# **UI Themes Documentation**

Release 1.0.7f1

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UI Themes is a tool for customizing the appearance of widgets and centralized customization management (works with UGUI).

It allows you to control and change colors, textures, and fonts from one place.

It is useful even if you do not have plans to use different themes.

For example, you have a couple dozen prefabs and want to adjust colors or replace sprites. It can be an annoying task to change settings for each of them and be sure you do not miss anything. The theme helps you to avoid such problems.

Easy to integrate and use with already existing UI.

YouTube Tutorial

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### **ONE**

### **GETTING STARTED**

UI Themes is a tool for customizing the appearance of widgets and centralized customization management.

It allows you to control and change colors, textures, and fonts from one place.

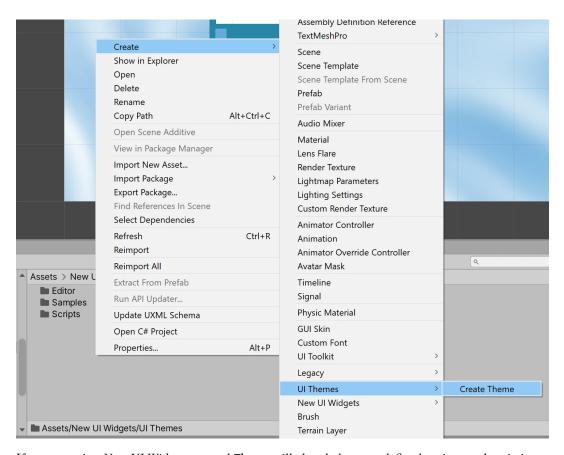
It is useful even if you do not have plans to use different themes.

For example, you have a couple dozen prefabs and want to adjust colors or replace sprites. It can be an annoying task to change settings for each of them and be sure you do not miss anything. The theme helps you to avoid such problems.

Easy to integrate and use with already existing UI.

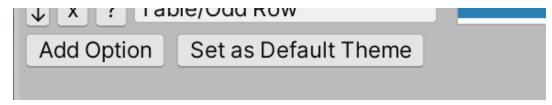
#### YouTube Tutorial

1. Create a Theme via the context menu Assets / Create / UI Themes / Theme

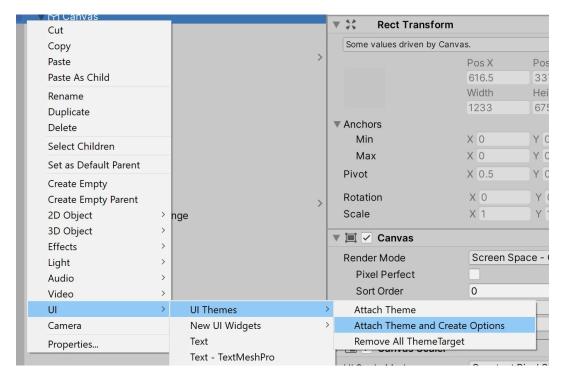


If you are using New UI Widgets created Theme will already have predefined options and variations.

2. Set Theme as default. The first created Theme will be already specified as default.



3. Select Canvas in the Hierarchy window and use the context menu *UI / UI Themes / Attach Theme and Create Options* 



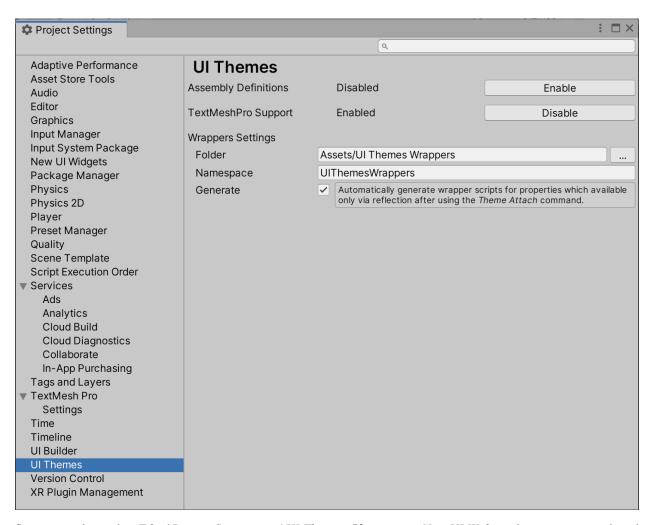
This will adds ThemeTarget component for each game object with components that have controllable properties and fields and select options by their values or create a new option if value was not found in initial variation.

**Note:** The Attach Theme command does not always work perfectly, sometimes minor adjustments can be required.

#### 4. Edit Theme

You can edit Theme values, add new variations, options, etc.

### **PROJECT SETTINGS**



Settings are located at *Edit / Project Settings... / UI Themes*. If you using *New UI Widgets* then settings are shared *New UI Widgets* and located at *Edit / Project Settings... / New UI Widgets* 

## 2.1 Assembly Definitions

Enable/disable assembly definitions. Enabled by default.

### 2.2 TextMeshPro Support

Enable/disable *TextMeshPro Support*. Enabled by default if the TextMeshPro is installed.

**Note:** Support is enabled only to installed platforms. Platforms that were added after it requires enabling support again.

**THREE** 

### THEME

## 3.1 Terminology

Variation is color scheme, it includes not only colors but sprites, textures, and fonts. Variation names should be unique per Theme.

Options are lists of values from different variations with the same purpose. Option names should be unique per the type of value of the Theme.

### 3.2 Menu

• Assets / Create / UI Themes / Theme

Creates a new Theme and sets it as the default one if not specified.

If you are using New UI Widgets created Theme will already have predefined options and variations.

• Window / UI Themes / Reflection Wrappers

Shows wrappers created via reflection. Details at Wrappers for the Custom Properties

• Hierarchy: UI / UI Themes / Attach Theme

Adds a ThemeTarget component for each game object with components that have controllable properties and fields and select options by their values from initial variation.

Not available if default Theme is not specified.

• Hierarchy: UI / UI Themes / Attach Theme and Create Options

Same as the previous, but creates a new option if the value was not found.

Not available if default Theme is not specified.

• Hierarchy: UI / UI Themes / Remove All Theme Target

Deletes all ThemeTarget components.

## 3.3 Attach Theme Exceptions

When you use Attach Theme some values are ignored and will have option None:

- · Image: null sprite
- Image: white color on non-white sprite or sprites with ui-themes-white-sprite label (case insensitive)
- Image: sprite with ui-themes-exclude label
- Selectable: default colors
- Text: null font
- RawImage: null texture

But you can manually select option for properties with such values.

## 3.4 Properties

• IReadOnlyList<Variation> Variations

Variations list.

• VariationId ActiveVariationId

ID of the active variation.

### 3.5 Methods

• bool SetActiveVariation(string name)

Set active variation by name. Return false if variation with specified name was not found.

• Variation GetVariation(string name)

Get variation by name.

• Variation GetVariation(VariationId id)

Get variation by ID.

### 3.6 Events

• Action<VariationId> OnChange

Event fired when active variation or its values were changed.

10 Chapter 3. Theme

### THEME EDITOR

Double click on Theme open editor window. Here you can add/rename/delete variations, options, change values.

You can filter variations and options by their name.

Variations should be unique per Theme.

Options should be unique per the type of value of the Theme.

Options can be reordered by drag and drop bi-directional arrow element.

• Initial Variation

Values in this variation will be used to find or create options when you use Attach Theme.

Active Variation

Currently active variation.

• Set as Default Theme

Theme to use with Attach Theme command.

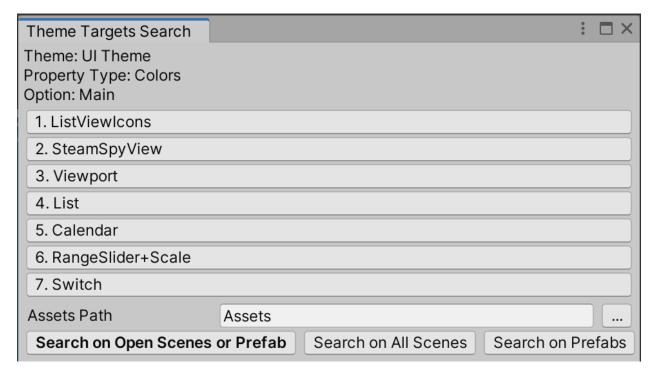


Fig. 1: You can check what game objects use specific options (by default for the currently open scene or prefab). Also possible to search across all scenes or prefabs.

## 4.1 Adding Custom Stylesheet

You can use UIThemes.Editor.ReferencesGUIDs.AddStyleSheet(StyleSheet styleSheet) method to add your own custom stylesheet to customize Theme editor.

```
#if UNITY_EDITOR
[RuntimeInitializeOnLoadMethod(RuntimeInitializeLoadType.SubsystemRegistration)]
static void StaticInit()
{
         var stylesheet = AssetDatabase.LoadAssetAtPath<Theme>(...);
         UIThemes.Editor.ReferencesGUIDs.AddStyleSheet(stylesheet);
}
#endif
```

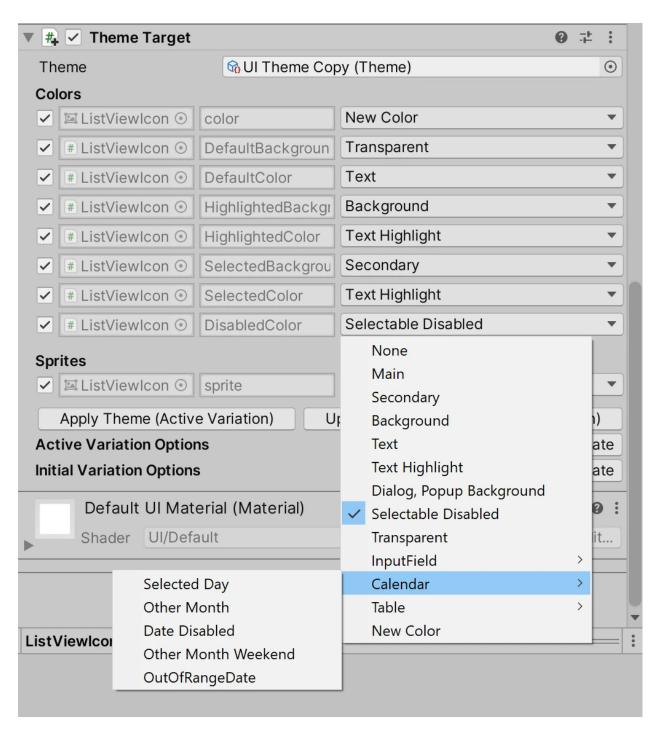


Fig. 2: You can use / in the option name to display them as nested.

### **THEME TARGET**

This is a component to control the properties and fields of other components on the same game object. You can use the context menu *Assets / Create / UI Themes / Create Theme* or manually add ThemeTarget component.

• Theme Theme

Current Theme.

• Colors / Sprites / Textures / Fonts

List of properties and fields with selected options of other components on the same game object.

• Apply Theme (Active Variation)

Update properties and fields of other components to reset user changes.

• Update Theme (Active Variation)

Update Theme values from properties and fields of other components.

• Active Variation Options / Initial Variation Options

Find: find options based on values of properties and fields.

Find or Create: find options based on values of properties and fields, create a new option if nothing found.

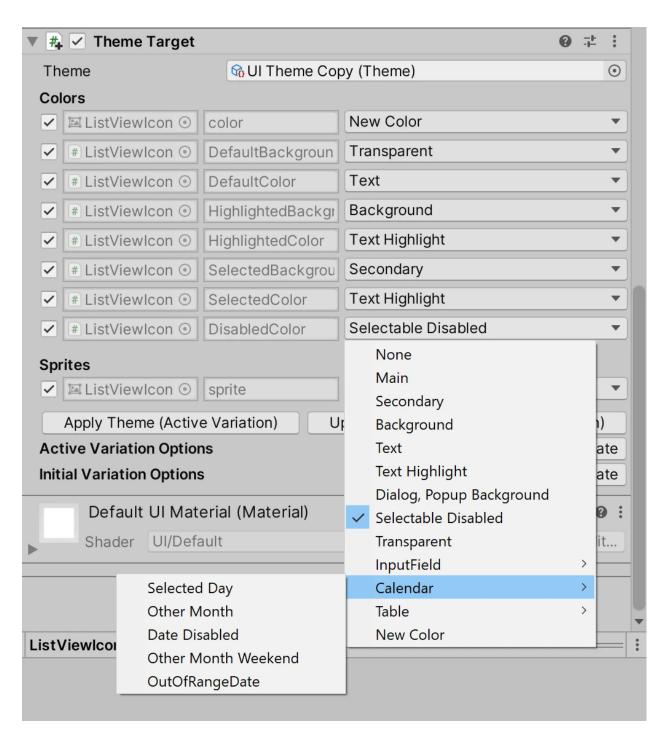


Fig. 1: You can use / in the option name to display them as nested.

SIX

## **LIMITATION**

Interface properties are supported, but properties with the same name from different interfaces on the single component are not supported.

### WRAPPERS REGISTRY

Wrappers are not registered automatically, you need to create a static method with PropertiesRegistry and Preserve attributes to register them with PropertyWrappers<TValue>.Add(IWrapper<TValue> wrapper) method.

If you do not want some property controlled by *Theme Target* in any way then you can use PropertyWrappers<TValue>.AddIgnore(Type component, string property) method to do this.

**EIGHT** 

### **WORKING WITH SELECTABLE**

Many widgets are inherited from the Selectable component which is used to control widgets' appearance depending on state. In most cases used Color Tint transition.

But it has some nuances on how it works: - result color = TargetGraphic.Sprite (if has any) \* TargetGraphic.color \* (Selectable.colorTint \* Selectable.colorMultiplier) - colors actually represented in the range 0-1 (in editor range 0-255 is used because it is human readable) - white is 1, black is 0

Those things matter when you try to create a dark theme: multiplying black color (TargetGraphic.color) on any tint color gives the same black color so you do not see any visual differences between states.

There are a few possible solutions for this: - increase the ColorMultiplier value and do not use completely black colors, but it will be difficult to get the desired colors - change TargetGraphic.Color to white and use normalColor to make it black by default (this does not help if TargetGraphic.Sprite is black) - use the Sprite Swap transition (no color multiplication no problem with black), but in this case, you need the sprites of different colors.

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### **CUSTOM WIDGETS**

By default, the properties of components are controlled by *Theme Target*, which is not always desirable when using the *Attach Theme* context menu, for example, if the image color is controlled by a widget and you don't want to manually disable it for each such component.

To avoid this, you can use the UIThemes.Utilities.SetTargetOwner<TComponent>(Type propertyType, TComponent component, string property, Component owner) method to indicate that the properties of the specified component are controlled by widget.

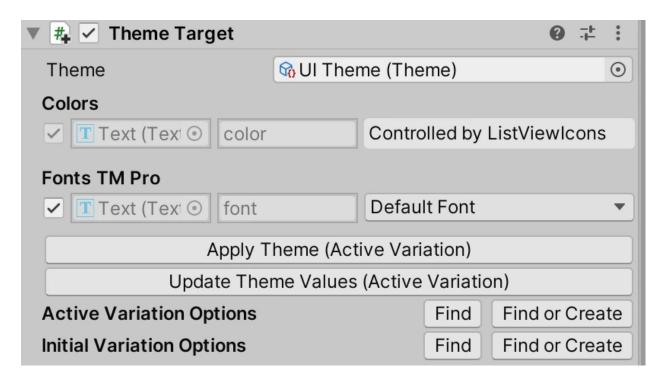


Fig. 1: The font color property is controlled by ListViewIcons and cannot be changed. On click, ListViewIcons will be highlighted in the Hierarchy window.

## 9.1 Original Widget Code

```
using UIThemes;
using UnityEngine;
using UnityEngine.UI;
// this widget changes image color when the toggle value is changed
public class ToggleBackgroundController : MonoBehaviour
        public Toggle Toggle;
        public Image ToggleBackground;
        [SerializeField]
        Color colorOn = Color.white;
        public Color ColorOn
                get => color0n;
                set
                {
                         color0n = value;
                        UpdateColor(Toggle.isOn);
                }
        [SerializeField]
        Color colorOff = Color.white;
        public Color ColorOff
        {
                get => colorOff;
                set
                {
                         colorOff = value;
                         UpdateColor(Toggle.isOn);
                }
        }
        void Start()
        {
                Toggle.onValueChanged.AddListener(UpdateColor);
                UpdateColor(Toggle.isOn);
        }
        void OnDestroy() => Toggle.onValueChanged.RemoveListener(UpdateColor);
        void UpdateColor(bool isOn) => ToggleBackground.color = isOn ? colorOn :__

    colorOff;
}
```

## 9.2 Widget Code Changes

**TEN** 

### WRAPPERS FOR THE CUSTOM PROPERTIES

UI Themes uses reflection to read and write properties and fields of components, this causes memory allocation.

Memory allocation can be avoided by using wrappers to access component properties; for properties and fields of standard components, such wrappers are available for default components and memory allocation does not occur for them.

Memory allocation by **UI Themes** when toggle Theme variations without reflection wrappers for properties and fields is zero.

You can create your own wrappers for custom components.

You can check properties and fields which are accessed via reflection in *Window / UI Themes / Reflection Wrappers*. In this window possible to generate wrappers for those properties and fields.

Recommended to toggle Theme variations before using because wrappers created on request.

#### Note:

Wrappers created via reflection only for the direct public fields and properties.

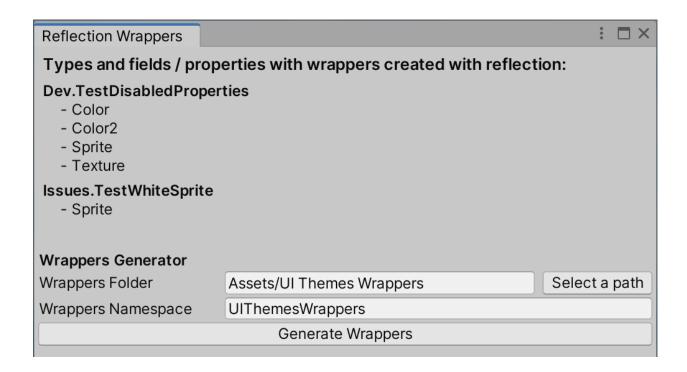
For the nested properties like Selectable.colors.normalColor wrappers should be create manually.

## 10.1 Sample Widget Code

```
using UIThemes;
using UIThemes.Wrappers;
using UnityEngine;
using UnityEngine.Scripting;
using UnityEngine.UI;

// this widget changes graphics color when the switch value is changed
public class CustomWidget : MonoBehaviour, ITargetOwner
{
    public Toggle Toggle;
    public Image Image;
    [SerializeField]
    Color colorOn = Color.white;
```

(continues on next page)



(continued from previous page) public Color ColorOn get => color0n; set { color0n = value; UpdateColor(); } } [SerializeField] Color colorOff = Color.white; public Color ColorOff get => colorOff; set { colorOff = value; UpdateColor(); } } protected void Start() SetTargetOwner(); Toggle.onValueChanged.AddListener(UpdateColor); UpdateColor();

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### 10.2 Wrapper

```
class CustomEffectColorOn : Wrapper<Color, CustomWidget>
        // name used by ThemeTarget, it should be unique per type
        public CustomEffectColorOn() => Name = nameof(CustomWidget.ColorOn);
        protected override Color Get(CustomWidget widget) => widget.ColorOn;
       protected override void Set(CustomWidget widget, Color value) => widget.ColorOn_
\rightarrow= value;
class CustomEffectColorOff : Wrapper<Color, CustomWidget>
        public CustomEffectColorOff() => Name = nameof(CustomWidget.ColorOff);
        protected override Color Get(CustomWidget widget) => widget.ColorOff;
        protected override void Set(CustomWidget widget, Color value) => widget.ColorOff_
→= value;
}
[PropertiesRegistry, Preserve]
public static void AddWrappers()
        PropertyWrappers<Color>.Add(new CustomEffectColorOn());
        PropertyWrappers<Color>.Add(new CustomEffectColorOff());
}
```

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### 10.3 Additional Information

Wrappers should implements IWrapper<TValue> interface, which has two additional methods:

• bool Active(Component component)

Check is property active.

If false then the property will not be available to the ThemeTarget list.

Example: Selectable sprites properties should be available only if Selectable.transition is SpriteSwap.

• bool ShouldAttachValue(Component component)

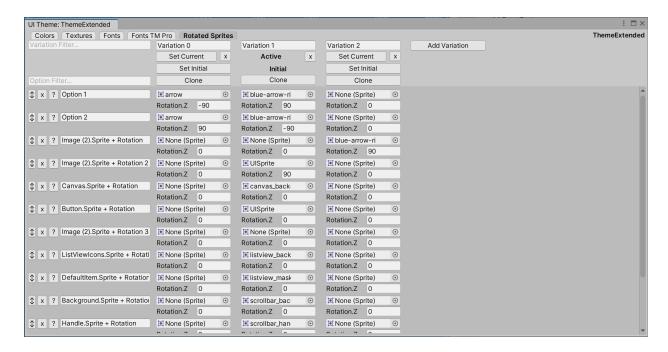
If true then try to find or create value in options (only when using menu "Attach Theme").

If false then the ThemeTarget option will be None.

Example: if Image component sprite is null then it should not be controlled by ThemeTarget by default.

### **ELEVEN**

### **EXTENDING THEME**



You can extend Theme to add custom types (not only Color, Sprite, Texture, Font, etc.).

Sample for type with sprite and its rotation:

1. Create a type for the value.

```
namespace UIThemes.Samples
{
    using System;
    using UnityEngine;
    using UnityEngine.UI;

    [Serializable]
    public struct RotatedSprite : IEquatable<RotatedSprite>
    {
        [SerializeField]
            public Sprite Sprite;
        [SerializeField]
            public float RotationZ;
```

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```
public RotatedSprite(Image image)
                        if (image == null)
                        {
                                Sprite = null;
                                RotationZ = 0f;
                        }
                        else
                                Sprite = image.sprite;
                                RotationZ = image.transform.localRotation.
→eulerAngles.z;
                        }
                }
               public bool Equals(RotatedSprite other)
                        if (!Mathf.Approximately(RotationZ, other.
→RotationZ))
                                return false;
                        }
                        return UnityObjectComparer<Sprite>.Instance.

—Equals(Sprite, other.Sprite);
                public bool Set(Image image)
                        if (image == null)
                                return false:
                        }
                        var rotation = image.transform.localRotation.
→eulerAngles;
                        if (UnityObjectComparer<Sprite>.Instance.
→Equals(image.sprite, Sprite) && Mathf.Approximately(rotation.z,
→RotationZ))
                        {
                                return false;
                        }
                        image.sprite = Sprite;
                        rotation.z = RotationZ;
                        image.transform.localRotation = Quaternion.
→Euler(rotation);
                        return true:
               }
                                                               (continues on next page)
```

**Chapter 11. Extending Theme** 

}

2. Create a class to create a VisualElement editor for this value.

```
namespace UIThemes.Samples
{
        using UnityEngine;
        using UnityEngine.UIElements;
       public class RotatedSpriteView : FieldView<RotatedSprite>
                public RotatedSpriteView(string undoName, Theme.
→ValuesWrapper<RotatedSprite> values)
                        : base(undoName, values)
                {
                }
                protected override VisualElement CreateView(VariationId_
→variationId, OptionId optionId, RotatedSprite value)
                {
                        #if UNITY_EDITOR
                        var block = new VisualElement();
                        block.style.flexDirection = FlexDirection.Column;
                        var input = new UnityEditor.UIElements.
→0bjectField();
                        input.value = value.Sprite;
                        input.objectType = typeof(Sprite);
                        input.RegisterValueChangedCallback(x =>
                                value.Sprite = x.newValue as Sprite;
                                Save(variationId, optionId, value);
                        });
                        block.Add(input);
                        var rotation = new UnityEngine.UIElements.
→FloatField("Rotation.Z");
                        rotation.value = value.RotationZ;
                        rotation.RegisterValueChangedCallback(x =>
                                value.RotationZ = x.newValue;
                                Save(variationId, optionId, value);
                        });
                        block.Add(rotation);
                        return block;
                        #else
                        return null:
                        #endif
                }
                public override void UpdateValue(VisualElement view,__
```

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```
→RotatedSprite value)
                {
                        #if UNITY_EDITOR
                        var block = new VisualElement();
                        block.style.flexDirection = FlexDirection.Column;
                        var input = view.ElementAt(0) as UnityEditor.

→UIElements.ObjectField;
                        if (input != null)
                                input.value = value.Sprite;
                                input.objectType = typeof(Sprite);
                        }
                        var rotation = view.ElementAt(1) as UnityEngine.
→UIElements.FloatField;
                        if (rotation != null)
                                rotation.value = value.RotationZ;
                        }
                        #endif
                }
       }
}
```

3. Create wrapper for the property

```
namespace UIThemes.Samples
{
       using System;
       using System.Collections.Generic:
       using UIThemes.Wrappers;
       using UnityEngine;
       using UnityEngine.UI;
       public class RotatedSpriteWrapper : IWrapper<RotatedSprite>
               public Type Type => typeof(Image);
               public string Name => "Sprite + Rotation";
               public RotatedSprite Get(Component component) => new_
→RotatedSprite(component as Image);
               public bool Set(Component component, RotatedSprite value,_
→ IEqualityComparer<RotatedSprite> comparer) => value.Set(component as_
→Image);
               public bool Active(Component component) => true;
               public bool ShouldAttachValue(Component component) =>_
(continues on next page)
```

```
}
```

#### 4. Create derived Theme

```
namespace UIThemes.Samples
{
        using System;
        using UnityEngine;
        using UnityEngine.Scripting;
        [Serializable]
        [CreateAssetMenu(fileName = "UI Theme Extended", menuName = "UI_
→ Themes/Create Theme Extended")]
        public class ThemeExtended: Theme
                [SerializeField]
                protected ValuesTable<RotatedSprite> RotatedSpritesTable =_
→new ValuesTable<RotatedSprite>();
                [UIThemes.PropertyGroup(typeof(RotatedSpriteView), "UI_
→Themes: Change Rotated Sprite")]
                public ValuesWrapper<RotatedSprite> RotatedSprites => new_
→ValuesWrapper<RotatedSprite>(this, RotatedSpritesTable);
                public override Type GetTargetType() =>_
→typeof(ThemeTargetExtended);
                public override void Copy(Variation source, Variation_
→destination)
                {
                        base.Copy(source, destination);
                        RotatedSpritesTable.Copy(source.Id, destination.Id);
                }
                protected override void DeleteVariationValues(VariationId_
\rightarrowid)
                {
                        base.DeleteVariationValues(id);
                        RotatedSpritesTable.DeleteVariation(id);
                }
                [PropertiesRegistry, Preserve]
                public static void AddProperties()
                        PropertyWrappers<RotatedSprite>.Add(new_
→RotatedSpriteWrapper());
                static List<string> disabledProperties = new List<string>()
                {
                        nameof(Sprites),
                                                               (continues on next page)
```

```
public override bool IsActiveProperty(string name) => !
disabledProperties.Contains(name);
}
```

5. Create derived ThemeTarget

```
namespace UIThemes.Samples
{
       using System:
       using System.Collections.Generic;
       using UnityEngine;
       public class ThemeTargetExtended : ThemeTargetCustom<ThemeExtended>
               [SerializeField]
               [ThemeProperty(nameof(ThemeExtended.RotatedSprites))]
               protected List<Target> rotatedSprites = new List<Target>();
              public IReadOnlyList<Target> RotatedSprites =>_
→rotatedSprites;
              public override void SetPropertyOwner<TComponent>(Type_
→propertyType, TComponent component, string property, Component owner)
                      if (propertyType == typeof(RotatedSprite))
                      {
                              SetPropertyOwner(RotatedSprites, component, _
→property, owner);
                      }
                      else
                              base.SetPropertyOwner(propertyType,__
}
               protected override void ThemeChanged(VariationId_
→variationId)
                      base.ThemeChanged(variationId);
                      SetValue(variationId, Theme.RotatedSprites, __
→rotatedSprites);
               #if UNITY_EDITOR
               protected override void FindTargets(List<Component>_
```

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**TWELVE** 

#### **COMMON TYPES**

Sometimes logically different properties have the same type, for example, both Selectable.colors. colorMultiplier and TMP\_Text.fontSize are float. And having them in the same options group is undesirable.

In such cases, you should wrap that type to the different structs for each property. Also, you will need to create *wrappers* and them to the registry since they cannot be automatically created.

## 12.1 Value Wrapper

```
using System;
using UIThemes;
using UnityEngine;

[Serializable]
public struct FontSizeValue : IEquatable<FontSizeValue>
{
        [SerializeField]
        public float Value;

        public FontSizeValue(float value) => Value = value;

        public static implicit operator float(FontSizeValue value) => value.Value;

        public static implicit operator FontSizeValue(float value) => new__
--FontSizeValue(value);

        // other code...
}
```

## 12.2 Property Wrapper

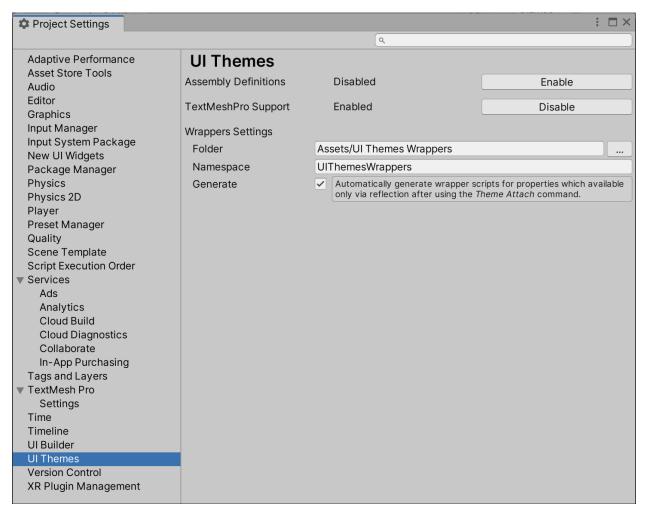
```
protected override FontSizeValue Get(TMPro.TMP_Text widget) => widget.fontSize;

protected override void Set(TMPro.TMP_Text widget, FontSizeValue value) => widget.fontSize = value;
}
```

## **THIRTEEN**

## SUPPORTED PACKAGES

## 13.1 TextMeshPro Support



You can enable **TextMeshPro** support with *Edit / Project Settings... / UI Themes / TextMeshPro Support / Enable.* If **TextMeshPro** not installed option will not be available.

You can disable support the same way with Edit / Project Settings... / UI Themes / TextMeshPro Support / Disable.

Note: Support is enabled only to installed platforms. Platforms that were added after it requires enabling support

again.

## **13.1.1 Details**

TextMeshPro support is enabled by adding UIWIDGETS\_TMPRO\_SUPPORT directive to the *Scripting Define Symbols* in the *Player Settings* and forced scripts recompilation.

# **FOURTEEN**

## **SUPPORT**

You can ask me questions at:

- $\bullet \ \ Forum\ private\ conversation:\ https://forum.unity.com/conversations/add?to=ilih$
- Email: support@ilih.name

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## **FIFTEEN**

## **CHANGELOG**

#### 15.1 Release 1.0.7

- "Remove All ThemeTargets" renamed to "Detach Theme"
- "Remove ThemeTargets with Default Theme" renamed to "Detach Default Theme"
- Theme editor: added "Attach to the Scene" button, it will add/replace all themes in the active scene with the current one

## 15.2 Release 1.0.6

• fixed problems during the first installation

## 15.3 Release 1.0.5

- · Assembly Definitions: improved support when reinstalling package
- fixed build error for Unity 2021.3 versions

## 15.4 Release 1.0.4

- added commands "Find Options" and "Find And Create Options" to use with existing ThemeTarget components
- font size by default changed to 24
- colorMultiplier by default changed to 1
- commands "... Create Options" now set the current value for all variations if the option was created

## 15.5 Release 1.0.3

- fixed bug when properties controlled by the owner were changed by Theme
- added Selectable.colorMultiplier support
- · added Text.fontSize support

#### 15.6 Release 1.0.2

• fixed error caused by a missing folder in the package (since Unity does not include an empty folder in the package)

#### 15.7 Release 1.0.1

- added option to specify folder, and namespace for wrappers, and enable generate wrappers in Project Settings
- ThemeTargets Search window: search is now performed on all opened scenes, not only active
- ThemeTargets Search window: added search on all scenes and prefabs
- ThemeTargets Search window: search results preserved after assembly reload
- added context menu "Remove ThemeTargets with Default Theme"
- · added variations reorder
- added Theme.IsActiveProperty(name) method to control available properties
- white sprite can be marked with the "ui-themes-white-sprite" label
- · fixed options reordering when filter enabled
- · fixed variations delete

## 15.8 Release 1.0.0

· Initial release