

Animator Access Generator

Code generator utility for Unity game engine. Creates a class to conveniently access **Animator** states and parameters. The goal is to facilitate access to Animator states and parameters. Further on encapsulating access through dedicated methods makes it possible to detect potential problems and inconsistencies already at compile time.

Quick Start

Installation:

- Unity 4.3 is needed
- Download the current stable release **AnimatorAccess.zip** from GitHub
- Unzip and copy all files to some location under your Assets directory but **NOT under any editor directory**.

Generating Code:

- In the hierarchy view select a game object that contains an Animator component having a valid controller
- Go to the new menu item **Animator Access / Create Animator Access**
- Choose a file name and the output directory where to place the C# file (has to be under Assets directory)
- Say *Yes* when the dialog appears about adding the component to the game object.

Usage example

Setup (related to provided ExampleScene.unity):

- Game object **ExamplePlayer** contains an Animator component
- Generated class is **ExamplePlayerAnimatorAccess.cs**
- Another component **Player** is attached to this game object too. It uses ExamplePlayerAnimatorAccess in its FixedUpdate method to control animations
- Animator states are:
 - **Idle, Jumping, Walking** and **Yawning** in layer 0 (**Base Layer**)
 - **Centered, Rotate-Left** and **Rotate-Right** in layer 1 (**Rot**)
- Animator parameters are:
 - **JumpTrigger** (trigger) and
 - **YawnTrigger** (trigger) and
 - **Rotate** (int) and
 - **Speed** (float)

To use **ExamplePlayerAnimatorAccess** define a member in **Player.cs** and assign a reference in Awake ():

```
AnimatorAccess.ExamplePlayerAnimatorAccess anim;

void Awake () {
    anim = GetComponent < AnimatorAccess.ExamplePlayerAnimatorAccess > ();
}
```

Now you have convenient access to all parameters and animator states. Aside from using parameter and state hash IDs directly, there are predefined methods for querying the state (prefix **Is**) and **Get** and **Set** methods to access parameters in a type safe way like **IsWalking ()** **SetSpeed ()**:

```
void FixedUpdate () {
    currentState0 = animator.GetCurrentAnimatorStateInfo (0).nameHash;
    if (anim.IsWalking (currentState0)) {
        // set speed
        anim.SetSpeed (speed);
        // alternatively you can use hash IDs directly but this is more cumbersome:
        // animator.SetFloat (anim.paramIdSpeed, speed);
    }
}
```

Another way to use it are **Events**. The following code will register an event handler which is called everytime an animator state has changed.

```
void OnEnable () {
    anim.OnStateChange += OnStateChange;
}
void OnDisable () {
    anim.OnStateChange -= OnStateChange;
}
void OnStateChange (int layer, int newState, int previousState) {
    if (anim.IsJumping (newState)) {
        Debug.Log ("OnStateChange: Jump, previous state was " + anim.IdToName (previousState));
    }
}
```

Concept And Workflow

Basic Idea

Whenever you have made any changes in the Animator window like adding, renaming or deleting states or parameters, you should update the animator access component. Animator Access Generator analyses the existing version of the component to be generated and works with a **two-**

step procedure to handle changes:

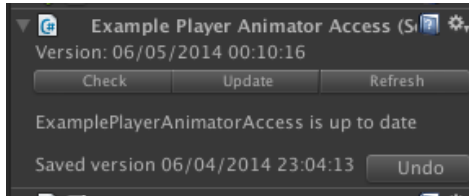
- Previously valid members (i.e. Animator parameters and states) are detected and marked with the *Obsolete* attribute
- Those members in the previous version that were already marked as *Obsolete* will be removed

The basic idea is to give you the chance to refactor your code without having uncompileable code. If there are any references to members that are not valid any longer, obsolete warnings guide you where you have to make changes:

(CS0168: Animator state or parameter is no longer valid and will be removed in the next code generation...).

Workflow Using The Custom Editor

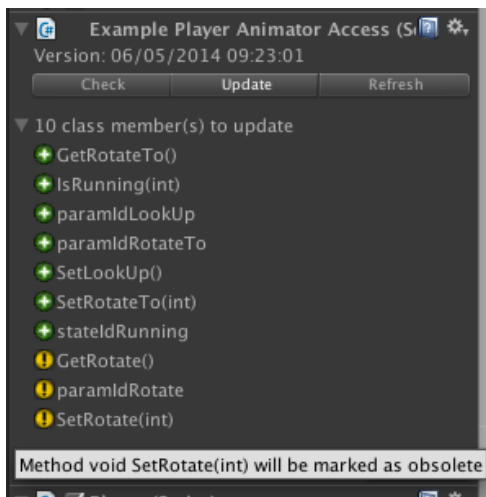
The generated component has a custom inspector window:



The status is updated every 30 seconds automatically. Use the *Check* button to force a status update immediately. *Check* will not perform any changes but is meant to preview what will happen on an update. Hovering the mouse over an entry will show a tooltip with more information

Supposed we made 3 changes: A new state **Running**, New trigger parameter **LookUp** and renaming of parameter **Rotate** to **RotateTo**

This will look like:



1. New field **stateIdRunning** and an **IsRunning ()** method for **Running**
2. Field **paramIdLookUp** and **SetLookUp ()** method for **LookUp** (triggers don't have Get methods)
3. Field and methods for **RotateTo** including a Get method as this is an int
4. The code of the previously named parameter **Rotate** will be marked as obsolete i.e. **paramIdRotate**, **GetRotate** and **SetRotate**.

Push the *Update* button to perform the changes and regenerate the component's source code. Note that the changes are not refreshed automatically. Most often you will like to first view and adopt the changes in MonoDevelop and then run your game in Unity.

The *Refresh* button forces Unity to reload the changes from disk (s. *Advance Topics* on automatic refreshing).

Undo performs a roll back to the previous version. Note that there is only one backup saved. Again there is no automatic refresh so push *Refresh* after *Undo*.

Using The Generated Code in MonoDevelop

See the Quick Start section above or find more details in the provided *ExampleScene* in the *Example* folder.

Although generated code should not be edited, it can be pretty useful to do so temporarily to quickly update your other code.

Efficient Handling of Warnings

If you rename Animator parameters, states or layers that are referenced in your own code, you will get warnings about using obsolete members. While single occurrences are easy to maintain, renaming of a widely used parameter would be painful to replace in code.

To do this more efficiently use refactoring and rename the **obsolete** member to the new name. Suppose there are several calls to **SetRotate** in the example above. We want to change all these calls at once to point to the new method **SetRotateTo**:

Go to the **obsolete** method **SetRotate (int newValue)** in the newly generated file **ExamplePlayerAnimatorAccess.cs** and rename it to **SetRotateTo**.

```

/// Set integer value of parameter RotateTo. <param...
public void SetRotateTo (int newValue) {
    animator.SetInteger (paramIdRotateTo, newValue);
}

[System.ObsoleteAttribute ("Animator state or parameter is no longer valid and will be removed")]
public void SetRotateTo (int newValue) {
    throw new System
}

```

Refactor ▶ Rename ⌘R

Go to declaration F3

Yes, there is already our new method `SetRotateTo` having exactly the same signature and now we have two of them. But that's the clue: After renaming is done, simply delete the **obsolete** version - ready. Now all references point to the correct method.

Errors in MonoDevelop

There are three known situations when you may get errors:

1. Obsolete warnings were ignored and the next *Update* was triggered. Then all obsolete members are removed and references to these will fail
2. You changed state and parameter hash prefix settings to contain the same string, removed a parameter and create a state with the same name
3. Generated code was edited so that a naming conflict arose.

If *Undo* does not help, most problems can be solved pretty similar the way we handled warnings. Do single changes manually and a bunch of changes with the refactoring strategy. If there are many places referring to a missing member, manually introduce it as dummy and then use refactoring.

Naming Convention And Customising

You can customise the way how to generate parameter and method names in the *Settings* window. All access methods start with **Is**, **Get** or **Set**. This cannot be changed but the pattern for the appended item name can be modified. You can for example define that all animator state query methods (Is...) contain the prefix *State* before the name e.g. `IsStateIdle ()`.

Be careful with changes for the hash ID member variables prefixes. States and parameters should have **different prefixes** to avoid naming conflicts.

By default the **Layer name** is ignored for layer 0 and prepended for all other layers.

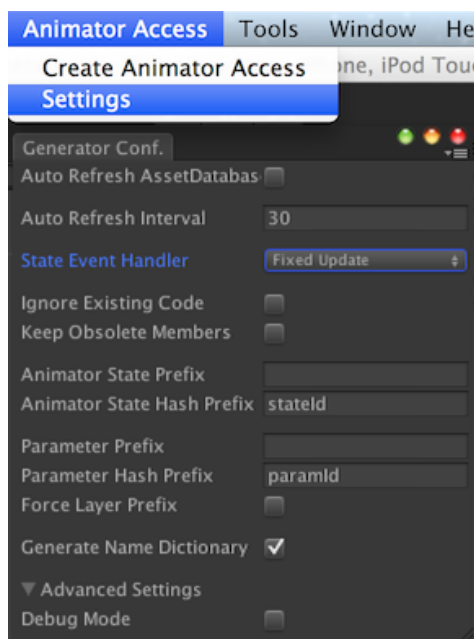
Avoid non-ANSI characters. Field names are converted to match the pattern `[a-z_][a-zA-Z0-9_]`. Non-matching characters are changed to an underscore.

Look at the tooltips in the *Settings* windows or go to *Advanced* section for a complete description.

Advanced Topics

Settings

Configuration is done via the Settings window.



1. **Auto Refresh AssetDatabase:** Automatically call an `AssetDatabase.Refresh ()` after updating an existing `AnimatorAccess` class. Note that the MonoDevelop project is reloaded too which can be annoying.
2. **Auto Refresh Interval:** Automatically check for updates after this interval (in seconds) has elapsed. Set this to 0 to suppress automatic checking.
3. **State Event Handler** Select if and where to generate the code for automatic event handling and invoking of callbacks on state changes:
FixedUpdate: Check for state changes and transitions is performed in `FixedUpdate`
Update: Same for `Update` method

None: you have to manually invoke method `CheckForAnimatorStateChanges ()` of the generated class.

4. **Ignore Existing Code**: Unchecked (default) means that the current version of the class is analysed first. Existing members that are not valid any longer are created once but with the obsolete attribute set.
So you can replace references to these outdated members in your code. Performing another generation will then remove all obsolete members. Check this if existing members should be removed immediately.
Note that this option overwrites 'Keep Obsolete Members'
5. **Keep Obsolete Members**: Obsolete fields and methods are not removed. This might lead to a lot of unnecessary code.
Note that this option is not considered if 'Ignore Existing Code' is set.
6. **Force Layer Prefix**: Check this if you want the layer name be prepended even for Animator states of layer 0.
7. **Animator State Prefix**: Optional prefix for all methods that check animation state. Prefix is set between 'Is' and the state name.
Example:
'State' will generate the method 'bool IsStateIdle ()' for state 'Idle'.
8. **Animator State Hash Prefix**: Optional prefix for all int fields representing an animator state.
Example:
'stateHash' will generate the field 'int stateHashIdle' for state 'Idle'.
9. **Parameter Prefix**: Optional prefix for parameter access methods. Prefix is set between 'Get'/'Set' and the parameter name.
Example:
'Param' will generate the method 'float SetParamSpeed ()' for parameter 'Speed'.
10. **Parameter Hash Prefix**: Optional prefix for int fields representing a parameter.
Example:
'paramHash' will generate the field 'float paramHashSpeed' for parameter 'Speed'.
11. **Generate State Dictionary**: Create an Animator state dictionary that can be queried by `StateIdToName (int id)`.
12. **Debug Mode**: Extended logging to console view.

Persistent Storage Location

All settings are saved in directory at:

```
Application.persistentDataPath + "/AnimatorAccessConfig.txt"
```

See the [Unity documentation](#) or use `Debug.Log` to find the OS specific place.

`AnimatorAccessConfig.txt` is a simple text file. The modified `PlayerPrefs` class is based on `PreviewLabs.PlayerPrefs` (s. [their web site](#) for original source and description).

The *Undo Files* are stored using Unity's **`Application.temporaryCachePath`**.

SmartFormat Template

SmartFormat is currently used as template engine to generate the code. There are OS dependent template files due to different line endings on UNIX and Windows. The templates can be found under: `InstallationDir/Editor/Templates/DefaultTemplate-UNIX.txt`
`InstallationDir/Editor/Templates/DefaultTemplate-Win.txt`

Moving Animator Access Menu

If you want to move the menu for Animator Access from top menu to a different location:

Edit the constant **`RootMenu`** in file **`Editor/MenuLocation.cs`**. Note that you have to repeat this step after every update of Animator Access.

Git Subtree Integration / Contributing

If you are using Git in your project, a *git subtree* for `AnimatorAccess` might be the easiest way to integrate it. Especially when you plan changes or like to contribute to `AnimatorAccess` there are some conventions about the **.meta files**. Basically **.meta** files should not be committed except for the *Example* folder. To integrate this smoothly the following best practice is recommended:

Given a subtree in `Assets/ThirdParty/AnimatorAccess` set up the following `.gitignore` structure:

- `Assets/ThirdParty/.gitignore` contains
`AnimatorAccess/.gitignore`
- `Assets/ThirdParty/AnimatorAccess/.gitignore` contains
`*.meta`
`Example/.gitignore`
- `Assets/ThirdParty/AnimatorAccess/Example/.gitignore` contains
`!*.meta`

This ensures that only `.meta` files under `Example` are committed and `.gitignore` files are held locally

File Specific Configuration

This is currently not supported via GUI but can be done easily in code. The responsible `Config` factory class is designed as partial class so that it can be extended in a separate file. In order to register your own **SpecialConfig** create a new file `ConfigFactoryExt.cs` and implement **`ConfigFactory`**'s static constructor.

```
namespace Scio.AnimatorAccessGenerator
{
    public partial class ConfigFactory {
        static ConfigFactory () {
            ConfigFactory myFactory = new ConfigFactory ();
            instance = myFactory;
            myFactory.defaultConfig = new Config ();
        }
    }
}
```

```
        Config specialConfig = new SpecialConfig ();
        specialConfig.AnimatorStatePrefix = "MyAnim";
        myFactory.configs ["ExamplePlayerAnimatorAccess"] = specialConfig;
    }
}
// Provide an implementation of your SpecialConfig class. Bear in mind that the default class makes all
// changes persistent.
public class SpecialConfig : Config {
    public override string AnimatorStatePrefix {
        get {
            return "MyAnim";
        }
        // provide an empty setter to avoid that "MyAnim" is written back to the default config.
        set {}
    }
}
}
```