Ivy Lite Manual.

IvyLite version: IvyLite2024_v1.1
Manual Date: 12/23/2023

Ivy.Lite is a streamlined version of Ivy.Pro, designed for creating ivy and other climbing plants. While retaining the core functionality of Ivy.Pro, Ivy.Lite can only utilize existing presets but produces the exact **same results as the Pro version**. The only difference is you can't tweak the settings directly in the editor. (You can still tweak them directly in the JSON file if you know what you are doing).

While **Ivy.Lite** doesn't include all the features of **Ivy.Pro**, such as customizable presets, access to all the settings (More than 100 parameters in the Pro version), **Granular Scatter** unique Item settings, and performance optimization tools like **mesh combiner** and **Occlusion Culling**, it still produces natural looking plants.

Ivy.Lite stands out from other vegetation tools by offering a more natural and integrated approach to plant generation. While other solutions are limited to superficially clinging to surfaces, resembling mere stickers plastered onto the host mesh, **Ivy.Lite** approach emulates the dynamic three-dimensional behavior of real climbing plants, bridging and connecting different environmental elements. This ability allows the vegetation to traverse across various assets, creating a more cohesive and engaging natural scene that truly captures the essence of living plants. The hanging and linking behaves in a way that mimics the droop of a catenary curve of the real-life vegetation.

Features in Ivy Lite.

- **Preset Utilization**: Access existing presets designed for various types of vegetation. Simply load a preset and apply it to your project, creating natural looking climbing plants in just a few clicks. You can use any preset created with Ivy.Pro in Ivy.Lite.
- **Simplified Interface**: With a focus on ease of use, Ivy.Lite offers a user-friendly interface that removes the more advanced settings and tools found in **Ivy.Pro.** This makes it perfect for beginners or those needing quick results without the need for detailed customization.
- **Basic Customization Options**: While most settings are streamlined, Ivy.Lite still offers essential controls such as master scale and a few additional parameters like number of branches and branching angle, allowing for some degree of personalization.
- **Host Mesh Compatibility**: Like its Pro counterpart, Ivy.Lite adapts to any user-defined host mesh, enabling the creation of natural looking climbing plants on a wide range of surfaces and objects.
- **Cross-Platform Support**: Tested on Windows and MacOS (Apple Silicon), ensuring a wide range of users can access and utilize Ivy.Lite in their projects.
- **Compatibility with Editor 2021 LTS and 2022 LTS**: Designed to work smoothly with recent versions of the editor, ensuring stability and compatibility.

Features in Ivy.Pro.

(** Means only available in Pro)
(* Means available in Lite with restrictions)

- ** **Customizable Presets**: Create custom presets using your own assets. Drag and drop game objects with a mesh filter to define ivy segments, foliage, end cap, fruits, and flowers.

- ***Precise Control Over Plant Growth:** Control various aspects of plant growth such as the number of branches, length , stem thickness, distance to the host mesh and many more. Tailor the scale and settings for foliage and flowers to fit your scene perfectly.

- **Catenary Control:** Adjust catenary settings for hanging branches, providing a greater variety of shape and style for your plants.

- **Host Mesh Recognition:** The addon adapts to any user-defined host mesh, enabling the creation of climbing plants on a wide range of surfaces and objects.

- **Plant Placement and Direction Control:** Place a seed at a specific location or set a growth direction by defining two points in your scene. This provides you with fine control over how and where your plants grow.

- ****3D and Surface Force Adjustment:** Influence how plants interact with their environment by tweaking various 3D and surface forces such as gravity, adhesion, wall seek, and inertia.

- ****Natural Branches:** Create freeform or rambling branches that grow independently of host surfaces for a more natural look.

- ****Granular Scatter:** Ideal for fruits, flowers, or any other structures that should maintain their natural orientation. This tool allows you to tweak each element's behavior and placement with its own unique settings.

- ****Foliage and End Cap Controls:** Settings to control leaves and end caps of your plants, adjusting their scale, density, rotation, and more.

- ****Performance Optimization Tools:** Integrated features for occlusion pruning and mesh combining to ensure that your plant-rich environments perform better.

Quick overview.

The addon is structured into four main tabs: Presets, Settings, Generator and Optimization. Likewise the creation process could be divided in 4 steps : Asset Collection, Growth Parameters, Plant Creation, and Optimization. Let's delve into each one.

1. ** Asset Collection:

The Preset Tab is not functional in Ivy.Lite version, In the PRESETS tab of Ivy.Pro, you can select distinct elements of your plant, such as leaves, stem segments, end caps and Granular Items. Simply drag and drop your preferred game objects into the correct GUI box. This is also where you'll find the preset Load and Save buttons. Use them to load and save presets that store specific combinations of assets and settings.

2.* Growth Parameters:

After assembling your assets, it's time to determine how your plant behaves using the SETTINGS tab. This tab is subdivided into several modules, each one focused on a specific aspect of plant growth:

- *General Settings.* This is where you set the overall attributes for your plant growth like the overall size and bounds. It serves as a master control panel for your ivy generation process.

- *Ivy Mesh Attributes.* Here, you can dictate the specific characteristics of your ivy's stem meshes, including radius, segment length, segment coverage, and twist. It's also possible to display the branches as a LineRenderer.

- **Main Stem Settings.* This section allows you to configure the key traits of your plant's main stem like length, branch distribution, etc. Here is where you can find settings for the 3D and surface forces that dictate the growth of the plant. Forces like adhesion, inertia, gravity, UP, Wall Seek and more can be found here.

- **Branch Settings.* These settings help you decide how the offshoots from the main stem behave and appear. Here you can find settings for the branch count , length and branching angle. Also the 3D and surface force settings analogue to the ones found in the main stem section.

- ***Surface Control.* An essential section that gives you control over how your plant will interact and grow in relation to the surface it clings to. Surface offset and the range of forces like adhesion and gravity settings live in this section.

- ***Catenary Control.* This module allows you to control the curve of the catenary section of the plant, the probability, the maximum and minimum length, etc.. greatly influencing the overall form and extension and size of the plant.

- ***Rambling Branches.* This section is dedicated to controlling the branches that grow independently from the constraints of the base mesh surface.

*- ***Foliage Settings.* Tweak how leaves appear and behave on your plant. This includes their size, shape, placement, distribution, patterns, easing, density and many other aspects.

- ***End Cap Settings.* Manage the terminations of your plant stems. Define how the ends of your stems and branches will look.

This may seem overwhelming, but each slider comes with a tooltip to help you understand its function.

3. Plant Creation:

With your assets and parameters set, now it's time to bring your plant to life in the GENERATOR section. After clicking on Set Seed And Grow, select a starting position in your scene, and the plant should appear in the scene view, growing organically according to your parameters. You can also dictate an initial growth direction by selecting two points of the scene using the Set Seed And Target button and then clicking on GROW.

Importantly, this section contains the GUI box where you'll need to drag and drop your '**Host Mesh.**' This mesh acts as a guide for your plant, dictating where it can grow, such as along walls, rocks, or trees. If you see a red warning message, it means a host mesh was not found and, without it, no plants will be generated.

This section also contains an additional preset loading button if you need to quickly change your plant configuration.

Remember, to save the plant as a prefab, simply drag the GameObject that should be named as the preset you used to create it to the desired folder within the project's Assets folder. This Prefab will be linked to the original meshes.**There is another way to save plants as prefabs explained in the next section.

** The easy method to save as Prefab is Not Available in the Lite Version. You can simply drag the Empty GameObject to the prefabs folder as you would normally but but you need to be aware that the meshes for the stems are stored in the IvyMeshes folder and you should move them from there to the location you want as this folder is meant to be a temp folder. In the paid version this is done automatically.

4. **Optimization Tools:

These features are only in **Ivy.Pro** . After your plant has taken form, you might wish to optimize it for performance or visual purposes. The OPTIMIZATION tab provides two key features for this: the Mesh Combiner and the Occlusion Pruner. The Mesh Combiner combines game objects based on their shared materials, boosting rendering performance. With it, you can also save your plant prefab by creating new mesh assets, this prefab won't be linked to the original meshes but to the newly created ones. Meanwhile, the Occlusion Pruner removes occluded meshes that aren't visible, freeing up resources and maintaining a clutter-free scene.

To use Occlusion Pruner drag the generated IvyPro plant into the designated area in the 'Occlusion Pruner' section. Once the plant is loaded into the tool, click on "prepare for pruning" and the tool is ready for the next step - setting the camera positions.

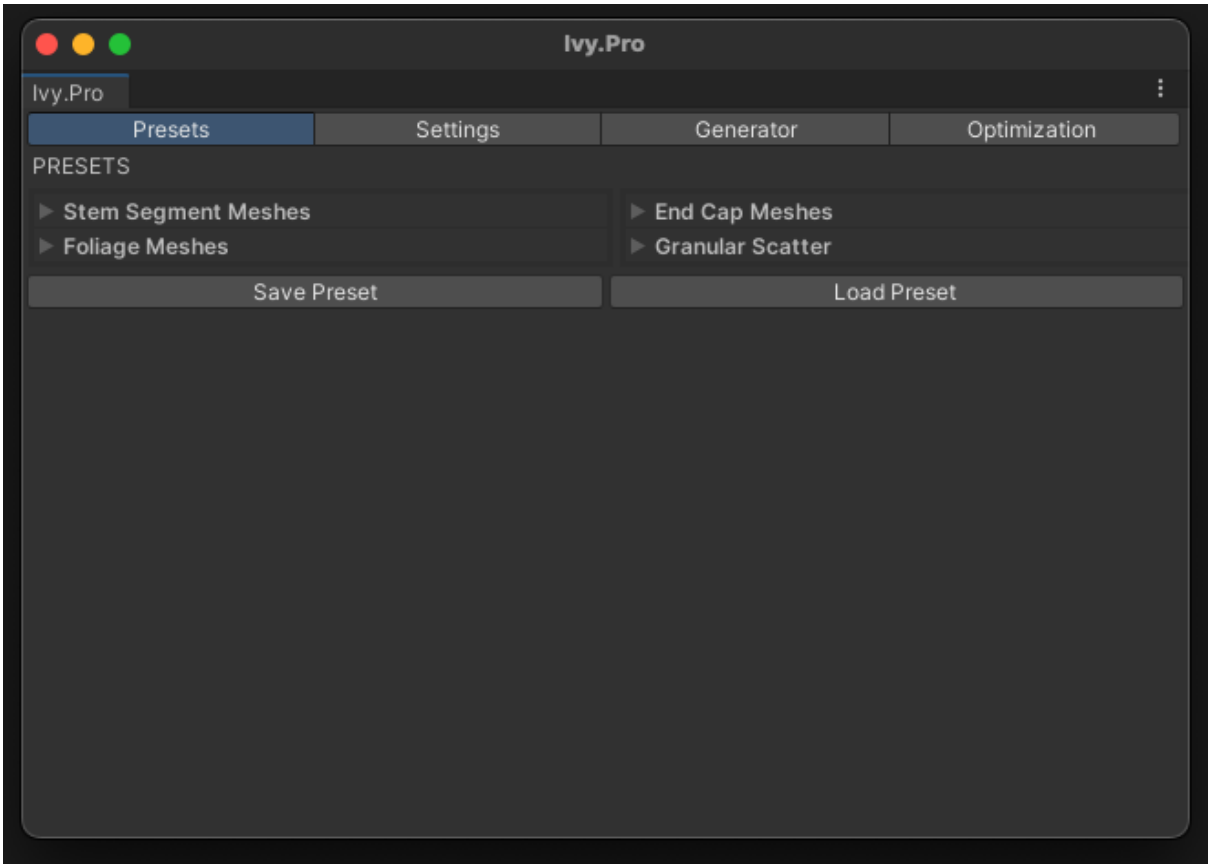
To do this, move your camera to the positions from which you expect your scene to be viewed. Normally 2 or 3 positions are enough. This could be a player's viewpoint, a cinematic camera angle, or any other perspective from which the plant will be seen. For each such position, you should click the 'Add Camera Position' button in the Occlusion Pruner section. This will record the camera's position.

Now, you can click on the Sight Pruner or Ray Pruner button. The tool will evaluate the visibility of each plant instance from every recorded camera position. Any instance that is not seen from any of the recorded viewpoints will be considered as 'occluded' and will be removed.

In summary with Ivy.Pro, creating beautiful, life-like climbing plants can be as simple as choosing a preset and clicking on the desired placement but the creation of your own presets can be a lot more challenging. You would start by gathering your assets and setting your growth parameters, then it is time to define a host mesh and place the plants where you want them, once you are happy with the plant you can apply some optimizations and save the prefab. The addon tries to offer a user-friendly, flexible interface and a wealth of options for full control over your plant's behavior.

Detailed Reference Guide.

** Presets tab. Not Available in Ivy.Lite



1. **Stem Meshes:** This interface allows you to drag and drop the mesh assets that will form your plant's stem structure. By default, if no stem meshes are present in the list, the program generates a continuous, connected mesh that

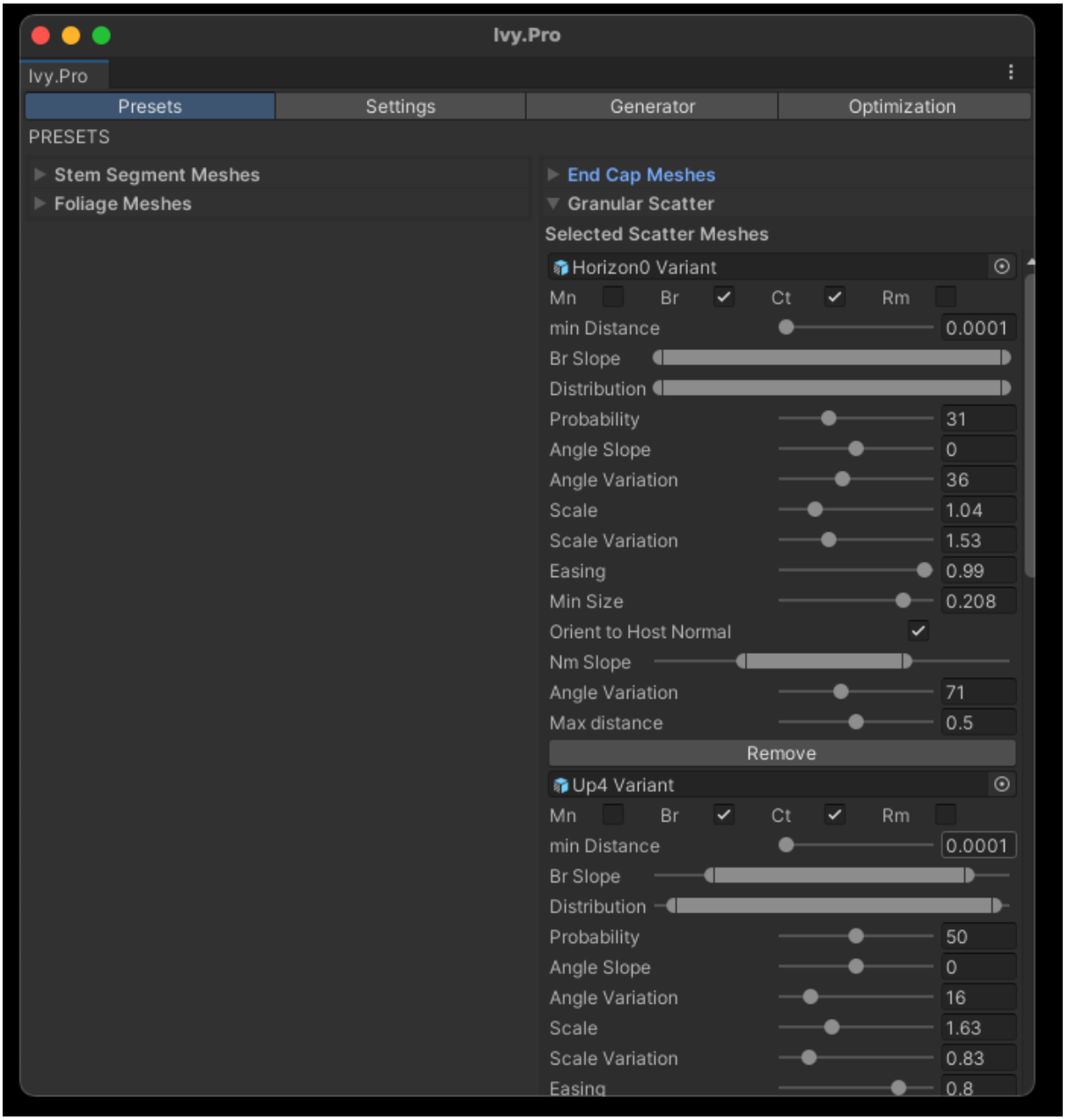
will form the basic structure of the plant. However, if you do have stem meshes in the list, they are seamlessly concatenated, creating a personalized stem structure. This method allows for creative freedom in designing the stem's form like adding spikes or any other elements. It also provides the convenience of removing any unwanted parts from the stem by simply selecting and deleting them or by using the Occlusion Pruner to optimize the scene.

2. **Foliage Meshes**: This section is where you can specify the foliage assets for your plant. Simply drag and drop your leaves assets into this interface. These meshes will then be distributed throughout the plant according to the settings defined in the Foliage section in the SETTINGS tab.

3. **End Cap Meshes**. End cap meshes are used to close off the ends of stems and branches. In this section, you can drag and drop your chosen end cap mesh assets like leaves or flowers. These will be automatically applied to the ends of the stem segments, providing a finished look to your plant structure. The settings for these meshes can be tweaked in the End Cap Section in the SETTINGS tab.

4. **Granular Scatter.** The settings for Stem, Foliage and End Cap meshes are applied to all elements in their respective lists. "Granular Scatter is a flexible tool that allows you to customize the placement, rotation, and scale of individual items within your plant structure. Here, you can assign individual growth settings to each plant element, influencing where and how they appear along different types of branches so each item can have customized settings such as minimum distance to the host, placement along the branch slope, distribution along the branch length, and its probability of occurrence. Moreover, you can adjust the rotation and scale parameters to add a naturalistic variation to your plant.

5. ## Granular Scatter Settings



In the **Granular Scatter** section of Ivy.Pro, you'll find a row consisting of four checkboxes: Mn (Main Stem), Br (Branches), Ct (Catenary), and Rm (Rambling Branches). These checkboxes represent the types of branches where the selected item can grow.

- **Mn** (Main Stem): If you check this box, the selected item will be able to grow on the main stem of your plant. The main stem is the central, most important part of a plant, growing directly from the root and providing a base for all other branches. Uncheck this box if you don't want the item to appear on the main stem.

- **Br** (Branches): By checking this box, you allow the selected item to grow on the branches that sprout from the main stem. Branches create the overall shape and size of the plant, and can contribute significantly to its visual complexity. If this box is unchecked, the item won't appear on these branches.

- **Ct** (Catenary): This option refers to the hanging, catenary sections of your plant. These are the parts that will droop or hang down under their own weight, such as you'd see with a weeping willow or a vine hanging from a tree branch. Check this box if you want the selected item to appear on these sections, uncheck it if you don't.

- **Rm** (Rambling Branches): Rambling branches are branches that grow independently from the constraints of the base mesh surface. If you'd like your selected item to grow on these unique, free-form branches, ensure this box is checked.

- **Min Distance**: This slider sets the minimum distance from the host mesh at which the selected item can appear. By increasing this value, you enforce a greater separation between the host mesh and the generated items, which can be particularly useful when dealing with larger mesh objects or when aiming for a particular aesthetic.

- **Br Slope (Branch Slope)**: This is a min-max slider that lets you control where on a branch your selected item will grow, based on the slope of the branch. The slope slider begins with the branch growing upwards, progresses to a horizontal direction, and finally ends with the branch growing downwards. By adjusting the minimum and maximum values, you can limit growth to specific orientations along this continuum.

- **Distribution**: This min-max slider enables you to designate the sections of a branch where the item can be replicated. You may, for instance, specify that an item should only grow on the last half or the first quarter of a branch, or

any other segment of your choosing. This allows for sophisticated control over plant design and can help emulate real-life growth patterns.

- **Probability**: This slider determines the probability that the item will appear on a branch, given the conditions set by the other filters are met. The probability is expressed as a percentage, with higher values indicating a greater chance of the item being replicated on the branch.

- **Angle Slope**: This slider applies a fixed tilt to the selected item along the Z-axis. The tilt value is set in degrees and allows you to control the item's orientation with respect to the branch's direction of growth.

- **Angle Variation**: This slider introduces a degree of random rotation along the Z-axis. By adjusting this value, you can achieve a more natural, less uniform look in the placement and orientation of your items.

- **Scale**: This slider sets the size of the selected item. By adjusting this value, you can control the overall size of the item as it appears on the plant.

- **Scale Variation**: This slider adds a random scale variation to the item, ranging from 0 (no variation) up to the slider value. This can be used to create more organic and less predictable size variations among the items.

- **Easing Start**: This slider sets the starting point of the item's scaling easing. A value of 0 corresponds to the beginning of the branch, and a value of 1 corresponds to the end of the branch. If set to 1, there's effectively no scaling easing.
- **Min Size**: This slider adds a minimum size to the scale of the item, which can be useful for preventing the creation of very tiny meshes, particularly when working with scale easing.

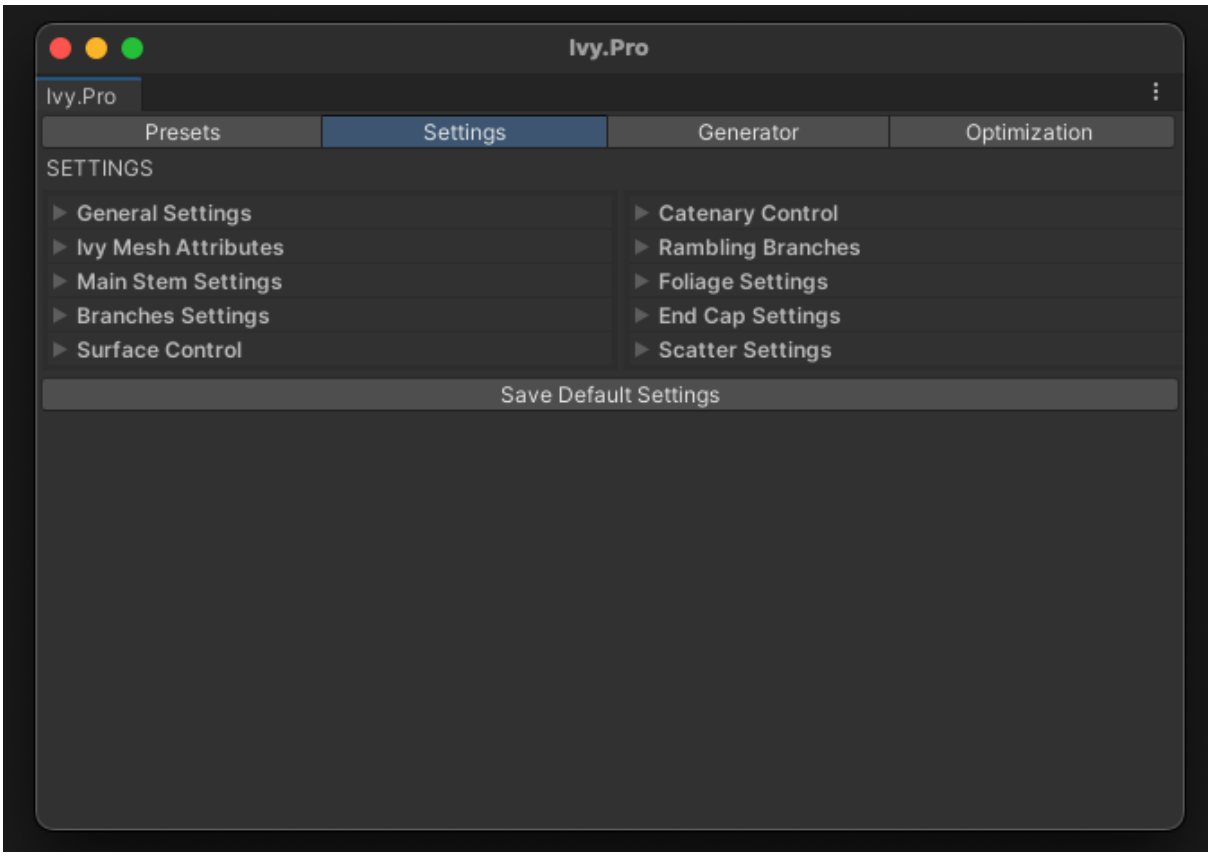
- **Overlap Threshold**: This slider adjusts the allowable proximity of an item to the host mesh surface, essentially controlling whether an item is considered overlapping the host mesh or not. The value ranges from -0.1 to 0.1, with a default setting of 0 which corresponds to the host mesh surface level. A negative value allows the items to be cloned even if their bounding box appears to slightly overlap with the host mesh, offering more freedom in item rotation close to the surface. A positive value, on the other hand, can filter out items that are too close to the host mesh for aesthetic reasons. This slider offers you an intuitive way to fine-tune the 'collision' detection between the item and the host.

- **Orient to Normal Checkbox**: When unchecked (default), the item can have a random rotation ranging from 0 to 360 degrees around the Y-axis. If checked, the item will be oriented to match the direction of the host mesh's surface normal.

- **Angle Variation (Orient to Normal)**: This slider becomes available when the "Orient to Normal" checkbox is checked. It allows you to add a degree of random rotation to the items, helping them look more natural and less perfectly aligned with the host mesh's normal.

- **Max Distance (Orient to Normal)**: Also available when "Orient to Normal" is checked, this slider sets a maximum distance value for the item from the host mesh. If the distance to the host exceeds this value, the item will be filtered out. This is useful for ensuring that items too far away from the host don't need to conform to its orientation.

*Settings Tab. Only some Settings are Available in Ivy.Lite



This tab features a range of sections, each focusing on different aspects of the plant creation process.

General Settings.

1. **Master Scale**. Affects Ivy's overall Scale
2. **Bounds Kill.** Set to 0 (Off) for unlimited growth, 1 (XYZ On) to halt growth at bounding box boundaries, or 2 (Y-Minimum) to stop growth below the minimum Y boundary.

Ivy Mesh Attributes.

1. **Drag Ivy Material Box**: Here you can assign the material to the ivy stem. Simply drag the desired material from your project window into this box.

2. **Segment Length**: This parameter defines the length of the segments making up the ivy.
3. **Segment Length Variation**: Add a random variance to the segment lengths to give the ivy a less uniform and more natural look.
4. **Stem Instances Coverage**: This parameter controls the coverage of the mesh stem segment from node to node. Values over 1 creates some overlap while values below 0 leave some empty gaps.
5. **Radius**: Define the overall thickness of the ivy's stem.
6. **Minimum Radius**: This parameter sets a minimum thickness limit for the branches. It's used to prevent branches from becoming too thin when the Radius Falloff is applied.
7. **Radius Falloff**: Controls how much the radius of the ivy stems decreases as they branch off from the main stem. Higher values result in thicker branches, while lower values fade the thickness faster.
8. **Twist**. This represents how the stem segment rotates around its own axis.
9. **Activate Line Renderer for Branches**. When this checkbox is ticked the branches will be displayed as a Line with aLineRenderer material assigned.
    - **Line Multiplier**. Multiplier factor for the line width.
    - **Simplify**. Factor for Line simplification based on the angle. O means original Line, 1 means a straight line.
    - **LineRenderer Material Box**. Here is where you can drag and drop the material for the LineRenderer.

Main Stem Settings.

1. **Main Stem Length**: This parameter sets the length (number of nodes) of the main stem, determining the overall size of the ivy.
2. **Minimum Length**: Defines the minimum length for the main stem, preventing it from being too short and ensuring a minimum size for the ivy.
3. **On Main**: This slider determines the percentage of new branches that will grow directly from the main stem as opposed to growing from other branches. A higher value will result in more branches sprouting directly from the main stem, while a lower value will encourage branching from other offshoots.
4. **Proximal Branching**: This parameter determines the starting point on the main stem where branches can begin to form. With a range of 0 (base of the stem) to 1 (end of the stem), a higher value delays the start of branching, resulting in a bare stem at the base of the ivy.
5. **Distal Branching**: This parameter establishes the point on the stem beyond which branches can no longer form. Also with a range of 0 (base of the stem) to 1 (end of the stem), a lower value will confine branching to the base of the ivy, leaving the upper part of the stem bare.

****Branches Settings.**

1. **Branches Count**: This slider sets the number of branches that will grow from the main stem or from other branches, influencing the overall density of the ivy.
2. **Branches Length**: This parameter sets the length of the branches, determining their size and how far they extend from the main stem.
3. **Minimum Length**: Sets the minimum length for the branches, ensuring they don't become too short and maintain a certain size.
4. **Branching Angle**: This slider determines the angle at which branches sprout from the main stem or from other branches, affecting the overall form and direction of the ivy growth.
5. **Proximal Branching**: Defines the starting point on the branch from where sub-branches can begin to grow. With a range from 0 (base of the branch) to 1 (end of the branch), a higher value delays the start of branching, resulting in a bare base of the branch.
6. **Distal Branching**: Establishes the point on the branch beyond which sub-branches can no longer form. Also ranging from 0 (base of the branch) to 1 (end of the branch), a lower value will confine sub-branching to the base, leaving the upper part of the branch bare.
7. **Branches on Main**: This slider, expressed as a percentage, controls the likelihood of new branches sprouting from the main stem of the ivy. A higher value increases the frequency of branches growing from the main stem.
8. **Branches on Branch**: Also expressed as a percentage, this setting adjusts the probability of branches growing from other branches. Higher values will result in a more densely branched ivy structure.
9. **Branches on Catenary**: This percentage-based slider influences the chance of branches sprouting from the hanging catenary sections of the ivy. Setting this value to 0 would mean that no branches form from these catenary sections, while increasing the value allows for more branching in these regions.
10. **Same as Main Stem.** This button copies the Settings for the Forces in the Main Stem on the Branch Settings.

****Forces.**

- **3D Forces:**
    1. **Inertia**: This force is related to the ivy's momentum and its resistance to change in direction. Higher inertia will result in straighter branches, while lower inertia allows the branches to change direction more readily.
    2. **Tangential Inertia**: This is similar to Inertia but acts tangentially to the host mesh surface.
    3. **Adhesion**: This force drives the ivy towards the Host Mesh surface. Higher adhesion values result in ivy that sticks more closely to its supporting structures.
    4. **Gravity**: This force simulates the effect of gravity pulling down on the plant. Higher gravity values will cause the ivy to droop more, resulting in hanging branches and tendrils. It can also get a negative value.
    5. **Vertical Seek**: This force is effective when the plant is creeping along the ground. It prompts the ivy to seek out and attach to vertical walls, simulating the behavior of ivy in nature seeking sunlight.
    6. **Free Growth**: This force promotes unrestricted growth of the plant, making it less likely to adhere to nearby surfaces. Higher values will lead to more sprawling growth patterns.
    7. **Angle Variation**: This force adds randomness to the Free growth direction of the plant. Higher values will result in a more chaotic growth pattern with branches growing in various directions.
- ****Surface Forces:**
    1. **Direction Change Chance**: This value dictates the probability of a sudden change in the plant's direction of growth. Lower values lead to straighter growth, while higher values create a more winding and twisting plant.
    2. **UP**: This force guides the plant's movement along the surface of the host mesh in a vertical direction. A positive value pushes the plant towards the topmost point of the host, while a negative value guides it towards the bottommost point.
    3. **Right**: This force guides the plant's movement along the host mesh surface in a horizontal direction. A positive value will make the plant drift to the right along the surface, while a negative value will make it drift to the left.
    4. **Surface Inertia**: This force helps to maintain a consistent direction for the plant's growth while ensuring it remains on the host mesh's surface. Higher values cause the plant to maintain its current growth direction, while lower values allow more variation in the growth path.

5. **Surface Inertia Random**: This force introduces a degree of randomness to the plant's growth direction on the host mesh's surface. Higher values increase the likelihood of the plant changing its growth direction.
6. **Angle Variation**: This parameter determines the maximum angle of variation for the surface inertia random force. Lower values produce a straighter plant, while higher values result in a more branched and complex plant.

****Surface Control.**

1. **Surface Offset**: This parameter sets the minimum distance between the host surface and the plant, defining how closely the plant will 'hug' the surface.
2. **Surface Offset Range**: This parameter defines a zone, extending from the Surface Offset distance, within which certain forces (like Adhesion or Gravity) can take modified values. For example, Gravity can have a positive value outside this range and be zero or negative inside it.
3. **Range Random**: This slider adds a random factor to the Surface Offset Range, which can create more natural-looking variation in how closely the plant follows the host surface.
4. **Range Adhesion**: This sets a multiplier for the Adhesion Force within the Offset Range space. It lets you control how strongly the plant adheres to the surface within this zone.
5. **Range Gravity**: This sets a multiplier for the Gravity Force within the Offset Range space. This allows you to control the effect of gravity on the plant within this zone.
6. **Influence Distance**: This parameter sets a distance from the host surface within which Adhesion and other forces will take effect. Surface Forces will not affect the plant beyond this distance.

****Catenary Control.**

1. **Min Distance**: This parameter defines the minimum length for a branch to form a hanging section. Branches shorter than this value will not form hanging sections.
2. **Max Distance**: This setting controls the maximum length for hanging (catenary) sections of the branches.
3. **Jump Counter Reset**: This parameter controls the frequency of hanging sections along a branch. After each hanging section, the plant must grow a

number of 'on-surface' segments equal to this setting before it can form another hanging section. Higher values will result in fewer hanging sections.
4. **Min Tension**: This parameter sets the minimum tension for hanging (catenary) branches. Lower values will create more pronounced curves.
5. **Max Tension**: This parameter adjusts the maximum tension in the hanging (catenary) branches. Higher values will result in straighter lines.
6. **Node Variation**: This slider adds natural-looking variation to the hanging sections. This will disrupt the perfect smoothness of the catenary curve for a more realistic appearance.

****Rambling Branches.**

1. **Count**: This sets the total number of rambling branches for the plant.
2. **Radius Fade Out**: This parameter controls the degree of tapering at the end of the branches, creating a natural diminishing effect on the branch thickness.
3. **Length**: This denotes the maximum length of the rambling branches.
4. **Minimum Length**: This parameter sets the shortest permissible length for the rambling branches.
5. **On Rambling Branches**: This value determines the proportion of new branches that will grow on existing rambling branches.
6. **Direction Change Chance**: This parameter regulates the frequency of changes in the growth direction of the rambling branches.
7. **Inertia**: This value determines the tendency of the rambling branches to maintain their current growth direction.
8. **Phototropism**: This parameter controls the extent to which rambling branches' growth direction is influenced by a simulated light source.
9. **Rambling Free Growth**: This Slider determines the intensity of the free growth force.
10. **Rambling Angle Variation**: This control introduces randomness into the growth angle for the Rambling Free Growth Force generating a more natural, less uniform appearance.

****Foliage Settings.**

1. **Node Steps.** Controls the frequency of leaf generation along the branches. A value of 0 suppresses leaf generation, while a value of 1 generates leaves at every node.
2. **Node Steps Random.** This setting adds a random factor to the Node Steps, interrupting the uniformity of the leaf pattern and lending a more natural look.

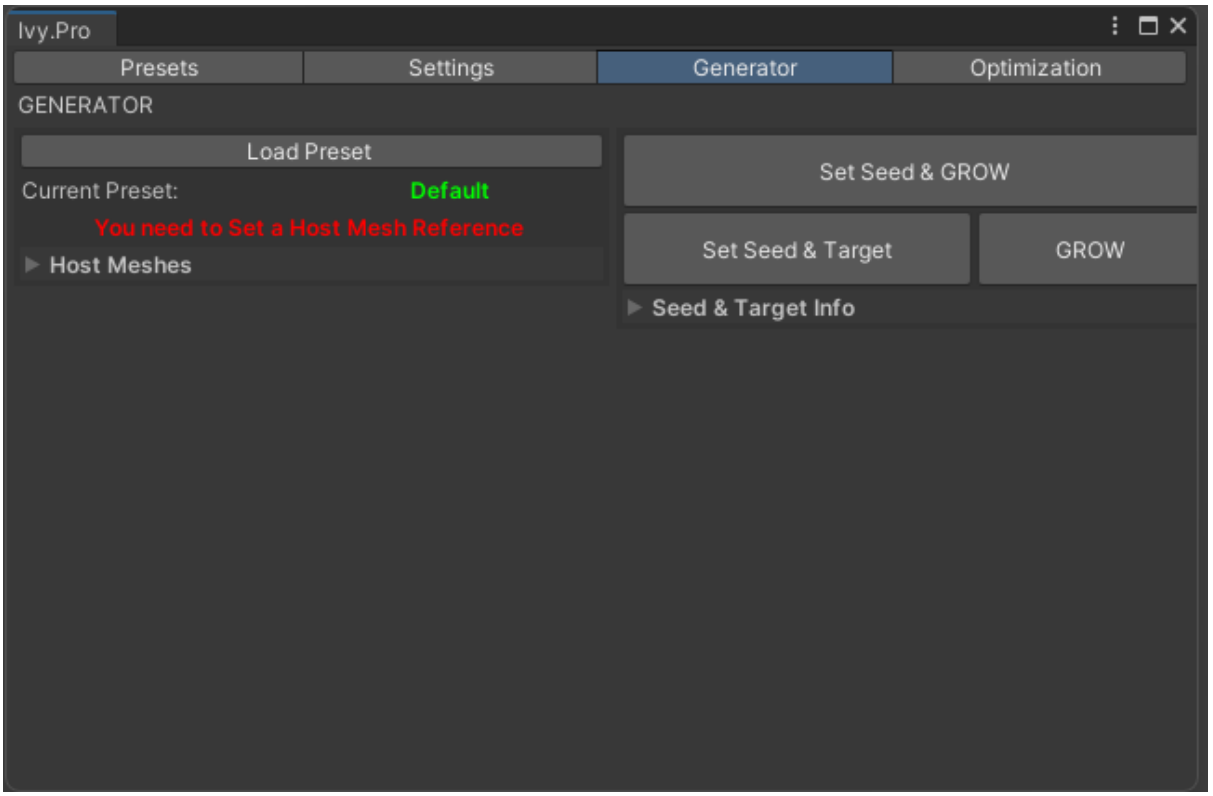
3. **Leaf orientation Threshold**.This slider controls the division between two distinct modes of leaf orientation along the stem. In "Static Mode", leaves maintain a consistent orientation relative to the vertical Y-Axis on the host mesh surface, regardless of the stem's direction.
4. **Alternating Mode Angle** : This setting comes into play exclusively in the "Alternating Mode". In this mode, the orientation of the leaves alternates at each node along the stem. The Alternating Mode Angle defines the angle of rotation around the host mesh's normal vector relative to the stem direction. An angle of 0 degrees means the leaf is perfectly aligned with the stem direction. In this mode, leaves on even nodes will orient in one direction while leaves on odd nodes will orient in the opposite direction, creating an alternating pattern as you move along the stem.
5. **Distance Threshold**.This setting defines the distance from the Host mesh surface beyond which leaves will not orient according to the host mesh's normal.
6. **Normal Variation**. Leaves typically align with the host mesh normal. This slider introduces a small random deviation from this orientation, creating a more organic appearance.
7. **Static Mode Angle**. This setting applies only in the Static Mode, and determines the angle between the leaf and the vertical axis Y. An angle of 0 degrees results in leaves pointing directly downward, while an angle of 180 degrees causes the leaves to point straight up.
8. **Static Angle Variation**. This introduces randomness into the leaf rotation angle, disrupting uniformity.
9. **Scale Variation**: This control introduces random variation into the leaf size, for a more natural look.
10. **Easing**: Transition in leaf size from the base to the tip of the branches.
11. **Minimum Size**: This setting specifies the smallest possible size for the leaves.
12. **On Main**: This determines the percentage of leaves growing on the main stem.
13. **On Branches**: This value sets the percentage of leaves that will grow on the branches.
14. **On Rambling Branches**: This sets the percentage of leaves growing on the rambling branches.
15. **On Catenary**: This slider controls the proportion of leaves that grow on the catenary sections of the branches.

****End Cap Settings.**

1. **On Branches**. This slider determines the percentage chance of end caps being created on the ends of regular branches.

2. **On Rambling Branches**. This slider serves the same function as "On Branches", but for rambling branches. It represents the probability of an end cap forming on each rambling branch.
3. **Scale**. This slider controls the size of the end caps on both the branches and rambling branches. Adjusting this value will directly impact the visual size of the end caps.
4. **Scale Variation**. This slider introduces an element of randomness to the size of the end caps. A higher value will result in a larger variation in size among the end caps, providing a more natural appearance.
5. **Scale By Radius**. When enabled, this feature adjusts the size of the end caps in proportion to the stem's radius. This leads to a more realistic rendering where larger branches have proportionally larger end caps and smaller branches have smaller end caps.

Generator Tab.



Overview: The Generator tab is designed for creating and managing the growth of plants in your Unity scene. It provides tools to load presets, set host meshes, place seeds and targets, and visualize the plant growth process.

Load Preset, Loads a predefined plant growth preset. Click to open a dialog and select a preset.

Current Preset Display Displays the name of the currently loaded preset in green.

Host Mesh Warning Alerts you if no host mesh is set for the plant to grow on with a red warning label indicating the need to set a host mesh.

Host Meshes Manages the 3D meshes that plants will grow on. A Drag and Drop Area allows adding new host meshes by dragging and dropping GameObjects.

"Set Host" Saves the selected meshes as host surfaces for plant growth.

"Clear List" Clears all selected host meshes.

Set Seed & GROW Places a seed and starts plant growth from the selected point.

Press the button and then click a location in the scene to set the seed, the plant growth will happen immediately after the seed was placed, the target is implied.

Set Seed & Target Sets a growth starting point (seed) and a target direction for the plant. Press the button and, then select two points in the scene: the starting point and then the target.

GROW Initiates plant growth based on the set seed and target positions. Click to generate a new plant from the selected placement and direction.

Seed & Target Info Provides options to set and visualize the seed and target positions manually.

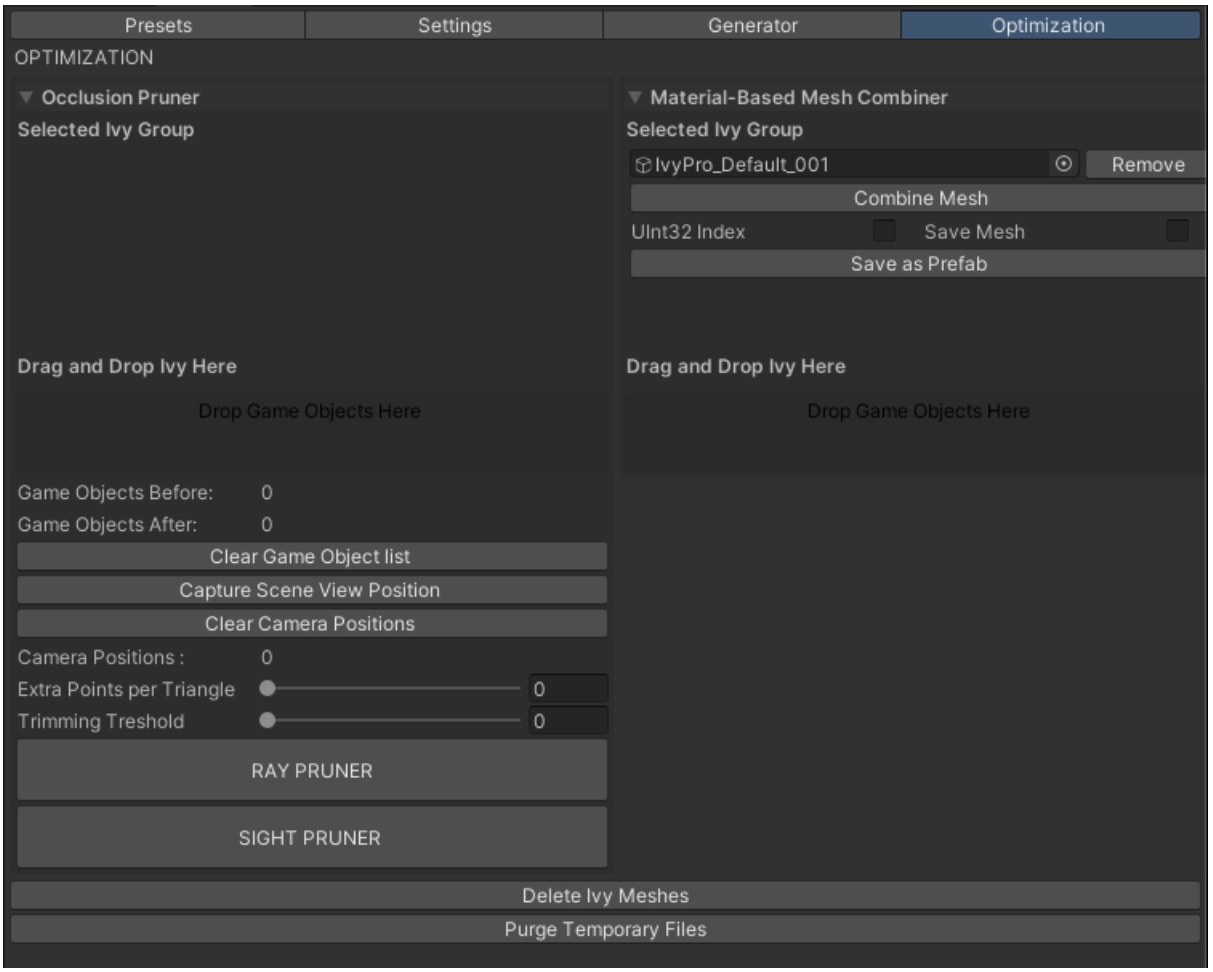
Drag & Drop for Seed and Target Allows attaching GameObjects to visualize and manually set the seed and target positions.

Seed and Target Position Fields: Displays and allows manual entry and visualization of the seed and target coordinates.

Distance Display: Shows the distance between the seed and target.

*Optimization Tab. Just some features are available in Ivy.Lite

**Occlusion Pruner.



1. **Selected Ivy Group**: This section lists all the GameObjects that are selected for occlusion pruning. You can add or remove GameObjects from this list.
2. **Remove Button**: Clicking this button removes the selected GameObject from the Ivy Group list.
3. **Prepare for Pruning Button**: This button prepares the selected GameObject for occlusion pruning by adding its children to the preCleaned list.
4. Drag and Drop Ivy Here: This box provides an area where you can drag and drop additional GameObjects to be added to the Ivy Group list.
5. **Game Objects Before/After**: These labels show the number of GameObjects before and after the pruning process, allowing you to see how many GameObjects were removed.
6. **Clear Game Object list Button**: This button clears the list of preCleaned GameObjects.
7. **Capture Scene View Position Button**: This button captures the current Scene View camera position, storing it for use in the pruning process.

8. **Clear Camera Positions Button**: This button clears all stored camera positions.
9. **Extra Points per Triangle Slider**: This slider controls how many additional points will be generated per triangle during the pruning process.
10. **Trimming Threshold Slider**: This slider adjusts the trimming threshold used in the pruning process.
11. **RAY PRUNER Button**: This button initiates the Ray Pruning process, which prunes the occluded GameObjects based on ray tracing techniques.
12. **SIGHT PRUNER Button**: This button initiates the Sight Pruning process, which prunes the occluded GameObjects based on line of sight occlusion techniques.

****Mesh Combiner**.

1. **Selected Ivy Group**: This section lists all the GameObjects that are selected for mesh combining. You can add or remove GameObjects from this list.
2. **Remove Button**: Clicking this button removes the selected GameObject from the Ivy Group list.
3. **Combine Mesh Button**: This button triggers the mesh combination process for the selected GameObject.
4. **UInt32 Index Toggle**: This toggle switch determines whether the combined mesh will use 32-bit indexes. If enabled, the combined mesh can contain more than 65,536 vertices.
5. **Save Mesh Toggle**: This toggle switch decides whether the combined mesh will be saved as a separate mesh filter asset.
6. **Save as Prefab Button**: Clicking this button saves the combined GameObject as a prefab.

Delete Ivy Meshes Button: This button deletes all mesh files in the IvyMeshes folder.

Purge Temporary Files Button: Clicking this button clears all temporary files that were created during the plant generation process. It helps to keep your project directory clean by removing unnecessary files.

Attribution:

I used a modified and reduced version of scanned models from ffish.asia / floraZia.com sketchfab released under the CC 4.0 license for some Wisteria and Adenochaeta Assets.