Overview

Insert Clipboard into Array

This class listens to a Control + C hotkey (or the added “Clipboard from Selection” context menu) to store the current selection. You can then right-click on any array property in the inspector to add that selection to the array.

Menu Items

This module contains the following items, which can mostly be found under the Tools menu:

- Transform Utilities
  - **Parent to Active (Ctrl T)**
    Parent all selected transforms to the active transform.
  - **Unparent Transform 1 Level (Alt T)**
    Parent selected transforms to their parent’s parent.
  - **Orphan Transform (Ctrl Alt T)**
    Parent selected transforms to the root level.
  - **Abstract Transform (Alt Shift T)**
    Create a new empty transform with the transform properties of the active transform, and parent selected transforms to it.
  - **Usurp Parent (Ctrl Shift T)**
    Active transform becomes its parent’s parent. Other children of the original parent remain children of the original parent.
- Snap to Ground
  - **Snap to Ground (Alt S)**
    Raycast downwards from selected transforms, move selected transforms to rest on top of the hit point. If selected transforms contain colliders, those will be used for a bottom boundary. Otherwise, if they contain a renderer, those will be used for a bottom boundary, otherwise, the s.
  - **Snap and Align to Ground (Alt Shift S)**
    Does the same as Snap to Ground, but additionally rotates the selected transform such that its up vector is aligned with the hit normal.
- Hide Flags
  - Hide Selection in Hierarchy
    Adds the HideInHierchy hide flag to selected objects
  - Show Last Hidden in Hierarchy
    Removes the HideInHierarchy flag from the last set of objects that were hidden.
  - Show All in Hierarchy
    Removes the HideInHierarchy flag from all objects in the scene.
  - Reset Hide Flags on All Objects
    Removes all hide flags from all objects in the scene.

    - Toggle [flag]
      Toggles the selected flag on all selected objects.
- Create Scriptable Object Asset
  If a selected object is a Scriptable Object, create an asset from it. This can be found in the project context menu.
- Control Groups
    - **Create Group (Control 1-0)**
      Creates a quick select group from the current selection.
    - **Select Group (1-0)**
      Creates a selection from the group.
    - **Add to Group (Alt 1-0)**
      Adds the selection to the group.
    - **Add to Selection (Shift 1-0)**
      Adds the group to the selection.

Object Comps

Object comps can be found in the Window menu and allows you to create sets of objects and save their current state. With these sets you can:

- Apply contained states contained objects
- Mark a set to be applied on Awake
- Select the set
- Deselect the set
- Add to the set
- Remove from the set
- Invert the states of the set
- Copy the set.

Prefab Painter

Prefab painter can be found in the Window menu and allows you to paint-place prefabs.

- Brush
    - From Collection
      Place objects from this collection.
    - Radius
      Place objects in this radius.
    - Density
      Place this many objects per place event.
    - Rate
      Create this many place events per second.
- Placement
    - Layer Mask
      Raycast against this mask.
    - Angle Threshold
      Disregard surfaces this far or greater in degrees from the center cast. (E.g. place on a floor, but not the wall.)

    - Align to Normal
      Should objects be rotated such that their up vector is equal to the normal of the surface they're being placed on
    - Random Rotation/Spin
      Should objects be randomly rotated when they're placed?
    - Depth
      Offset placed objects this far into the ground.
    - Scale
      Scale placed objects by this much.
    - Parent to
      Parent placed objects to either nothing, the active object, the object that was hit with the raycast, or a specified object.
- Collections
    - Create and manage collections from which to place.

Serializable Datatypes

- Serializable Dictionary
  Generic dictionary that can be manipulated in the inspector. It has the same functions and accessors as a normal dictionary.
- Matrix2D
  Generic 2D array that can be manipulated in the inspector. It has the same functions and accessors as a normal matrix.

Transform Inspector

This Transform Inspector buttons for resetting position, rotation and scale, Toggles for local and world coordinate modes, and buttons for aligning and distributing selected transforms.

Spline Tools

Spline Object

This is the base of all spline tools. It is a curve defined by interpolating some data. The base of the spline type is generic, so any type for which you can define an interpolation function can have a spline defined for it. This Spline Object implements a Vector3 spline for position, a Quaternion spline for rotation and a Vector2 spline for width and height.

- Edit Spline
    - Coordinate mode
      You can move and rotate spline points in either local or global mode.
    - Add at
      New points can either be placed where the transform currently is, or in front of the last point in the spline.
    - Edit position (Shift W in scene view)
      Edit the position of spline points.

    - Edit rotation (Shift E in scene view)
      Edit the rotation of spline points.
    - Add point (Shift t in scene view)
      Add a new spline point.
    - Reverse spline
      Reverse the order of splines.
    - Split spline
      Create a new spline object with points from the selected node up to the end of the spline. Remove points after the selected points from this one.
    - Sew spline
      Sew two selected splines together.
    - Remove last (Backspace in scene view)
      Remove the last point from the spline.
    - Clear all
      Remove all points from the spline.
- Smooth Spline
    - Smooth tangent
      If a point is a node, average the surrounding tangents so they are tangential. If it is a tangent, project the paired tangent across the associated node, and place it there.
    - Smooth all tangents
      Average out all tangents such that they are tangential.
    - Close loop
      Place the end point onto the start point.
    - Smooth looped end tangents
      Perform the smooth tangent operation with the first and last tangents.
    - Point node at next
      Change the rotation of the selected point such that is looking at the next point.
    - Point all nodes at next
      Change the rotation of all points such that they are looking at the next point in the spline.
- Twist Spline
    - Rotate all points by x degrees about their Z axis
- Project Spline
    - Projection axis
      Axis on which to project points.
    - Projection Mask
      Layer mask on which to project points.
    - Conform Rotation to Normal
      Should points be rotated to match the normal of the raycasted object?
    - Projection height
      Offset points this much from the surface of the raycasted object.
    - Project
      Project the selected point, all points, or the transform with the configured settings.
    - Upright
      Rotate the selected point, all points, or the transform to the nearest rotation where the up vector is aligned to the world up vector
    - Up pitch
      Rotate the selected point, all points, or the transform to the nearest rotation where the forward vector is orthogonal to the world up vector.

    - Up roll
      Rotate the selected point, all points, or the transform to the nearest rotation where the right vector is orthogonal to the world up vector.
- Edit Spline Transform
    - Move Spline to Transform
      Offset and rotate every point in the spline such that the spline begins where the transform currently is.
    - Move Transform
      Move the transform to the start, end, or to some percentage of the spline.
- Spline Data
  Directly edit spline points

Spline Mesh Extrusion

Spline Mesh Extrusion creates a mesh by extruding a cross section along a spline curve.

- Spline
  The spline to extrude across.
- Mesh Object
  Place the resulting mesh in this object.
- Mesh Material
  Assign this material to the mesh.

- Presets
  Procedurally create cross sections from squares, circles, rails, or use previously saved cross sections.
- Draw
    - Cross section window
      Displays the current cross section. Left Mouse Button Selects and moves vertices. Right Mouse Button adds or inserts vertices. Shift can be used to align vertices by 45 degrees. Middle mouse button pans and zooms, and G will frame the cross section in the window.
    - Weld Ends
      Merge each pair shells together if the end of one shell shares a vertex with the start of another.
    - Split >= X degrees
      Split any vertex if the angle between the surrounding points is greater than the threshold.
    - Weld Selection
      Merge two shells together on the selected vertex.
    - Split Selection
      Split the selected vertex
    - Mirror Shell
      Mirror the selected shell across the given line
    - Reverse Shell
      Reorder the points of the selected shell. This has the effect of reversing the normals.
- Modify
    - Apply to all
      Should operations in this section be applied to all shells, or just the selected shell?

- Scale cross section
  Multiply every point by this amount.
- Offset cross section
  Move every point by this amount.
- Rotate cross section
  Rotate every point about the origin by this amount.
- Clear cross section
  Remove all shells from the cross section.
- Scale UVs
  Multiply the UVScale value of the selected shell or all shells by this amount.
- Offset UVs
  Add this amount to the UVOffset value of the selected shell or all shells.
- Rotate UVs
  Add this amount to the UVRotation value of the selected shell or all shells.
- Reset UVs
  Set the selected shell's or all shells' UV settings to default.
- Generate cap vertices
  Duplicate all vertices of the cross section into the caps data.
- Generate convex cap triangles
  Assuming the cross section is convex, add triangle indices to the cap data
- Clear caps
  Remove all cap data.

- Data
  - Shells
    A shell is a contiguous group of vertices that will be used to generate a submesh during the extrusion operation. Normals across this resulting mesh will be interpolated. If hard edges are desired, the hard edge should be split between multiple shells.
    - Omit
      Do not build this shell
    - Flip normals
      Reverse normals of this shell.
    - Smooth Seam normals
      If the first and last vertices of this shell are the same, average their normals.
    - UV Method
      Create no UVs, use Cylindrical UVs, or project UVs in object space.
    - UV Scale, Offset, Rotation
      Manipulate the placement of UVs of this shell.
    - Vertices
      Directly manipulate the vertices of this shell.
  - Caps
    You can choose to generate a flat submesh intended to cover the holes at either end of the mesh.
- Noise
  - Cross section-only noise
    Should noise affect points in all 3 axes, or just the two orthogonal to the forward vector at that point in the spline?
  - Randomized noise seed
    Should noise be generated differently every time?

    - Noise passes
      Generate noise in none or more passes using the provided frequency and amplitude.
- Divisions
  The resulting mesh will have this number of sections across the length of the spline.
- Build Mesh
  Immediately builds the mesh. The mesh will be built on start anyway, but it is useful to preview the mesh. Also, the mesh data can be saved in the scene, but not in a prefab.

Spline Mover

Move an object along a spline over time.

- Spline
  The Spline to move along
- Starting Position
  How far along the spline to start. This is affected by Drive Method, below.
- End Behavior
  What action will be taken when the end of the spline has been reached. Options are Stop, Loop, or Oscillate.
- End Pause
  Optionally, a pause can be taken before performing the end behavior.
- Use Fixed Update
  If this is enabled, the object will move during the FixedUpdate step instead of Update. This is primarily used for interacting with the physics system.
- Use Time Scale
  If this is enabled, the object will move at a speed proportional to time scale. Otherwise it will ignore timescale entirely.
- Drive Method
  Determines what the drive curve and "speed" will be interpreted as. Options are World Space Speed, World Space Position, Spline Space Speed, and Spline Space Position.
  In World Space options, the mover compensates against spline density. E.g. If there were a stack of points in the spline, the mover would not pause as it passed the stack in World Space mode, as it would in Spline Space Mode.
  In Position modes, the curve directly correlates with the user's position on the spline, and a separate parameter is used to control that position from 0 to 1, using Speed.
  In Speed modes, the curve represents the mover's speed at that position on the spline.
- Speed
  The speed at which the mover moves. In Speed modes, this is just a multiplier for the curve, but in position modes, it directly controls the position.
- Cross section Position
  Offset the mover in spline space by this vector.
- Use Width
  Multiply Cross section Position by spline width?
- Use Height
  Multiply Cross section Position by spline height?

Spline Prefab Instancer

Places prefabs along a spline.

- Spline
  The spline along which to instantiate prefabs.

- Prefabs
  The collection of prefabs to instantiate.
- Iterations
  Perform the instantiate operation this many times.
- Instantiate on Start
  Should prefabs be instantiated on start? If this is left off, nothing will happen at start.
- Instantiate
  Immediately instantiate objects in the editor.
- Delete all children
  Instantiated objects are parented to this object. This is intended as a later 'undo' option.
- Interval
  Settings for determining how far apart to instantiate objects.
    - Interval Mode
        - Fixed Distance
          A regular, normalized distance in world space.
        - Variable Distance
          Normalized, world space distance controlled by a curve, indexed by spline position.
        - Equal Distribution
          Create X instances along the spline.
        - Random Distribution
          Create X instances anywhere on the spline
    - Spawn Object at Start
      Should an additional object be instantiated at the start of the spline?
    - Spawn Object at End
      Should an additional object be instantiated at the end of the spline?
- Rotation
  Settings for controlling the initial rotation of instantiated objects.
    - Always upright
      After rotating an object, should it be uprighted in world space?
- Position
  Settings for controlling the cross-sectional position of instantiated objects.
- Scale
  Settings for controlling the scale of instantiated objects.

Spline Mesh Tiler

Duplicates and distorts a mesh along a spline.

- Source Mesh
  The mesh to duplicate.
- Target Mesh Filter
  The destination Mesh filter whose mesh will be overridden with the generated mesh.
- Spline
  The spline to use.
- Build On Start
  Whether or not this object should generate its mesh on startup.
- Imperfect Tile Benavior
  What to do when the length of the spline isn't divisible by the width of the mesh.
    - Overlap
      Place the last instance, even if it would extend past the end of the spline.

    - Underlap
      Do not place the last instance if it would extend past the end of the spline.
    - Round, Floor, and Ceil
      Set the number of instances to the nearest/next lowest/next highest integer multiple of the mesh width, and scale all instances to fit.
- Offset
  Offset the starting position of the first, and all subsequent instances by this amount.
- Interval multiplier
  Instances are created every [mesh width] X interval units.
- Interval Curve
  Vary the interval across the length of the spline.
- Scale affects interval
  Should the interval correct for the scale of the mesh?
- Scale multiplier
  Multiply the scale of the mesh by this amount across the entire spline.
- Uniform Scale
  Enable or disable separate scale curves for each dimension. Otherwise, just use X curve for all.
- Scale Curves
  Vary the scale of instanced meshes across the length of the spline (per vertex, not per instance.)
- Width/Height is separation
  When true, the width and height components of the spline are used to separate vertices from 0, rather than as a multiplier.
- Noise Freq Amp
  Frequency and amplitude pairs to apply noise to the generated mesh
- Noise Seed
  Set a particular random seed. If Randomize Seed is unchecked, noise will always be generated using this seed.
- Randomize Seed
  Generate a new random seed before applying noise?
- Noise Cross
  If unchecked, Noise will be generated in 3D space. If checked, noise will be generated in spline space.
- Recalculate normals
  After mesh generation, should normals be recalculated? Otherwise, normals will only be rotated according to the spline. Rotation alone may not be sufficient, especially if the spline has a relatively tight curvature.

Behaviors

- Jitter
  Adds noise to the position of an object.
- Basic Animation
  Super basic animation controller for making small animations using Transform and UI properties. Mostly meant for UI work.
- Visibility Zone
  A triggerable zone that enables/disables specified objects. Very basic optimization technique.

- Multi Tag
  Allows you to tag objects with one or more strings and provides an efficient way to search for those objects from a static reference.

Attributes

- Conditional
  Selectively display fields in the inspector without having to write a custom editor.
- Draggable
  Makes lists and arrays reorderable by dragging in the inspector.
- EnumArray
  Draws lists and arrays in the inspector as if they were Enum dictionaries. (Provided enum values have not been overridden.)
- EnumFlags
  Makes an enum be drawn as a mask field in the inspector.
- Foldout
  Draws Booleans as foldouts
- ToggleLeft
  Draws Booleans with the checkbox on the left, allowing more space for the property name.
- Maximum
  Limits the value of the field to a maximum
- Minimum
  Limits the value of the field to a minimum
- Pow2
  Limits the value of the field to powers of two.
- Unit
  Draws a unit string next to the field (e.g. Speed ____ m/s)
- Vector Label
  Renames the components of a vector field.

Runtime console

Get debug output and monitor values in a complete build.

Property Context Items

Do cool stuff with the context menu (right click menu) for properties.

- Insert Clipboard
  Allows objects that have been added to the clipboard via Ctrl-C (twice) to be inserted into an array via the context menu.
- Copy/Paste/Append/Replace Properties
  Copy and paste arrays and other properties directly from the inspector to and from other fields of the same type, even on different objects.
- Shuffle Array Property
  Easily randomize the order of an array.

Base

- Static
  - Mask Fields
    Contains methods for drawing LayerMask fields in the editor.
  - Proj Styles
    Contains GUIStyles used throughout PETools.
  - Easing
    Contains efficient methods for transforming numbers in the [0-1] space.
  - Coroutine Holder
    Convenience class for starting and managing coroutine sequences, even when a monobehaviour isn't present to host them.
  - Proj Utils
    Contains small, generally useful methods that don't have anywhere else to live.
- Class Extensions
  Mostly convenience methods, although there are also some substantial methods. Nearly all references to convenience methods have been removed from other modules.