URHO3D SCENE PREFAB ADDON

The ‘Urho3D Scene Prefab’ addon leverages the Urho3D exporter. It brings :
- instancing support
- and ability to export the scene only, without having to re-export all the individual objects
It builds the Urho3D scene from individual prefabs exported with the Urho3D exporter.

Instancing support is achieved by :
- creating groups, assigning objects to them and then duplicating these groups using 'Empty' objects
- and/or duplicating meshes

Blender instancing and linking capabilities bring many benefits, especially for managing big projects :
- allow to split the assets in external blend files, so you are not limited to the 20 object layers
- modifications to external assets are back-propagated in all the scenes that are using them
- give ability to create intermediate assets from standalone pieces (modularity)

THE URHO3D SCENE PREFAB PANEL

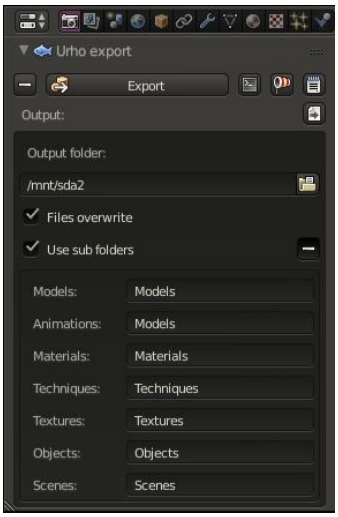
The addon panel, located in the ‘Render’ properties, is rather simple.

‘Front view’ and ‘Scale’ are identical to the Urho3D exporter. They are duplicated as you can use assets from external blend files.

‘PhysicsWorld’, ‘NavigationMesh’ and ‘Navigable’ options allow to create eponymous components in the scene.

Finally the ‘Skybox’ setting allows to create a skybox in the prefab, as long as a valid path to a material file is supplied (‘BrightDay’ by default).

The ‘Output’ settings are inherited from the Urho3D exporter :

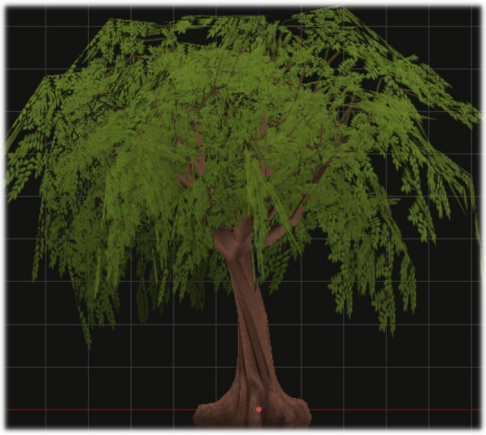
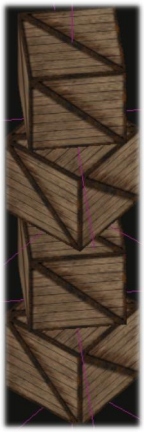


USING BLENDER INSTANCING CAPABILITIES IN YOUR SCENES

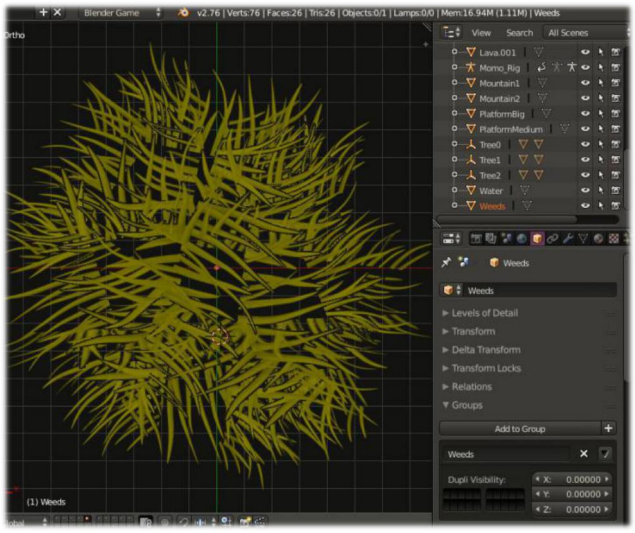
Standalone Assets

Definition

Assets that are designed to be used:
- as is (for example a crate)
- in combination with other assets (for example the foliage of tree, to be used with a trunk)
- in bunches (for example some grass from individual weeds, or a pile of crates)


Assigning an object to a Group



Click on the '+' button to create a new group and name it as your asset ('Weeds' here).
That's it, your asset is ready for instancing.

Note that an object can belong to more than one group (for example a crate can belong to an unic group for this crate and to another group shared by other crates, to easily create a single crate or a pile of crates).

Also note that for skinned models the armature must belong to the same group as the mesh.

Combined Assets

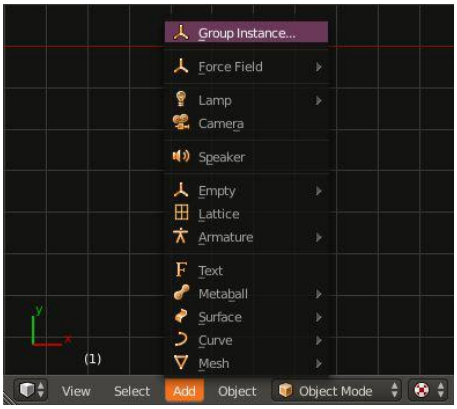
Definition

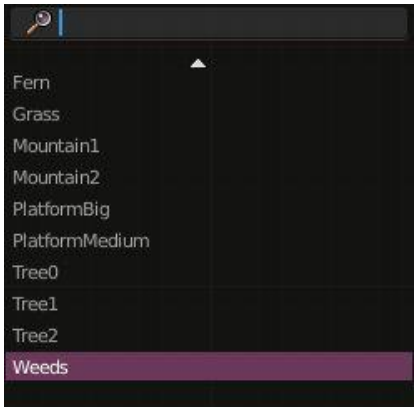
Assets that are built from standalone assets.
In this example we will create some grass from the 'Weeds' asset.

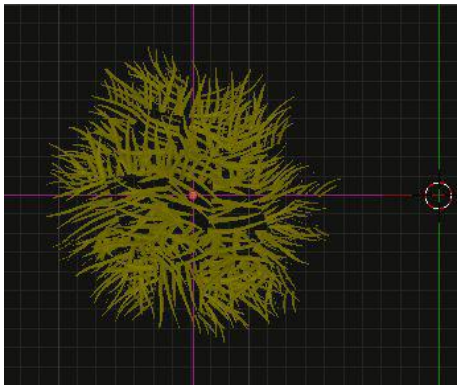
Adding an instance of a standalone asset

- Add > Group Instance
- Select your standalone asset in the list ('Weeds' here)

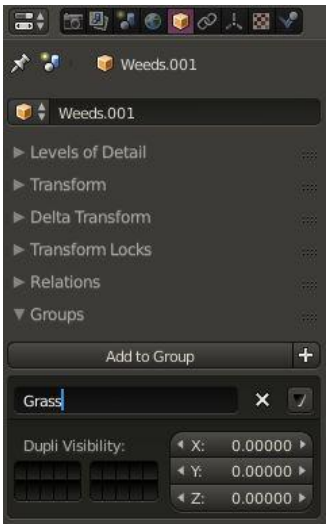
This creates a new instance of the base asset, that you can freely move, rotate and scale (here it is moved to the left).





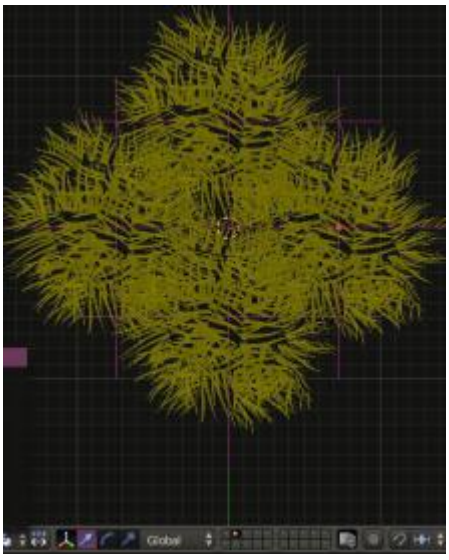


Assign instance to a new group for the combined asset



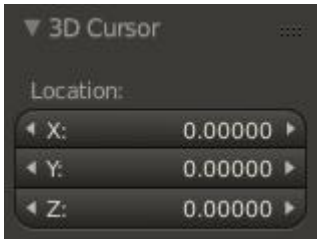
- Click the '+' button to create a new group
- Rename to 'Grass', which will be the name of the group asset

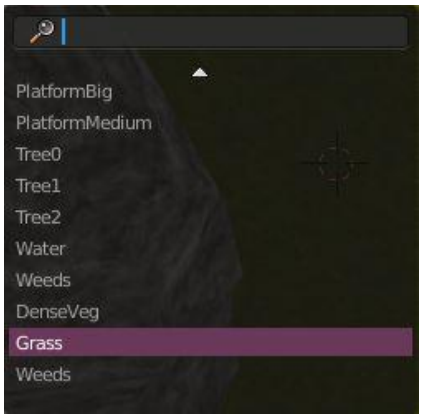
Now we will add 3 other 'Weeds' in the same way (adding a new instance and assigning it to the 'Grass' group, but this time by clicking the 'Add to Group' button and selecting 'Grass', as the group already exists).

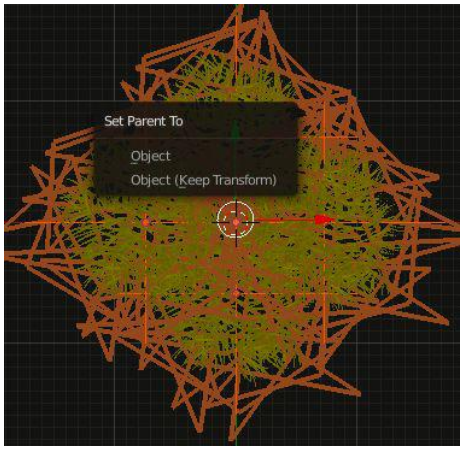


We have now 4 instances of the 'Weeds' asset, that we will parent to an 'Empty' to make the 'Grass' asset.

With 3D Cursor positioned at zero :







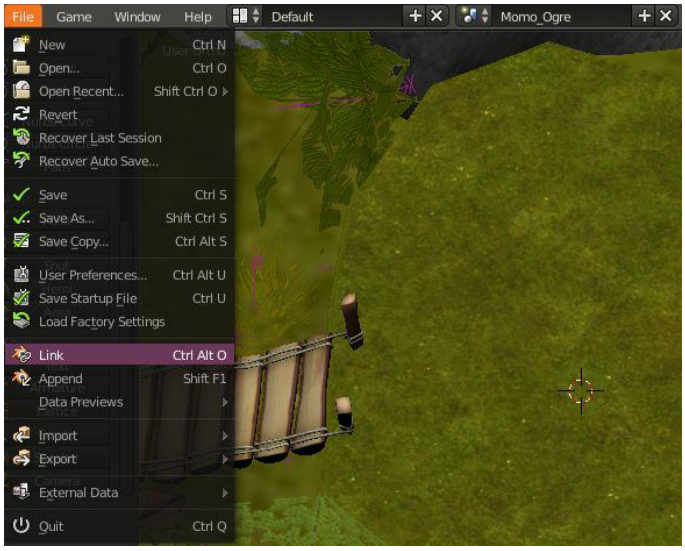
Now select all the 4 ‘Weeds’ instances and then the ‘Grass’ Empty.
Ctrl+P to ‘Set Parent To’ (any option should work)

Your ‘Outliner’ should now look like this:

Your new ‘Grass’ asset is ready to be used in a scene.

Scene Building from Instances

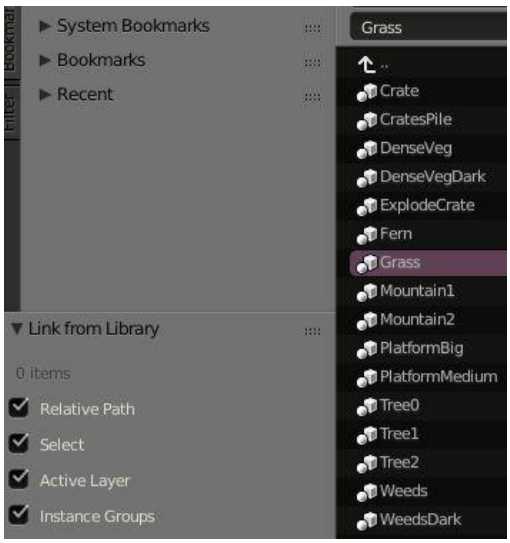
<u>Linking Assets</u>



Note: Linking allows to use assets from other Blender files. It is only done once.
It is not mandatory, you can create your groups in the blend file you are using for your scene.

Click in the scene where you want to create some grass.

File > Link to browse to the ‘Grass’ asset nested in the blend file where you saved it (‘Momo_Assets’ here).

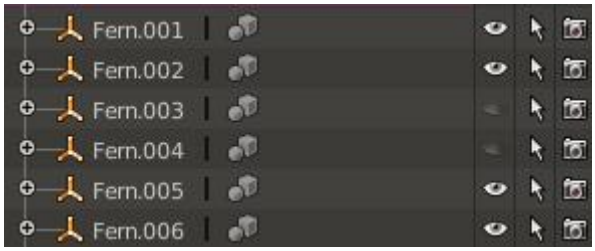


Our ‘Grass’ asset lies in the ‘Group’ folder.

This both creates a link to the ‘Grass’ asset nested in the ‘Momo_Assets’ and instantiate the ‘Grass’ asset in the scene.

Now that the asset is linked, we can instantiate it as many times as needed, by simply left-clicking where we want it to be positioned, and then Add > Group Instance and select the ‘Grass’ asset.

Note that **only visible objects will be replicated.**
So, if you want to selectively skip a particular instance, hide the unwanted 'Empty' in the Outliner. Here ‘Fern.003’ and ‘Fern004’ won’t be exported in the scene prefab :



Unlinking external assets

If you no longer need an asset for building your scene or you mistakenly linked an asset, you can unlink it that way:

- select any object in the scene
- assign it to the group you want to remove (Add To Group)
- click the triangle pointing down and select ‘Unlink Group’
- save your file and reload it

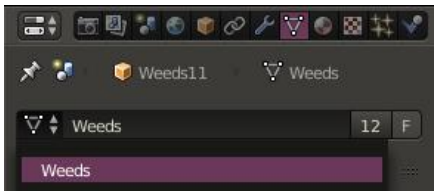
Further improvements

- Use of Urho3D ‘StaticModelGroup’, with a per Empty object boolean setting to direct the exporter to enable this feature (which makes sense for grass where each weed behaves as a group, but not for crates piles where each crate behaves independently).
- Technique selector for materials, from available techniques in the ‘Techniques’ folder, to allow using custom techniques or directly choosing the right technique without having to set individual settings like transparency, alpha, shadeless...
- Lights, zone and fog
- ...

Other supported scene design

Another way to use Blender instancing capabilities is to use Mesh data-block to direct which prefabs to use to build the scene.

To build your level using this technique, simply duplicate your mesh objects and use the drop-down located at the left of the object name to select the same mesh data-block as the original object. This will instruct the addon to use the eponymous prefab each time.



For example, we have 12 instances of the 'Weeds' mesh here. If 'Weeds' object has been exported as an individual prefab, then it will be instanced 12 times in your Urho3D scene.

SUMMARY

- Export every single mesh object as an 'Individual Prefab' using the Urho3D exporter
It is recommended to use 'Local' origin and that the mesh objects have their origin (location) at (0,0,0).
Note that **you must use the same 'Orientation' and 'Scale' settings in both addons**.
You only need to selectively re-export the assets that have been modified.

- Build your Blender scene using groups (instances) and/or duplicated mesh data-blocks

- Use this addon to export the scene prefab

Troubleshooting

Two sample blend files are provided to demonstrate some working setups :
- one file containing some ready to use assets
- one file containing the scene, built from the assets
These files are derivatives of the YoFranky project.

To export the scene, you will have to :
- export individual prefabs for each mesh object in the assets file
- export the scene using the 'Urho3D Scene Prefab' addon.

Some other setups might work either, without warranty.
If you experience some issues, please refer to this manual and to the blend files to check the accuracy of your setups.