Maximo, MechAnim, Animator & Animation

▼ Maximo

You can visit the Maximo website here

▼ What is Maximo

Maximo is a FREE Adobe Platform that allows you to download multiple models and animations.

Additionally you can use Maximo to rig your personal 3D Humanoid Models with Animations.

▼ Unity and Maximo

With Maximo you can easily Prototype characters using the default X or Y bot and download a variety of animations for them.

To download animations you will need to apply the following settings:

- If the animation is moving
  - Check the “In Place” checkbox ☑️
  - This will ensure that the model maintains its origin
- Downloading
  - Format Setting
    - Choose Unity FBX, this option optimizes the model and animation for Unity
  - Skin Setting
    - Here you can choose with or without skin.
      - With Option - Downloads the model and the animation

        - Without Option - Only downloads the animation
    - Frames Setting
        - Determines how many frames your animation will have, higher numbers means the models download size will be bigger
    - Keyframe Reduction Setting
        - This will remove animations that do not have enough variations between each frame. Thus reducing the number of total frames of the overal animation.
- Importing
    - Drag and drop the FBX into your unity Project.
    - Select the FBX model
    - Select the Rig Tab
        - Set the Animation Type to Humanoid
        - Set the Avatar Definition to Create from this Model or Create from other Model
            - Create from other model implies that another models skeleton will be used as a Skeleton for this model
            - This also means that the 2 skeletons the source and the current share the same properties
        - Skin Weights
            - If you

▼ Unity + Maximo

▼ Importing and Preparing a Maximo Model

- Login to Maximo and download your character and animations
    - In our case, we have Idle, Walk and Run
- Import your character and animations to Unity by Dragging and Dropping the FBX Models

- Add your model to the scene and Right Click and Select, Prefab, Unpack Completely
- If any of the Characters you imported that are display a default material do the following
    - Select the Model
    - Go to the Inspector
        - Click on the Materials Tab
            - Click Extract Textures
            - Click Extract Materials
        - Setup the Materials accordingly with the textures you extracted
        - Add the Materials to your character in the scene
- Add a Animator Component to your Character in the scene, we will need it to animate the object
    - Create an Animator Controller for the Character in your Project Files
        - Right Click in your project and navigate to the following, Create/Animator Controller
        - Create additional Controllers if required
            - Alternatively, if any of the other controllers are going to reuse the same animations with the same conditions then use a Animator Override Controller

▼ Model

▼ Rig

- Animation Type
    - None - Disables Rig
    - Legacy - Original Unity Animation System (DO NOT USE IT)
    - Generic - Default Animation Type for Character Rigs
    - Humanoids - This is the new Unity System MechAnim, that allows you to retarget animations for Humanoid Characters AKA

Characters that have a skeleton

- Avatar Definition
  - Create From This Model - Creates a Skeleton Avatar from the Selected Model
  - Create From Other Model - Copies the Skeleton Avatar from Another Model
    - Note - This option implies that 2 Models have a similar Skeleton (bones are named the same), if this is not the case, do not use this option.
  - Skin Weights - Allows you to modify the vertices of a mesh on a per bone basis
    - Those of you who have model characters will know more about this
    - 4 Bones Default - Tells Unity that up to four bones can be used to influence a vertex.
  - Optimize Game Objects - Removes the Transform Hierarchy from the Imported Model. You should use this setting when shipping your game

▼ Avatar

- Displays a human like structure of the models humanoid body
  - Body - Entire Avatar
  - Head - Only the joints of the Head
  - Left and Right Hand - Only the bones of the Hand
- Mapping
  - Clear - Remove all Bones
  - AutoMap - Automaps all bones found in the model to the correct positions in the Avatar, this is done the first time you create a humanoid avatar
  - Load - Load and reuse avatar

    - Save - Save and reuse avatar for models that have the same bone names.
- Pose
    - Reset - Resets its bone transformations back to the starting frame of the animation of the model
    - Same Bind Pose - reset the characters bone positions back to the characters bind position.
        - The Bind Position is the position the character was in initially binding done in a 3D Modelling software
    - Enforce T Pose - Enforces the T Pose for your Model

▼ Animation

- Clips
    - This is a list of the animations attached to the model
    - You can view the Animations below in this window by selecting an animation and pressing the ▶️ Button
    - You can also extract animations from the Model by selecting the animation in the Project View, and Pressing ctrl+d to duplicate it.
        - Note - Duplicating an Animation from a Model maintains its Avatar setup
- Loop Time - This controls if an animation should be looped (True) or not looped (False)
- Root Transform Rotation
    - Bake Into Pose -
        - Enable to make Root Rotations be baked into the movement of the bones.
        - Disable to make Root Rotations be stored as Root Motion
    - Based Upon -
        - Body Orientation - Keeps the upper body pointing forward

        - Original - Keeps the Rotation as it is authored in the source file
    - Offset - Changes the default facing Direction of the Model
- Root Transform Position (Y)
    - Bake Into Pose
        - Enable to make vertical root motion be baked into the movement of the bones
        - Disable to make vertical root motion be stored as root motion
    - Based Upon
        - Original - Keeps the Vertical Position as it is authored in the source file
        - Center of Mass - Keeps the center of the mass aligned with the root transform position
        - Keeps the feet aligned with the root transform position
    - Offset - Offset to the Vertical root Position
- Root Transform Position (XZ)
    - Bake Into Pose
        - Enable to make Horizontal root motion be baked into the movement of the bones
        - Disable to make Horizontal Root Motion be stored as root motion
    - Based Upon
        - Center of Mass - Keeps the center of the mass aligned with root transform position
        - Original - Keeps the Horizontal position as it is authored in the source file

▼ Animator

▼ Component

▼ Controller

The animator Controller controls the animation states of the the model.

It allows you to setup how your animation states will change from one state to another.

To change from one animation state to another we use Parameters (bool, float, int, trigger).

By applying these Parameters we create conditions that need to be met before a specific animation state can be played

▼ Avatar

▼ Apply Root Motion

Root motion allows us to change the motion of the character to be controlled either by Script (Apply Root Motion = False) or by the Animation (Apply Root Motion = True).

Remember in Maximo, when you click “In Place” to be true, this implies that we want to control our Characters movement by Script and not by the Animation!

▼ Update Mode

- Normal
  - This will Alter the Speed of the Animation based on the Time Scale of the Project.
  - This implies that if you set the Time Scale to .5f (half the speed) the animation will play half the speed as well.
  - This is great for slow mode effects
- Animate Physics
  - Shifts the Animation logic to the FixedUpdate()
  - Use this option if your Character or Object will be interacting with Physics Based Objects
- Unscaled Time

- This means that the Animation will play independently from the Time Scale.
- This means that if you Change the Time Scale of your game, to .5f (half the speed) the animation will still play at full speed.

▼ Culling Mode

Culling is a technique that prevents unity from performing rendering calculations for objects that are completely hidden.

- Always Animate
  - This implies that the object will always animate regardless if its in the view of the camera or not.
  - This should be changed to either Cull Update Transforms or Cull Completely if your project has many animators in the scene
- Cull Update Transforms
  - Unity calculates the frames of the animation, when the object comes into view again, the animation will continue as if it never stopped.
- Cull Completely
  - This will completely stop the animations of objects that are no longer in view

▼ Animator Window

▼ Parameters

- Types (float, int, bool, trigger)
  - A trigger is also like a boolean, however it behaves differently.
  - Personal opinion it behaves more like an event callback
- To use Parameters click the + button and choose which Parameter you need and name them accordingly
- To use your Parameters you need to create Transitions.

▼ Transitions

- To create a Transition between 2 animation states you Right Click the Animation and select Make Transition and then Click the Destination Animation State
- Transitions allow you to switch between one animation state to another
- To switch between one state to another we use Conditions
- If you click on a transition arrow, you will see a conditions list in the inspector

▼ Conditions

- Conditions allow use to create criteria for our animations to transition from one state to another
- To add a condition, click the + button
  - This will create a new condition
- The condition will have a drop down
  - This drop down will contain a list of all of your parameters.
- To change the values of your Animator Parameters, you will need to use your C# skills and knowledge of the Animator

▼ Additional Settings

- Has Exit Time - This means that x% of the animation needs to be completed before transitioning
- Settings
  - Exit Time - Represents the X% of the animation that needs to be completed before transitioning to another animation state
  - Transition Duration
    - A blend Duration of 0 means that the transition between the animations will be snappier
    - Any value greater than 0, Blends the the two animations together producing a long transition duration between the animations

        - Transition Offset - This represents a value between [0,1] and allows us to start x% in to an animation
            - 0% means the start of the animation
            - Other than 0%, any X% will start X% into the animation
        - Interruption
            - This allows us to quickly switch between different animations mid transition
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▼ Blend Tree Settings

- Blend Type
    - 1D - Blends Animations in a Linear Fashion, for example from Idle to Walk to Run
    - 2D - Blends Multiple Animations for Multiple Directions
- Threshold - Distribute the Parameter Value across the blend tree
    - Auto Thresholds will try and evenly distribute the Parameter evenly across the blend tree
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▼ Animation

- Record
    - Allows us to record changes to the objects components (movement, rotation, change in colour, etc)
    - We can also apply these changes on the Property itself in the animation window
- Add Keyframe Button
    - Adds your changes in the inspector to the Animation Preview
    - It records any manual changes you made to the object as an animation keyframe
- Samples

    - Represents the number of frames per second
- Events
    - Allows you to trigger callbacks to your methods of scripts attached to the object
    - The Methods of a script you want to access needs to on the animated object.
- Add Property
    - Allows you to edit the properties of components during the animation