ATHIAN GAMES / PLUGIN DOCUMENTATION

Procedural Plant Creator

Plugin workflows and node reference for Unreal Engine developers.

- Tree, grass and bush graph configurations
- Node connections and parameter tables
- Variables, actor overrides, LODs and mesh export

Plugin guide · 9 September 2026
Example values are not factory defaults. Node diagrams are illustrations, not editor screenshots.
https://www.athiangames.com/docs/procedural-plant-creator/overview

REFERENCE CONTENTS

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CHAPTER 01

Plugin Guide

Plant Graph authoring, node parameters, per-actor controls and mesh export.

Plant Graph workflow

Create a **Procedural** → **Plant Graph** asset. Curve generators define the structure, Skin creates wood geometry, Foliage distributes leaf prototypes, and Plant Output supplies the final result. Use a Procedural Plant Actor for editable instances or Export Mesh for fixed geometry.

Topic	Plugin workflow
1. Create a Plant Graph	Graph templates, minimum output chain and asset-editor controls.
2. Tree graph setup	Trunk, three branch orders, roots, foliage and optional wind weights.
3. Variables and actor variations	Shared Height, TrunkRadius and Seed controls; unique placed instances.
4. Grasses and bushes	Narrow-bladed grass, shape variations and a multi-stem bush.
5. LODs, export and baking	A standalone Static Mesh and a separately editable graph actor.
6. Tree node reference	Trunk, branches, roots, Skin and Flute diagrams and tables.
7. Foliage node reference	Leaf, Leaf Card, Foliage and Frond explained.
8. Utility node reference	Join Geometry, Wind Weights, Plant Output and LOD Table.

> Geometry dimensions are graph metres unless stated otherwise. Keep Plant Output.WorldScale at 100 to convert them to Unreal centimetres. Angular parameters such as Branch Level.Angle use radians: 0.5 ≈ 29°, 1 ≈ 57°, 1.57 ≈ 90°. Size is a multiplier, not a length.

PDF reference, example project and support

CHAPTER 02

Create a Plant Graph

Creation templates, minimum graph and Plant Graph editor controls.

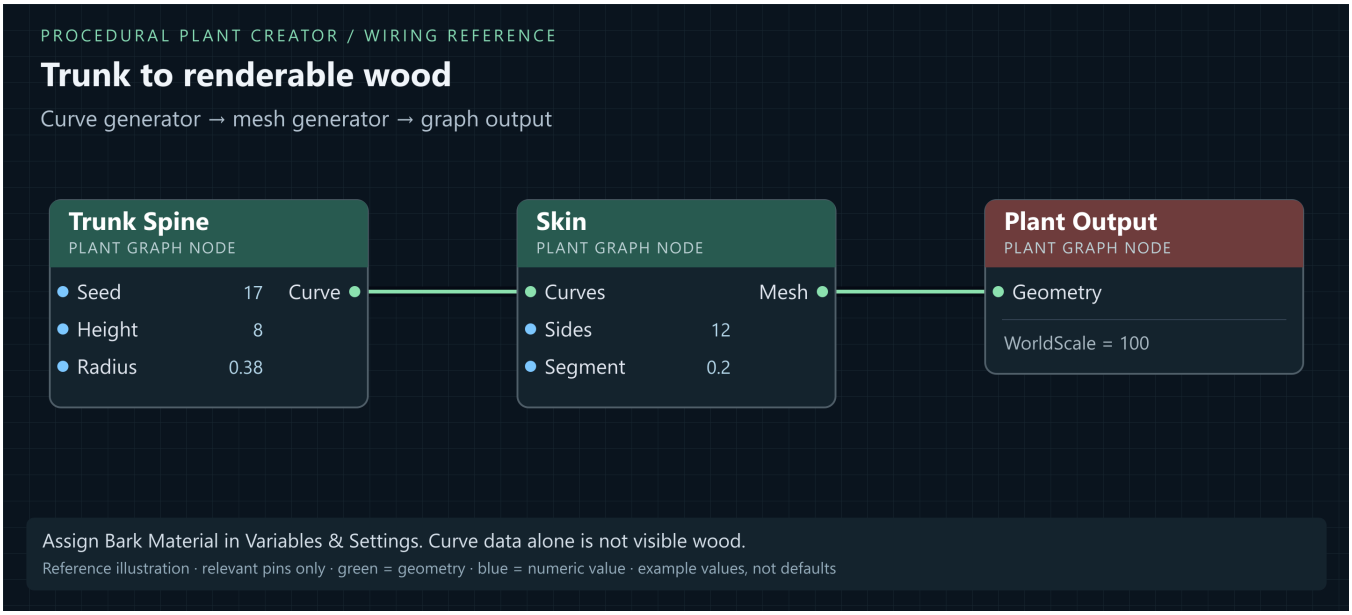
Create the asset

With Procedural Plant Creator enabled, use **Content Browser → right-click → Procedural → Plant Graph**. Choose a template:

Template	Result
Empty Graph	No preconfigured nodes. Use for a custom recipe.
Tree Starter	Editable Bare Ivory tree with trunk, roots and branches.
Grass Starter	Editable Marsh Sedge grass clump.
Bush Starter	Editable Beach Rose shrub with foliage and flowers.

Open the asset and add nodes through the graph context menu. **Species** replaces the current graph with a preset; duplicate the asset first if you need to retain its recipe.

Minimum renderable graph



Trunk Spine → Skin → Plant Output: curve and mesh connections. Reference illustration with relevant pins and example values. Open full-size diagram.

Trunk Spine.Curve → Skin.Curves
Skin.Mesh → Plant Output.Geometry

Set **Plant Output.WorldScale = 100** for graph metres to Unreal centimetres. Assign **Bark Material** in Variables & Settings. Enable **Auto** or use **Build** to evaluate the graph.

Curve generators alone are not renderable wood. Foliage uses a separate prototype/instance path; see Tree Graph Setup.

Plant Graph editor controls

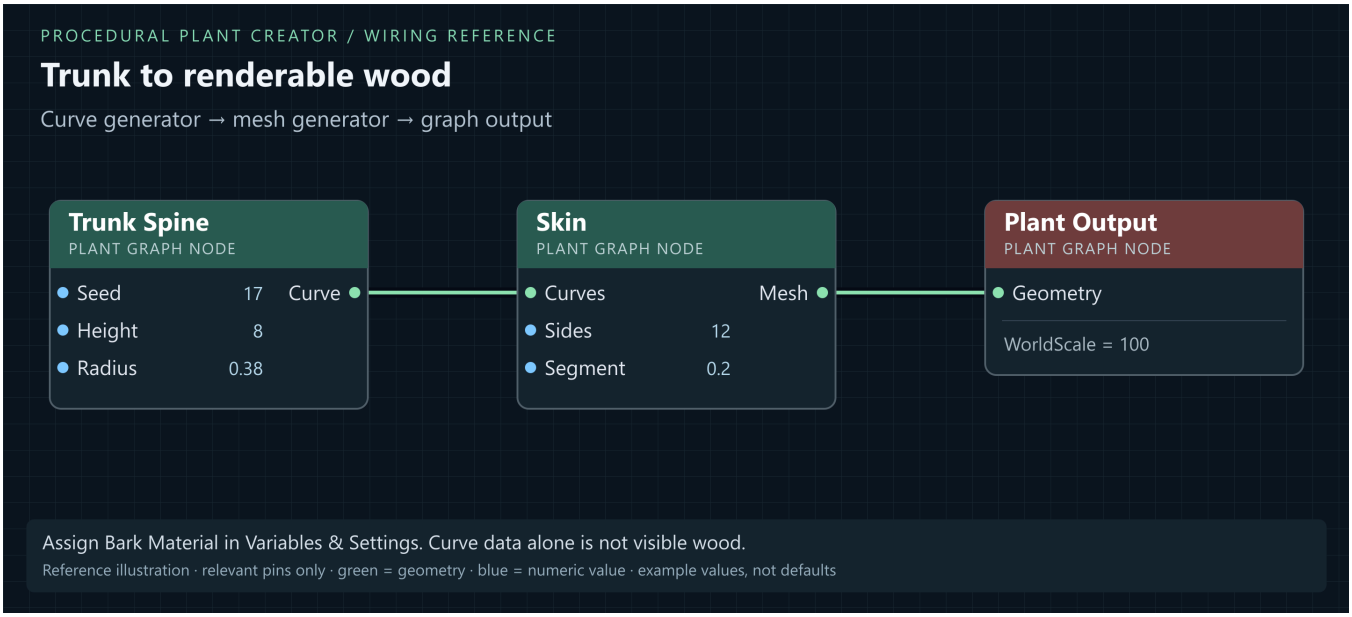
Control / panel	Purpose
Selected-node Details	Edit node properties; wired inputs use incoming values.
Variables & Settings	Graph variables, exposed controls and material assignments.
Auto / Build	Auto rebuilds after edits. Build refreshes manually when Auto is off.
Focus	Frame the complete generated plant in the preview.
White Studio	Hide the preview floor/grid and inspect against white.
Foliage	Toggle leaf instances to inspect the branch structure.
Wireframe	Inspect tube sampling and leaf geometry.
Export Mesh	Create a separate Static Mesh from the graph result.

CHAPTER 03

Tree Graph Setup

A complete tree recipe: node configuration, connections and generated result.

1. Trunk and wood mesh



Trunk Spine, Skin and Plant Output with the example trunk settings. Reference illustration with relevant pins and example values. Open full-size diagram.

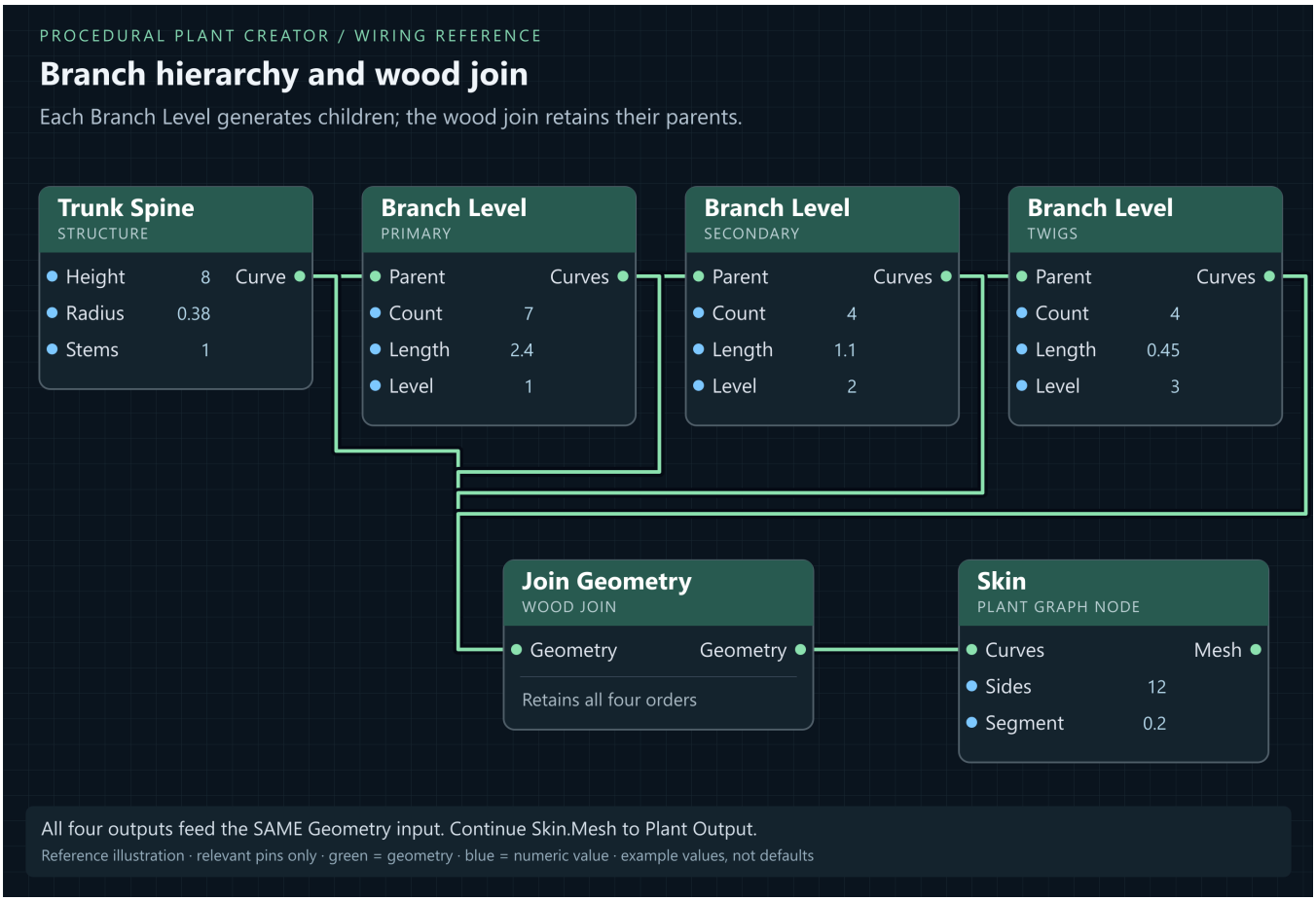
1. In an Empty Graph, add **Trunk Spine**, **Skin** and **Plant Output**.
2. Select Trunk Spine. Set Seed = 17, Height = 8, Radius = 0.38, Flare = 0.25, Lean = 0.04, Gnarl = 0.025, Sink = 0.2 and TipRadius = 0.08. Keep Resolution = 48, BaseAnchor = 0.18 and Stems = 1.
3. Set Skin Sides = 12, Segment = 0.2 and MaterialSlot = 0. Keep Plant Output.WorldScale = 100.
4. Connect **Trunk Spine.Curve** → **Skin.Curves**, then **Skin.Mesh** → **Plant Output.Geometry**. Click Build if Auto is off, then Focus.
5. Set **Variables & Settings** → **Bark Material** to the plugin's **M_TreeBark** or your compatible bark material.

> **Result:** One tapered trunk is visible. Height 8 at WorldScale 100 means about 800 cm above the base. A curve alone is not a solid mesh.

Height sets trunk length, **Radius** sets nominal thickness, and **Flare** widens the base. **Lean** and **Gnarl** modify the spine.

2. Branch hierarchy

Use three **Branch Level** nodes for primary limbs, secondary branches and twigs:



Three Branch Levels and the multi-input wood join before Skin. Reference illustration with relevant pins and example values. Open full-size diagram.

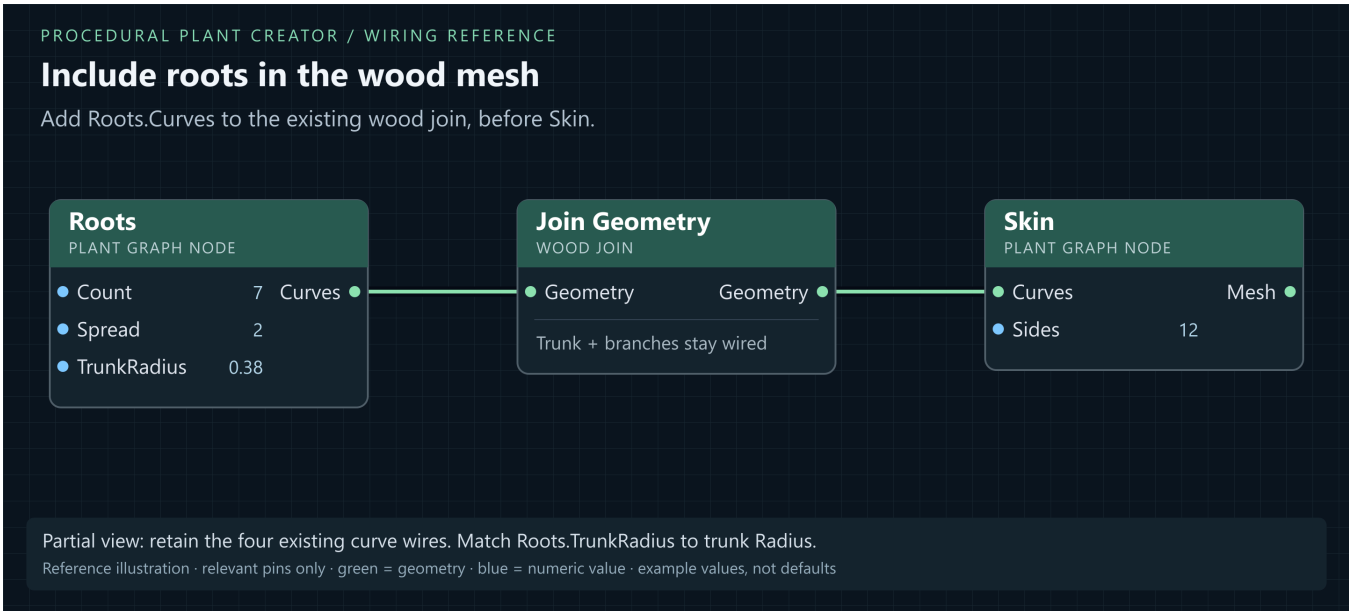
Setting	Primary	Secondary	Twigs
Seed	17	17	17
Count	7	4	4
TrimStart / TrimEnd	0.4 / 0.95	0.25 / 0.95	0.3 / 0.95
Length (m)	2.4	1.1	0.45
LenRand	0.25	0.3	0.3
Angle (radians)	0.85	0.75	0.65
AngleRand	0.2	0.25	0.25
RadFac	0.55	0.5	0.4
Arc	0.2	0.2	0.15
Droop	0.05	0.08	0.1
Res	12	10	8
Level	1	2	3
Whorls / Leaders	0 / 0	0 / 0	0 / 0

1. Connect **Trunk Spine.Curve → Primary.Parent**, **Primary.Curves → Secondary.Parent**, then **Secondary.Curves → Twigs.Parent**.
2. Add **Join Geometry** before Skin. We call it the **wood join**; it is an ordinary Join Geometry node.
3. Connect Trunk Spine.Curve, Primary.Curves, Secondary.Curves and Twigs.Curves into the same **wood join.Geometry** input. It accepts multiple wires; retain all four.
4. Connect **wood join.Geometry → Skin.Curves**, replacing the direct trunk-to-Skin wire. Keep Skin.Mesh connected to Plant Output.Geometry.

> **Result:** The trunk and three branch orders are visible. Branch Level outputs only its new children: using only Twigs would lose the larger structure.

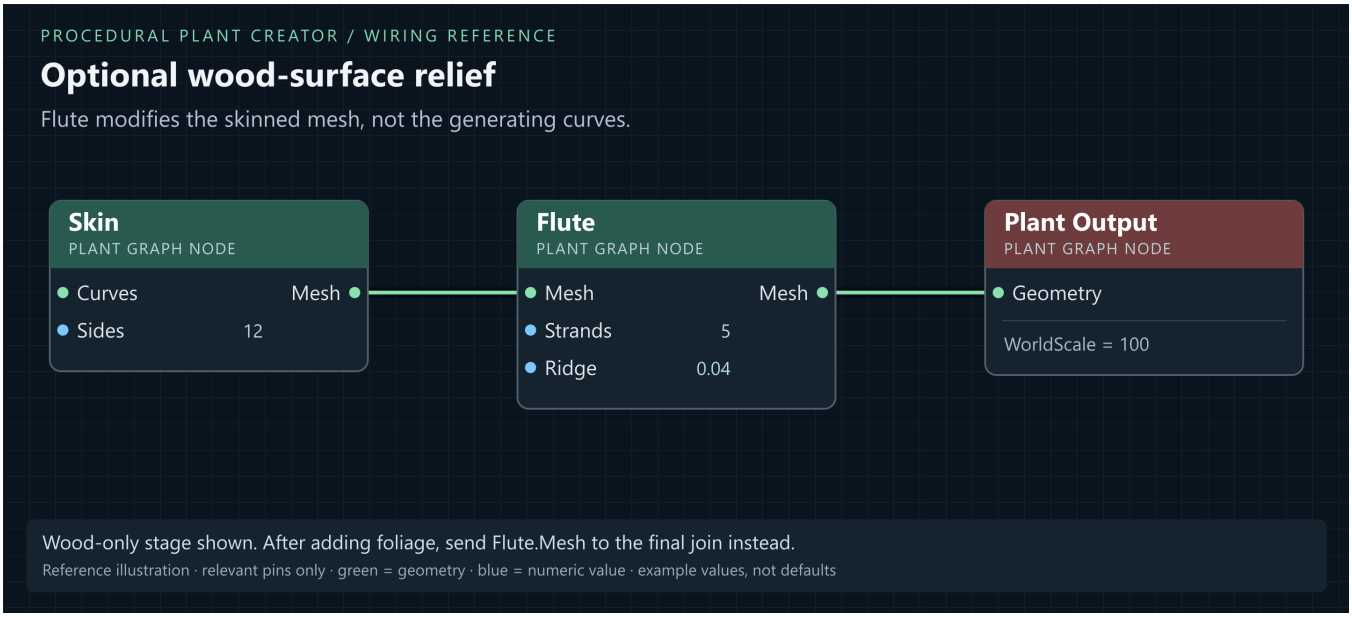
Raise Primary.TrimStart for more clear trunk; lower it for low branches. Raise Primary.Angle for a wider crown. Tune the silhouette before adding leaf density.

3. Add roots and optional relief



Roots.Curves joins the existing trunk and branch curves before Skin. Reference illustration with relevant pins and example values. Open full-size diagram.

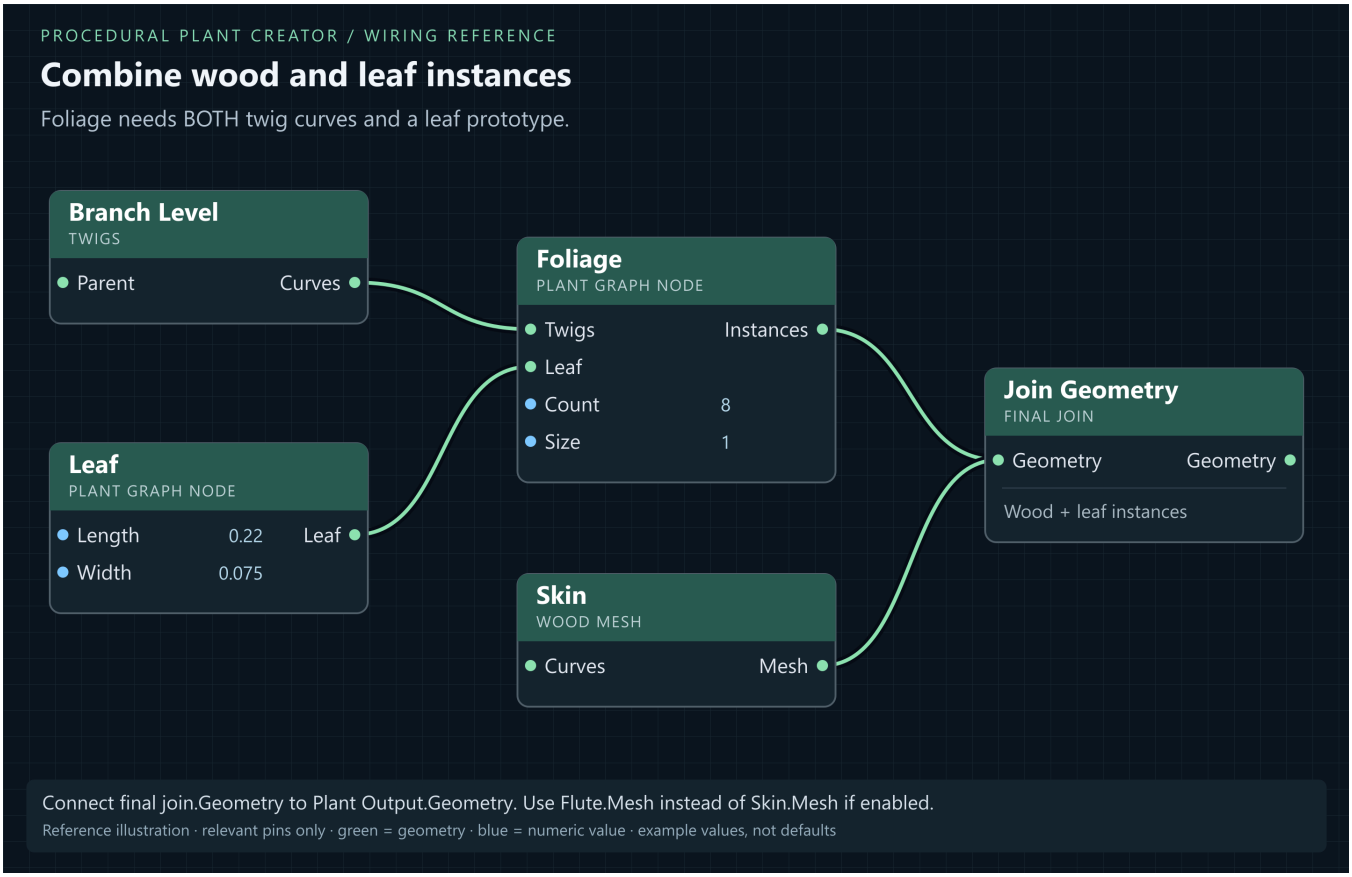
1. Add **Roots**. Set Seed = 17, Count = 7, Spread = 2, Rise = 0.45, Thickness = 0.2, Collar = 0.7, TrunkRadius = 0.38, Sink = 0.25 and Resolution = 24.
2. Connect **Roots.Curves → wood join.Geometry**. Five curve wires now enter that input: trunk, primary, secondary, twigs and roots. Roots has no Parent input.
3. Match **Roots.TrunkRadius** to **Trunk Spine.Radius**; these settings are independent unless driven by the same variable.
4. Optional: add **Flute** after Skin. Replace Skin-to-Output with **Skin.Mesh → Flute.Mesh → Plant Output.Geometry**. Set Seed = 17, Strands = 5, Twist = 0.4, Ridge = 0.04, Sharpness = 1.6, Bark = 0.01, BarkScale = 2.2, Lobes = 7, LobeDepth = 0.06 and LobeFalloff = 3.4.
5. Inspect from two sides with Wireframe. If relief is faceted, increase Skin.Sides or reduce relief. Bypass Flute for a smoother trunk.



Optional Flute connection between Skin and the wood-stage output. Reference illustration with relevant pins and example values. Open full-size diagram.

> **Result:** Roots and trunk share the origin. Join Geometry combines tubes; it is not a boolean union and does not guarantee a seamless welded collar.

4. Add leaves



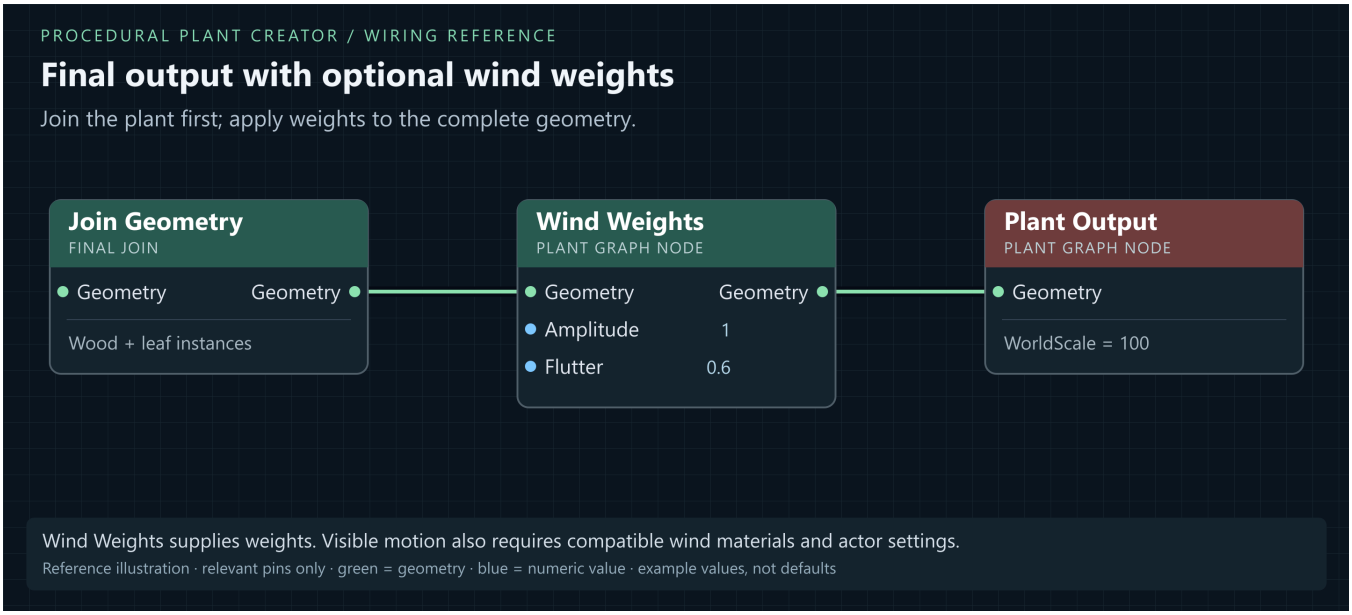
Leaf and twig inputs feed Foliage; wood and leaf instances enter the final join. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Add **Leaf**, **Foliage** and another **Join Geometry**. Call this second join the **final join**.
2. Set Leaf Length = 0.22, Width = 0.075, Fold = 0.3, Droop = 0.2, Cup = 0.09, Petiole = 0.025, ResU = 3, ResV = 11 and MaterialSlot = 1.
3. Connect **Twigs.Curves** → **Foliage.Twigs** and **Leaf.Leaf** → **Foliage.Leaf**.
4. Set Foliage Seed = 17, Count = 8, TrimStart = 0.15, TrimEnd = 1, Size = 1, SizeRand = 0.3, Angle = 1.05, AngleRand = 0.28, AzJitter = 0.3, Droop = 0.28, FaceUp = 0.75, RollRand = 0.4 and MinLevel = -1.
5. Connect the wood mesh output (Skin.Mesh, or Flute.Mesh if used) and **Foliage.Instances** to **final join.Geometry**. Connect **final join.Geometry** → **Plant Output.Geometry**.
6. Assign **M_TreeLeafBlade** from the plugin content to **Variables & Settings** → **Leaf Material**. This is for the modelled Leaf prototype. An atlas material needs a Leaf Card configured for that atlas instead.
7. Use the graph toolbar's **Foliage** toggle to inspect the branch structure independently of the canopy.

> **Result:** Leaves follow fine twigs and wood remains visible. 7 × 4 × 4 gives up to 112 twig curves before filtering; Count 8 requests about 896 instances. Increase gradually.

For cards, replace Leaf with Leaf Card and connect its Leaf output to the same Foliage.Leaf input. Start with Cross, Foliage.FaceUp = 0.15 and stronger RollRand. Match AtlasColumns/Rows to the texture; see Leaf Card reference.

5. Wind and final connection check



Final Join Geometry → Wind Weights → Plant Output. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Optional: insert **Wind Weights** between final join and Plant Output: **final join.Geometry → Wind Weights.Geometry → Plant Output.Geometry**.
2. Set Amplitude = 1, Flutter = 0.6, BaseHold = 0.12 and HeightPower = 2.6. These are weights: compatible wind materials and actor wind settings are also needed for visible motion.

Output	Input(s)	Purpose
Trunk.Curve	Primary.Parent + wood join.Geometry	Keep trunk and grow limbs.
Primary.Curves	Secondary.Parent + wood join.Geometry	Keep limbs and grow branches.
Secondary.Curves	Twigs.Parent + wood join.Geometry	Keep branches and grow twigs.
Twigs.Curves	Foliage.Twigs + wood join.Geometry	Keep twigs and place leaves.
Roots.Curves	wood join.Geometry	Include the root curves.
wood join.Geometry	Skin.Curves	Generate wood tubes.
Skin.Mesh (or optional Flute.Mesh)	final join.Geometry	Collect wood mesh.
Leaf.Leaf	Foliage.Leaf	Supply leaf prototype.
Foliage.Instances	final join.Geometry	Collect canopy.
final join.Geometry (or Wind Weights.Geometry)	Plant Output.Geometry	Complete plant result.

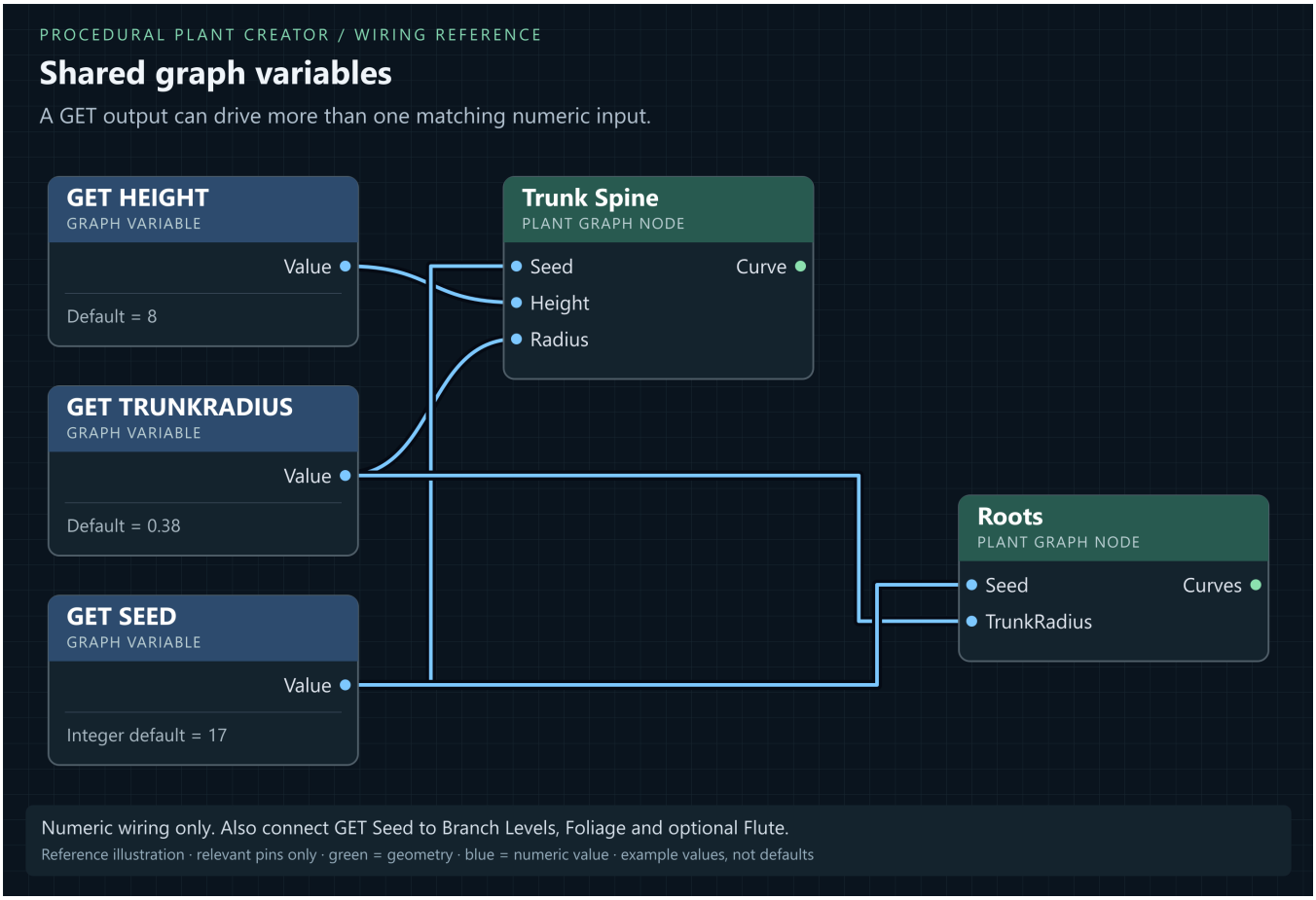
> **Result:** One connected Plant Output receives wood and foliage, with no invalid connections. Continue to variables and actor variations.

CHAPTER 04

Variables and Actor Variations

Promote settings, reuse GET nodes and control placed plants independently.

1. Expose the controls



GET Height, GET TrunkRadius and GET Seed connected to trunk and root inputs. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Right-click an unconnected numeric input such as **Trunk Spine.Height** and choose **Promote to Variable**. This creates a variable and a connected GET.
2. In **Variables & Settings** → **Variables**, check Name, Value and Exposed. Use **Height**, Value = 8 and Exposed enabled. Names must be unique.
3. Promote Trunk Spine.Radius. Use **TrunkRadius**, Value = 0.38 and Exposed enabled. If renaming a variable, update its GET node's variable name too.
4. Right-click canvas → **Variables** → **Get TrunkRadius**. Connect Value to **Roots.TrunkRadius**. Both trunk and root collar now share one setting.
5. Add a variable named exactly **Seed** in the Variables list: Value = 17, Integer enabled, Exposed enabled. Add GET Seed nodes beside generators and connect Value to Seed on Trunk Spine, Roots, all Branch Levels, Foliage and optional Flute.
6. Change Height or TrunkRadius in Variables & Settings and inspect the result. Every wired consumer should update. No SET node is required.

Variable	Type / default	Connect Value to	Effect
Height	Float / 8	Trunk Spine.Height	Height in metres.
TrunkRadius	Float / 0.38	Trunk Spine.Radius + Roots.TrunkRadius	Consistent trunk/collar.
Seed	Integer / 17	Each generator Seed	Repeatable variation.
RootCount (optional)	Integer / 7	Roots.Count + Flute.Lobes	Keep root/lobe counts aligned.
LeafCount (optional)	Integer / 8	Foliage.Count	Density per twig. Do not also wire an LOD count to this input.

> A variable only affects wired inputs. Naming it Seed does not replace each node's local Seed automatically. Fresh Random changes between builds; leave it out for repeatability.

2. Place editable instances

1. Drag a **Plant Graph** into your level to create a **Procedural Plant Actor**. Set its Graph property to the required recipe.
2. Select its Procedural Plant component in Details. If exposed controls are missing, click **Sync Parameters From Graph**.
3. Enable the override checkbox next to Height and set 7. Disabled override values do not replace graph defaults.
4. For multiple instances, use the same Graph with different enabled overrides. **Seed** has its own component property, not a duplicate override row.
5. Use **Randomize Plant** for a new seed. Reusing a Seed reproduces the individual when the graph contains no Fresh Random node.

Actor	Seed	Height override	TrunkRadius override
Tree A	17	7	0.34
Tree B	42	8	0.38
Tree C	91	9	0.42

> **Result:** One shared graph, three individual plants. Editing graph defaults affects its users; editing an actor override affects that actor only.

Named references versus variables

Use **Named Reroute** → **Create Named Reference** to reuse computed geometry or values. A reference reads its declaration's output; it does not define an exposed parameter. Use graph variables and GET nodes for defaults and actor overrides.

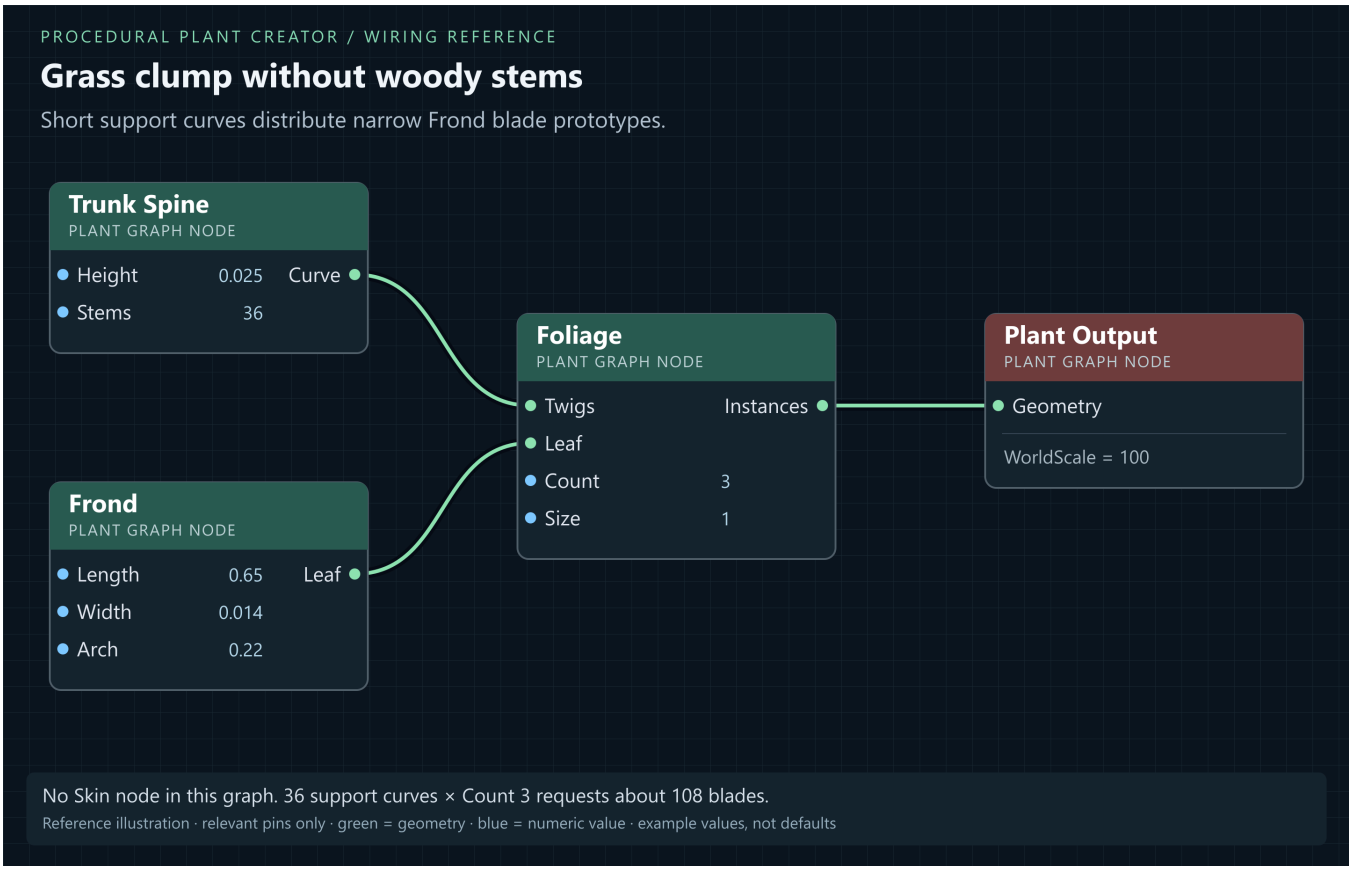
CHAPTER 05

Create Grasses and Bushes

Narrow-bladed clumps, different silhouettes and multi-stem shrubs, built manually.

1. Grass from Empty Graph

Short support curves place narrow Frond blades. They are deliberately not skinned into woody stems.



Trunk Spine + Frond → Foliage → Plant Output, without a Skin node. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Create **PG_Grass_Upright** with Empty Graph. Add Trunk Spine, Frond, Foliage and Plant Output.
2. Set Trunk Spine Height = 0.025, Radius = 0.002, Sink = 0, Flare = 0, Lean = 0, Gnarl = 0, Resolution = 4, Seed = 17 and Stems = 36. In Clump, set StemSpread = 0.12, StemLean = 0.1 and StemHeightVar = 0.35.
3. Set Frond Length = 0.65, Width = 0.014, PetioleFraction = 0.03, Arch = 0.22, Fold = 0.1, Curl = 0.05, Twist = 0.1, Segments = 24, SegmentsAcross = 3, SplitDepth = 0 and MaterialSlot = 1.
4. Connect **Trunk Spine.Curve** → **Foliage.Twigs**, **Frond.Leaf** → **Foliage.Leaf** and **Foliage.Instances** → **Plant Output.Geometry**. Do not add Skin to this simple grass graph.
5. Set Foliage Count = 3, Seed = 17, TrimStart = 0, TrimEnd = 1, Size = 1, SizeRand = 0.3, Angle = 0.25, AngleRand = 0.18, AzJitter = 0.9, Droop = 0, FaceUp = 0, RollRand = 0.15 and MinLevel = -1.
6. Keep Plant Output.WorldScale = 100. Assign a suitable two-sided grass/leaf material to Leaf Material. For shape testing, an opaque two-sided green material shows the full blade; an unrelated masked atlas can cut holes in it.

7. Use Stems for the number of support curves and Foliage Count for blades per curve. Increase these for density; use Frond Width to control individual blade width.

> **Result:** 36 curves × Count 3 requests about 108 blades. Length 0.65 at Size 1 gives a roughly 65 cm blade before arching. No thick supporting trunks should be visible.

2. Grass variations

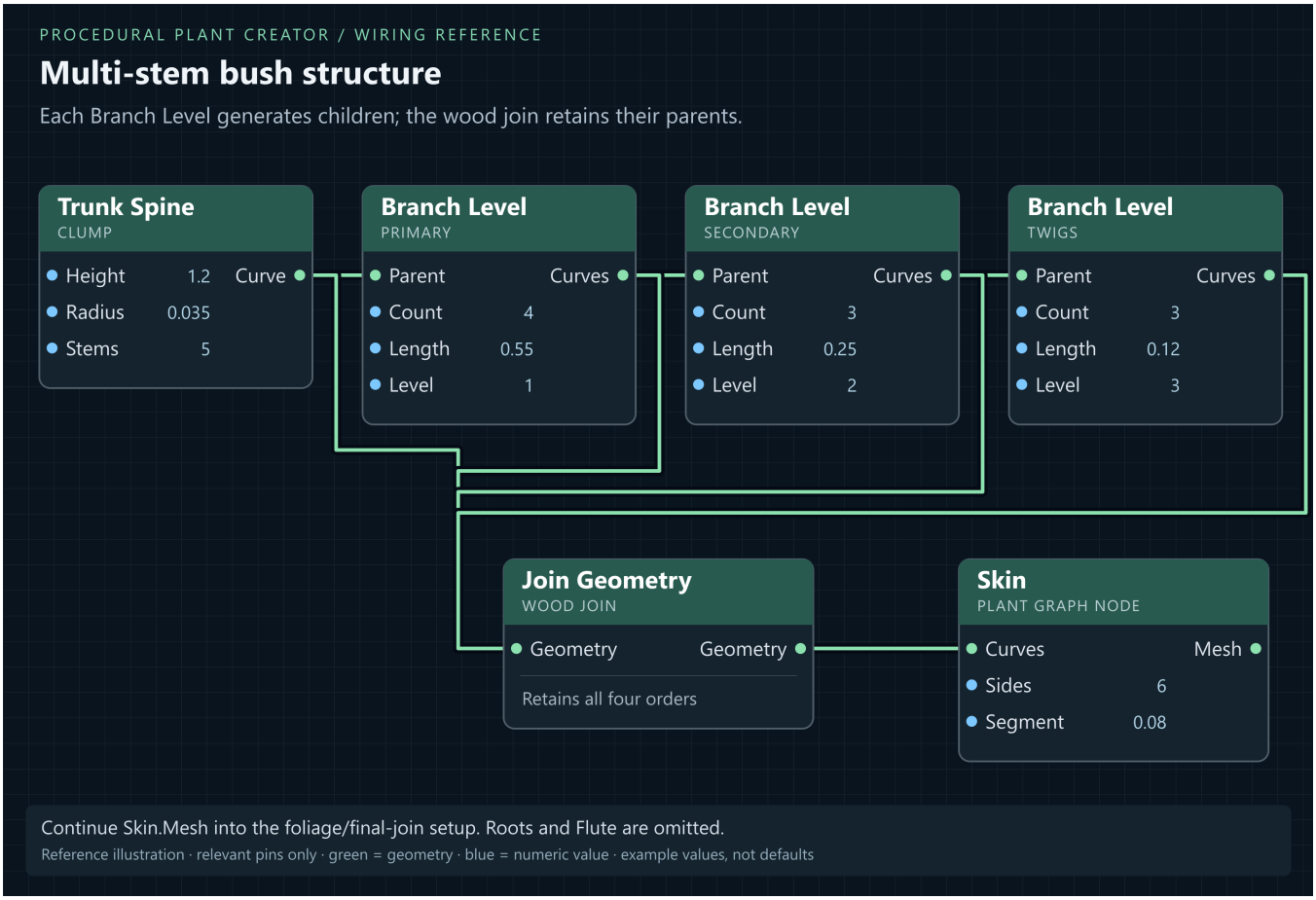
Use Frond dimensions and Arch with Trunk Spine clump settings to define different grass forms.

Design	Length / Width (m)	Arch / Foliage Angle	Clump
Upright fine	0.65 / 0.014	0.22 / 0.25	36 stems, spread 0.12
Arching meadow	0.8 / 0.012	0.55 / 0.4	40 stems, spread 0.15
Low broad sedge	0.4 / 0.022	0.4 / 0.65	30 stems, spread 0.16
Tall narrow tuft	1.05 / 0.009	0.15 / 0.18	32 stems, spread 0.1

Seed changes the individual arrangement, not the grass type or material colour. Flowering heads require a separate prototype and placement layer; increasing blade Count does not create them.

Actual Unreal capture of example grass graphs. Select the image to open it at full size.

3. A small multi-stem bush



Multi-stem bush settings and its three branch orders joined before Skin. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Reuse the tree graph's branch, wood, leaf and output wiring in a separate Plant Graph.
2. Set variables Height = 1.2 and TrunkRadius = 0.035. Set Trunk Spine Stems = 5, StemSpread = 0.15, StemLean = 0.25, StemHeightVar = 0.3, Sink = 0.05 and Flare = 0.08.
3. Set Primary Length = 0.55, Count = 4 and TrimStart = 0.2. Set Secondary Length = 0.25 and Count = 3; Twigs Length = 0.12 and Count = 3. Each node acts on every incoming stem/branch.
4. Disconnect Roots from the wood join and bypass Flute. Keep those nodes disconnected for reference if desired. Set Skin Sides = 6 and Segment = 0.08.
5. Set Leaf Length = 0.08, Width = 0.035 and Foliage Count = 5. If these inputs are wired, change the driving variable/table instead. Build and inspect before increasing density.
6. Duplicate for compact and spreading forms by changing StemSpread, branch Angle and Length. Create a separate Bush Starter to inspect the more developed Beach Rose recipe.

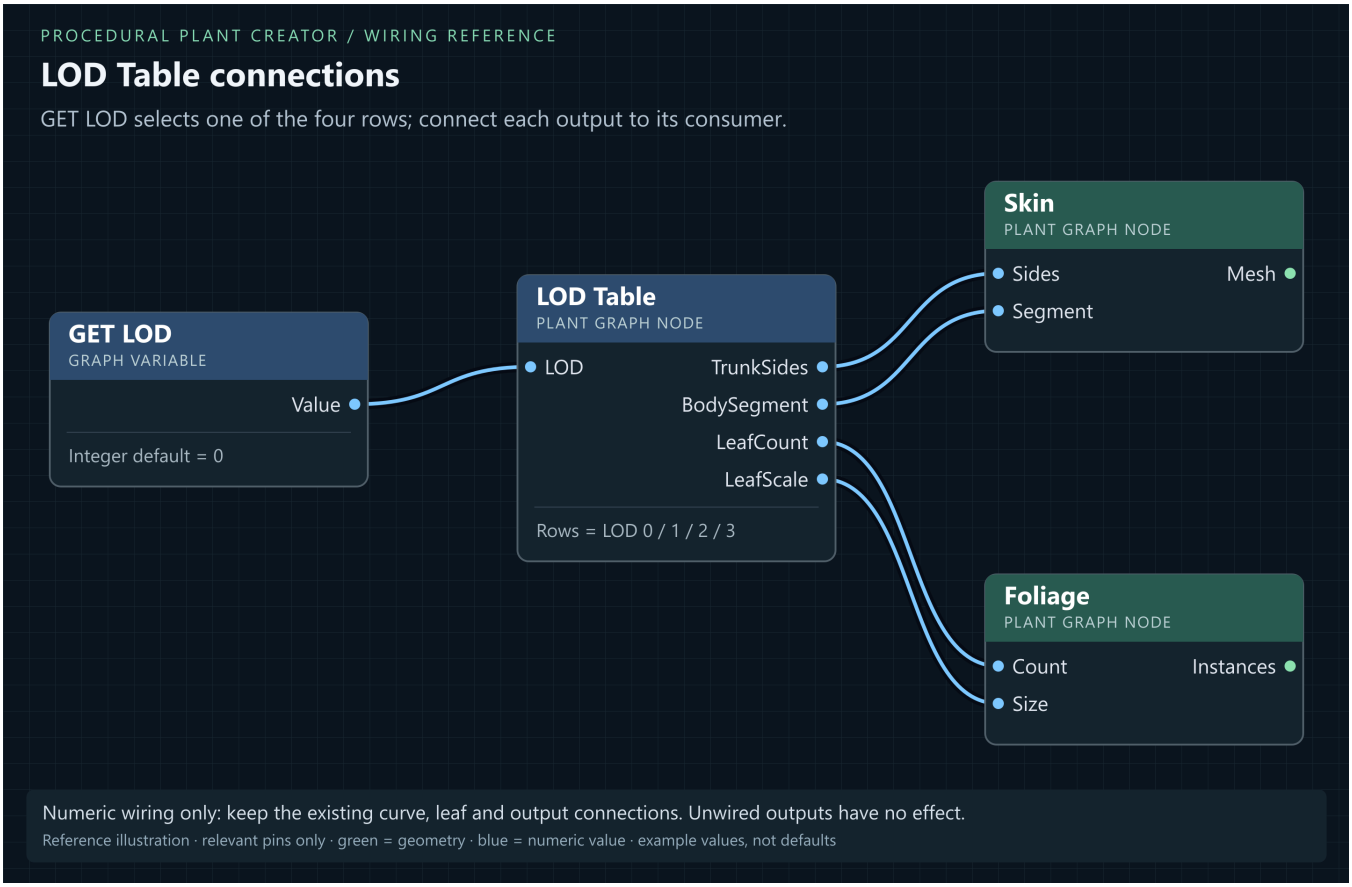
> **Result:** Several thin stems and low branches form a shrub, rather than a scaled-down single-trunk tree.

CHAPTER 06

LODs, Export and Baking

Control detail levels and distinguish editable actors from fixed mesh exports.

1. Wire an LOD Table



GET LOD selects table outputs connected to Skin and Foliage detail controls. Reference illustration with relevant pins and example values. Open full-size diagram.

1. Add **LOD Table** to the tree graph. Add an Integer variable named exactly **LOD**, default 0. Connect GET LOD.Value to LOD Table.LOD.
2. Set TrunkSides to 12, 10, 8, 6; BodySegment to 0.2, 0.35, 0.55, 0.8; LeafCount to 8, 6, 4, 3; LeafScale to 1, 1.1, 1.25, 1.45. The four entries mean LOD 0, 1, 2, 3.
3. Connect TrunkSides → Skin.Sides, BodySegment → Skin.Segment, LeafCount → Foliage.Count and LeafScale → Foliage.Size. Replace earlier wires on these numeric inputs.
4. Use the preview LOD control to inspect all four levels. Look for angular trunks and sparse canopy. Restore LOD 0 for close-up review.

> **Result:** Only connected table outputs affect the plant. This setup retains every branch order; Orders does nothing until connected to logic that uses it.

2. Export a Static Mesh

1. Connect both wood and Foliage.Instances to Plant Output through the final join. Set graph materials and atlas settings before export.
2. Click graph toolbar **Export Mesh**. The export realises leaf instances into mesh geometry and creates four LODs.
3. The resulting **SM_<GraphName>** asset is created beside the graph. It can be used in standard Static Mesh placement and scattering workflows.

> A Static Mesh freezes one result and has no live Seed or Height controls. Edit the source graph and export again to change it. Actor overrides do not automatically change an export made from the graph's defaults.

3. Bake an individual actor

1. Select the Procedural Plant Actor with the desired individual overrides.
2. In its component Cooking controls, click **Bake**. Use **Cook Policy** → **Use Baked Mesh** for a fixed plant.
3. The bake stores wood plus separate foliage prototypes and transforms. Save these generated assets with the actor's level.
4. Bake again after graph, seed, density or material changes. Test the intended map in a packaged build before shipping.

Workflow	Use	Shape control
Plant Graph in level	Editable procedural actor	Per-actor Seed and exposed overrides.
Export Mesh	Standalone mesh placement/scattering	Fixed shape; re-export to change.
Actor Bake + Use Baked Mesh	Saved wood and separate canopy instances	Source editable; bake again after changes.
Build At Runtime	Generate plant shape during gameplay	Has generation cost; profile on target hardware.

Large modelled canopies and repeated runtime rebuilds can be expensive. Measure frame time, memory and export size in the intended scene. Nanite does not remove foliage overdraw, material cost or generation cost.

CHAPTER 07

Tree Node Reference

Large diagrams and parameter tables for the trunk, crown, roots and wood surface.

Values are example configurations, not factory defaults. Some settings are only in the selected-node Details panel. Geometry lengths are metres; angular controls use radians.

Trunk Spine

A curve is a skeleton. Add Skin and Plant Output to see a solid trunk.

Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Numeric settings
Output: Curve → Skin.Curves / Branch Level.Parent

Trunk Spine · parameter reference

Parameter	Example value	Meaning / visible effect
Seed	17	Integer. Repeatable variation in lean and gnarl.
Height	8	Metres above ground. Increase for a taller trunk.
Radius	0.38	Base radius in metres, not diameter. Share with Roots.TrunkRadius.
Flare	0.25	Base widening. Use modest values before adding root relief.
Lean	0.04	Sideways displacement relative to height; not an angle in degrees.
Gnarl	0.025	Irregular bending strength. Too much can fold thick tubes.
Sink	0.2	Metres of buried base below the graph origin.
Resolution	48	Curve samples (4–512). This is not the tube side count.
BaseAnchor	0.18	Fraction of height over which bending fades in; keeps the base anchored.
TipRadius	0.08	Tip radius as a fraction of Radius. Lower gives a finer tip.
Stems	1	Stem count (1–64). More than one makes a clump.

Branch Level

Each node adds one branch order. It does not include its parent geometry.

Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

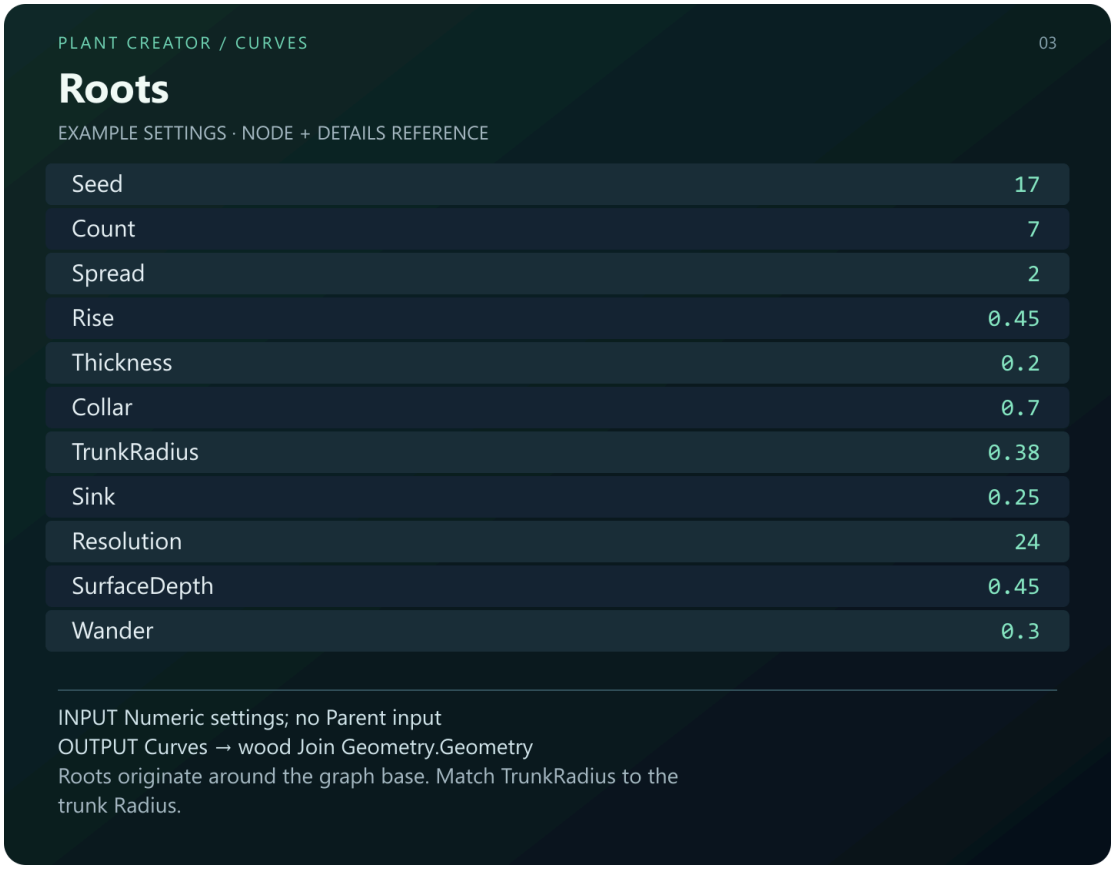
Input: Parent ← Trunk Spine.Curve
Output: Curves → next Branch Level.Parent / wood join

Branch Level · parameter reference

Parameter	Example value	Meaning / visible effect
Seed	17	Integer. Changes attachment variation and shape.
Count	7	Children per parent curve; with Whorls enabled, children per ring.
TrimStart	0.4	Start of attachment range along parent (0–1). Clears the lower trunk.
TrimEnd	0.95	End of attachment range. Keep greater than TrimStart.
Length	2.4	Branch length in metres before variation and profiles.
LenRand	0.25	Length variation. Breaks equal-length repetition.
Angle	0.85	Radians from parent direction; larger values spread branches outward.
AngleRand	0.2	Random angular variation in radians.
RadFac	0.55	Radius factor, also limited by parent calibre and child count.
Arc	0.2	Branch curvature. Inspect side view when changing it.
Droop	0.05	Downward bending contribution.
Res	12	Curve resolution. Skin controls mesh sampling separately.
Level	1	Branch-order tag: use 1 for primary, 2 for secondary, 3 for twigs.
Whorls	0	0 = spiral distribution. Positive values create rings.
Leaders	0	Children that continue the parent direction. Useful for upright crowns.

Roots

Roots originate around the graph base. Match TrunkRadius to the trunk Radius.



Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

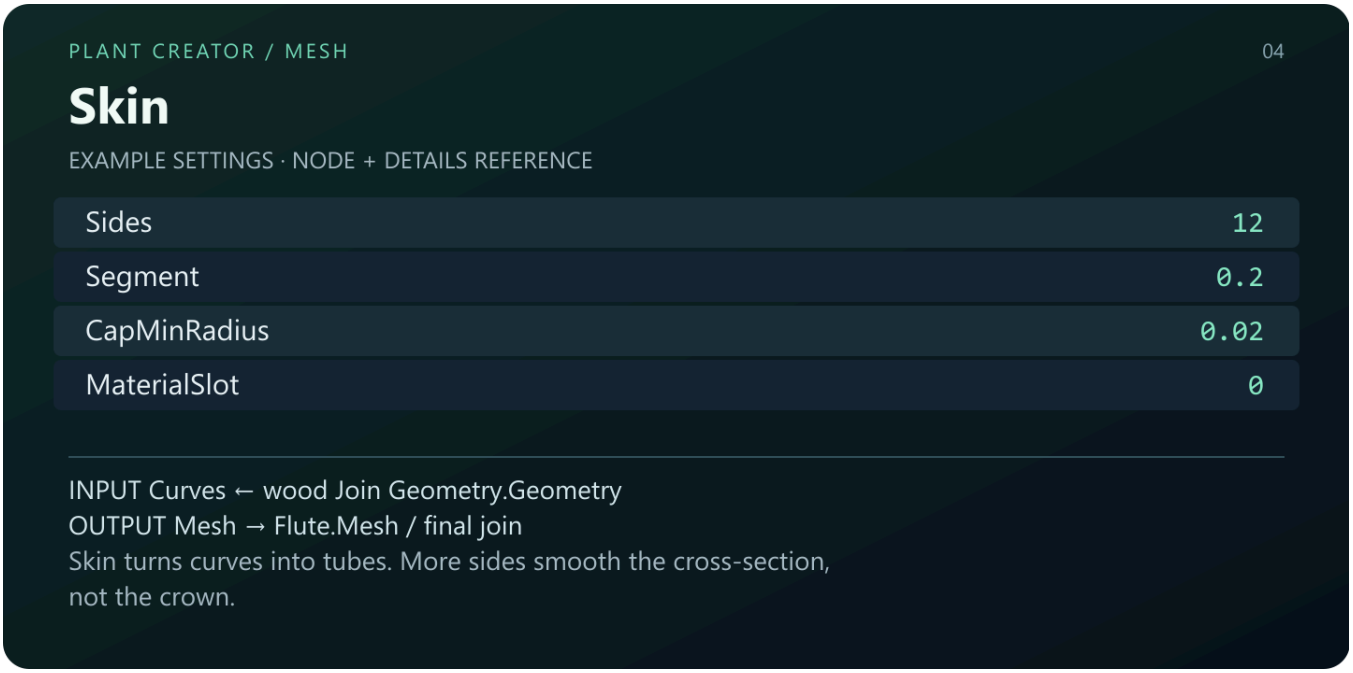
Input: Numeric settings; no Parent input
Output: Curves → wood Join Geometry.Geometry

Roots · parameter reference

Parameter	Example value	Meaning / visible effect
Seed	17	Repeatable direction and shape variation.
Count	7	Number of main roots. Does not add fine branching automatically.
Spread	2	Outward reach in metres.
Rise	0.45	Raised root shape near the trunk, in metres.
Thickness	0.2	Root radius factor relative to TrunkRadius, not metres. Variation, a radius cap and taper also apply.
Collar	0.7	Extra swelling at the trunk junction.
TrunkRadius	0.38	Metres. Must match Trunk Spine.Radius for this example.
Sink	0.25	Controls the root's downward settling toward the surface band.
Resolution	24	Curve sample count. Raise only when the outline needs it.
SurfaceDepth	0.45	Details: resting depth as a multiple of local root radius.
Wander	0.3	Details: sideways wandering relative to reach.

Skin

Skin turns curves into tubes. More sides smooth the cross-section, not the crown.



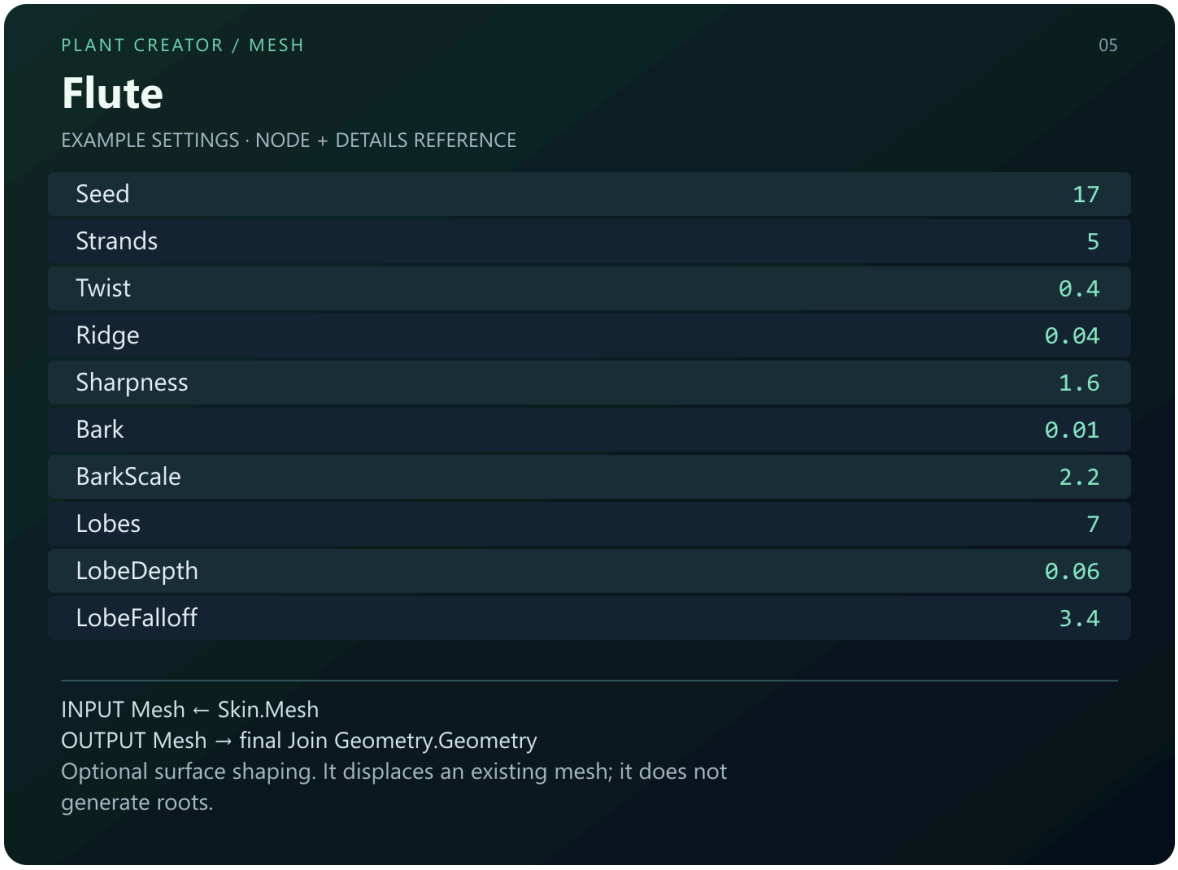
Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Curves ← wood Join Geometry.Geometry
Output: Mesh → Flute.Mesh / final join

Parameter	Example value	Meaning / visible effect
Sides	12	Vertices around each tube ring. Higher = rounder and heavier.
Segment	0.2	Metres between resampled rings. Smaller = more mesh detail.
CapMinRadius	0.02	Ends wider than this radius in metres receive caps.
MaterialSlot	0	Details: 0 uses the bark slot in this tutorial.

Flute

Optional surface shaping. It displaces an existing mesh; it does not generate roots.



Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Mesh ← Skin.Mesh
Output: Mesh → final Join Geometry.Geometry

Flute · parameter reference

Parameter	Example value	Meaning / visible effect
Seed	17	Keep in sync with Roots when aligning lobes.
Strands	5	Number of longitudinal ridges.
Twist	0.4	Spiral twist of the ridge pattern.
Ridge	0.04	Ridge relief strength. Start small.
Sharpness	1.6	Higher values sharpen ridge peaks.
Bark	0.01	Fine surface displacement; not the bark material.
BarkScale	2.2	Frequency of fine bark relief.
Lobes	7	Buttress lobe count. Match Roots.Count for this study.
LobeDepth	0.06	Buttress relief strength near the base.
LobeFalloff	3.4	How quickly buttress relief fades up the trunk.

Advanced shape controls

Node / group	Controls	Visible effect
Trunk / Clump	StemSpread, StemLean, StemHeightVar	Spread is metres; lean is relative to height; height variation breaks identical stems.
Trunk / Trunk	GnarlScale, GnarlDetail	Bend frequency and second-octave strength. Lower frequency gives broader bends.
Trunk / Kinks	Kinks, KinkAngle	Distinct elbows; KinkAngle is radians. Start with one small kink.
Trunk / Taper	TaperPower, TaperCurve, RadiusProfile	Shape taper from base to tip.
Branch / Branch	AzJitter, UpBias, OutBias, Gnarl, GnarlScale	Rotational variety, initial direction bias and irregular bends.
Branch / Phyllotaxy	Whorls, WhorlPhase	Branch rings; phase rotates each ring in radians and Count is per ring.
Branch / Dominance	Leaders, LeaderStraighten, LeaderLength, LeaderRadius	Continuing upright shoots, their length and thickness.
Branch / Tropism	Tropism, TropismStrength, TropismStiffness	Turn toward a direction over length; strength is radians per metre.
Branch / Fork	AttachSink, Collar, CollarFalloff	Bury the branch start and shape a short collar; inspect joints close up.
Branch / Tips	MinRadius, SnapChance, SnapMin, SnapMax	Tip thickness and probability/length of snapped branches.
Roots	SurfaceBlend, CollarFalloff, MinRadius, TaperPower, WanderScale	Ground transition, collar reach, taper and wandering frequency.
Flute / Buttress	LobeSharp, LobeBias, LobeFloor	Lobe sharpness and limits on grooves between roots.
Flute / Nodes	NodeSpacing, NodeBulge, NodeWidth, NodeStep	Repeating culm joint rings. Spacing is metres; 0 disables rings.

To edit a profile, expand it in node Details and inspect its enable, keys and multiply/replace controls. Its horizontal position runs from 0 to 1. Trunk RadiusProfile runs base-to-tip; Branch LengthProfile runs from TrimStart to TrimEnd; Branch RadiusProfile runs along each branch. Start with a flat multiplier of 1, change one key and inspect the result.

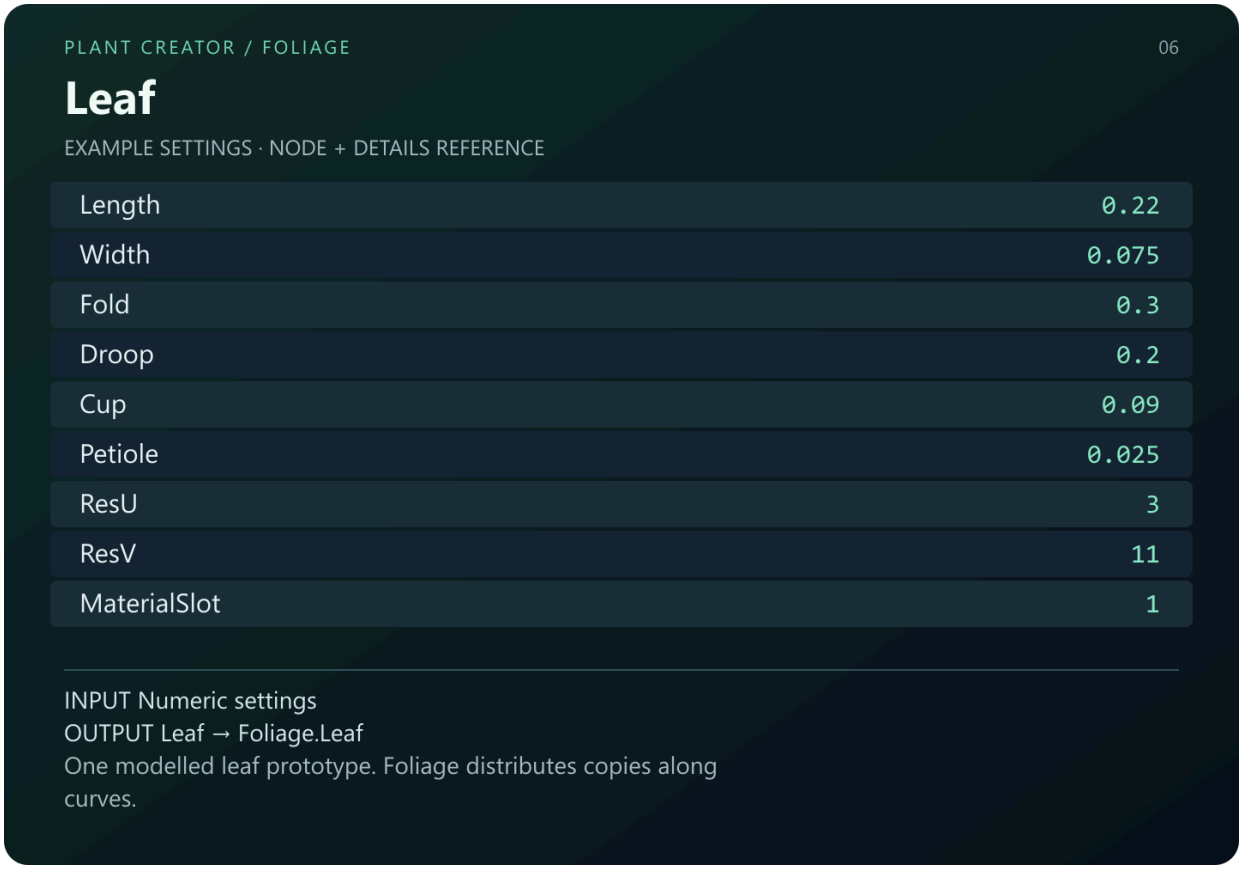
CHAPTER 08

Foliage Node Reference

Prototype shape, placement, density, atlas layout and shading.

Leaf

One modelled leaf prototype. Foliage distributes copies along curves.



Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Numeric settings
Output: Leaf → Foliage.Leaf

Leaf · parameter reference

Parameter	Example value	Meaning / visible effect
Length	0.22	Blade length in metres.
Width	0.075	Blade width in metres.
Fold	0.3	Fold across the blade's midrib.
Droop	0.2	Bending of the individual leaf, not the branch.
Cup	0.09	Cupping across the leaf surface.
Petiole	0.025	Leaf-stalk length in metres.
ResU	3	Blade subdivisions across its width.
ResV	11	Blade subdivisions along its length.
MaterialSlot	1	Details: leaf material slot for this tutorial.

Leaf Card

Alternative to Leaf. Match the atlas grid to the assigned texture.

Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Card, Shape, Atlas and Shading settings
Output: Leaf → Foliage.Leaf

Leaf Card · parameter reference

Parameter	Example value	Meaning / visible effect
Layout	Cross	Two intersecting planes. Single is one plane; Fan is flat.
Length	0.45	Card length in metres.
Width	0.38	Card width in metres.
Bend	0.16	Sag relative to card length.
SegmentsV	3	Length subdivisions that allow the bend to show.
AtlasColumns	4	Use 4 only with the shipped 4-column species atlas.
AtlasRows	4	Use 4 only with the shipped 4-row species atlas.
AtlasIndex	-1	Walk the allowed atlas cells instead of fixing one cell.
AtlasFirst	0	First allowed cell. Restricts a mixed-species atlas.
AtlasCount	0	0 allows cells through the end of the atlas.
NormalBlend	0.7	0 = plane normals; 1 = outward cluster normals.
MaterialSlot	1	Assign a matching masked foliage material to the graph's leaf slot.

Foliage

Both geometry inputs are required. A prototype alone does not make a canopy.

Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

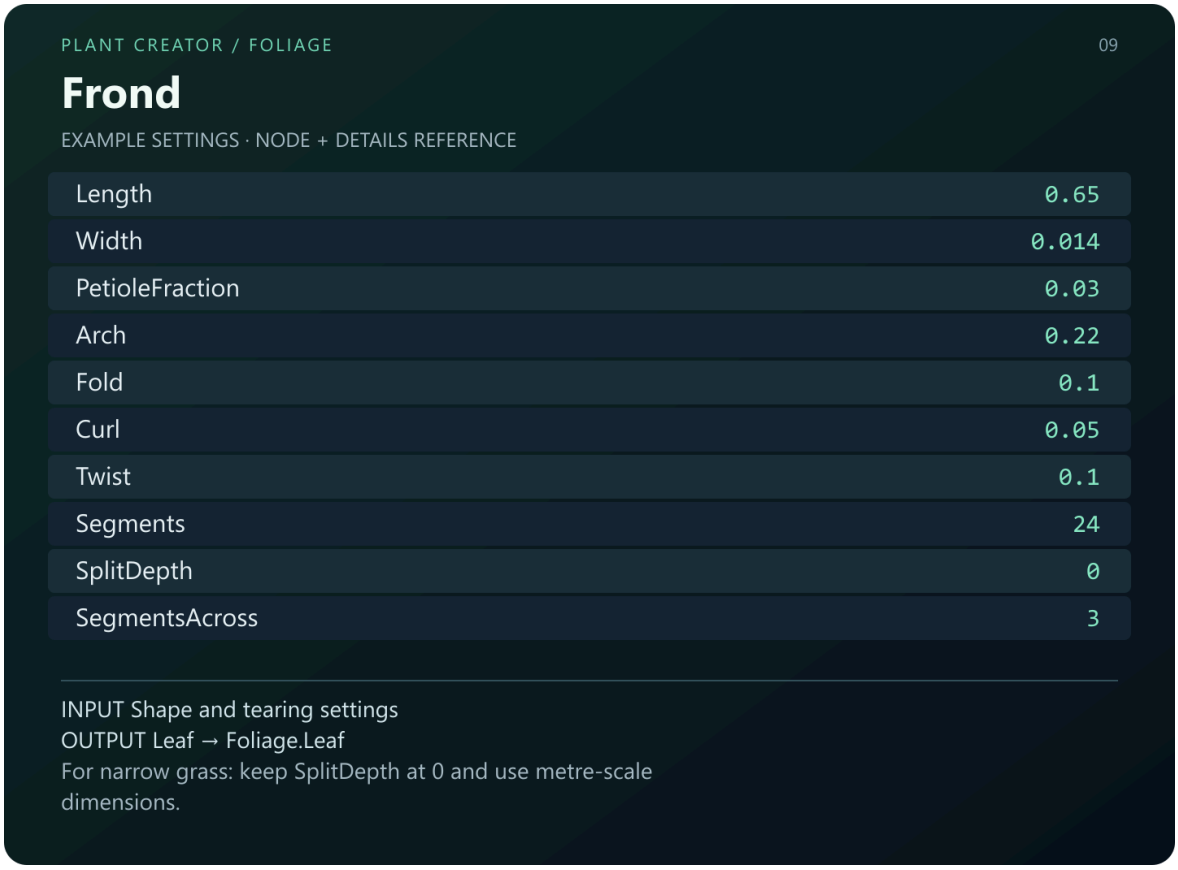
Input: Twigs ← twig Curves; Leaf ← Leaf.Leaf
Output: Instances → final Join Geometry.Geometry

Foliage · parameter reference

Parameter	Example value	Meaning / visible effect
Seed	17	Repeatable leaf placement and orientation.
Count	8	Instances per eligible curve, not total leaf count for the tree.
TrimStart	0.15	Start of leaf placement along each twig (0–1).
TrimEnd	1	End of leaf placement along each twig.
Size	1	Multiplier on the prototype's dimensions; not metres.
SizeRand	0.3	Random size variation.
Angle	1.05	Radians relative to the supporting curve.
AngleRand	0.28	Random angle variation in radians.
AzJitter	0.3	Variation around the supporting curve.
Droop	0.28	Placement droop; distinct from Leaf.Droop.
FaceUp	0.75	0–1 tendency to face skyward. Try 0.15 for crossed cards.
RollRand	0.4	Random roll in radians. Cards benefit from stronger roll variation.
MinLevel	-1	Minimum branch-order tag. -1 accepts the supplied curves.

Frond

For narrow grass: keep SplitDepth at 0 and use metre-scale dimensions.



Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Shape and tearing settings
Output: Leaf → Foliage.Leaf

Frond · parameter reference

Parameter	Example value	Meaning / visible effect
Length	0.65	Blade length in metres before Foliage.Size.
Width	0.014	Total blade width in metres: 0.014 m = 1.4 cm.
PetioleFraction	0.03	Bare stalk as a fraction of blade length.
Arch	0.22	Tip sag relative to length. Raise for arching grasses.
Fold	0.1	V-shaped fold across the midrib.
Curl	0.05	Curvature across each half of the blade.
Twist	0.1	Twist along the blade in radians.
Segments	24	Longitudinal strip count; also affects blade sampling.
SplitDepth	0	0 = continuous blade; higher separates the edges into strips.
SegmentsAcross	3	Samples across the blade for its folded shape.

Additional foliage decisions

Choice / settings	Purpose	Caution
Leaf / Leaf Card	Modelled blade / textured plane cluster	Cards need the correct masked material and atlas grid.
Card Layout	Cross/Star give volume; Fan is flat; Whorl is a shallow bowl	Fan can disappear edge-on. Planes is ignored by Single and Cross.
Card Tilt, FanSpread	Plane angle and fan opening in radians	These are card layout, not branch direction.
Card Curl, Twist, SegmentsU	Crosswise shape and tessellation	Increase sampling only where needed.
Foliage BareChance, ClumpRand, LimbBareChance	Empty twigs, density variation and bare limb groups	Start at 0; high values intentionally remove canopy coverage.
Frond ArchPower, FoldTipBias	Distribution of blade bending/folding	First fix overall dimensions and scale.
Frond SplitDepth, SplitGap, SplitChance	Torn broad leaves or separated strips	Keep SplitDepth = 0 for intact grass blades.
Frond BaseEnd, BaseFull, BaseCap, TipStart, TipFull, TipCap	Blade widening and tip narrowing	Inspect a single prototype close up.
MaterialSlot	0 bark / 1 leaf for these examples	Slot index and graph material assignment are different controls.

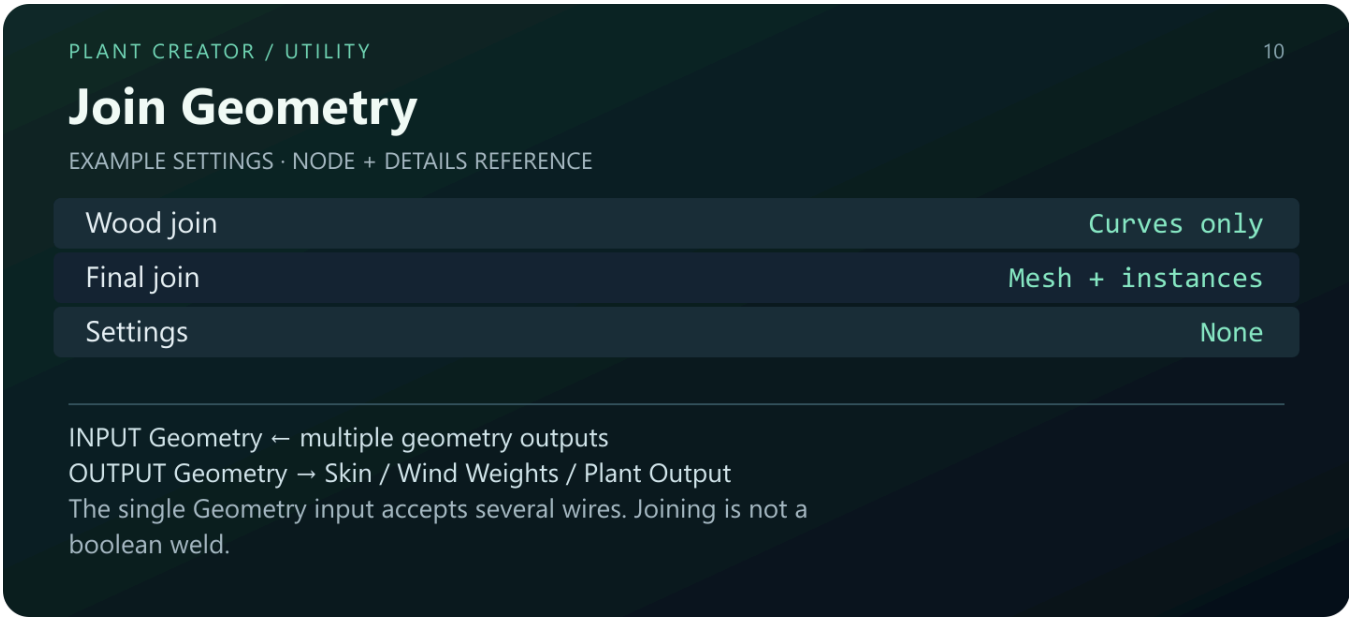
CHAPTER 09

Utility Node Reference

Combining geometry, motion weights, output units and detail controls.

Join Geometry

The single Geometry input accepts several wires. Joining is not a boolean weld.



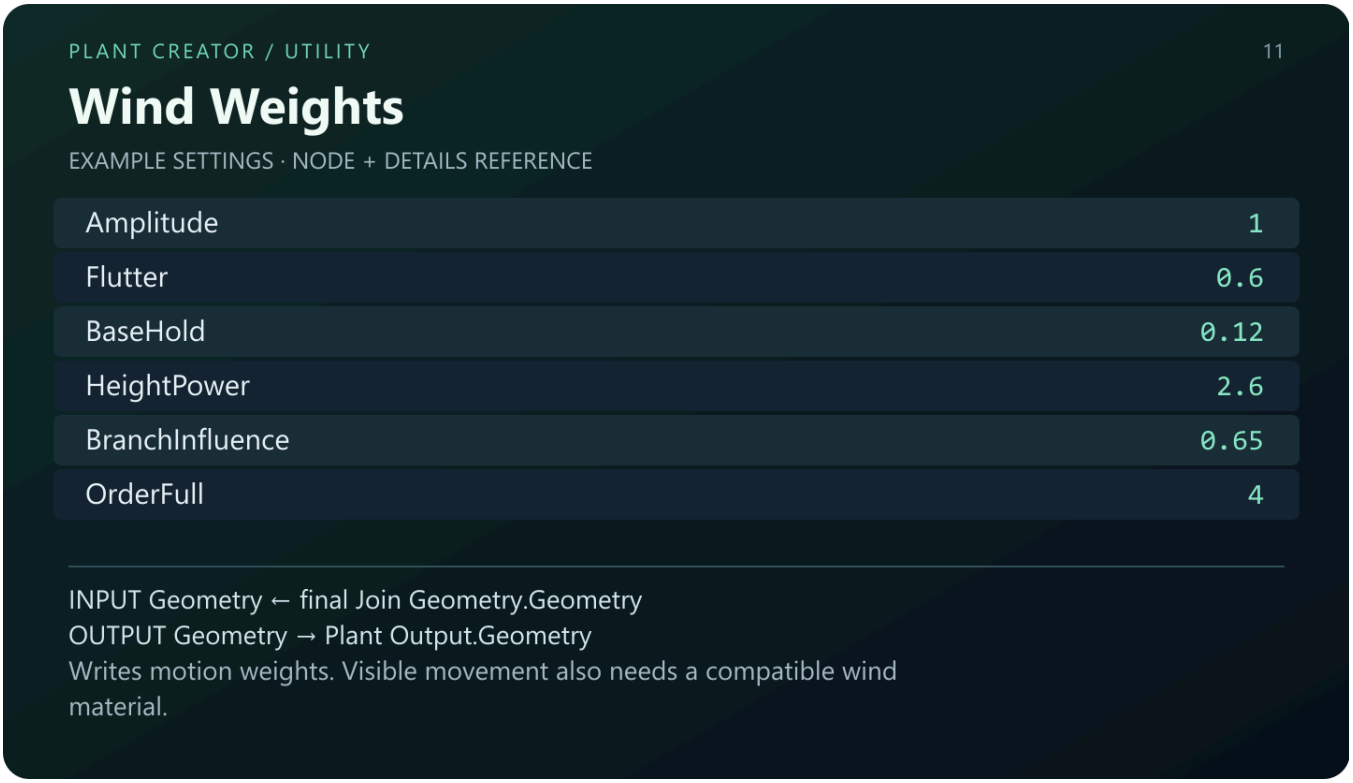
Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Geometry ← multiple geometry outputs
Output: Geometry → Skin / Wind Weights / Plant Output

Parameter	Example value	Meaning / visible effect
Wood join	Curves only	Collect trunk, branch orders and roots, then send to Skin.
Final join	Mesh + instances	Collect skinned wood and Foliage.Instances before output.
Settings	None	This node combines the connected payloads; it has no density control.

Wind Weights

Writes motion weights. Visible movement also needs a compatible wind material.



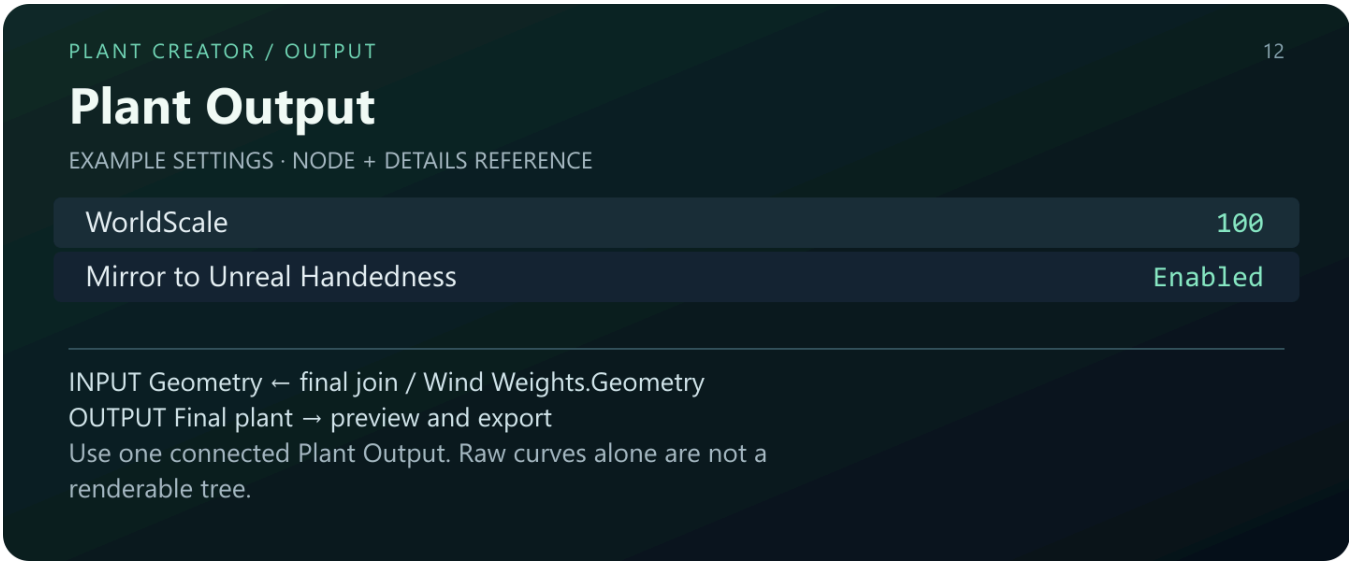
Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Geometry ← final Join Geometry.Geometry
Output: Geometry → Plant Output.Geometry

Parameter	Example value	Meaning / visible effect
Amplitude	1	Master weight multiplier (0–1). 0 anchors the plant.
Flutter	0.6	Leaf flutter weight multiplier (0–1).
BaseHold	0.12	Details: fraction of height that stays anchored.
HeightPower	2.6	Details: higher values concentrate movement toward the top.
BranchInfluence	0.65	Details: adds flexibility according to branch order.
OrderFull	4	Details: branch order considered fully flexible.

Plant Output

Use one connected Plant Output. Raw curves alone are not a renderable tree.



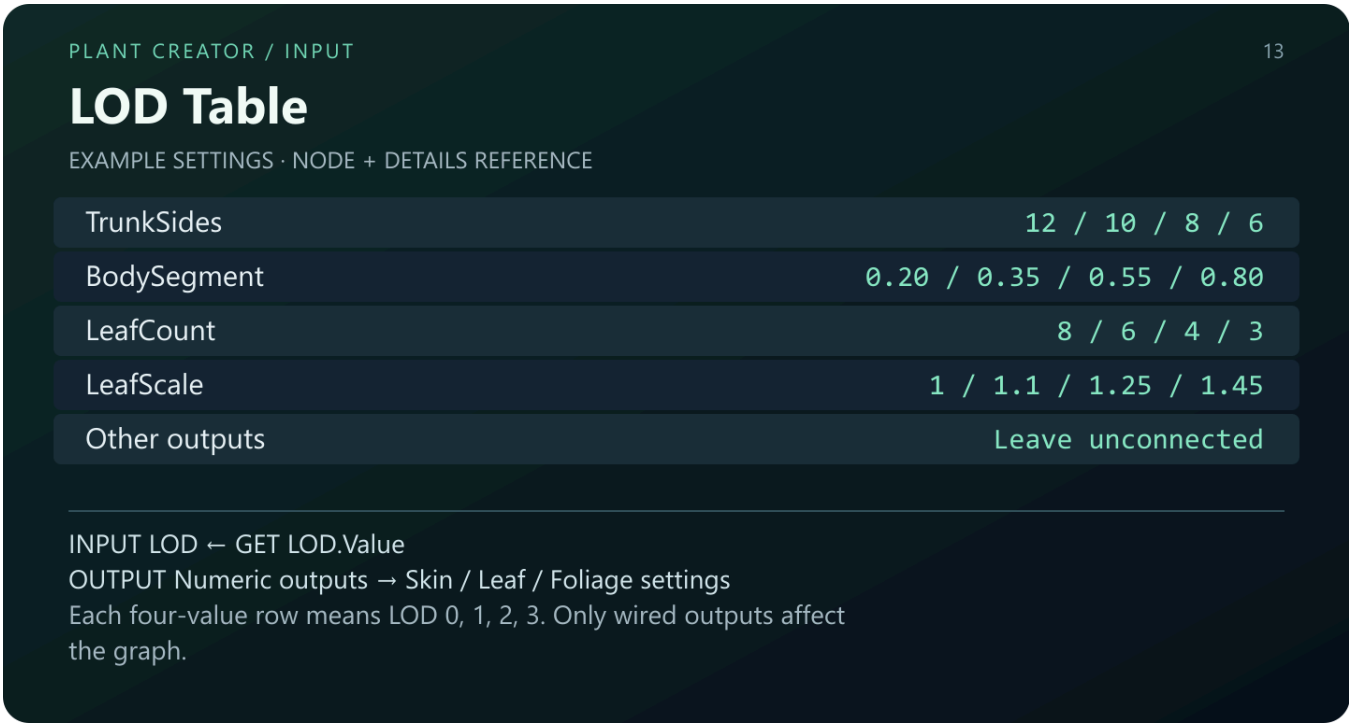
Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: Geometry ← final join / Wind Weights.Geometry
Output: Final plant → preview and export

Parameter	Example value	Meaning / visible effect
WorldScale	100	Details: converts graph metres to Unreal centimetres. 8 m becomes 800 cm.
Mirror to Unreal Handedness	Enabled	Details: converts coordinate handedness, including winding and rotations.

LOD Table

Each four-value row means LOD 0, 1, 2, 3. Only wired outputs affect the graph.



Node reference illustration. Example values, not factory defaults; includes node Details settings. Select the image to open it at full size.

Input: LOD ← GET LOD.Value
Output: Numeric outputs → Skin / Leaf / Foliage settings

Parameter	Example value	Meaning / visible effect
TrunkSides	12 / 10 / 8 / 6	Connect to the tutorial's Skin.Sides.
BodySegment	0.20 / 0.35 / 0.55 / 0.80	Connect to Skin.Segment; distances are metres.
LeafCount	8 / 6 / 4 / 3	Connect to Foliage.Count.
LeafScale	1 / 1.1 / 1.25 / 1.45	Connect to Foliage.Size; inspect coverage at every LOD.
Other outputs	Leave unconnected	They do nothing until wired. Orders alone does not remove branches.

Values and routing

Tool	Result	Manual use
GET variable	Named variable → Value	Create the variable, then canvas → Variables → Get its name.
Promote to Variable	Variable and connected GET	Right-click an unconnected numeric input; check name, type and default.
Named Reroute	Typed In → Out	Name the declaration and create references near consumers.
Math	Derived numeric value	Choose an operation to derive a related control, such as a proportional length.
Fresh Random	New sample each generation	Set Min, Max and Integer; avoid for seed-repeatability demonstrations.
Switch Geometry	One of two geometry inputs	Use explicit conditional wiring to drop an order at lower LODs.

Keep one connected Plant Output. Invalid types and cycles are rejected: a numeric Value cannot replace curve geometry.

CHAPTER 10

Explore the Example Project

Example maps, source graph locations and species controls.

Maps and source graphs

Maps are under **Content/Examples/Maps**; source recipes are under **Content/Examples/PlantGraphs**. The example archive excludes the plugin and requires a matching installed version.

A Procedural Plant Actor exposes its source through the component's **Graph** property. A Static Mesh specimen is a fixed export: edit its source graph and export again to update the shape.

Map	Study
L_ProceduralPlant_Gallery	Labeled beds for grasses, shrubs, flowering plants and concept trees; older downloads may retain separate study maps.
L_ProceduralPlant_Showcase	Living Collection: broadleaf, orchard, conifers, understory and warm-climate plants.
L_ProceduralPlant_Forest	Mixed canopy and layered groundcover.
L_ProceduralPlant_Marsh	Willow, reeds, sedge and wetland banks.
L_ProceduralPlant_OpenWorld	Landscape/PCG regions. Load the region in World Partition before inspection.

Actual Unreal viewport capture. Select the image to open it at full size.

Graph folders include Species, Concepts, Arboretum, GrassCollection12 and MarshRuntime under Content/Examples/PlantGraphs. Example maps/graphs belong to the project; reusable materials and textures belong to the plugin.

Silhouette study

Form	First controls	Objective
Spreading oak	Primary TrimStart, Angle, Length; branch hierarchy	Low spreading limbs and an irregular broad crown.
Slender birch	Trunk Radius, Lean, Stems; small leaves	Thin stems and an airy crown.
Conifer	Whorls, Count, Leaders, LengthProfile; needle cards	Layered rings and tapered crown.
Weeping form	Tropism direction, strength and stiffness	Shoots turning downward along their length.
Coppice / shrub	Stems, StemSpread, StemLean; low branch attachment	Unequal stems emerging from one base.

Some finished showcase root collars include mesh finishing beyond a plain Join Geometry connection. Joining tubes does not reproduce every finishing operation of those supplied meshes.

CHAPTER 11

Graph Troubleshooting

Graph evaluation, parameter overrides, foliage, LOD and baking issues.

Graph and output issues

Symptom	Cause to check	Correction
Empty preview	Output wiring / Auto / curves only	Connect mesh or instances through the final join; Build and Focus.
Only twigs	Children do not include parents	Join trunk and each branch order before Skin.
Missing leaves	Both Foliage inputs, Count, Size, MinLevel	Connect Twigs and Leaf, use positive count/size and enable preview Foliage.
Wrong scale	Metres, Size multiplier, WorldScale	Use graph metres and WorldScale 100; do not convert twice.
Value edit does nothing	Wired input or disabled override	Edit its driving variable, or enable the actor override.
Seed has no effect	Local Seed inputs not wired	Connect GET Seed to relevant generators.
Same Seed, different result	Fresh Random or changed graph	Remove Fresh Random for repeatability; compare identical graph settings.
Disconnected roots	TrunkRadius / moved base	Share the trunk radius, keep the base anchored and inspect from several angles.
Faceted relief	Skin sampling versus Flute detail	Reduce relief or increase Skin.Sides; Trunk.Resolution is different.
Rectangular/cut leaves	Material and atlas layout	Match prototype, mask, grid/cell range and two-sided shading.
Canopy disappears edge-on	Flat cards / high FaceUp	Try Cross/Star, lower FaceUp and inspect from the side.
Grass resembles a bush	Width, arch, spread and scale	Use narrow Frond blades and unskinned support curves.
Mesh ignores Seed	Fixed mesh versus graph actor	Use the graph actor, or edit and re-export the mesh.
LOD unchanged	Unwired LOD Table	Connect table outputs to numeric consumers.
Missing packaged plant	Bake, cook policy and saved references	Bake for Use Baked Mesh, save assets and include the map.

CHAPTER 12

Downloads and Support

Plugin reference, example project and support.

Resources

Resource	Contents
Plugin guide PDF	Plugin workflows, node images and parameter tables for offline use.
Example project	Project editor binaries included; plugin excluded. Install the matching plugin first.
Discord support	Include engine/plugin versions, affected graph and a screenshot of node values and connections.

The hosted example archive may differ from the latest illustrated gallery layout; older archives retain separate study maps. This manual does not require a specific showcase map.

Installation scope

Workflow	Requirement
Manual graph authoring	Matching precompiled Procedural Plant Creator plugin enabled in Unreal.
Documented release target	Unreal Engine 5.8 / Windows Win64. Check supported product versions before installing.
Example project	Matching engine build and installed plugin; included project binaries avoid rebuilding on that matching build.
Different engine build or C++ changes	May require a C++ toolchain/rebuild; not part of the graph tutorial.
Environment examples	PCG for biome examples; the project also enables Water and Landmass.
Core authoring	No online service or subscription required.

Image labels

Node and wiring images are source-checked reference illustrations, not editor screenshots. Wiring views show the relevant pins; parameter tables cover additional settings. Actual Unreal captures show example plants. Some supplied texture artwork has AI-generated sources.