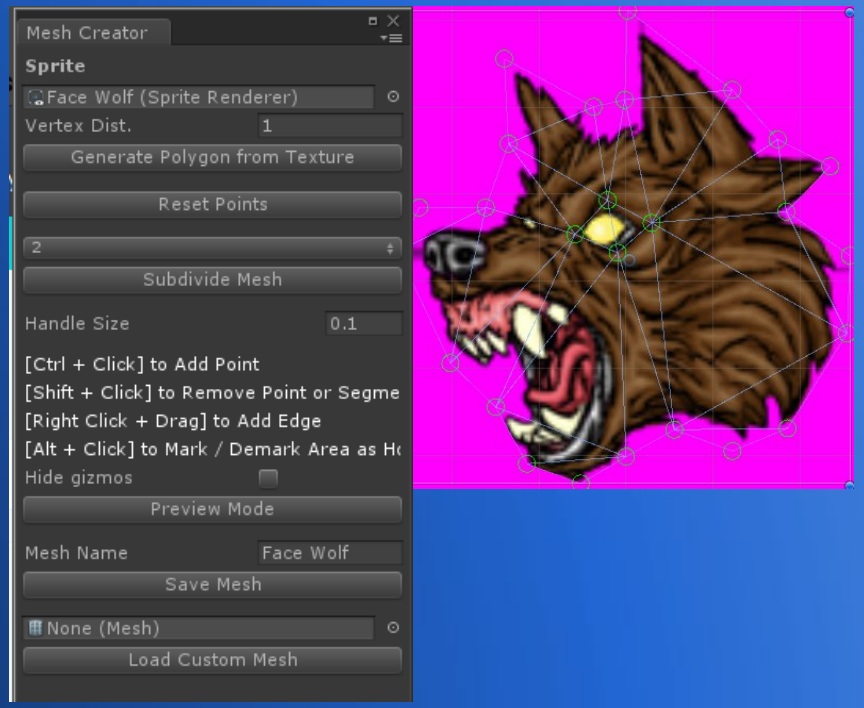
- Select the Sprite you want to Deform
- Go to Sprites and Bones/Skin2D to convert the Sprite to a Skinned Mesh Renderer.
- In the Skin2D component, click Create Control Points to create individual control points to deform the mesh.
- You can change the handle size and color of the control points or reset them if needed.
- After you have completed your changes save the Skin2D as a Prefab with the Save as Prefab button.





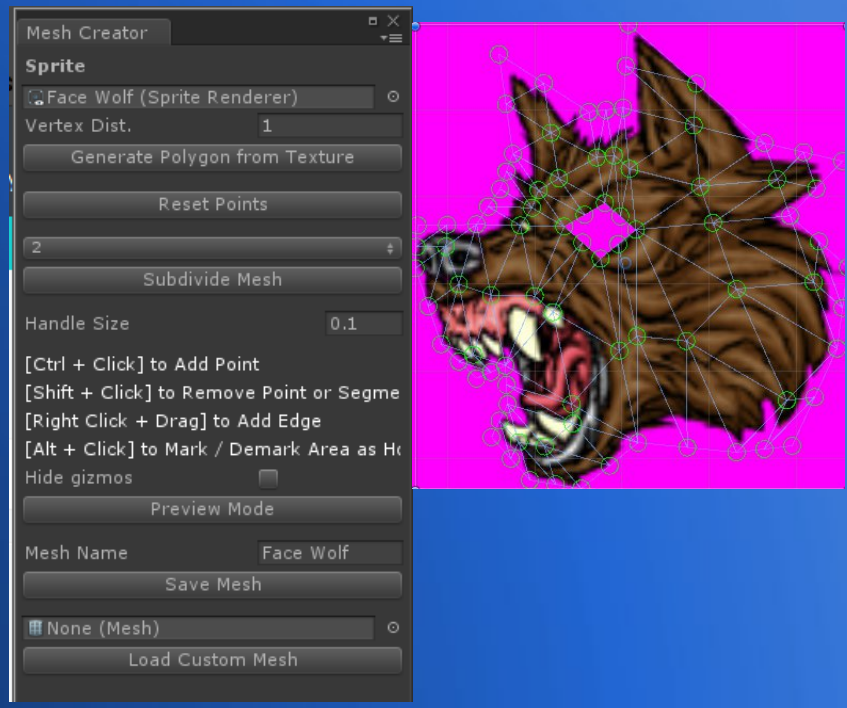
Mesh Creation – Mesh Creator

- You can make more customized meshes using Mesh Creator or Create Mesh.
- Select the Sprite you want to create a Mesh for.
- Go to Sprites and Bones/Mesh Creator to pop up the Mesh Creator Window.
- You have the option of Generating a Polygon from the texture or creating your own vertices and edges for the mesh.



Mesh Creator Continued

- Ctrl + Left Click to add points, Right click and Drag from point to point to create edges. You can press Shift + Left Click to remove points or edges. Use Alt + Left Click to mark an enclosed area as a hole.
- Click the Preview Mode Button to get a preview of the mesh, you can drag points around to see how the vertices control the mesh.
- You can Subdivide the Mesh using the Subdivide Mesh button, and change the levels of subdivisions above that.
- To save the mesh, change the name in the Mesh Name field and click the Save Mesh field. This will save the Mesh under the Meshes directory.
- You can also Load a saved mesh to edit using the Load Custom Mesh button.

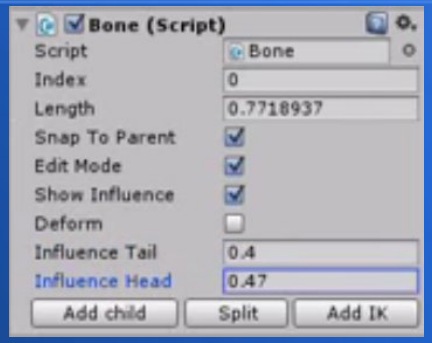


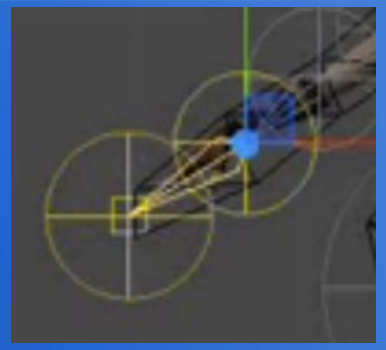
Replacing the Mesh

- Select the Skin2D you want to replace the mesh with.
- Drag and drop the new mesh into the MeshFilter component of the Skin2D.
- Click on Recalculate Bone Weights in the Skin2D component. You can lock the weights of other Skin2D components so their weights will not change.
- This will create a SkinnedMesh under the Meshes/SkinnedMeshes folder in a folder of the Skeleton's name.

Skinning Using Bone Influence

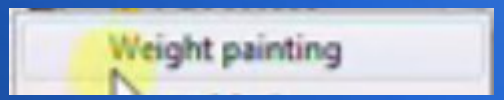
- You can use Bone influence to skin the Skin2D to the Bone. Make sure the Skeleton is in Edit Mode before you start.
- Check Show Influence and edit the Influence Tail and Influence Head to see circles envelope the areas you want to skin.
- Go to the Skeleton Component and click on the Calculate weights button.
- This should skin the weights to the bones you have influenced.

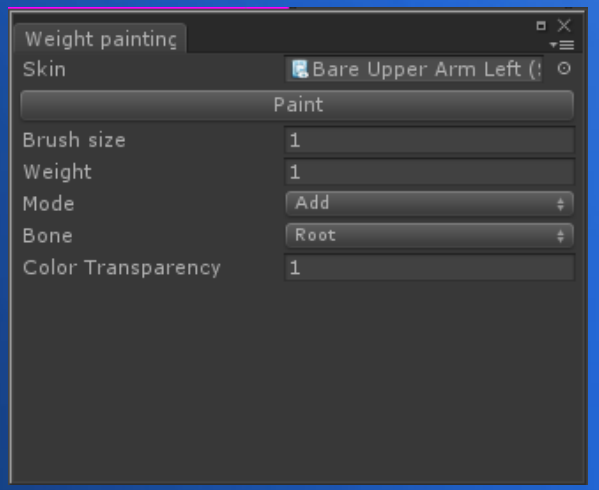


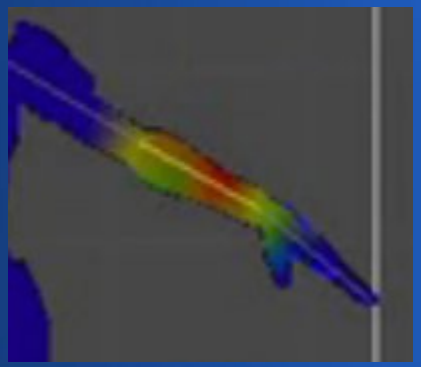


Skinning Using Weight Painting

- Select the Skin2D you want to paint on.
- Go to Sprites and Bones/Weight painting to start painting the Bone weights.
- Select the Add or Subtract mode to add or remove paint from the mesh.
- Change the Bone to the bone you want to skin to.
- Click on the Pain Button to start painting the vertices of the Skin2D to the Bone.
- You can change the transparency of the colors here as well by changing the Color Transparency value.

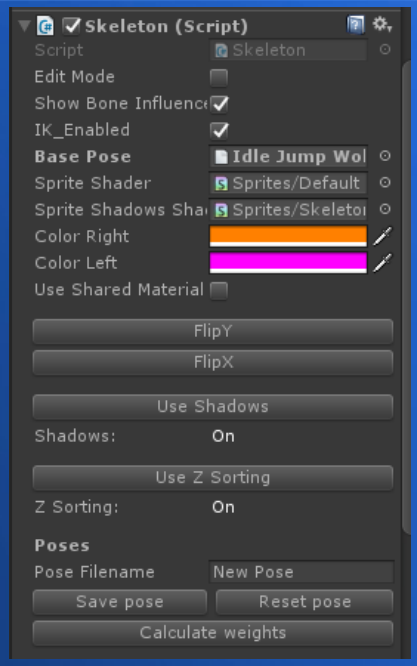


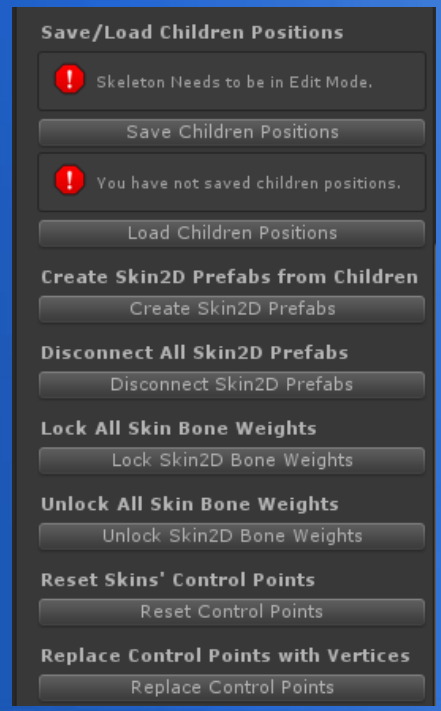




The Skeleton

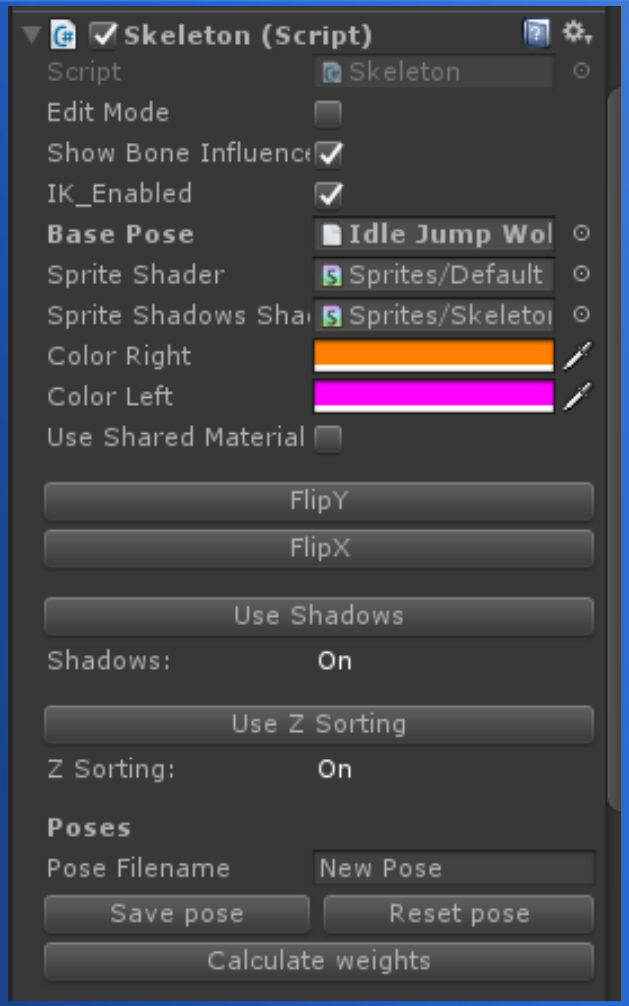
- You can turn on and off IK in the skeleton component using the IK_Enabled checkbox.
- If you want to Flip the skeleton using rotation you can use the FlipX or FlipY buttons. You can also scale the root transform of the Skeleton.
- You can use separate shaders for the Sprites or Sprites using Shaders in the Shader fields.
- The Skeleton can use only Shared Materials if the Use Shared Material checkbox is checked, otherwise it will instance the material on play.
- Use Shadows and Use Z Sorting changes the materials Normal and Sorting Order values of the Sprite and Skinned Mesh Renders of the Skeleton.
- There are other helper buttons for convenience functions associated to the components of the rig here.





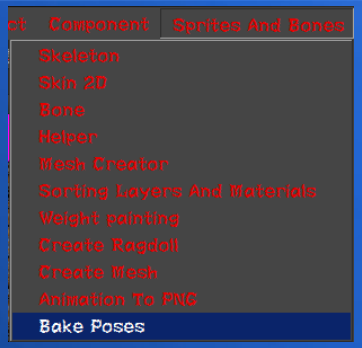
Posing and Animating

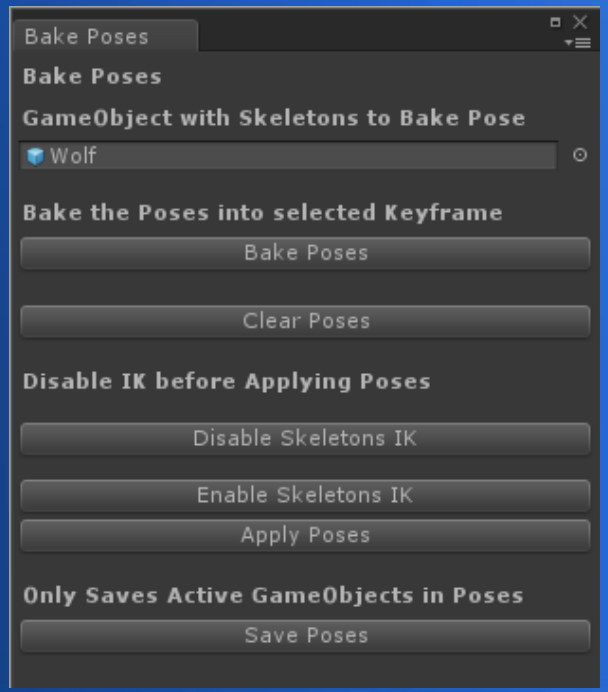
- Make sure you uncheck Edit Mode before you start animating or posing your rig.
- Move your IK Helpers or the Bones in your rig to make a pose.
- Save the pose by renaming the Pose Filename field in the Skeleton Component then click on the Save Pose Button.
- The Pose should be saved to the Poses directory. Drag it into the Base Pose field to make it the base pose.
- Click on the Rest Pose button if you want to reset the rig to the Pose set in the Base Pose field.
- Reseting the Pose while the record button is on in the Animation Window will set keys to all the control points and bones in the rig.



Animating and Baking

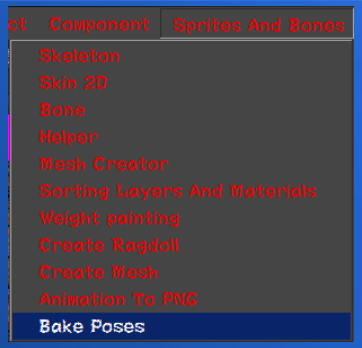
- You can animate the rig in the Animation Window, keys will be created for IK Helpers, Bone positions and rotations, and Control Point positions in the Skin2D components.
- You can Bake Poses to be applied in the Animation Window to bake in IK keys to help save on CPU cycles for the animation.
- Go to Sprites and Bones/Bake Poses to bring up the Bake Poses Window.
- Drag and drop the root Game Object of the rig into the field and the buttons will show.

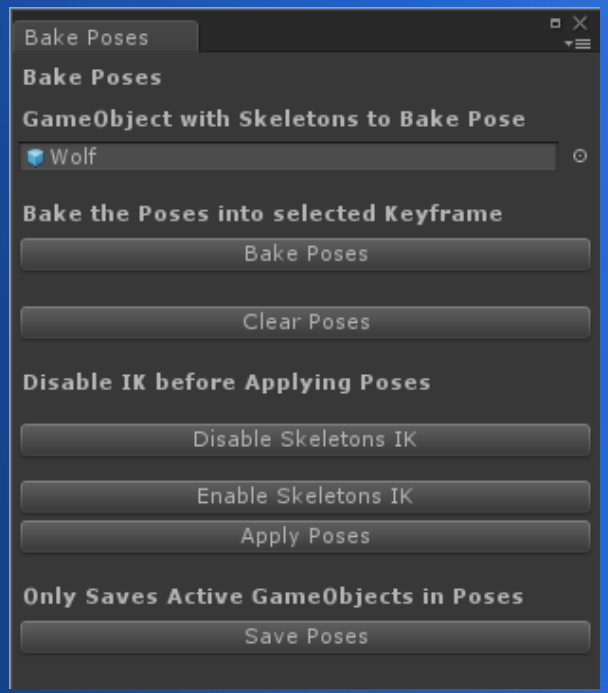




Baking Continued

- Click on the Bake Poses button if you want to Bake the poses of the Skeletons in the rig.
- Disable the IK before hitting the Apply Poses button to apply the Poses to the frame you are on in the Animation Window.
- You can save out the poses for the active gameobjects to Pose files in the Poses directory with the Save Poses button.
- You may need to turn on IK and reposition the rig again to make sure all the keys you want set are applied.
- Hitting Apply Poses only sets keys for those Control Points and Bones that are currently different than what is displayed. If the current pose and the baked pose are the same there will be no extra keys created.



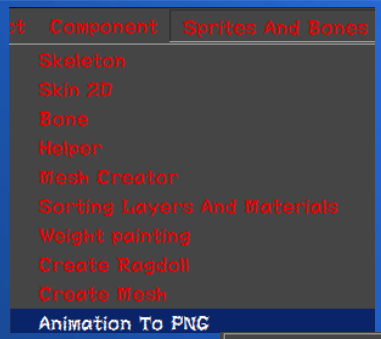


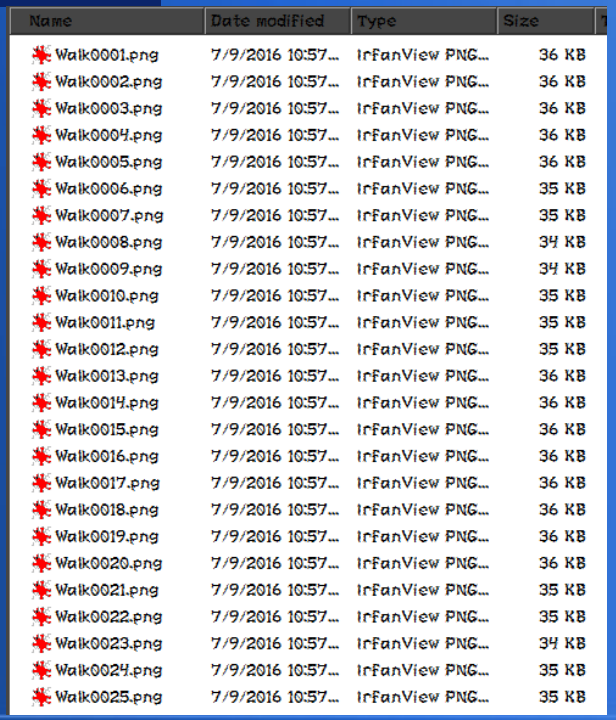
Rag Doll Creation

- A 2D Ragdoll can be created from the bones of the Skeleton.
- Select the Skeleton you want to make a rag doll of.
- Go to Sprites and Bones/Create Ragdoll
- A ragdoll will be created from the Skeleton, using BoxCollider2D and RigidBody2D components. The Bone length is used to make the size of the colliders.
- You need to manually adjust the size of the colliders to better fit your rig.

Animation to PNG

- An animation can be exported to a PNG sequence using the AnimationToPNG tool.
- Go to Sprites and Bones/Animation To PNG to create an Animation To PNG Game Object.
- This object will have the AnimationToPNG component attached, you can adjust the Animation Name, Folder to export to, the frame rate, frames you wish to capture, and the Pixels To World Unit here.
- Hit Play to start the export.
- The exported PNGS should be in the folder you designated in the component. Make sure to delete the Animation To PNG Game Object when finished.





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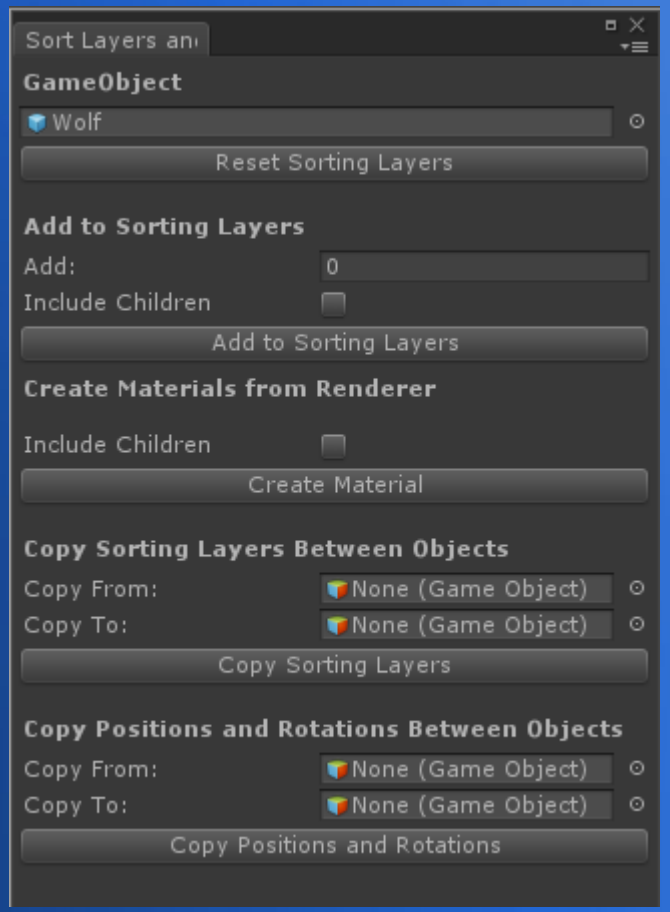
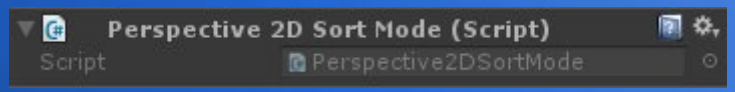
Sorting Layers and Materials

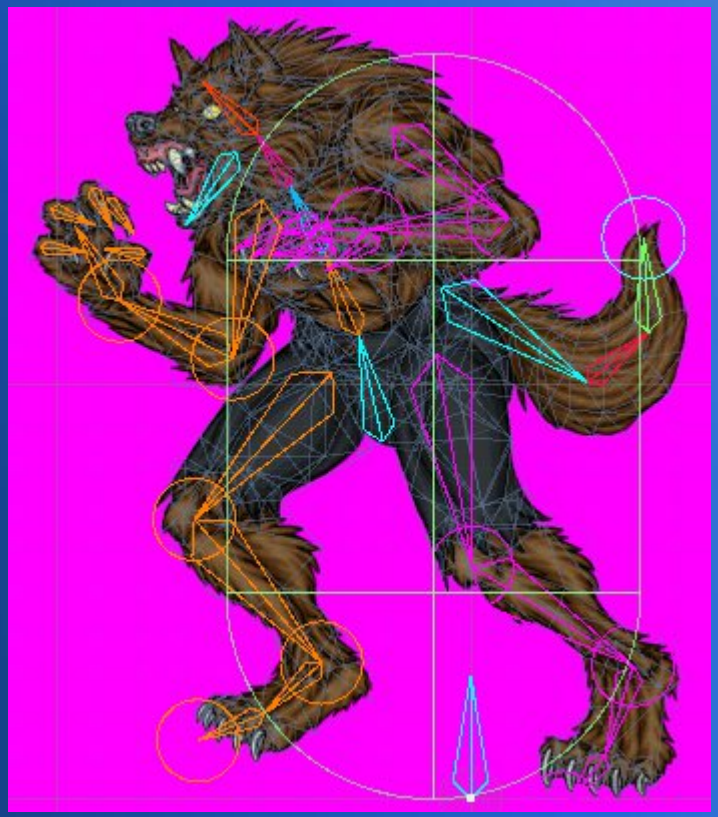
- You can use the Sorting Layers and Materials tool to help sort the objects in your rig.
- Select the game object with your Skeletons and go to Sprites and Bones/Sort Layers and Materials.
- The Sort Layers and Materials Window will pop up.
- You can Reset Sorting Layers to 0, add a number to the Sorting Layers and affect the children of that Game Object. You can even create Materials from the Renderer of that object.
- You can copy Sorting Layers, Positions, and Rotations between Game Objects so that they match.



Tips, Tricks, and Extras

- In order to use Z Sorting properly you must add a Perspective2DSortMode Component to your camera.
- There are some shaders provided for Sprite Cutout using Shadows in the Shader folder.
- The more control points you use, the more keys are created which can slow down the Animation Editor.
- There can only be up to 512 control points on a mesh, it can be edited in the script to hold more if needed.
- RestorePose() can be called from the Skeleton component in script to restore a pose to it's base pose.
- You can customize the colors of bones and the shapes and colors of helpers.
- It's free and open source so improve and share!





Links and Contact

For more questions on 2D skeletal animation, game development or my current project Lone Wolf contact: Brad Nelson info@lonewolf.ws

http://www.lonewolfgame.com or http://www.lonewolf.ws