New UI Widgets Documentation

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Contents

CHAPTER 1

Overview

Most of the widgets can be used without knowledge of the Unity UI, but some of them require a basic understanding of the Unity UI.

1.1 Recommended Unity UI documentation

- Canvas
- RectTransform
- Events and Event Triggers
- Mask
- Transitions
- Layout Groups

1.2 Collections

Collections for your custom types can be created with *Widgets Generation*.

TileView, Table, TreeGraph does not have default implementation like ListView because of no standard for those widgets, so they should be created with *Widgets Generation*.

- **Combobox** Data type `string`.
- ComboboxIcons
- **ComboboxIconsMultiselect** ComboboxIcons with multiple selection support.
- DirectoryTreeView *
- FileListView *
- **ListView** Data type `string`.
- **ListViewColors** Data type `Color`.

- **ListViewInt** Data type `int`.
- ListViewIcons
- **ListViewHeight** Data type `string`.
- **ListViewPaginator** Paginator for ListView, TileView, and Table.
- TreeView

1.3 Containers

- Accordion
- **Tabs** Tabs buttons displayed on the top side.
- **TabsLeft** Tabs buttons displayed on the left side.
- **TabsIcons** Tabs buttons with an icon and buttons displayed on the top side.
- **TabsIconsLeft** Tabs buttons with an icon and displayed on the left side.

1.4 Dialogs

- **DatePicker** Data type `DateTime`.
- **DateTimePicker** Data type `DateTime`.
- **Dialog Template** Template for the custom dialogs.
- FileDialog *
- FolderDialog *
- **NotifyTemplate** Template for the custom notifications.
- **PickerBool** Data type `bool`.
- PickerIcons
- **PickerInt** Data type `int`.
- **PickerString** Data type `string`.
- **Popup** Template for the custom popup.
- **TimePicker** Data type `TimeSpan`.

1.5 Input

- **Autocomplete** Data type `string`.
- AutocompleteIcons
- ButtonBig
- ButtonSmall
- Calendar
- **CenteredSlider** Horizontal direction.
- **CenteredSliderVertical** Vertical direction.
- ColorPicker

- ColorPickerRange
- ColorPickerRangeHSV
- **ColorsList** Should be used with ColorPicker to save colors.
- **DateTime** Data type `DateTime`.
- **RangeSlider** Data type `int`. Horizontal direction.
- **RangeSliderVertical** Data type `int`. Vertical direction.
- **RangeSliderFloat** Data type `float`. Horizontal direction.
- **RangeSliderFloatVertical** Data type `float`. Vertical direction.
- **Spinner** Data type `int`.
- **SpinnerFloat** Data type `float`.
- Switch
- **Time12** Data type `TimeSpan`. 12-hour format with AM / PM switch.
- **Time24** Data type `TimeSpan`. 24-hour format.

1.6 Misc

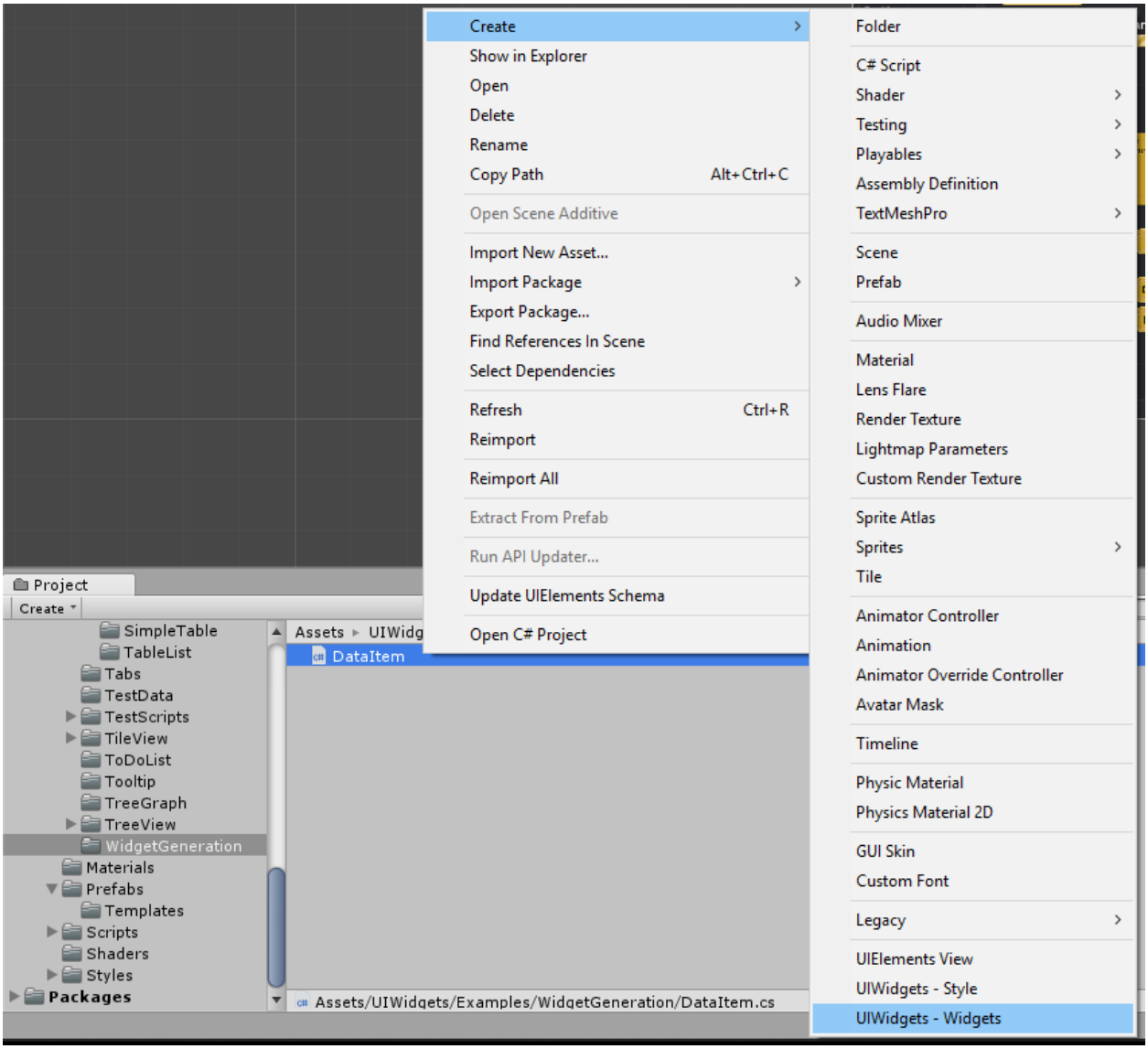
- AudioPlayer
- ProgressbarDeterminate
- ProgressbarIndeterminate
- ScrollRectPaginator
- ScrollRectNumericPaginator

* not available on platforms with restricted access to file system (like WebGL and UWP).

CHAPTER 2

Widgets Generation

You can generate widgets for your data type with *Context menu / Create / New UI Widgets / Generate Widgets*.



2.1 Requirements

Data type should have at least one public field or public readable property of the supported types.

2.2 Supported types

Text types (`string` or types convertible to the `string`):

- `string`
- numeric data types (`int`, `float`, etc)
- any type with overridden ToString() method and not derived from `UnityEngine.Object`.

Graphic types:

- `Sprite`
- `Texture2D`

- `Color`
- `Color32`

2.3 Limitations

- Autocomplete

  Requires at least one field or property of the `string` type.

- Table

  Requires at least one field or property of the text type.

2.4 Known Problems

Widget generation does not work with `struct` or `interface` types inside a namespace with some Unity versions due to bug.

Workaround

Specify the type name in the *Data Type* field.
Another way is to change `interface` or `struct` to `class` in the type definition. Then run widgets generation and return type to `interface` or `struct`.

2.5 INotifyPropertyChanged Support

`ObservableList<T>` used by widgets provide support for `INotifyPropertyChanged` interface of the data type, so if property updated and was raised `PropertyChanged` event then widget will be updated.
If you want to automatically update collections widgets (like ListView, TileView, Table) on item data changes, then you need to add `INotifyPropertyChanged` implementation to your data type.
Implementation can be added even after widgets generation.

```
public class ListViewIconsItemDescription : INotifyPropertyChanged
{
   [SerializeField]
   string name;

   public string Name
   {
      get
      {
         return name;
      }

      set
      {
         name = value;
         Changed("Name");
      }
   }
```

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```
    public event PropertyChangedEventHandler PropertyChanged = (x, y) => { };

    protected void Changed(string propertyName)
    {
        PropertyChanged(this, new PropertyChangedEventArgs(propertyName));
    }

    ...
}
```

This way name of the first item displayed with the widget will be changed:

```
ListView.DataSource[0].Name = "New name";
```

You can disable this behavior with `ObserveItems` property:

```
ListView.DataSource.ObserveItems = false;
// name displayed with the widget will be not changed
ListView.DataSource[0].Name = "New name";
```

2.6 Replacing generated code

Generated code can be freely modified.

Important: Be careful not to overwrite modified scripts if you decide re-run widget generation.

2.6.1 Collections

Widgets to display collections consist of the three classes:

- your custom data type (class, struct or interface)
- Widget class (required because of the generic components not allowed)
- DefaultItem class to control tile view

Widget and DefaultItem classes created with widget generation for your type and you will need only to modify created DefaultItem class if it needs at all.

Functions to modify in the DefaultItem class:

- SetData() to display passed data. Called when the item displayed or recycled.
- MovedToCache() to unload unused resources like *Sprite*. Called when the item is out of sight and not be displayed or recycled (can happen when items list cleared).

For example you can replace default widgets used to display item fields with other widgets.

This example show `Item.Number` field displayed with `Spinner` instead of `Text` and field value update with `Spinner` changes.

Original code:

```
namespace UIWidgets.Examples.WidgetGeneration.Widgets
{
    /// <summary>
```

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```
   /// ListView component for the DataItem.
   /// </summary>
   public class ListViewComponentDataItem : UIWidgets.ListViewItem,
      UIWidgets.IResizableItem,
      UIWidgets.IViewData<UIWidgets.Examples.WidgetGeneration.DataItem>
   {
      ...

      /// <summary>
      /// The Number.
      /// </summary>
      public UIWidgets.TextAdapter Number;

      ...

      /// <summary>
      /// Gets the current item.
      /// </summary>
      public UIWidgets.Examples.WidgetGeneration.DataItem Item
      {
         get;
         protected set;
      }

      /// <summary>
      /// Sets component data with specified item.
      /// </summary>
      /// <param name="item">Item.</param>
      public virtual void SetData(UIWidgets.Examples.WidgetGeneration.DataItem item)
      {
         Item = item;

         if (Number != null)
         {
            Number.text = Item.Number.ToString();
         }

         ...
      }

      ...
   }
}
```

New code:

```
namespace UIWidgets.Examples.WidgetGeneration.Widgets
{
   /// <summary>
   /// ListView component for the DataItem.
   /// </summary>
   public class ListViewComponentDataItem : UIWidgets.ListViewItem,
      UIWidgets.IResizableItem,
      UIWidgets.IViewData<UIWidgets.Examples.WidgetGeneration.DataItem>
   {
      ...
```

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```
    /// <summary>
    /// The Number.
    /// </summary>
    public UIWidgets.Spinner Number;

    ...

    /// <summary>
    /// Gets the current item.
    /// </summary>
    public UIWidgets.Examples.WidgetGeneration.DataItem Item
    {
        get;
        protected set;
    }

    /// <summary>
    /// Add callbacks.
    /// </summary>
    protected override void Start()
    {
        base.Start();

        if (Number != null)
        {
            Number.onValueChangeInt.AddListener(UpdateNumber);
        }
    }

    /// <summary>
    /// Update Item.Number when spinner value changed.
    /// </summary>
    void UpdateNumber(int value)
    {
        Item.Number = value;
    }

    /// <summary>
    /// Sets component data with specified item.
    /// </summary>
    /// <param name="item">Item.</param>
    public virtual void SetData(UIWidgets.Examples.WidgetGeneration.DataItem item)
    {
        Item = item;

        if (Number != null)
        {
            Number.Value = Item.Number;
        }

        ...
    }

    /// <summary>
    /// Remove callbacks.
    /// </summary>
    protected override void OnDestroy()
```

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```
        {
            if (Number != null)
            {
                Number.onValueChangeInt.RemoveListener(UpdateNumber);
            }

            base.OnDestroy();
        }

        ...
    }
}
```

If you need to dynamicaly change the state of the objects like enabling or disabling them and restore state after item recycled then this can be done with *SetData* function:

```
public virtual void SetData(UIWidgets.Examples.WidgetGeneration.DataItem item)
{
    Item = item;

    // set state after item recycled
    ToggableObject.setActive(item.IsToggableObjectActive);

    ...
}
```

2.6.2 Autocomplete

You can override Startswith, Contains, and GetStringValue functions to use different field or use other match condition.

This example show `Text` field replaced with `SomeOtherText` field and match with `EndsWith` instead of `Contains`.

Original code:

```
namespace UIWidgets.Examples.WidgetGeneration.Widgets
{
  /// <summary>
   /// Autocomplete for the DataItem.
   /// </summary>
   public class AutocompleteDataItem : UIWidgets.AutocompleteCustom<UIWidgets.
↪Examples.WidgetGeneration.DataItem,
      ListViewComponentDataItem, ListViewDataItem>
   {
      ...
      /// <summary>
      /// Returns a value indicating whether Input occurs within specified value.
      /// </summary>
      /// <param name="value">Value.</param>
      /// <returns>true if the Input occurs within value parameter; otherwise, false.
↪</returns>
      public override bool Contains(UIWidgets.Examples.WidgetGeneration.DataItem␣
↪value)
      {
         if (CaseSensitive)
         {
            return value.Text.Contains(Query);
```

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```
            }

            return value.Text.ToLower().Contains(Query.ToLower());
        }
    }
}
```

New code:

```
namespace UIWidgets.Examples.WidgetGeneration.Widgets
{
  /// <summary>
   /// Autocomplete for the DataItem.
   /// </summary>
   public class AutocompleteDataItem : UIWidgets.AutocompleteCustom<UIWidgets.
↪Examples.WidgetGeneration.DataItem,
       ListViewComponentDataItem, ListViewDataItem>
   {
       ...
       /// <summary>
       /// Returns a value indicating whether Input occurs within specified value.
       /// </summary>
       /// <param name="value">Value.</param>
       /// <returns>true if the Input occurs within value parameter; otherwise, false.
↪</returns>
       public override bool Contains(UIWidgets.Examples.WidgetGeneration.DataItem␣
↪value)
       {
           if (CaseSensitive)
           {
               return value.SomeOtherText.EndsWith(Query);
           }

           return value.SomeOtherText.ToLower().EndsWith(Query.ToLower());
       }
   }
}
```

CHAPTER 3

Widgets

3.1 Collections

3.1.1 Combobox

Combobox is wrapper for `ListView`, so you should mostly use *ListView properties and events*.

Also available AutocompleteCombobox, this is Autocomplete with Combobox-like behavior.

Options

- ListView `TListViewCustom`

  ListView with items.

- ToggleButton `Button`

  Button to show and hide ListView on click.

- Current `TComponent`

  Template to display selected items.

- HideAfterItemToggle `bool`

  Hide ListView right after item selected or deselected.

Events

- OnShowListView `UnityEvent`
- OnHideListView `UnityEvent`

3.1.2 DirectoryTreeView

- All collections widgets support virtualization: gameobjects created only for the visible items.
- Add `Selectable` component to use keyboard and gamepad navigation.

- See also *FolderDialog*.

Settings

Settings are almost same as the *TreeView*.

- Data Source `ObservableList<TreeNode<FileSystemEntry>>`

  Not available in the inspector window.
  Filled automatically.

- Root Directory `string`

  Root directory.

- Exceptions View `IOExceptionsView`

  Special component to display IO errors.

3.1.3 FileListView

- All collections widgets support virtualization: gameobjects created only for the visible items.
- Add `Selectable` component to use keyboard and gamepad navigation.
- See also *FileDialog*.

Settings

Settings are almost same as the *ListView, TileView and Table*.

- Data Source `ObservableList<FileSystemEntry>`

  Not available in the inspector window.
  Filled automatically.

- Current Directory `string`

  Current directory. `Application.persistentDataPath` will be used if not specified.

- Directory Patterns `string`

  Directory patterns, semicolon used as separator between patterns.
  Directory will be displayed if it's match one of the pattern.
  Wildcards:
  * - Zero or more characters in that position.
  ? - Zero or one character in that position.
  Warning: if directory match two or more patterns it will be displayed two or more times.

- File Patterns `string`

  File patterns, semicolon used as separator between patterns.
  File will be displayed if it's match one of the pattern.
  Wildcards:
  * - Zero or more characters in that position.
  ? - Zero or one character in that position.
  Warning: if file match two or more patterns it will be displayed two or more times.

- Button Up `Button`

  Button to open parent directory of current directory.

- Button Toggle Drivers `Button`

  Button to toggle DriversList.

- Path View `FileListViewPath`

  Widget to display the current directory.

- Drives List View `DrivesListView`

  Widget to display drives list.

- Exceptions View `IOExceptionsView`

  Special component to display IO errors.

- Can Display Entry `Func<FileSystemEntry, bool>`

  Not available in the inspector window.
  Function to check if `FileSystemEntry` should be displayed.

3.1.4 ListView, TileView and Table

- All collections widgets support virtualization: gameobjects created only for the visible items.
- Add `Selectable` component to use keyboard and gamepad navigation.
- Different ListView, TileView and Table can display the same list.
- *Table Header* provides Table specific methods.

List View Type

Fig. 1: ListView with Fixed Size.

Fig. 2: ListView with Variable Size.

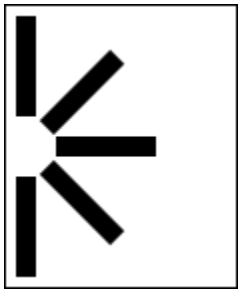

Fig. 3: ListView with Ellipse layout.

Fig. 4: TileView with Fixed Size.

Fig. 5: TileView with Variable Size.

ListView.Container settings for the Ellipse type

- **RectTransform.pivot** Defines on which side or corner will be the center point.
- **EasyLayout.Ellipse settings** Width and height usually should be specified, set the same value for the circle.
- ***Angle Start*** Base rotation for the first item.
- ***Angle Step Auto*** Should be disabled.
- ***Angle Step*** Angular distance between items.
- ***Fill*** Should be `Arc`.
- ***Arc Length*** Should be **180** if center at the side and **90** if center at the corner.

Settings

- Interactable `bool`

  Allow users interact with the ListView.

- Virtualization `bool`

  Enable virtualization. If enabled GameObject instantiated only for the visible items; otherwise for the all items.

- List Type `ListViewType`

  Determines how items are displayed.

  - `ListViewWithFixedSize`

    Works with EasyLayout, Horizontal Layout Group and Vertical Layout Group.

  - `ListViewWithVariableSize`

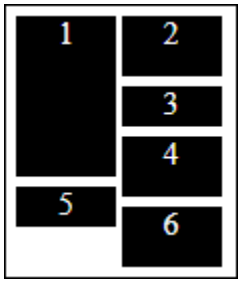

Fig. 6: TileView Staggered.

Works with EasyLayout, Horizontal Layout Group and Vertical Layout Group.

- `ListViewEllipse`

  Works with EasyLayout.

- `TileViewWithFixedSize`

  Works with EasyLayout.

- `TileViewWithVariableSize`

  Works with EasyLayout.

- `TileViewStaggered`

  Works with EasyLayout.

- Sort `bool` *deprecated*

  If enabled items will be sorted with **SortFunc**. Deprecated, replaced with DataSource.Comparer.

- SortFunc `Func<IEnumerable<TItem>, IEnumerable<TItem>>` *deprecated*

  Not available in the Inspector window Function to sort items. Deprecated, replaced with **DataSource.Comparer**.

- Data Source `ObservableList<TItem>`

  List of the items. It works the same way as List<T> with some additions.
  Not available in the inspector window if type not specified as serializable.

- Multiple Select `bool`

  Allow to select multiple items, otherwise only one.

- SelectedIndex `int`

  Index of the last selected item.

- SelectedIndices `List<int>`

  Not available in the Inspector window List of the selected items indices.

- SelectedItem `TItem`

  Not available in the Inspector window Last selected item.

- SelectedItems `List<TItem>`

  Not available in the Inspector window List of the selected items.

- Direction `ListViewDirection`

  ListView direction.

  - `Horizontal`
  - `Vertical`

- DefaultItem `TComponent`

  A prefab used to display item.

- Container `Transform`

  The container of the instantiated gameobjects used to display items. Should have layout required for the specified `List Type`.

- ScrollRect `ScrollRect`

ScrollRect used by ListView. Required for virtualization support.

- AllowColoring `bool`

  Change colors of the highlighted and selected items.

- Colors

  Colors for the text and background elements of the **DefaultItem** instances.

  Text and background elements defined with **GraphicsForeground** and **GraphicsBackground** properties of the `TComponent`.

  - Default Color `Color`
  - Default Background Color `Color`
  - Highlighted Color `Color`
  - Highlighted Background Color `Color`
  - Selected Color `Color`
  - Selected Background Color `Color`
  - Disabled Color `Color`: multiplicator, actual color is current color (default, highlighted, selected) * disabled Color.

- Fade Duration `float`

  Time for a smooth color change when the state of an element changes.

- End Scroll Delay `float`

  Delay from last scroll event to **OnEndScrolling** event raising.

- Navigation `bool`

  Allow to use navigation with keyboard or gamepad.

- Looped List `bool`

  Is list looped? First items will be displayed after the last item and scrolling scrolling are infinite. Recommended to disable scrollbar.

- Is Table `bool`

  Is ListView will be displayed as a table? Used for correct styles support.

- Set Content Size Fitter `bool`

  Changes ContentSizeFitter settings according to the selected direction. Disable if you want to use manual settings.

- Scroll Unscaled Time `bool`

  ScrollTo functions will be used unscaled time.

- Scroll Movement `AnimationCurve`

  Animation curve for the ScrollTo functions.

- Center The Items `bool`

  Display items at the center of the list if items not enough to fill the list.

- Precalculate Item Size `bool`

Precalculate items sizes for List Type with items of variable size.

You can disable this option to increase performance in exchange to less accurate scrolling.

- CanSelect `Func<int, bool>`

  The function that determines whether the item with the specified index can be selected. Unselectable items cannot be highlighted and skipped by keyboard and gamepad navigation.

- CanDeselect `Func<int, bool>`

  The function that determines whether the item with the specified index can be deselected.

Events

- OnSelect `UnityEvent<int, ListViewItem>`

  Event raised when item selected.

  Arguments: index of the selected item and DefaultItem instance for the selected item.

- OnDeselect `UnityEvent<int, ListViewItem>`

  Event raised when item deselected.

  Arguments: index of the deselected item and DefaultItem instance for the deselected item.

- OnSelectObject `UnityEvent<int>`

  Event raised when item selected.

  Arguments: index of the selected item.

- OnDeselectObject `UnityEvent<int>`

  Event raised when item deselected.

  Arguments: index of the deselected item.

- OnStartScrolling `UnityEvent`

  Event raised when scrolling starts.

- OnEndScrolling `UnityEvent`

  Event raised when after **End Scroll Delay** from left last scroll event.

- onSubmit `UnityEvent`

  Event raised when ListView gameobject has been selected via a "submit" key you specify (default is the return key).

- onCancel `UnityEvent`

  Event raised when ListView gameobject has been deselected.

- onItemSelect `UnityEvent`

  Event raised when ListView item gameobject has been selected via a "submit" key you specify (default is the return key).

- onItemCancel `UnityEvent`

  Event raised when ListView item gameobject has been deselected.

- OnUpdateView `UnityEvent`

  Event raised when ListView view was updated.

- OnFocusIn `UnityEvent<BaseEventData>`

Event raised when ListView gameobject received focus.

- OnFocusOut `UnityEvent<BaseEventData>`

  Event raised when ListView gameobject lost focus.

- OnPointerEnterObject `UnityEvent<int>`

  Event raised when pointer entered ListView item gameobject.

  Arguments: index of the item.

- OnPointerExitObject `UnityEvent<int>`

  Event raised when pointer exited ListView item gameobject.

  Arguments: index of the item.

ListViewComponent Class

Component to display item.

Fields and properties

- Index `int`

  Index of the displayed item. Negative if item not displayed or not used by ListView.

- Owner `ListViewBase`

  Reference to ListView.

- GraphicsForeground `Graphic[]`

  References to the foreground objects like Text.

- GraphicsBackground `Graphic[]`

  References to the background objects.

Methods

- SetData(`TItem` item)

  Set data.

- GraphicsColoring(`Color` foregroundColor, `Color` backgroundColor, `float` fadeDuration)

  Called by ListView to set colors for the GraphicsForeground and GraphicsBackground.

- MovedToCache()

  Called by ListView when GameObject moved to cache or recycled.

- StateDefault()

  Called by ListView when item in the default state.

- StateSelected()

  Called by ListView when item selected.

- StateHighlighted()

  Called by ListView when item highlighted.

Add item

```
var new_item = new ListViewIconsItemDescription()
{
   Icon = sampleIcon,
   Name = "test item",
};
listView.DataSource.Add(new_item);
```

Get items

```
var items = listView.DataSource;
```

Set items

```
var items = new ObservableList<ListViewIconsItemDescription>();
listView.DataSource = items;

var items2 = new List<ListViewIconsItemDescription>();
listView.DataSource = items2.ToObservableList();
```

Display same list with ListView, TileView or Table

```
var items = new ObservableList<ListViewIconsItemDescription>();
listView.DataSource = items;
tileView.DataSource = items;
table.DataSource = items;
```

Get last selected index

```
Debug.Log(listView.SelectedIndex);
```

Get selected indices

```
var indices = listView.SelectedIndices;
Debug.Log(string.Join(", ", indices.ConvertAll(x => x.ToString()).ToArray()));
```

Last selected item

```
Debug.Log(listView.SelectedItem.Name);
```

Get selected items

```
var selected_items = listView.SelectedItems;
Debug.Log(string.Join(", ", selected_items.ConvertAll(x => x.Name).ToArray()));
```

Delete specified item

```
listView.DataSource.Remove(items[0]);
```

Delete item by index

```
listView.DataSource.RemoveAt(0);
```

Clear list

```
listView.DataSource.Clear();
```

Add items

```
var new_items = new List<ListViewIconsItemDescription>()
{
   new_item,
   new_item,
   new_item,
};
listView.DataSource.AddRange(new_items);
```

Optimization

```
// Use BeginUpdate() and EndUpdate() to keep widget from updating on each change.
// All changes after BeginUpdate() call will be displayed with EndUpdate() call.
var items = listView.DataSource;
items.BeginUpdate();

items.Clear();
items.Add(new_item);
items.Add(new_item);
items.Add(new_item);
items.AddRange(new_items);
items.RemoveAt(0);

// widget will be updated after EndUpdate() call
items.EndUpdate();
```

Replace item

```
listView.DataSource[0] = new ListViewIconsItemDescription()
{
   Name = "new item"
};
```

Sort

```
// Sort by LocalizedName or Name in ascending order
Comparison<ListViewIconsItemDescription> ItemsComparisonAsc = (x, y) => x.Name.
↪CompareTo(y.Name);

// sort by LocalizedName or Name in descending order
Comparison<ListViewIconsItemDescription> ItemsComparisonDesc = (x, y) => -(x.Name).
↪CompareTo(y.Name);

// sort items only once
items.Sort(ItemsComparisonAsc);
```

Enable permanent sort

```
items.Comparison = ItemsComparisonDesc;
```

Important: Items will be always sorted, but if you use .BeginUpdate() then items will be re-sorted only after .EndUpdate() call.

Disable permanent sort

```
items.Comparison = null;
```

Set selected index

```
listView.SelectedIndex = 1;
```

Or:

```
listView.Select(1);
```

Behavior is different if you enable `MultipleSelect`:

- `listView.SelectedIndex = 1` last selected item will be deselected and specified item will be selected.
- `listView.Select(1)` new item will be added to selected items.

Deselect

```
listView.SelectedIndex = -1;
```

Or:

```
listView.Deselect(1);
```

Adding callbacks to custom events of the components

```
public class YourListView : ListViewCustom<YourListViewItemComponent,␣
↪YourListViewItem>
{
    protected override void AddCallback(ListViewItem item)
    {
        base.AddCallback(item);
        item.onDoubleClick.AddListener(ProcessDoubleClick);
    }

    protected override void RemoveCallback(ListViewItem item)
    {
        base.RemoveCallback(item);
        item.onDoubleClick.RemoveListener(ProcessDoubleClick);
    }

    void ProcessDoubleClick(int index)
    {
        Debug.Log("double click: " + DataSource[index]);
    }
}
```

Scroll to item

```
listView.ScrollToAnimated(index);
```

Example of ListView with Filter

```
namespace UIWidgets.Examples
{
   using System.Collections.Generic;
   using UIWidgets;
   using UnityEngine;
   using UnityEngine.Serialization;

   /// <summary>
   /// Sample ListViewIcons with filter.
   /// </summary>
   public class ListViewIconsWithFilter : ListViewIcons
   {
      [SerializeField]
      List<ListViewIconsItemDescription> listItems = new List
↪<ListViewIconsItemDescription>();

      ObservableList<ListViewIconsItemDescription> originalItems;

      /// <summary>
      /// Get or sets items.
      /// </summary>
      public ObservableList<ListViewIconsItemDescription> OriginalItems
      {
         get
         {
            if (originalItems == null)
            {
               originalItems = new ObservableList<ListViewIconsItemDescription>
↪(listItems);
               originalItems.OnChange += Filter;
            }

            return originalItems;
         }

         set
         {
            if (originalItems != null)
            {
               originalItems.OnChange -= Filter;
            }

            originalItems = value;

            if (originalItems != null)
            {
               originalItems.OnChange += Filter;
            }
         }
      }
```

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```
    /// <summary>
    /// Search string.
    /// </summary>
    protected string Search = string.Empty;

    /// <summary>
    /// Filter data using specified search string.
    /// </summary>
    /// <param name="search">Search string.</param>
    public void Filter(string search)
    {
        Search = search;
        Filter();
    }

    /// <summary>
    /// Copy items from OriginalItems to DataSource if it's match specified string.
    /// </summary>
    protected void Filter()
    {
        DataSource.BeginUpdate();
        DataSource.Clear();

        if (string.IsNullOrEmpty(Search))
        {
            // if search string not specified add all items
            DataSource.AddRange(OriginalItems);
        }
        else
        {
            // else add items with name starts with the specified string
            var finded = OriginalItems.FindAll(x => x.Name.StartsWith(Search));
            DataSource.AddRange(finded);
        }

        DataSource.EndUpdate();
    }

    /// <summary>
    /// Init this instance.
    /// </summary>
    public override void Init()
    {
        base.Init();

        // call Filter() to set initial DataSource
        Filter();
    }

    /// <summary>
    /// Process the destroy event.
    /// </summary>
    protected override void OnDestroy()
    {
        if (originalItems != null)
        {
            originalItems.OnChange -= Filter;
```

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```
            }

            base.OnDestroy();
        }
    }
}
```

3.1.5 Paginator

Important: ScrollRect.Content anchors should be setted to top left corner.

How to select paginator

- If you need paginator with fixed items quantity per page use ListViewPaginator.
- If you need paginator where the page size is equal ScrollRect size use ScrollRectPaginator. Add TileViewScrollRectFitter if you also need the whole number of items on one page.
- Use ScrollRectPaginator for any ScrollRect outside ListView, TileView etc.

Settings

- ScrollRect `ScrollRect`

  ScrollRect to work with.

- Default Page `RectTransform` *optional*

  Template GameObject to display inactive pages.

- Active Page `RectTransform` *optional*

  Template GameObject to display active page.

- Prev Page `RectTransform` *optional*

  GameObject, go to the previous page.

- Next Page `RectTransform` *optional*

  GameObject, go to the next page.

- Direction `PaginatorDirection`

  Scroll direction.

  - `Auto` detect direction by ScrollRect settings and ScrollRect.content size.
  - `Horizontal` scroll in the horizontal direction
  - `Vertical` scroll in the vertical direction

- Fast Drag Distance `float`

  Scroll to the next or previous page if drag distance more than *Fast Drag Distance* and drag time less than *Fast Drag Time*. Set zero to disable.

- Fast Drag Time `float`

  Scroll to the next or previous page if drag distance more than *Fast Drag Distance* and drag time less than *Fast Drag Time*. Set zero to disable.

- Forced Position `PaginatorPagePosition`

  Automatically scroll to the nearest page after drag ended if not meet *Fast Drag* condition.

  - `None` automatical scroll disabled
  - `OnStart` automatical scroll enabled; page aligned by the left side of the ScrollRect (or the top side if scroll in the vertical direction)
  - `OnCenter` automatical scroll enabled; page aligned by the center side of the ScrollRect
  - `OnEnd` automatical scroll enabled; page aligned by the right side of the ScrollRect (or the bottom side if scroll in the vertical direction)

- Animation `bool`

  Enable animation.

- Current Page `int`

  Default page.

Events

- OnPageSelect `UnityEvent<int>`

ScrollRectPaginator Options

- Page Size Type `PageSizeType`

  If *Page Size Type* = *Auto* page size is equal to scroll rect size, if *Page Size Type* = *Fixed* will be used *Page Size* value.

  - `Auto`
  - `Fixed`

- Page Size `float`

  Size of the page.

- Page Spacing `float`

  Space between pages.

- Movement `AnimationCurve`

  Animation curve.

- Unscaled Time `bool`

  Run animation with unscaled time.

ListViewPaginator Options

- PerPage `int`

  Items count on one page, for TileView this is rows or columns count per page.

ListViewPaginator works with ListLiew, TileView (in this case PerPage is rows or columns count) and TreeView. ListView animation settings used if animation enabled.

Tile View ScrollRect Fitter

Resize ScrollRect to fit the whole number of columns and rows. Add it to gameobject with TileView script.

3.1.6 TreeView

- All collections widgets support virtualization: gameobjects created only for the visible items.
- Add `Selectable` component to use keyboard and gamepad navigation.

> **Attention:** Different TreeView's cannot display same nodes, unlike ListView, TileView, and Table.

Settings

Settings are almost same as the *ListView, TileView and Table*.

- Data Source `ObservableList<TreeNode<TItem>>`

  Not available in the inspector window.

- Deselect Collapsed Nodes `bool`

  Deselect nested nodes when parent node collapsed.

Get nodes

```
public TreeView Tree;

ObservableList<TreeNode<TreeViewItem>> nodes;

void Start()
{
   nodes = Tree.Nodes;
}
```

Get selected nodes

```
Tree.SelectedNodes.ForEach(x =>
{
   // do something with selected node
   Debug.Log(x.Item.Name);

   var component = Tree.GetItemComponent(x.Index);

   // not displayed component will be null
   if (component != null)
   {
      component.DoSomething();
   }
});
```

Add listeners

```
void AddListeners()
{
   Tree.NodeSelected.AddListener(ProcessSelectedNode);

   Tree.NodeDeselected.AddListener(ProcessDeselectedNode);
}
```

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```
void ProcessSelectedNode(TreeNode<TreeViewItem> node)
{
   Debug.Log("selected: " + node.Item.Name);
}

void void ProcessDeselectedNode(TreeNode<TreeViewItem> node)
{
   Debug.Log("deselected: " + node.Item.Name);
}
```

Select node

```
Tree.SelectNode(nodes[1].Nodes[0]);
```

Select node with subnodes

```
Tree.SelectNodeWithSubnodes(nodes[1].Nodes[1]);
```

Deselect node

```
Tree.DeselectNode(nodes[1].Nodes[0]);
```

Deselect node with subnodes

```
Tree.DeselectNodeWithSubnodes(nodes[1].Nodes[1]);
```

Scroll to node

```
Tree.ScrollToAnimated(node);
```

Add node

```
var test_item = new TreeViewItem("added");
var test_node = new TreeNode<TreeViewItem>(test_item);
nodes.Add(test_node);
```

Hide nodes

```
nodes[1].IsVisible = false;
nodes[2].Nodes[1].IsVisible = false;
```

Collapse node

```
nodes[0].Nodes[0].IsExpanded = false;
```

Expand node

```
nodes[0].Nodes[0].IsExpanded = true;
```

Change node name

```
nodes[0].Item.Name = "Node renamed from code";
nodes[0].Nodes[1].Item.Name = "Another node renamed from code";
```

Sort

```
// Compare nodes by Name in ascending order
Comparison<TreeNode<TreeViewItem>> comparisonAsc = (x, y) => x.Item.Name.CompareTo(y.
↪Item.Name);

// Compare nodes by Name in descending order
Comparison<TreeNode<TreeViewItem>> comparisonDesc = (x, y) => -x.Item.Name.
↪CompareTo(y.Item.Name);

public void SortAsc()
{
   nodes.BeginUpdate();
   ApplyNodesSort(nodes, comparisonAsc);
   nodes.EndUpdate();
}

public void SortDesc()
{
   nodes.BeginUpdate();
   ApplyNodesSort(nodes, comparisonDesc);
   nodes.EndUpdate();
}

void ApplyNodesSort<T>(ObservableList<TreeNode<T>> nodes, Comparison<TreeNode<T>>␣
↪comparison)
{
   // apply sort for current nodes
   nodes.Sort(comparison);
   // apply sort for child nodes
   nodes.ForEach(node =>
   {
      if (node.Nodes != null)
      {
         ApplyNodesSort(node.Nodes as ObservableList<TreeNode<T>>, comparison);
      }
   });
}
```

Filter nodes

```
public void Filter(string nameContains)
{
   // Maintains performance while items are added/removed/changed
   // by preventing the widgets from drawing
   // until the EndUpdate() method is called.
   nodes.BeginUpdate();

   SampleFilter(nodes, x => x.Name.Contains(nameContains));

   // Apply changes.
   nodes.EndUpdate();
```

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```
}

bool SampleFilter(IObservableList<TreeNode<TreeViewItem>> nodes, Func<TreeViewItem,
↪bool> filterFunc)
{
   return nodes.Count(x =>
   {
      var have_visible_children = (x.Nodes==null) ? false : SampleFilter(x.Nodes,␣
↪filterFunc);
      x.IsVisible = have_visible_children || filterFunc(x.Item);
      return x.IsVisible;
   }) > 0;
}
```

Reset filter

```
public void ResetFilter()
{
   nodes.BeginUpdate();
   nodes.ForEach(SetVisible);
   nodes.EndUpdate();
}

void SetVisible(TreeNode<TreeViewItem> node)
{
   if (node.Nodes != null)
   {
      node.Nodes.ForEach(SetVisible);
   }

   node.IsVisible = true;
}
```

Clear nodes

```
public void Clear()
{
   nodes.Clear();
}
```

3.2 Containers

3.2.1 Accordion

Options

- Items (DataSource) `ObservableList<AccordionItem>`

  Items.

  `AccordionItem` fields:

  - ToggleObject `GameObject` Click on this object open or close *ContentObject*.
  - ContentObject `GameObject`

  - Open `bool` Default state of the *ContentObject*.

- Only One Open `bool`

  Only one item can be open at the same time.

- All Items Can Be Closed `bool`

  Allow to close all items; otherwise at least one item always will be opened.

- Animate `bool`

  Animate open and close.

- Animation Duration `float`

  Animation Duration.

- Unscaled Time `bool`

  Run animation with unscaled time.

- Direction `AccordionDirection`
  - `Horizontal`
  - `Vertical`
- Resize Method `ResizeMethods`
  - `Size` - change width or height of the ContentObject.
  - `Flexible` - change LayoutElement flexibleWidth or flexibleHeight of the ContentObject.
- Disable Closed `bool`

  Disable closed ContentObjects.

Events

- OnToggleItem `UnityEvent<AccordionItem>`

Open item

```
Accordion.Open(Accordion.DataSource[0]);
```

Close item

```
Accordion.Close(Accordion.DataSource[0]);
```

Toggle item

```
Accordion.ToggleItem(Accordion.DataSource[0]);
```

Set items

```
Accordion.DataSource = new ObservableList<AccordionItem>()
{
   new AccordionItem()
   {
      ToggleObject = Header1,
      ContentObject = Content1,
```

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```
        Open = true,
    },
    new AccordionItem()
    {
        ToggleObject = Header2,
        ContentObject = Content2,
        Open = false,
    },
    new AccordionItem()
    {
        ToggleObject = Header3,
        ContentObject = Content3,
        Open = false,
    },
};
```

3.2.2 Tabs

Options

- Container `Transform`

  Container for the tabs buttons.

- DefaultTabButton `Button`

  Button template for the inactive tabs.

- ActiveTabButton `Button`

  Button for the active tab.

- TabObjects `Tab[]`

  Tabs array, contains names and references to the tabs gameobjects.

  `Tab` fields:

  - Name `string`
  - TabObject `GameObject`

- DefaultTabName `string`

  Name of the tab opened by default.

- KeepTabsActive `bool`

  If true does not deactivate hidden tabs.

Events

- OnTabSelect `UnityEvent<int>`

  Receive index of the selected tab.

Select tab

```
Tabs.SelectTab(Tabs.TabObjects[0]);
```

Enable tab

```
Tabs.EnableTab(Tabs.TabObjects[0]);
```

Disable tab

```
Tabs.DisableTab(Tabs.TabObjects[0]);
```

3.3 Dialogs

Dialogs, Popups, Pickers, Notifications works with templates.
Code usually looks like this:

```
dialogTemplate.Clone().Show(...)
```

`Clone()` method creates a new instance of the *dialogTemplate* (or takes an instance from the cache if available) and displayed will be this instance, not the original template.
This way, you need only one template to display multiple dialogs at the same time, and also closed dialogs instances are automatically recycled.
But if you have a script outside of the *dialogTemplate* hierarchy and it has reference to the component inside a hierarchy, this reference will never be replaced with the new instance.
The script will be work with *dialogTemplate*, not with actually displayed dialog. To change this behavior, you need to move the script inside the dialog hierarchy.

3.3.1 DatePicker

Options

- Calendar `DateBase`

  Reference to the Date widget.

- Date Change Only `bool`

  If true select date only when date changes; otherwise select date on click.

```
namespace UIWidgets.Examples
{
   using System;
   using UIWidgets;
   using UnityEngine;
   using UnityEngine.UI;

   /// <summary>
   /// Test DatePicker.
   /// </summary>
   public class TestDatePicker : MonoBehaviour
   {
      [SerializeField]
      DatePicker PickerTemplate;
```

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```
        [SerializeField]
        Text Result;

        DateTime currentValue = DateTime.Today;

        /// <summary>
        /// Open picker and log selected value.
        /// </summary>
        public void Test()
        {
            // create picker by template
            var picker = PickerTemplate.Clone();

            // show picker
            picker.Show(currentValue, ValueSelected, Canceled);
        }

        void ValueSelected(DateTime value)
        {
            currentValue = value;
            Debug.Log("value: " + value);
        }

        void Canceled()
        {
            Debug.Log("canceled");
        }

        /// <summary>
        /// Open picker and display selected value.
        /// </summary>
        public void TestShow()
        {
            // create picker by template
            var picker = PickerTemplate.Clone();

            // show picker
            picker.Show(currentValue, ShowValueSelected, ShowCanceled);
        }

        void ShowValueSelected(DateTime value)
        {
            currentValue = value;
            Result.text = "Value: " + value;
        }

        void ShowCanceled()
        {
            Result.text = "Canceled";
        }
    }
}
```

3.3.2 Dialog

Options

- Buttons Templates `ReadOnlyCollection<Button>`

  Templates for the buttons.

- Content Root `RectTransform`

  Root gameobject for the content.

- Title Text `Text` (obsolete)

  GameObject to display title. Replaced with the *DialogInfo*.

- Content Text `Text` (obsolete)

  GameObject to display text. Replaced with the *DialogInfo*.

- Icon `Image` (obsolete)

  GameObject to display icon. Replaced with the *DialogInfo*.

- Dialog Info `DialogInfoBase`

  Component to display the dialog info.

Show() Method Parameters

All parameters are optional.

- title `string`

  Dialog title.

- message `string`

  Dialog message.

- buttons `IList<DialogButton>`

  Dialog buttons.

  `DialogButton` fields:

  - Label `string`

    Button label.

  - Action `Func<int, bool>`

    Function to run on button click. Receive button index and return `true` to close dialog; otherwise `false`.

  - Template Index `int`

    Index of the button template.

- focusButton `string`

  Button with focus by default.

- position `Vector3?`

  Dialog position.

- icon `Sprite`

  Dialog icon.

- modal `bool`

Modal dialog.

- modalSprite `Sprite`

  Background image for the modal dialog.

- modalColor `Color?`

  Background color for the modal dialog.

- canvas `Canvas`

  Canvas to display dialog. Required if dialog template is prefab.

- content `RectTransform`

  Dialog content. Can be used instead of the *message* and *icon*.

- onClose `Action`

  Action to run when dialog closed.

- onCancel `Func<int, bool>`

  Function to run when dialog canceled. Receive -1 and return `true` if dialog should be closed.

Minimal code

```
// create dialog from template
var dialog = dialogTemplate.Clone();
// show dialog
dialog.Show();
// specify root canvas if dialog cloned from prefab
dialog.Show(canvas: canvas);
```

Advanced

```
// create dialog from template
var dialog = dialogPrefab.Clone();
// show dialog with following parameters
dialog.Show(
   title: "Modal Dialog",
   message: "Simple Modal Dialog.",
   buttons: new DialogButton[]
   {
      new DialogButton(
        "Close", // label
        Dialog.AlwaysClose, // Func<int, bool>, receive button index and return true
↪to close dialog, otherwise false
        0 // button index in ButtonsTemplates
      ),
   },
   focusButton: "Close",
   modal: true,
   modalColor: new Color(0, 0, 0, 0.8f)
);
```

Adding new behaviour

1. Create helper component

```
using UnityEngine;
using UnityEngine.UI;

public class DialogInputHelper : MonoBehaviour {
   [SerializeField]
   public InputField Username;

   [SerializeField]
   public InputField Password;

   // Reset values
   public void Refresh()
   {
      Username.text = "";
      Password.text = "";
   }

   public bool Validate()
   {
      var valid_username = Username.text.Trim().Length > 0;
      var valid_password = Password.text.Length > 0;

      if (!valid_username)
      {
         Username.Select();
      }
      else if (!valid_password)
      {
         Password.Select();
      }

      return valid_username && valid_password;
   }
}
```

2. Show dialog.

```
public void ShowDialogSignIn()
{
   var dialog = dialogSignIn.Clone();
   var helper = dialog.GetComponent<DialogInputHelper>();
   helper.Refresh();

   dialog.Show(
      title: "Sign into your Account",
      buttons: new DialogButton[]
      {
         // on click call SignInNotify
         new DialogButton("Sign in", (index) => SignInNotify(helper)),

         // on click close dialog
         new DialogButton("Cancel", Dialog.AlwaysClose),
      },
      focusButton: "Sign in",
      modal: true,
      modalColor: new Color(0, 0, 0, 0.8f)
   );
```

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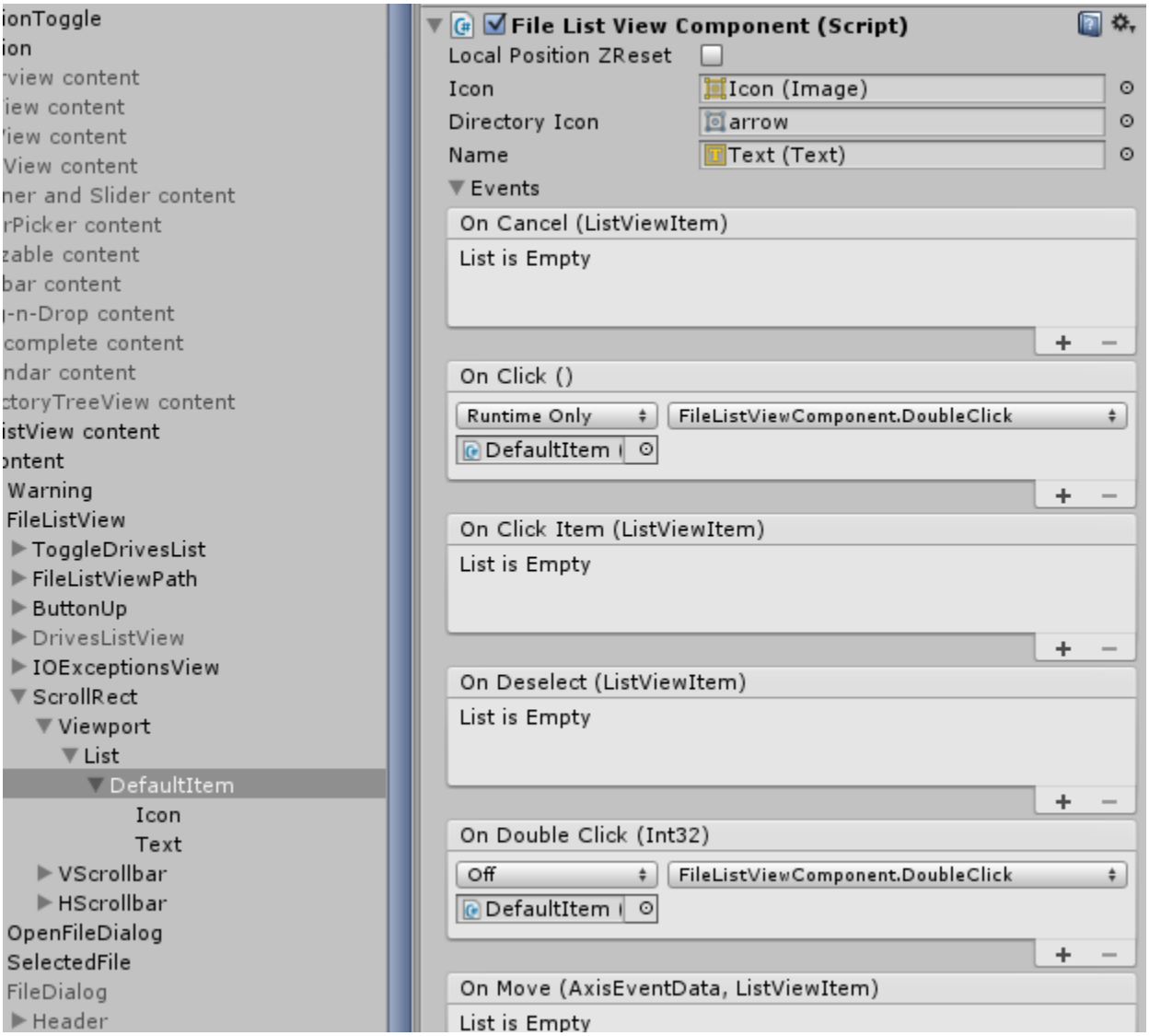
```
}

bool SignInNotify(DialogInputHelper helper)
{
   //if username or password empty than don't close dialog
   if (!helper.Validate())
   {
      return false;
   }

   //show notification
   var message = "Sign in.\nUsername: " + helper.Username.text + "\nPassword:
↪<hidden>";
   notifySample.Clone().Show(message, customHideDelay: 3f);

   return true;
}
```

3.3.3 FileDialog

If you want to open directories and select files with a single click instead of the double-click just move `FileListView.DefaultItem` `DoubleClick` callback to `OnClick` event.



Options

- File List View `FileListView`

  FileListView.

- Confirm Dialog `PickerBool`

  Dialog to get confirmation if *Request Confirmation If File Exists* enabled.

- FilenameInput `InputField`

  Input for the filename.

- OkButton `Button`

  Button to close dialog.

- FileShouldExists `bool`

  Selected file should exists.

- Request Confirmation If File Exists `bool`

Show *Confirm Dialog* if file exists.

Code examples

```
namespace UIWidgets.Examples
{
   using UIWidgets;
   using UnityEngine;
   using UnityEngine.UI;

   /// <summary>
   /// Test FileDialog.
   /// </summary>
   public class TestFileDialog : MonoBehaviour
   {
      [SerializeField]
      FileDialog PickerTemplate;

      [SerializeField]
      Text Result;

      string currentValue = string.Empty;

      /// <summary>
      /// Show picker and log selected value.
      /// </summary>
      public void Test()
      {
         // create picker by template
         var picker = PickerTemplate.Clone();

         // show picker
         picker.Show(currentValue, ValueSelected, Canceled);
      }

      void ValueSelected(string value)
      {
         currentValue = value;
         Debug.Log("value: " + value);
      }

      void Canceled()
      {
         Debug.Log("canceled");
      }

      /// <summary>
      /// Show picker and display selected value.
      /// </summary>
      public void TestShow()
      {
         // create picker by template
         var picker = PickerTemplate.Clone();

         // show picker
         picker.Show(currentValue, ShowValueSelected, ShowCanceled);
      }
```

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```
        void ShowValueSelected(string value)
        {
            currentValue = value;
            Result.text = "Value: " + value;
        }

        void ShowCanceled()
        {
            Result.text = "Canceled";
        }
    }
}
```

3.3.4 FolderDialog

Options

- Directory Tree View `DirectoryTreeView`

  DirectoryTreeView widget.

- Ok Button `Button`

  Button to close dialog.

```
namespace UIWidgets.Examples
{
    using UIWidgets;
    using UnityEngine;
    using UnityEngine.UI;

      /// <summary>
      /// Test FolderDialog.
      /// </summary>
      public class TestFolderDialog : MonoBehaviour
      {
              [SerializeField]
              FolderDialog PickerTemplate;

              [SerializeField]
              Text Result;

              string currentValue = string.Empty;

              /// <summary>
              /// Show picker and log selected value.
              /// </summary>
              public void Test()
              {
                      // create picker by template
                      var picker = PickerTemplate.Clone();

                      // show picker
                      picker.Show(currentValue, ValueSelected, Canceled);
              }

              void ValueSelected(string value)
```

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```
        {
                currentValue = value;
                Debug.Log("value: " + value);
        }

        void Canceled()
        {
                Debug.Log("canceled");
        }

        /// <summary>
        /// Show picker and display selected value.
        /// </summary>
        public void TestShow()
        {
                // create picker by template
                var picker = PickerTemplate.Clone();

                // show picker
                picker.Show(currentValue, ShowValueSelected, ShowCanceled);
        }

        void ShowValueSelected(string value)
        {
                currentValue = value;
                Result.text = "Value: " + value;
        }

        void ShowCanceled()
        {
                Result.text = "Canceled";
        }
    }
}
```

3.3.5 Notifications

Important: If you want to display more than one notification at the same time, then *notification container* should have *layout group* component like `EasyLayout`. Start positions of notifications are determined with `Group Position`.

Options

- Hide Button `Button`

  Button to close notification.

- Text `Text` (obsolete)

  GameObject to display the notification text. Replaced with NotifyInfo.

- Hide Delay `float`

  Delay before notification automatically hidden.

- Unscaled Time `bool`

  Delay with unscaled time.

- SlideUpOnHide `bool`

  Start slide up animations after hide current notification. Turn it off if its managed with HideAnimation.

- NotifyInfo `NotifyInfoBase`

  Component to display the notification text.

Minimal code

```
// get notification instance by template name (name of existing GameObject with␣
↪Notify component).
var notification = notifySample.Clone();
// show notification
notification.Show();
```

Advanced

```
var notification = notifySample.Clone();
// show notification
notification.Show(
   // Show notification with following text
   message: "Simple Notification.",
   // Hide it after 4.5 seconds
   customHideDelay = 4.5f,
   // Run specified animation on hide
   hideAnimation = Notify.AnimationCollapseVertical,
   // without SlideUpOnHide
   slideUpOnHide = false
);
```

Default Hide Animations

Note: Hide Animation is coroutine that accepts `Notify` instance and play hide animation for this instance. You can specify any custom coroutine.

- **AnimationRotateHorizontal** Rotate notification on X axis.
- **AnimationRotateVertical** Rotate notification on Y axis.
- **AnimationCollapseHorizontal** Resize width of the notification.
- **AnimationCollapseVertical** Resize height of the notification.
- **AnimationSlideRight** Slide notification on right.
- **AnimationSlideLeft** Slide notification on left.
- **AnimationSlideUp** Slide notification on up.
- **AnimationSlideDown** Slide notification on down.

Configurable Hide Animations

- **AnimationRotateBase**

  Arguments:

  - **`Notify` notify** Notification instance.

- **bool isHorizontal** Rotate in horizontal or vertical direction.
- **float timeLength** Length of animations in seconds.

- **AnimationCollapseBase**

  Arguments:

  - **Notify notify** Notification instance.
  - **bool isHorizontal** Resize in horizontal or vertical direction.
  - **float speed** Resize speed in points per second.

- **AnimationSlideBase**

  Arguments:

  - **Notify notify** Notification instance.
  - **bool isHorizontal** Slide in horizontal or vertical direction.
  - **float direction** Slide direction, -1f for left/down, +1f for right/up.
  - **float speed** Slide speed in points per second.
  - **bool animateReplacement** Animate other notifications.

```
NotifyTemplate.Clone().Show(
   "Notification message.",
   customHideDelay: 3f,
   hideAnimation: x => Notify.AnimationSlideBase(x, true, -1f, 200f, true)
);
```

3.3.6 Pickers

Base class for the custom pickers.

```
namespace UIWidgets.Examples
{
   using System.Linq;
   using UIWidgets;
   using UnityEngine;

     public class PickerIntTest : MonoBehaviour
   {
            [SerializeField]
            PickerInt PickerTemplate;

            int currentValue = 0;

            public void Test()
            {
                    // create picker by template
                    var picker = PickerTemplate.Clone();

                    // set values from template
                    picker.ListView.DataSource = PickerTemplate.ListView.DataSource.
↪ToObservableList();
                    // or set new values
                    //picker.ListView.DataSource = Enumerable.Range(1, 100).
↪ToObservableList();
```

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```
                // show picker with callbacks
                picker.Show(currentValue, ValueSelected, Canceled);
        }

        // will be called if value selected
        void ValueSelected(int value)
        {
                currentValue = value;
                Debug.Log("value: " + value);
        }

        // will be called if cancel button pressed
        void Canceled()
        {
                Debug.Log("canceled");
        }
    }
}
```

3.3.7 Popup

Options

- Title Text `Text` (obsolete)

  GameObject to display title. Replaced with the *DialogInfo*.

- Content Text `Text` (obsolete)

  GameObject to display text. Replaced with the *DialogInfo*.

- Icon `Image` (obsolete)

  GameObject to display icon. Replaced with the *DialogInfo*.

- Info `DialogInfoBase`

  Component to display the popup info.

Minimal code

```
// create popup from template
var popup = popupTemplate.Clone();
// show popup
popup.Show();
// specify root canvas if popup cloned from prefab
dialog.Show(canvas: canvas);
```

Advanced

```
// create popup from template
var popup = popupTemplate.Clone();
// show popup with following parameters
popup.Show(
   title: "Modal popup",
   message: "Simple Modal popup.",
```

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```
    modal: true,
    modalColor: new Color(0, 0, 0, 0.8f)
);
```

3.4 Input

3.4.1 Autocomplete

Options

- Input Field `InputField`

  Input field.

- Target List View `TListView`

  ListView to display available values.

- Display List View `TListView`

  Selected value will be added to this ListView.

- Allow Duplicate `bool`

  TargetListView can have duplicated items.

- Data Source `List<TValue>`

  List of the all values.

- Filter `AutocompleteFilter`

  Filter settings.

  - `Startswith`

    Value should starts with the specified input.

  - `Contains`

    Value should contains with the specified input.

- Case Sensitive `bool`

  Is filter case sensitive?

- Delimiter Chars `char[]`

  Delimiter chars to split input to the words.

- Input Type `AutocompleteInput`

  Filter with the current word or the whole input.

  - `Word`
  - `AllInput`

- Result `AutocompleteResult`

  What to do with input after value selected.

  - `Append`
  - `Replace`

- Min Length `int`

  Minimal length of the input to start search.

- Search Delay `float`

  The delay in seconds between when a keystroke occurs and when a search is performed.

- Unscaled Time `bool`

  Delay with unscaled time.

Events

- OnOptionSelected `UnityEvent`
- OnOptionSelectedItem `UnityEvent<TValue>`

```
namespace UIWidgets.Examples
{
   using UIWidgets;
   using UnityEngine;

   public class AutocompleteIconsText: MonoBehaviour
   {
      [SerializeField]
      public AutocompleteIcons Autocomplete;

      [SerializeField]
      ListViewIconsItemDescription item;

      void Start()
      {
         Autocomplete.OnOptionSelectedItem.AddListener(SetItem);
      }

      void OnDestroy()
      {
         Autocomplete.OnOptionSelectedItem.RemoveListener(SetItem);
      }

      void SetItem(ListViewIconsItemDescription newItem)
      {
         item = newItem;
      }
   }
}
```

3.4.2 Calendar

Note: DateTime.TimeOfDay is not setted or changed by Calendar.

Options

- Interactable `bool`

  Is interactable?

- Date `DateTime`

Current date.

- Date Min `DateTime`

  Minimal date.

- Date Max `DateTime`

  Maximum date.

- First Day Of Week `DayOfWeek`

  First day of the week.

- Container `RectTransform`

  Container for the dates.

- Calendar Date Template `CalendarDateBase`

  Template for the date.

- HeaderContainer `RectTransform`

  Container for the day of weeks.

- Calendar Day Of Week Template `CalendarDayOfWeekBase`

  Template for the day of week.

- Date Text `Text`

  Text to display the current date.

- Month Text `Text`

  Text to display the current month.

Events

- OnDateChanged `UnityEvent<DateTime>`
- OnDateClick `UnityEvent<DateTime>`

```
namespace UIWidgets.Examples
{
   using UnityEngine;

   /// <summary>
   /// Test Calendar.
   /// </summary>
   public class TestCalendar : MonoBehaviour
   {
      /// <summary>
      /// Calendar.
      /// </summary>
      [SerializeField]
      protected UIWidgets.Calendar Calendar;

      /// <summary>
      /// Start this instance.
      /// </summary>
      protected virtual void Start()
      {
         Calendar.OnDateChanged.AddListener(ProcessDate);
```

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```
        // change first day of the week
        Calendar.FirstDayOfWeek = System.DayOfWeek.Sunday;

        // change culture
        Calendar.Culture = new System.Globalization.CultureInfo("en-US");

        // change calendar
        SetCalendar(new System.Globalization.JapaneseCalendar());
    }

    void ProcessDate(System.DateTime dt)
    {
        Debug.Log(dt);
    }

    void SetCalendar(System.Globalization.Calendar calendar)
    {
        Calendar.Culture.DateTimeFormat.Calendar = calendar;
        Calendar.UpdateCalendar();
    }
  }
}
```

3.4.3 Centered Slider

The differences from a default slider:

- zero at center
- positive and negative parts have different scales.

Options

- Value `int`

  Current value.

- Use Value Limits `bool`

  Value cannot exceed the specified limits.

- Limit Min `int`

  Minimal limit of the value.

- Limit Max `int`

  Maximum limit of the value.

- Value Min `int`

  Minimal value.

- ValueMax `int`

  Maximal value.

- Step `int`

  Value step.

- Whole Number Of Steps `bool`

Whole number of steps for the value.

- Handle `RangeSliderHandle`

  Handle to drag.

- UsableRangeRect `RectTransform`

  Usable range.

- FillRect `RectTransform`

  GameObject to display fill (line from center to the current value).

Events

- OnValuesChange `UnityEvent<int>`
- OnChange `UnityEvent`

Set value

```
slider.Value = 150;
```

Set display limits

```
slider.LimitMin = -500;
slider.LimitMax = 250;
```

Set value limits

```
slider.UseValueLimits = true;
slider.ValueMin = -100;
slider.ValueMax = 200;
```

3.4.4 ColorPicker

Set color

```
ColorPicker.Color = Color.cyan;
```

Get color

```
Debug.Log(ColorPicker.Color);
```

Add listener

```
void Start()
{
   ColorPicker.OnChange.AddListener(ColorChanged);
}

void ColorChanged(Color32 color)
{
   Debug.Log("selected color: " + Color);
}
```

3.4.5 DateScroller, DateTimeScroller, TimeScroller

Note: DateTime.TimeOfDay is not setted or changed by DateScroller, but changed by DateTimeScroller.

Note: DateTime Formats Strings

DateScroller Settings

- Interactable `bool`

  User can interact with ListView.

- Current Date As Default `bool`
  - Default Date `DateTime` (`string` in Inspector window)
- Default Date Min `DateTime` (`string` in Inspector window)

  Minimal selectable date.

- Default Date Max `DateTime` (`string` in Inspector window)

  Maximum selectable date.

- Format `string`

  Format to parse **Default Date**, **Default Date Min**, and **Default Date Max**.

- Independent scroll `bool`

  If enabled any time period changes will not change other time periods.

- Years `bool`

  Display years scroller.
  - Years Scroller `Scroller`
  - Years Step `int`
  - Years Format `string`
- Months `bool`

  Display moths scroller.
  - Months Scroller `Scroller`
  - Months Step `int`
  - Months Format `string`
- Days `bool`

  Display days scroller.
  - Days Scroller `Scroller`
  - Days Step `int`
  - Days Format `string`
- Events
  - OnDateChanged `UnityEvent<DateTime>`

Event raised when date changed.

Arguments: selected datetime.

- OnDateClick `UnityEvent<DateTime>`

  Event raised when date setted or changed.

  Arguments: selected datetime.

DateTimeScroller Settings

Same settings as DateScroller with addition:

- Hours `bool`

  Display hours scroller.

  - Hours Scroller `Scroller`
  - Hours Step `int`
  - Hours Format `string`

    Used if **AMPM** disabled.
  - Hours AMPM Format `string`

    Used if **AMPM** enabled.
- Minutes `bool`

  Display minutes scroller.

  - Minutes Scroller `Scroller`
  - Minutes Step `int`
  - Minutes Format `string`
- Seconds `bool`

  Display seconds scroller.

  - Seconds Scroller `Scroller`
  - Seconds Step `int`
  - Seconds Format `string`
- AMPM `bool`

  Display AMPM scroller.

  - AMPM Scroller `Scroller`
  - AMPM Format `string`

TimeScroller Settings

- Interactable `bool`

  User can interact with ListView.
- Current Time As Default `bool`
  - Time Text `TimeSpan` (`string` in Inspector window)
- Default Time Min `TimeSpan` (`string` in Inspector window)

Minimal selectable time.

- Default Time Max `TimeSpan` (`string` in Inspector window)

  Maximum selectable time.

- Format `string`

  Format to parse **Time Text**, **Default Time Min**, and **Default Time Max**.

- Independent scroll `bool`

  If enabled any time period changes will not change other time periods.

- Hours `bool`

  Display hours scroller.

  - Hours Scroller `Scroller`
  - Hours Step `int`

- Minutes `bool`

  Display minutes scroller.

  - Minutes Scroller `Scroller`
  - Minutes Step `int`

- Seconds `bool`

  Display seconds scroller.

  - Seconds Scroller `Scroller`
  - Seconds Step `int`

- AMPM `bool`

  Display AMPM scroller.

  - AMPM Scroller `Scroller`

- Events

  - OnTimeChanged `UnityEvent<TimeSpan>`

    Event raised when time changed.

    Arguments: selected time.

```
namespace UIWidgets.Examples
{
   using UnityEngine;

   /// <summary>
   /// Test DateScroller.
   /// </summary>
   public class TestDateScroller : MonoBehaviour
   {
      /// <summary>
      /// DateScroller.
      /// </summary>
      [SerializeField]
      protected UIWidgets.DateBase DateScroller;
```

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```
        /// <summary>
        /// Start this instance.
        /// </summary>
        protected virtual void Start()
        {
            DateScroller.OnDateChanged.AddListener(ProcessDate);

            // change culture
            DateScroller.Culture = new System.Globalization.CultureInfo("en-US");

            // change calendar
            DateScroller.Culture = new System.Globalization.CultureInfo("ja-JP");
            DateScroller.Culture.DateTimeFormat.Calendar = new System.Globalization.
↪JapaneseCalendar();
        }

        void ProcessDate(System.DateTime dt)
        {
            Debug.Log(dt);
        }
    }
}
```

3.4.6 RangeSlider

Slider with two handles for minimum and maximum. Has versions for the `int` and `float` types.

Options

- Type `RangeSliderType`

  Type of the slider.

  - `AllowHandleOverlay`

    Handles can intersects. Value scale is constant.

  - `DisableHandleOverlay`

    Handles can not intersects. Value scale is variable.

- Value Min `int`/`float`

  Minimal value.

- Value Max `int`/`float`

  Maximal value.

- Step `int`/`float`

  Step of the value.

- Limit Min `int`/`float`

  Value cannot be less that this.

- Limit Max `int`/`float`

  Value cannot be more that this.

- Handle Min `RangeSliderHandle`

Handle to change the minimal value.

- Handle Max `RangeSliderHandle`

  Handle to change the maximal value.

- UsableRangeRect `RectTransform`

  Usable range.

- FillRect `RectTransform`

  GameObject to display fill (line from minimal value to the maximal value).

- Whole Number Of Steps `bool`

  Whole number of steps for the value.

Events

- OnValuesChange `UnityEvent<int, int>/UnityEvent<float, float>`
- OnChange `UnityEvent`

Set values

```
slider.ValueMin = 10;
slider.ValueMax = 80;
```

Set step

```
slider.Step = 2;
```

Set limits

```
slider.LimitMin = 0;
slider.LimitMax = 100;
```

Add listener

```
void Start()
{
   slider.OnValuesChange.AddListener(SliderChanged);
}

void SliderChanged(int min, int max)
{
   if (slider.WholeNumberOfSteps)
   {
      Debug.Log(string.Format("Range: {0:000} - {1:000}; Step: {2}", min, max, slider.
↪Step));
   }
   else
   {
      Debug.Log(string.Format("Range: {0:000} - {1:000}", min, max));
   }
}
```

3.4.7 Spinner

Has versions for the `int` and `float` types.

Options

- Value Min `int`/`float`

  Minimal value.

- Value Max `int`/`float`

  Maximal value.

- Step `int`/`float`

  Step of the value.

- SpinnerValue `int`/`float`

  Current value.

- Validation `SpinnerValidation`

  Validate value on specified event.

  - `OnKeyDown`

    Value checked on every key down event.
    Some value ranges cannot processed correctly with `OnKeyDown` validation.
    For example `2..10` because to enter `10` you need to enter `1` and `1` is not valid value.

  - `OnEndInput`

    Value checked when editing has ended.

- AllowHold `bool`

  Change value on button hold.

- HoldStartDelay `float`

  Delay of hold in seconds to start change value.

- HoldChangeDelay `float`

  Delay of hold in seconds between each change value.

- Plus Button `ButtonAdvanced`

  Button to increase value.

- Minus Button `ButtonAdvanced`

  Button to decrease value.

Events

- onPlusClick `UnityEvent`
- onMinusClick `UnityEvent`

Spinner Events

- onValueChangeInt `UnityEvent<int>`
- onEndEditInt `UnityEvent<int>`

SpinnerFloat Options

- Format `string`

  Value format.

- Decimal Separators `char[]`

  Decimal separators.

- Number Style `NumberStyles`

  Style of the number.

SpinnerFloat Events

- onValueChangeFloat `UnityEvent<float>`
- onEndEditFloat `UnityEvent<float>`

Set maximum

```
spinner.Max = 100;
```

Set minimun

```
spinner.Min = 0;
```

Set value

```
spinner.Value = 10;
```

Set step

```
spinner.Step = 1;
```

Get value

```
Debug.Log(spinner.Value);
```

3.4.8 SplitButton

Button with the additional dropdown list of the buttons.

Settings

- Primary Button `Button`

  Primary Button.

- Toggle Button `Button`

  Button to toggle the *Additional Buttons Block*.

- Additional Buttons Block `GameObject`

  Container for the additional buttons.

- Additional Buttons `List<Button>`

List of the additional buttons.

- Modal Sprite `Sprite`

  Background sprite when additional buttons block displayed.

- Modal Color `Color`

  Background color when additional buttons block displayed.

3.5 Misc

3.5.1 ProgressbarDeterminate

Progress animation is based on *FillMethod* of the *Full Bar Mask* and *Full Bar Border*.

Options

- Max `int`

  Maximum value of the progress.

- Value `int`

  Current value of the progress.

- Full Bar Mask `Image`

  Image to display progress. Image type should be `Filled`.

- Full Bar Border `Image`

  Border image to display progress. Image type should be `Filled`.

- Text Type `ProgressbarTextTypes`

  How to progress should be displayed as text.

  - `None`

    Does not display text.

  - `Percent`

    Show progress as percent like *15%*

  - `Range`

    Show progress as text like *15 / 100*

- Speed `float`

  Animation speed in the seconds.

- Speed Type `ProgressbarSpeedType`

  Specifies how speed should be interpreted.

  - `TimeToValueChangedOnOne`

    Speed is time to change progress on 1.

  - `ConstantSpeed`

    Speed is time to change progress from 0 to Max. If value changed from 0 to Max/2 than animation takes speed/2 seconds.

  - `ConstantTime`

Speed is time to change progress from current value to new value.

- Unscaled Time `bool`

  Run animation with unscaled time.

- Text Func `Func<ProgressbarDeterminateBase, string>`

  Custom function to convert progress value to the text. Overwrites Text Type settings.

- Background `Image`

  Background image.

- Empty Bar `Image`

  Empty bar image.

- Full Bar Image `Image`

  Full bar Image.

- Empty Bar Text `Text`

  Text to display progress.

- Full Bar Text `Text`

  Text to display progress.

Set value

```
Progressbar.Animate(value);
```

Stop animation

```
Progressbar.Stop();
```

3.5.2 ProgressbarIndeterminate

Options

- Direction `ProgressbarDirection`

  Animation direction.

  - `Horizontal`
  - `Vertical`

- Bar `RawImage`

  Image to animate. Use texture type `` `texture `` and set *Wrap Mode* to `repeat`.

- Border `Image`

  Border image.

- Mask `Image`

  Mask.

- Speed `float`

  Animation speed.

- Unscaled Time `bool`

  Run animation with unscaled time.

Start animation

```
Progressbar.Animate();
```

Stop animation

```
Progressbar.Stop();
```

CHAPTER 4

Components

4.1 Bring to Front

Use it to bring to front selected GameObject. Commonly used with Dialog or Draggable objects.

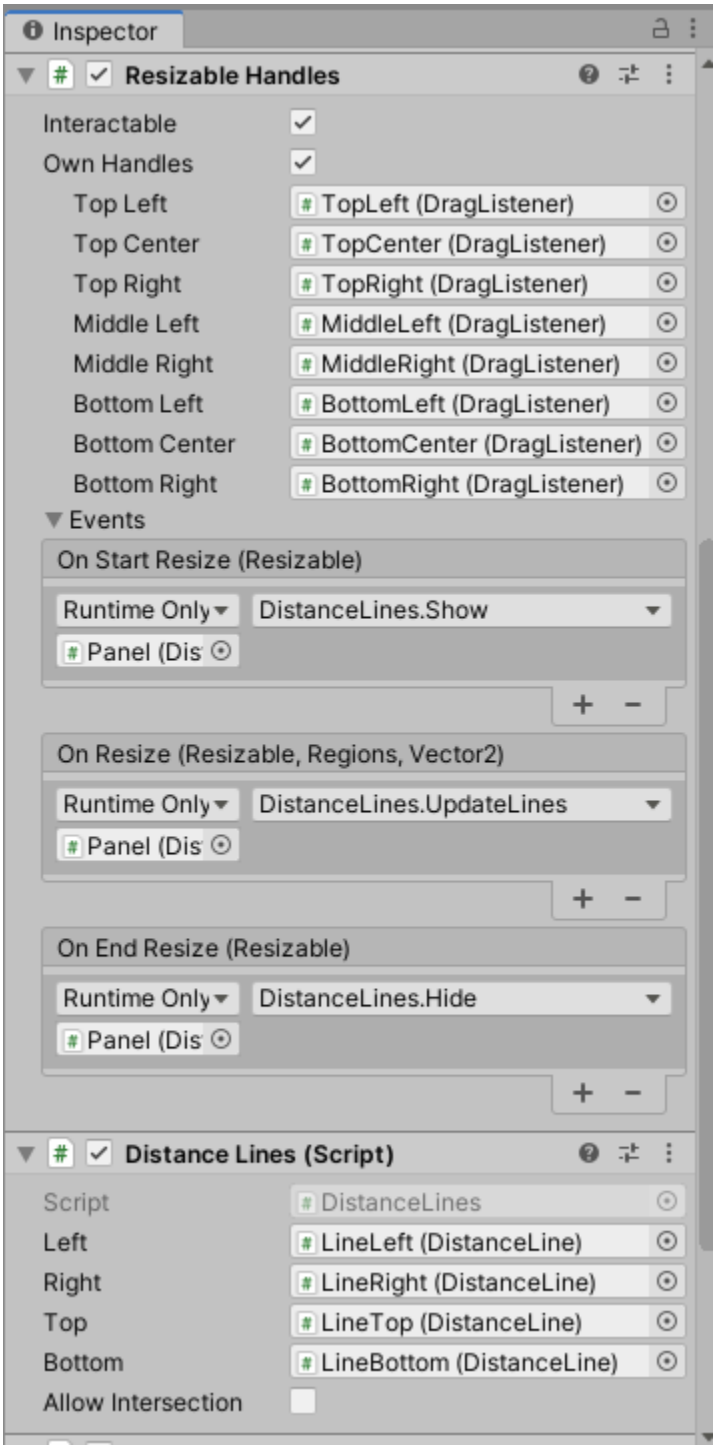
4.1.1 Options

- With Parents `bool`

  Bring to front GameObject with parents GameObjects.

4.2 Distance Lines

`Show()`, `UpdateLines()`, `Hide()` methods can be attached to appropriate events like `OnStartResize`, `OnResize`, `OnEndResize` for ease of use.



4.2.1 Settings

- Left `DistanceLine` *optional*

  Line from the left border of the parent.

- Right `DistanceLine` *optional*

  Line from the right border of the parent.

- Top `DistanceLine` *optional*

  Line from the top border of the parent.

- Bottom `DistanceLine` *optional*

  Line from the bottom border of the parent.

- Allow Intersection `bool`

  Allow lines intersection.
  If disabled lines are drawn from parent border to the nearest Target border; otherwise from parent border to the same Target border.

4.3 Drag and Drop components

4.3.1 Drag-and-Drop Support for the Collections

Different drag-and-drop components used with different widgets. Default widgets already have drag-and-drop components. For the generated widgets drag-and-drop components create automatically. Default Drag components usually attached to DefaultItem. Default Drop components usually attached to widgets and TreeView.DefaultItem.

Drag will be cancelled with `OnCancel` event from `EventSystem` (for example by pressing *Esc*).

You can remove drag-and-drop components from the widgets to disable drag-and-drop functionality.

4.3.2 Options

- ListView `TListView` *optional*

  ListView.

- DragInfo `TComponent` *optional*

  Component to display the dragged data.

- DragInfo Offset `Vector3`

  Offset from the cursor position for the DragInfo.

- Allow Drop Cursor `Texture2D` *optional*

  Cursor when drop allowed.

- Allow Drop Cursor Hot Spot `Vector2`

  Cursor hot spot.

- Denied Drop Cursor `Texture2D` *optional*

  Cursor when drop denied.

- Denied Drop Cursor Hot Spot `Vector2`

  Cursor hot spot.

- Default Cursor Texture `Texture2D` *optional*

  Default cursor.

- Default Drop Cursor Hot Spot `Vector2`

  Cursor hot spot.

- Handle `DragSupportHandle` *optional*

Handle.

- Delete After Drop `bool`

  Delete item from ListView after drop.

4.3.3 Custom Drag Support

You can add own drag support with component inherited from `DragSupport<TItem>` implementation.

Methods

- InitDrag(`PointerEventData` eventData) *required*: set Data value to drag
- Dropped(`bool` success) *optional*: what to do after the drop happened or canceled

Here is basic example of the drag support for the InputField:

```
namespace UIWidgets.Examples
{
   using UnityEngine;
   using UnityEngine.EventSystems;
   using UnityEngine.UI;

   /// <summary>
   /// Drag support for the InputField.
   /// </summary>
   [RequireComponent(typeof(InputField))]
   public class InputFieldDragSupportBase : DragSupport<string>
   {
      /// <summary>
      /// Set Data, which will be passed to the Drop component.
      /// </summary>
      /// <param name="eventData">Current event data.</param>
      protected override void InitDrag(PointerEventData eventData)
      {
         Data = GetComponent<InputField>().text;
      }
   }
}
```

This example show how to display draggable data:

```
namespace UIWidgets
{
   using UnityEngine;
   using UnityEngine.EventSystems;
   using UnityEngine.Serialization;
   using UnityEngine.UI;

   /// <summary>
   /// Drag support for the InputField.
   /// </summary>
   [RequireComponent(typeof(InputField))]
   public class InputFieldDragSupport : DragSupport<string>
   {
      /// <summary>
      /// Set Data, which will be passed to Drop component.
      /// </summary>
      /// <param name="eventData">Current event data.</param>
```

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```
    protected override void InitDrag(PointerEventData eventData)
    {
        Data = GetComponent<InputField>().text;

        ShowDragInfo();
    }

    /// <summary>
    /// Called after the drop completed.
    /// </summary>
    /// <param name="success">true if Drop component received data; otherwise,␣
↪false.</param>
    public override void Dropped(bool success)
    {
        HideDragInfo();

        base.Dropped(success);
    }

    /// <summary>
    /// Component to display draggable info.
    /// </summary>
    [SerializeField]
    public GameObject DragInfo;

    /// <summary>
    /// DragInfo offset.
    /// </summary>
    [SerializeField]
    public Vector3 DragInfoOffset = new Vector3(-5, 5, 0);

    /// <summary>
    /// Start this instance.
    /// </summary>
    protected virtual void Start()
    {
        if (DragInfo != null)
        {
            DragInfo.SetActive(false);
        }
    }

    /// <summary>
    /// Shows the drag info.
    /// </summary>
    protected virtual void ShowDragInfo()
    {
        if (DragInfo == null)
        {
            return;
        }

        DragInfo.transform.SetParent(DragPoint, false);
        DragInfo.transform.localPosition = DragInfoOffset;

        DragInfo.SetActive(true);
```

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```
            DragInfo.GetComponentInChildren<Text>().text = Data;
        }

        /// <summary>
        /// Hides the drag info.
        /// </summary>
        protected virtual void HideDragInfo()
        {
            if (DragInfo == null)
            {
                return;
            }

            DragInfo.SetActive(false);
        }
    }
}
```

4.3.4 Custom Drop Support

You can add own the drop support with `IDropSupport<TItem>>` implementation.

Methods

- `CanReceiveDrop(TItem data, PointerEventData eventData)`: determine if the drop can be accepted or not, can used to display the drop preview.
- `Drop(TItem data, PointerEventData eventData)`: process the dropped data.
- `DropCanceled(TItem data, PointerEventData eventData)`: process the cancelled drop, can used to hide the drop preview or the drop indicator.

Here is example code shows how to add `TreeNode<TreeViewItem>` and `string` drop support to the *InputField*, after drop *InputField* value would be set to the dropped node name or the dropped string.

`CanReceiveDrop` function allows to accept only nodes with names ends with *1*.

```
namespace UIWidgets.Examples
{
    using UnityEngine;
    using UnityEngine.UI;
    using UnityEngine.EventSystems;

    /// <summary>
    /// TreeNode drop support for the InputField.
    /// </summary>
    [RequireComponent(typeof(InputField))]
    public class InputFieldDropSupport : MonoBehaviour, IDropSupport<TreeNode
↪<TreeViewItem>>, IDropSupport<string>
    {
        /// <summary>
        /// InputField.text value before drop.
        /// Can be used to swap content with drag source.
        /// </summary>
        public string OriginalData;

        #region IDropSupport<string>
```

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```
        /// <summary>
        /// Handle dropped data.
        /// </summary>
        /// <param name="data">Data.</param>
        /// <param name="eventData">Event data.</param>
        public void Drop(string data, PointerEventData eventData)
        {
            var input = GetComponent<InputField>();
            OriginalData = input.text;
            input.text = data;
        }

        /// <summary>
        /// Determines whether this instance can receive drop with the specified data␣
↪and eventData.
        /// </summary>
        /// <returns>true if this instance can receive drop with the specified data and␣
↪eventData; otherwise, false.</returns>
        /// <param name="data">Data.</param>
        /// <param name="eventData">Event data.</param>
        public bool CanReceiveDrop(string data, PointerEventData eventData)
        {
            return true;
        }

        /// <summary>
        /// Handle canceled drop.
        /// </summary>
        /// <param name="data">Data.</param>
        /// <param name="eventData">Event data.</param>
        public void DropCanceled(string data, PointerEventData eventData)
        {
        }

        #endregion

        #region IDropSupport<TreeNode<TreeViewItem>>

        /// <summary>
        /// Handle dropped data.
        /// </summary>
        /// <param name="data">Data.</param>
        /// <param name="eventData">Event data.</param>
        public void Drop(TreeNode<TreeViewItem> data, PointerEventData eventData)
        {
            var input = GetComponent<InputField>();
            OriginalData = input.text;
            input.text = data.Item.Name;
        }

        /// <summary>
        /// Determines whether this instance can receive drop with the specified data␣
↪and eventData.
        /// </summary>
        /// <returns>true if this instance can receive drop with the specified data and␣
↪eventData; otherwise, false.</returns>
        /// <param name="data">Data.</param>
```

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```
        /// <param name="eventData">Event data.</param>
        public bool CanReceiveDrop(TreeNode<TreeViewItem> data, PointerEventData␣
↪eventData)
        {
            return data.Item.Name.EndsWith("1");
        }

        /// <summary>
        /// Handle canceled drop.
        /// </summary>
        /// <param name="data">Data.</param>
        /// <param name="eventData">Event data.</param>
        public void DropCanceled(TreeNode<TreeViewItem> data, PointerEventData␣
↪eventData)
        {
        }

        #endregion
    }
}
```

4.3.5 Swapping content between Drag and Drop components

Original content of the drop component saved to `IDropSupport<T>.OriginalData` field. And content should be swapped in the `DragSupport<T>.OnEndDrag()` function

```
namespace UIWidgets.Examples
{
    using UnityEngine;
    using UnityEngine.EventSystems;
    using UnityEngine.UI;

    /// <summary>
    /// Drag support with content swap for the InputField.
    /// </summary>
    [RequireComponent(typeof(InputField))]
    public class InputFieldDragSwapSupport : InputFieldDragSupport
    {
        /// <summary>
        /// Called by a BaseInputModule when a drag is ended.
        /// </summary>
        /// <param name="eventData">Current event data.</param>
        public override void OnEndDrag(PointerEventData eventData)
        {
            if (!IsDragged)
            {
                return;
            }

            var target = FindTarget(eventData);
            if (target != null)
            {
                target.Drop(Data, eventData);
                Dropped(true);

                // replace dragged text with drop target text
```

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```
            GetComponent<InputField>().text = (target as InputFieldDropSupport).
↪OriginalData;
         }
         else
         {
            Dropped(false);
         }

         IsDragged = false;
         Cursor.SetCursor(DefaultCursorTexture, DefaultCursorHotSpot, Compatibility.
↪GetCursorMode());
      }
   }
}
```

4.3.6 Adding limitations to the Drop component

In this example, ListViewIcons will receive drag-and-drop data only if DataSource.Count less than MaxQuantity.

```
namespace UIWidgets.Examples
{
   using UnityEngine;
   using UnityEngine.EventSystems;

   public class ListViewIconsDropSupportLimitedQuantity : ListViewIconsDropSupport
   {
      [SerializeField]
      public int MaxQuantity = 10;

      public override bool CanReceiveDrop(ListViewIconsItemDescription data,␣
↪PointerEventData eventData)
      {
         // disable drop if quantity limit reached
         if ((MaxQuantity >= 0) && (ListView.DataSource.Count >= MaxQuantity))
         {
            return false;
         }

         return base.CanReceiveDrop(data, eventData);
      }
   }
}
```

4.4 Draggable

Dragging gameobject.

4.4.1 Options

- Interactable `bool`

  Allow interaction.

- Handle `GameObject` *optional*

  GameObject used to drag current GameObject.

- Horizontal `bool`

  Allow horizontal drag movement.

- Vertical `bool`

  Allow vertical drag movement.

- Restriction `DraggableRestriction`:
  - `None`: no restriction.
  - `Strict`: does not allow drag outside the parent.
  - `After Drag`: does not allow drag outside the parent, applied after drag ended.
- Curve `AnimationCurve`

  Animation curve used to animate applied **After Drag** restriction.

- UnscaledTime `bool`

  Run animation with unscaled time.

4.4.2 Properties

- Target `RectTransform`

  Target to drag; the self is by default.

4.4.3 Events

- OnStartDrag `UnityEvent<Draggable>`
- OnDrag `UnityEvent<Draggable>`
- OnEndDrag `UnityEvent<Draggable>`

4.5 EasyLayout

EasyLayout provides different layouts that not available with default layout groups.

4.5.1 Options

- Main Axis `Axis`

  Determine how elements will be placed (at horizonal or vertical direction first).

- Layout Type `LayoutTypes`
  - `Compact`: Compactly places the elements.
  - `Grid`: Places elements in the grid. Cell size is not fixed and depend on elements sizes in the same row and column.
  - `Flex`: Places elements like CSS flexbox layout.
  - `Staggered`: Places elements one-by-one to the shortest column or row depending on the main axis.
  - `Ellipse`: Places elements one-by-one on the border of the ellipse or the circle starting from `Angle Start` and `Angle Step` distance between items.
- Group Position `Anchors`

Only for the `Compact` and `Grid` layouts.

Combination of horizonal (`Left`, `Center`, `Right`) and vertical (`Upper`, `Middle`, `Lower`) positions.

Elements combine to the group, this option specifies group position relative to the parent.

- Row Align `HorizontalAligns`

  Only for the `Compact` layout.

  Element position in the row (`Left`, `Center`, `Right`).

- Inner Align `InnerAligns`

  Only for the `Compact` layout.

  Column position relative to the group (`Top`, `Middle`, `Bottom`).

- Compact Constraint `CompactConstraints`

  Only for the `Compact` layout.

  - `Flexible`: Rows and columns count depends on the parent size.
  - `Max Column Count`
  - `Max Row Count`

- Compact Constraint Count `int`

  Only for the `Compact` layout.

  Max count of the rows or columns for the `Compact Constraint` option.

- Cell Align `Anchors`

  Only for the `Grid` layout.

  Elements position relative to the cell size. Same as `Group Position`.

- Grid Constraint `GridConstraints`

  Only for the `Grid` layout.

  - `Flexible`: Rows and columns count depends on the parent size.
  - `Fixed Column Count`
  - `Fixed Row Count`

- Grid Constraint Count `int`

  Only for the `Grid` layout.

  Count of the rows or columns for the `Grid Constraint` option.

- Flex Setting `EasyLayoutFlexSettings`

  Only for the `Flex` layout.

  - Wrap `bool`

    If disabled elements will all placed onto one line (row or column).

  - Justify Content `EasyLayoutFlexSettings.Content`

    Alignment along the main axis. Also distribute extra free space on the main axis.

    * `Start`: elements placed at the start of the line.

    * `Center`: elements placed at the center of the line.
    * `End`: elements placed at the end of the line.
    * `Space Between`: first element at the start of the line, last element at the end of the line, other elements placed between them with evenly spacing.
    * `Space Around`: first and last elements are placed with *1n* space from the edges, other elements placed with *2n* space between them.
    * `Space Evenly`: elements are placed so that the spacing between any two element and the space to the edges is equal.

  – Align Content `EasyLayoutFlexSettings.Content`

    Alignment of the lines (columns or rows) along the cross axis. Also distribute extra free space on the cross axis.

    * `Start`: lines placed to the start of the parent.
    * `Center`: lines placed to the center of the parent.
    * `End`: lines placed to the end of the parent.
    * `Space Between`: first line to the start of the parent, last line to the end of the parent, other lines placed between them with evenly spacing.
    * `Space Around`: first and last lines are placed with *1n* space from the edges, other lines placed with *2n* space between them.
    * `Space Evenly`: line are placed so that the spacing between any two lines and the space to the edges is equal.

  – Align Items `EasyLayoutFlexSettings.Items`

    Define how elements are placed out along the cross axis on the line (column or row).

    * `Start`
    * `Center`
    * `End`

- Staggered Settings `EasyLayoutStaggeredSettings`

  Only for the `Staggered` layout.

  – Fixed Block Count `bool`

    Count of the rows or columns.

  – Blocks Count `int`

- Ellipse Settings `EasyLayoutEllipseSettings`

  Only for the `Ellipse` layout.

  Set equal width and height for the circle layout.

  RectTransform pivot is used as the center of the ellipse.

  – Width Auto `bool`

    RectTransform width is used as the width of the ellipse.

  – Width `float`

    Ellipse width if `Width Auto` disabled.

  - Height Auto `bool`

    RectTransform height is used as the height of the ellipse.

  - Height `float`

    Ellipse height if `Height Auto` disabled.

  - Angle Start `float`

    Position of the first element in the degrees.

  - Angle Step Auto `bool`

    Are elements placed with equal angular distance or specified `Angle Step`?

  - Angle Step `float`

    Elements placed with specified angular distance between neighbour elements.

  - Fill `EllipseFill`

    Determines how to calculate the distance between elements if `Angle Step Auto` enabled.

    * `Closed`: angular distance is 360 degrees divided into the elements count; distance is the same between the first and last elements.

    * `Arc`: angular distance is arc length divided into the elements count minus one

  - Arc Length `float`

    Distance between first and last elements if `Angle Step Auto` enabled and `Fill` is `Arc`.

    Can be more than 360 degrees.

  - Align `EllipseAlign`

    Determines how elements are placed on the ellipse border.

    * `Outer`: right borders of the elements are placed on the ellipse border.

    * `Center`: center of the elements are placed on the ellipse border.

    * `Inner`: left borders of the elements are placed on the ellipse border.

  - ElementsRotate `bool`

    Rotate elements according to position or not.

  - ElementsRotationStart `float`

    Initial rotation of the elements.

- Spacing `Vector2`

  Empty space between elements.

  Can be more than specified value for `Flex` layout.

- Symmetric `bool`

  Use symmetric margin.

- Margin `Vector2`

  Empty space from parent edges.

- Skip Inactive `bool`

Do not reserve space for disabled elements.

- Right To Left `bool`

  The order of placement of elements.

- Top To Bottom `bool`

  The order of placement of elements.

- ResetRotation `bool`

  Reset rotation of the elements to 0.

- Children Width `ChildrenSize`
  - `Do nothing`: do not resize elements.
  - `Set Preferred`: set element width to `Preferred Width`.
  - `Set Max From Preferred`: set maximum of the `Preferred Width` from the all elements.
  - `Fit Container`: increase elements width proportionally `Flexible Width` to fit parent width.
  - `Shrink On Overflow`: decrease elements width if summary width more than parent width with margin.
- Children Height `ChildrenSize`

  Similar to `Children Width`

4.5.2 Events

- Settings Changed `UnityEvent`

  Event, raised after any setting was changed.

4.6 Groupable

Allows to select a group of the gameobjects; and then resize, rotate, align all of them simultaneously.
Can select only elements with the same parent as the Groupable component.

Shared components settings between Groupable and the selected elements:

- `Resizable.KeepAspectRatio`
- `Rotatable.LimitRotation`
- `Rotatable.AngleMin`
- `Rotatable.AngleMax`
- `Rotatable.AngleStep`

4.6.1 Options

- Interactable `bool`

  Allow interaction.

- Highlight Template `RectTransform` *optional*

  Template to highlight selected gameobjects.

- Selection Mode `Groupable.Mode`

  Selection mode.

  - `Contains`

    Selects only gameobjects fully inside the selection area.

  - `Overlaps`

    Selects gameobjects inside the selection area or partially overlaps the selection area.

- Group Rotation `bool`

  If enabled selected gameobjects will be rotated as part of the group; otherwise each separately.

4.6.2 Events

- OnStartSelection `UnityEvent<Groupable>`
- OnSelection `UnityEvent<Groupable>`
- OnEndSelection `UnityEvent<Groupable>`

4.7 Layout Switcher

Allows creating different layouts with the same GameObjects for different screen sizes and aspect ratios. Used when anchors, pivots and layout groups not enough to create a layout with different aspect ratios support.

Saves the values of the position, size, anchors, pivot, rotation, scale, active/disable state for each layout.

4.7.1 Options

- Objects `List<RectTransform>`

  List of the controlled objects.

- Default Display Size (inches) `float`

  Display size to use when actual display size cannot be detected.

- Layouts `List<UILayout>`

  List of the layouts.

  - Name `string`

    Layout name.

  - Aspect Ratio `Vector2`

    Aspect ratio for this layout.

  - Max Display Size (inches) `float`

    Maximum size of the display for this layout (layout will not be used if display size more than the specified one).

4.7.2 Events

- LayoutChanged `UnityEvent<UILayout>`

4.8 Lightbox

Lightbox is a component used to display overlay image.

4.9 ListViewAutoResize

Auto-resizes ListView or TileView according to items counts until specified maximum size reached.

4.9.1 Options

- MaxSize `float`

  Maximum size.

- UpdateRectTransform `size`

  Set RectTransform size.

- UpdateLayoutElement

  Set LayoutElement min size.

4.10 Object Sliding

Component to drag GameObject horizontally or vertically between specified positions.

4.10.1 Options

- Interactable `bool`

  Allow interaction.

- Positions `List<float>`

  Allowed positions for this object.

- Direction `ObjectSlidingDirection`

  Slide direction.

  - `Horizontal`
  - `Vertical`

- Movement `AnimationCurve`

  Animation curve.

- Unscaled Time `bool`

  Animate with unscaled time.

4.10.2 Helper components

This components used to automatically set *Positions* instead of the manual input.

- Object Sliding Horizontal Helper
  - Object on Left `List<RectTransform>`

    List of the objects on the left side of the current object.

  - Object on Right `List<RectTransform>`

List of the objects on the right side of the current object.

- Object Sliding Vertical Helper
  - Object on Top `List<RectTransform>`

    List of the objects on the top side of the current object.
  - Object on Bottom `List<RectTransform>`

    List of the objects on the bottom side of the current object.

4.11 Pinchable

Allows drag/resize/rotate gameobject with multi-touches.

4.11.1 Options

- Interactable `bool`

  Allows users interaction.
- AllowDrag `bool`

  Allows drag.
- AllowResize `bool`

  Allows resize.
- AllowRotate `bool`

  Allows rotation.

4.11.2 Events

- OnStartPinch `UnityEvent<Pinchable>`
- OnPinch `UnityEvent<Pinchable>`
- OnEndPinch `UnityEvent<Pinchable>`

4.12 Resizable

Allows resizing gameobject by size or scale.

4.12.1 Options

- Interactable `bool`

  Allow users to change the size of the GameObject.
- Resize Directions `Resizable.Directions`

  Allowed resizing directions.
- Type `ResizeType`

  Resize type.
  - `Size`

    Resize by changing size of the gameobject.

  - `Scale`

    Resize by changing scale of the gameobject.

- IncludeCorners `bool`

  Allow resize when cursor in the one of the corners. Should be disabled to use together with *Rotatable* component.

- IntegerSize `bool`

  If enabled size is rounded to the integer number. Reason: size can be float number if gameobject is rotated.

- Update RectTransform `bool`

  Change RectTransform size.

- Update LayoutElement `bool`

  Change LayoutElement size.

- Active Region `float`

  Distance from border where resize allowed.

- Min Size `Vector2`

  Minimal size in points, for the `Scale` type limits is checked against *width * scale.x* and *height * scale.y*.

- Max Size `Vector2`

  Maximum size in points, for the `Scale` type limits is checked against *width * scale.x* and *height * scale.y*.
  Not applied if size is zero.

- Keep Aspect Ratio `bool`

  Aspect ratio applied after MinSize and MaxSize, so if default aspect ratio not equal MinSize and MaxSize aspect ratio then real size may be outside limit with one of the axis.

4.12.2 Events

- OnStartResize `UnityEvent<Resizable>`
- OnResize `UnityEvent<Resizable>`
- OnEndResize `UnityEvent<Resizable>`
- OnResizeDirectionsChanged `UnityEvent<Resizable>`

4.12.3 Properties

- Target `RectTransform`

  Target to resize; the self is by default.

4.12.4 Resize Children With Parent

There are a few ways to resize children with parent:

- Use `RectTransform anchors` to set children size relative to parent with padding from borders.

  Probably setting anchors to horizontal stretch (for the labels or buttons) or horizontal and vertical stretch (for the long text or ListView) will be enough.

Video about anchors.

- Add Layout Group (`Horizontal Layout Group`, `Vertical Layout Group`, `Grid Layout Group`, EasyLayout) to parent with enabled `Control Child Size` options.

  It is a more complex way, and it will be harder to achieve the desired result.

  If you want to add/remove/enable/disable children from a script and automatically reposition them after this, then Layout Group is the right way to do this.

4.13 Resizable Handles

Helper component with handles to resize for the *Resizable*.

4.13.1 Options

- Interactable `bool`

  Allow users to change the size of the GameObject.

- Own Handles `bool`

  If enabled you can specify your own handles for the current component.
  If disabled you can specify Handles Source for current component, this allows you to create a single set of handles instead of duplicate them for each component.
  Handles should be acquired with `GetSourceHandles()` and returned with `ReleaseSourceHandles()` functions.

- Handles Source `ResizableHandles`

  Handles source to use if Own Handles disabled.

- Top Left `DragListener` *optional*

  Top left handle.

- Top Center `DragListener` *optional*

  Top center handle.

- Top Right `DragListener` *optional*

  Top right handle.

- Middle Left `DragListener` *optional*

  Middle left handle.

- Middle Right `DragListener` *optional*

  Middle right handle.

- Bottom Left `DragListener` *optional*

  Bottom left handle.

- Bottom Center `DragListener` *optional*

  Bottom center handle.

- Bottom Right `DragListener` *optional*

  Bottom right handle.

4.13.2 Events

- OnStartResize `UnityEvent<Resizable>`
- OnResize `UnityEvent<Resizable>`
- OnEndResize `UnityEvent<Resizable>`

4.14 Rotatable

Allows rotating gameobject around its pivot.

4.14.1 Options

- Interactable `bool`

  Allow users to change the rotation of the GameObject.

- Rotate Directions `Rotatable.Directions`

  Allowed corners to apply the rotation.

- Active Region `float`

  Distance from border where rotation allowed.

- Limit Rotation `bool`

  Allows rotating objects only with the specified angles range.

  - Angle Min `float`

    Allowed value is in range [-180..180].

  - Angle Max `float`

    Allowed value is in range [-180..180].

- Angle step `float`

  Allowed value is in range [0..180). Set 0 to disable.

- CursorTopLeftTexture `Texture2D` *optional*

  Cursor texture for the enabled rotation in the top right corner.

- CursorTopLeftHotSpot `Vector2`

  The offset from the top left of the CursorTopLeftTexture to use as the target point (must be within the bounds of the cursor).

- CursorTopRightTexture `Texture2D` *optional*

  Cursor texture for the enabled rotation in the top right corner.

- CursorTopRightHotSpot `Vector2`

  The offset from the top left of the CursorTopRightHotSpot to use as the target point (must be within the bounds of the cursor).

- CursorBottomLeftTexture `Texture2D` *optional*

  Cursor texture for the enabled rotation in the top right corner.

- CursorBottomLeftHotSpot `Vector2`

The offset from the top left of the CursorBottomLeftHotSpot to use as the target point (must be within the bounds of the cursor).

- CursorBottomRightTexture `Texture2D` *optional*

  Cursor texture for the enabled rotation in the top right corner.

- CursorBottomRightHotSpot `Vector2`

  The offset from the top left of the CursorBottomRightHotSpot to use as the target point (must be within the bounds of the cursor).

- DefaultCursorTexture `Texture2D` *optional*

  Default cursor texture.

- DefaultCursorHotSpot `Vector2`

  The offset from the top left of the DefaultCursorTexture to use as the target point (must be within the bounds of the cursor).

4.14.2 Events

- OnStartRotate `UnityEvent<Rotatable>`
- OnRotate `UnityEvent<Rotatable>`
- OnEndRotate `UnityEvent<Rotatable>`

4.14.3 Properties

- Target `RectTransform`

  Target to rotate; the self is by default.

4.15 Rotatable Handle

Helper component with handle to rotate for the *Rotatable*.

4.15.1 Options

- Interactable `bool`

  Allow users to change the rotation of the GameObject.

- Own Handle `bool`

  If enabled you can specify your own handle for the current component.
  If disabled you can specify Handle Source for current component, this allows you to create a single handle instead of duplicate it for each component.
  Handle should be acquired with `GetSourceHandle()` and returned with `ReleaseSourceHandle()` functions.

- Handle Source `RotatableHandle`

  Handle source to use if Own Handle disabled.

- Handle `DragListener` *optional*

  Handle.

4.15.2 Events

- OnStartRotate `UnityEvent<Rotatable>`
- OnRotate `UnityEvent<Rotatable>`
- OnEndRotate `UnityEvent<Rotatable>`

4.16 Scrollbar Min Size

Allow to set minimal scrollbars sizes of the ScrollRect.

4.16.1 Options

- Horizontal Min Size `float`

  Minimal size of the horizontal scrollbar.

- Vertical Min Size `float`

  Minimal size of the vertical scrollbar.

4.17 ScrollRect Events

Provide pull events for the ScrollRect.

4.17.1 Options

- Thresholds `PullThreshold`

  Separate thresholds values for each pull direction to raise events.

4.17.2 Events

- OnPull `UnityEvent<PullDirection>`
- OnPullAllowed `UnityEvent<PullDirection>`
- OnPullCancel `UnityEvent<PullDirection>`
- OnPulling `UnityEvent<ScrollRectEvents, PullDirection>`
- OnPullUp `UnityEvent`
- OnPullDown `UnityEvent`
- OnPullLeft `UnityEvent`
- OnPullRight `UnityEvent`

4.18 Selectable Helper

Selectable works only with one Graphic component, Selectable Helper allows to control more Graphic components.

4.19 Sidebar

Component to drag sidebar from behind the screen.

4.19.1 Options

- Interactable `bool`

  Enable or disable the ability to drag the sidebar.

- Curve `AnimationCurve`

  Animation curve for the open and close animations.

- Direction `SidebarAxis`

  Drag direction to open sidebar.

- Animation Type `SidebarAnimation`
  - `Overlay`
  - `Push`
  - `Scale Down`
  - `Uncover`
  - `Slide Along`
  - `Slide Out`
  - `Resize`
  - `Scale Down and Push`

- Scale Down Limit `float`

  Content scale cannot be lower this value for the ScaleDown animation.

- Is Open `bool`

  Is sidebar opened?

- Modal `bool`

  Is sidebar should be closed with the click outside of the sidebar?

- ScrollRect Support `bool`

  Allow to handle children ScrollRect's drag events.

- Content `RectTransform`

  Cntent GameObject. Required by some animations.

- Animate With Layout `bool`

  Change Content LayoutElement size during animation.

- Optional Handle `GameObject` *optional*

  Handle to open and close sidebar.

- Unscaled Time `bool`

  Run animations with unscaled time.

4.19.2 Events

- OnOpen `UnityEvent`
- OnClose `UnityEvent`
- OnOpeningStarted `UnityEvent`
- OnClosingStarted `UnityEvent`

4.20 Splitter

Resize neighboring or specified gameobjects on drag. Should be used with layout group.

4.20.1 Options

- Interactable `bool`

  Allow users to interact with the splitter.

- Type `SplitterType`
  - `Horizontal`: change heights of the gameobjects.
  - `Vertical`: change widths of the gameobjects.
- Update RectTransform `bool`

  Change RectTransform size of the left and right gameobjects.

- Update LayoutElement `bool`

  Change LayoutElement size of the left and right gameobjects.

- Mode `SplitterMode`
  - `Auto`: use previous and next siblings in hierarchy.
  - `Manual`: use specified targets to resize.
- Previous Object `RectTransform`

  Left (or top) object to resize.

- Next Object `RectTransform`

  Right (or bottom) object to resize.

4.20.2 Events

- OnStartResize `UnityEvent<Splitter>`
- OnResize `UnityEvent<Splitter>`
- OnEndResize `UnityEvent<Splitter>`

4.21 Switch Group

Same as Toggle Group, but for the Switch widget.

4.21.1 Options

- Allow Switch Off `bool`

  Is it allowed that no switch is on? If this option is enabled, pressing the switch that is currently on will change it to off, so that no switch is on. If this setting is disabled, pressing the switch that is currently on will not change its state.

4.22 Table Header

Used with ListView on table mode. Allows to resize and reorder columns.

Important: TableHeader and the ListView.DefaultItem should have same amout of the children GameObjects (cells count should match with header cells count).

4.22.1 Options

- Interactable `bool`

  Allow interaction.

- List `ListViewBase`

  Controlled ListView.

- Allow Resize `bool`

  Allow to change columns width.

- Allow Reorder `bool`

  Allow to change columns order.

- On Drag Update `bool`

  Update column width during drag, if disabled column width will be changed after the drag ended.

- Active Region `float`

  Distance from border where resize allowed.

- Drop Indicator `LayoutDropIndicator`

  Indicator to display new column position during column reordering.

4.22.2 Cet Current Columns Order

```
// index is the original position of the column
// value is the current position of the column
var order = tableHeader.GetColumnsOrder();
```

4.22.3 Change Columns Order

```
var order = new List<int>(2, 1, 0);
tableHeader.SetColumnsOrder(order);
```

4.22.4 Restore Original Columns Order

```
tableHeader.RestoreColumnsOrder();
```

4.22.5 Disable Column

```
var column = 0;
tableHeader.ColumnDisable(column);
```

4.22.6 Enable Column

```
var column = 0;
tableHeader.ColumnEnable(column);
```

Add/Remove Column at Runtime

```
var order = tableHeader.GetColumnsOrder();
tableHeader.RestoreColumnsOrder();

// add new column to the header
new_column_header.SetParent(tableHeader.transform);
new_column_header.SetSiblingIndex(...);
order.Insert(..., ...);

// or remove column
Destroy(tableHeader.transform.GetChild(index));
order.RemoveAt(...);
tableHeader.Refresh()

// new DefaultItem with another set of cells
listView.DefaultItem = newDefaultItem;

// modify order with new column index or deleted column index and set it back
tableHeader.SetColumnsOrder(order);
```

4.23 Tooltip

Displaying the tooltip on object focus.

4.23.1 Options

- Tooltip Object `GameObject`

  GameObject used as tooltip.

- Bring To Front `bool`

  Bring tooltip object to front.

- Show Delay `float`

  Delay in seconds before tooltip displayed.

- Unscaled Time `bool`

  Delay with unscaled time.

4.23.2 Events

- OnShow `UnityEvent`
- OnHide `UnityEvent`

4.24 TreeView data source

Used in editor mode, allow to edit TreeView nodes.

Important: Work only with default TreeView. Custom TreeView's are not supported.

CHAPTER 5

Animations and Time

All widgets and components with animations have option UnscaledTime. The animation will be run with `Time.unscaledTime` if this option enabled.

You can also specify your timer instead of the default one. To do this, you need to set the following fields:

- `Func<bool, float>` Utilities.GetTime

  Accept time type, `true` if unscaled time. Returns the current time in seconds since the start of the game.

- `Func<float>` Utilities.GetDeltaTime

  Accept time type, `true` if unscaled time. Returns the current time in seconds since the last frame.

CHAPTER 6

Shaders

6.1 Gradient Shaders

Those are shaders used by ColorPicker. Use ColorHSV.ShaderColor to set colors for the HSV shaders.

- UIGradientHLineHSV

  The horizontal gradient between the two colors. HSV color model.

- UIGradientHLineRGB

  The horizontal gradient between the two colors. RGB color model.

- UIGradientVLineHSV

  The vertical gradient between the two colors. HSV color model.

- UIGradientVLineRGB

  The vertical gradient between the two colors. RGB color model.

- UIGradientPlaneHSV

  The plane gradient between the four colors, each color in the own corner. HSV color model.

- UIGradientPlaneRGB

  The plane gradient between the four colors, each color in the own corner. RGB color model.

6.2 UIFlare

6.2.1 Settings

- Flare Color `Color`

  Color of the flare.

- Flare Size `float`

  Size of the flare, range 0..1.

- Flare Speed `float`

  Speed of the flare. Higher is faster.

CHAPTER 7

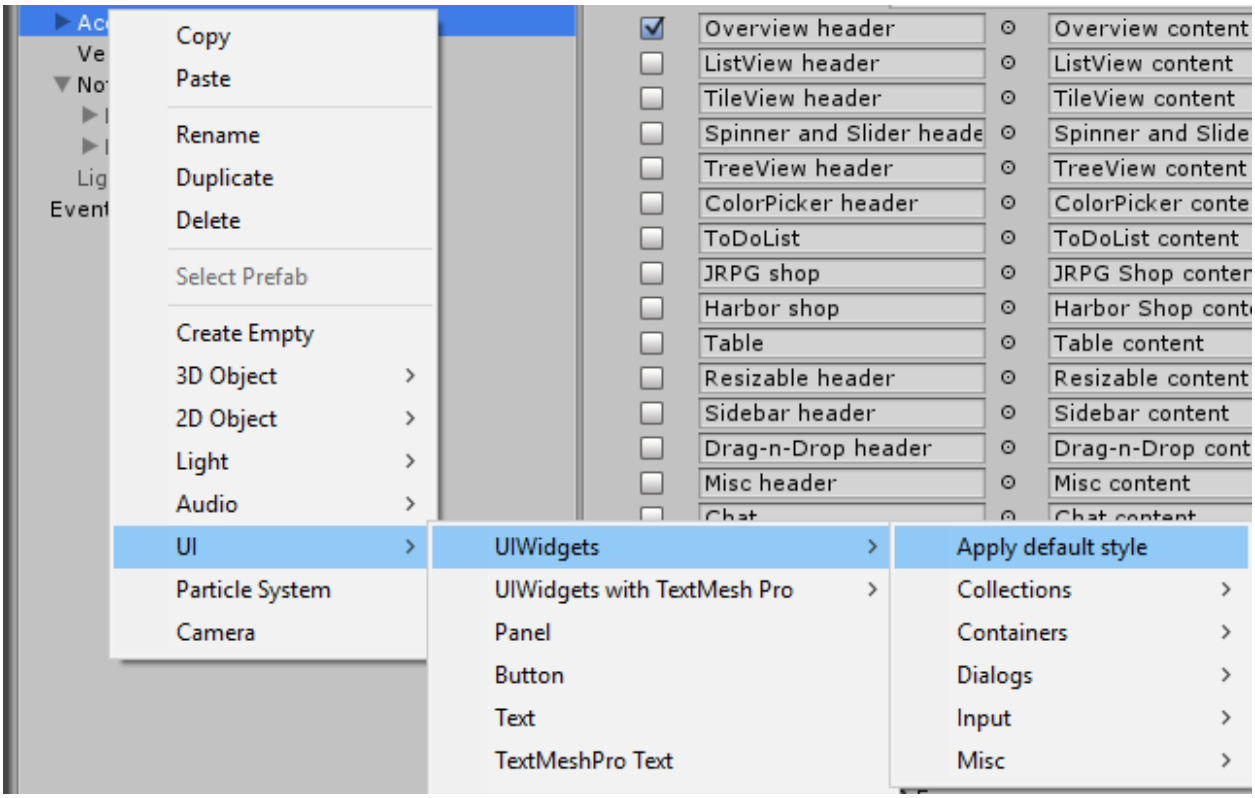
Styles (Skins)

Styles are like skins. They are used to change the **Color**, **Text**, and **Images** options of the widgets.

New UI Widgets contains two predefined styles: *Default* and *Blue*.

New style can be created with menu *Assets / Create / New UI Widgets / Style*.

You can set any style to use as default. Default style will be applied for the created widgets. Also, you can apply style for objects on the scene with *UI / New UI Widgets / Apply default style*.



Styles has two modes: *fast* and *detailed* settings:

- *Fast* allow to quickly set settings for all widgets with *Apply Fast Settings* button.
- *Detailed* allow to tune settings for each widget type separately.

Note: Recommended **Sprites** settings to avoid graphical artifacts:

- *Filter Mode* = *Point* for sprites with straight lines, *Trilinear* in other cases
- *Generate Mip Maps* = disabled
- *Compression* = *None* (you can try other settings, but be careful because sometimes compression artifacts can be seen only in *Play mode*)

7.1 Style support for the custom widgets

You can add style support for your widgets with `IStylable` implementation.

```
using UIWidgets.Styles;
using UnityEngine;
using UnityEngine.UI;

[RequireComponent(typeof(Image))]
public class CustomPanel : MonoBehaviour, IStylable
{
   public virtual bool SetStyle(Style style)
   {
      style.Collections.MainBackground.ApplyTo(GetComponent<Image>());

      return true; // true if style applied to children gameobjects; otherwise false.
   }
}
```

Note: Widgets created with *Widgets Generation* already have style support.

CHAPTER 8

Localization Support

8.1 Default ListViewIcons and TreeView

ListViewIcons and TreeView items have LocalizedName field, and you can use it for localization support.

```
using UnityEngine;
using System.Collections;
using UIWidgets;

[RequireComponent(typeof(ListViewIcons))]
public class ListViewIconsLocalization : MonoBehaviour
{
   ListViewIcons targetListView;

   public ListViewIcons TargetListView;
   {
      get
      {
         if (targetListView==null)
         {
            targetListView = GetComponent<ListViewIcons>();
         }

         return targetListView;
      }
   }

   void Start()
   {
      LocalizationSystem.OnLanguageChanged += Localization;
      Localization();
   }

   void OnDestroy()
   {
```

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```
        LocalizationSystem.OnLanguageChanged -= Localization;
    }

    public void Localization()
    {
        TargetListView.DataSource.BeginUpdate();
        TargetListView.DataSource.ForEach(x => x.LocalizedName = LocalizationSystem.
↪getLocalizedString(x.Name));
        TargetListView.DataSource.EndUpdate();
    }
}
```

8.2 Generated ListView, TreeView, TileView

You can change component class to add localization support.

```
public class SomeItemComponent : ListViewItem, IViewData<SomeItem>
{
    SomeItem item;

    void Start()
    {
        LocalizationSystem.OnLanguageChanged += Localization;
    }

    void OnDestroy()
    {
        LocalizationSystem.OnLanguageChanged -= Localization;
    }

    public virtual void SetData(SomeItem newItem)
    {
        item = newItem;
        Localization();
    }

    public virtual void Localization()
    {
        Text.text = item.LocalizedField ?? item.OriginalField;

        Description.text = LocalizationSystem.getLocalizedString(item.Description);
    }
}
```

If you need sorting for some fields, you can add special fields for localization. For other fields, you can apply localization in Component.SetData() function.

```
Comparison<SomeItem> ItemsComparison = (x, y) => (x.LocalizedField ?? x.
↪OriginalField).CompareTo(y.LocalizedField ?? y.OriginalField);
ListView.DataSource.Comparison = ItemsComparison;
```

8.3 Tabs

Use derived class from TabButtonComponent for Tabs with overridden SetButtonData method or TabIconActiveButton and TabIconDefaultButton for TabsIcons with overridden SetData method.

```
public class TabButtonComponentLocalized : TabButtonComponent
{
   public override void SetButtonData(Tab tab)
   {
      Name.text = LocalizationSystem.getLocalizedString(tab.Name);
   }
}

public class TabIconActiveButtonLocalized : TabIconActiveButton
{
   public override void SetData(TabIcons tab)
   {
      base.SetData(tab);
      Name.text = LocalizationSystem.getLocalizedString(tab.Name);
   }
}
```

CHAPTER 9

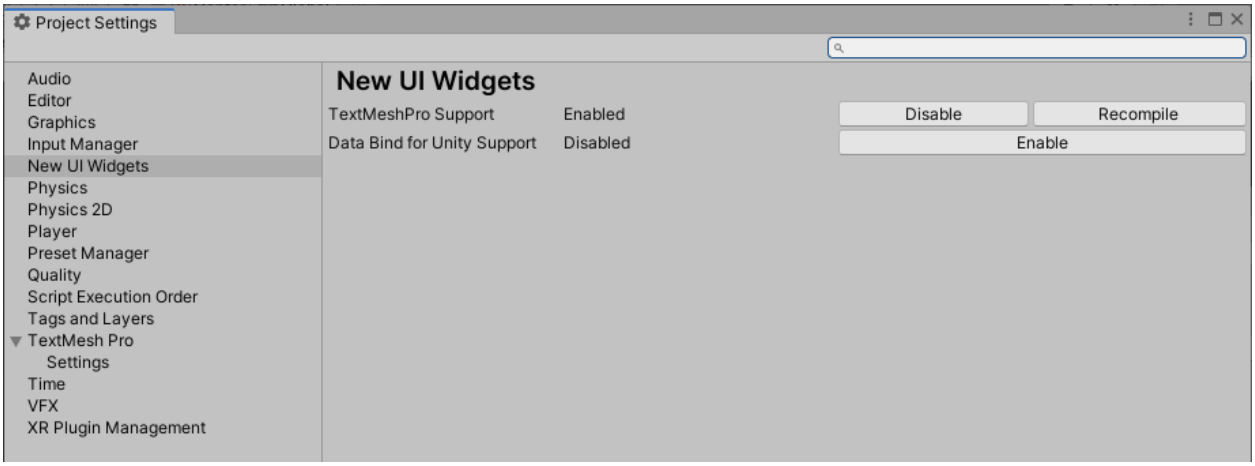
Data Bind for Unity Support

You can enable Data Bind for Unity support with *Project Settings... / New UI Widgets / Enable DataBind support*. If **Data Bind for Unity** not installed option will not be available.

After enabling support:

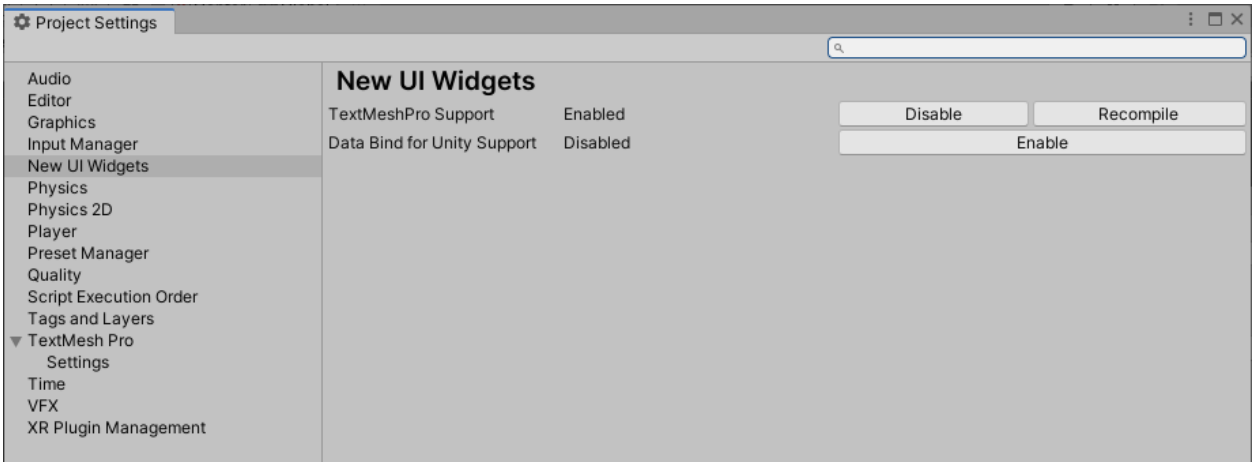
- will be available **Data Bind** support for default widgets
- for generated widgets support can be added with context menu *Assets / New UI Widgets / Add Data Bind support*

Disable support with *Project Settings... / New UI Widgets / DataBind Support / Disable*.



CHAPTER 10

TextMeshPro Support



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

After enabling support:

- widgets created with menu *UI / New UI Widgets /* will use **TextMeshPro** instead of the default **Text**
- generated widgets will be using TextMeshPro instead of the default Text

You can disable support the same way with *Project Settings... / New UI Widgets / TextMeshPro Support / Disable*.

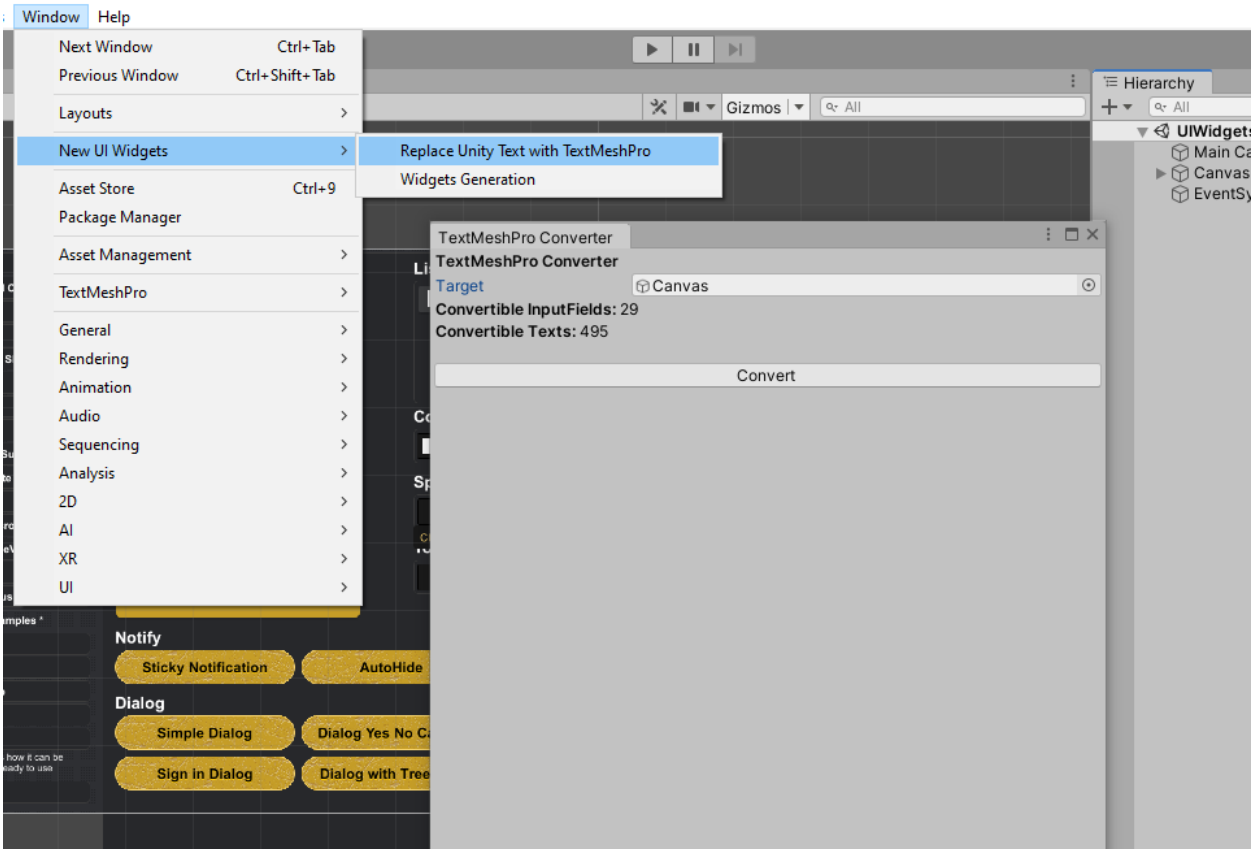
10.1 Details

TextMeshPro support is enabled by adding `UIWIDGETS_TMPRO_SUPPORT` directive to the *Scripting Define Symbols* in the *Player Settings* and forced scripts recompilation.

Starting with version *1.12* TextMeshPro support is done with `TextAdapter` and `InputFieldAdapter` components. Those are adapters for the actual Unity and TextMeshPro components. This allows replacing Text components without any code changes.

CHAPTER 11

TextMeshPro Converter



This is a tool to convert existing UI at the scene from default `Text` and `InputField` to the **TextMeshPro** equivalent components.

Converter available with the context menu *UI/New UI Widgets/Replace Unity Text with TextMeshPro* or with *Window/New UI Widgets/Replace Unity Text with TextMeshPro.*

Scripts references to `Text` and `InputField` components will be automatically replaced if type of reference is common base type like `Graphic` or `MonoBehaviour`; otherwise those components will not be converted.

Limitations:

- If you have any scripts with the serialized fields of type `Text` or `InputField` with specified components, then those components will not be converted.

```
[SerializeField]
Text Name; // cannot be converted

[SerializeField]
Graphic SecondName; // can be converted

[SerializeField]
TextAdapter ThirdName; // can be converted
```

  Solutions:

  - manualy change type to the `TextAdapter` or `InputFieldAdapter` and add the corresponding component to the referenced GameObject
  - modify code to automatically replace components with adapters

11.1 Modify Code to Adapters

Original script:

```
class SomeComponent : MonoBehaviour
{
   [SerializeField]
   Text Name;

   public void SomeMethod()
   {
      Name.text = "value";
   }
}
```

Modification:

```
class SomeComponent : MonoBehaviour, IUpgradeable
{
   [SerializeField]
   [System.Obsolete("Replaced with NameAdapter.")]
   Text Name;

   [SerializeField]
   TextAdapter NameAdapter;

   public void SomeMethod()
   {
      NameAdapter.text = "value";
   }

   public virtual void Upgrade()
   {
        Utilities.GetOrAddComponent(Name, ref NameAdapter);
```

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```
    }

    #if UNITY_EDITOR
    protected virtual void OnValidate()
    {
        Upgrade();
    }
    #endif
}
```

Note: If you **undo** convertation you can see warnings like *Not found any Text/InputField/InputFieldExtended component*. This is happening because the newly added TMPro components was deleted and the old default components are not yet restored. In such cases, those warnings should be ignored.

CHAPTER 12

Known Problems

- **Missing references or scripts**

  Sometimes newly created widgets have missing references, or scripts are missing after the update.
  Please try to import package again.

- **TextMeshPro support are disabled after the platform switch**

  In some cases TextMeshPro support can be disabled after the platform switch because of the missing directive in *Scripting Define Symbols* for the current platform.
  Like an upgrade to the new Unity version with the newly added platform and then switch to it.
  You need to enable *TextMeshPro Support* again **without** saving the scene to avoid references lost.

- **TextMeshPro related errors after upgrade**

  Package upgrade remove TMPro reference from assembly definitions.
  Disable TMPro support and enabling it back solves the problem.

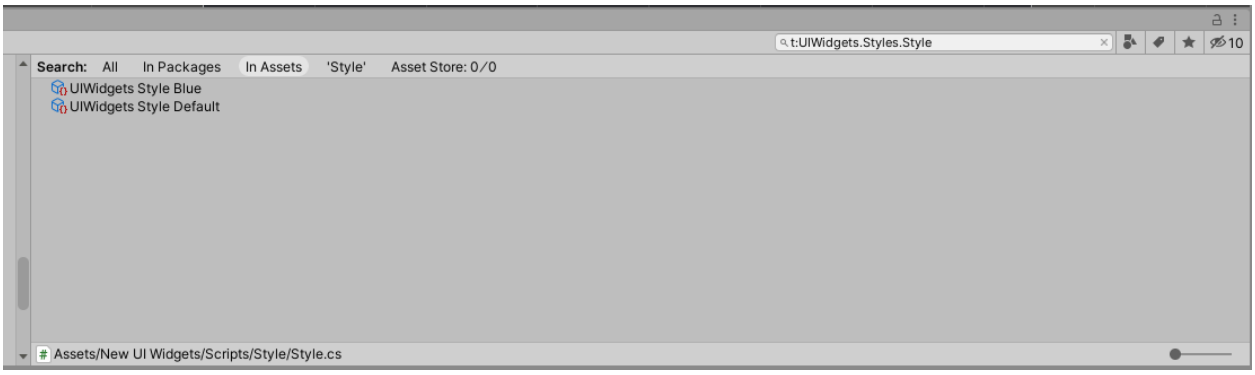
- **Newly created widgets are white**

  It happens because of the empty style used as default and it automatically applied to newly created widgets.
  Please open *New UI Widgets/Styles/UIWidgets Style Default* and check it settings (it should not be all white color or null), and set it as default.
  If UIWidgets Style Default values are all white color or null, then try to import package again, sometimes import works incorrectly.

  You can use "t:UIWidgets.Styles.Style" to find all styles and check which one is used by default.

- **Random errors of type *MissingReferenceException: The object of type '...' has been destroyed but you are still trying to access it* in 2019.3 or later**

  These errors can be related to *Enter Play Mode* settings with disabled *Reload Domain* and static variables in your code.



If *Reload Domain* is disabled, then static variables are not reset to default values on entering *Play Mode*.
You should add special code to reset static variables to solve the problem or enable *Reload Domain*.

Example:

```
static ObservableList<int> Numbers = new ObservableList<int>();

[RuntimeInitializeOnLoadMethod(RuntimeInitializeLoadType.
↪SubsystemRegistration)]
protected static void StaticInit()
{
    Numbers = new ObservableList<int>();
}
```

CHAPTER 13

Support

You can ask me questions at:

- Forum thread: https://forum.unity.com/threads/new-ui-widgets.297353/
- Forum private conversation: https://forum.unity.com/conversations/add?to=ilih
- Disqus: https://ilih.ru/unity-assets/UIWidgets/
- Email: support@ilih.ru

CHAPTER 14

Changelog

14.1 Release 1.12.3

- added Pinchable component: drag, rotate, resize multi-touch support
- added ListViewAutoResize component: auto-resize ListView or TileView according to items counts until specified maximum size reached
- [Serializable] attribute of TreeNode<TItem> class not available for Unity 2020.1 and later versions
- ListView: added DisableScrollRect property to disable ScrollRect if ListView is not Interactable
- ListView and TreeView Drag&Drop: added Interactable support

14.2 Release 1.12.2

- added DistanceLines component
- added UI Cursor settings component
- Dialog: fixed buttons order
- DirectoryTreeView: fixed drives list
- ListViewPaginator, ScrollRectPaginator: fixed LastPageFullSize option
- ListView: now resize of disabled ListView processed correctly

14.3 Release 1.12.1

- added converter from Unity Text to TextMeshPro text
- added IUpgradeable interface to improve compatibility between versions
- added Groupable component
- added UIFlareTransparent shader

- added ResizableHandles component
- added Rotatable component
- added RotatableHandle component
- deleted a lot of lambda functions
- other lambda functions replaced with local functions
- renamed classes *Utilites to *Utilities
- improved performance with Asset Pipeline V2
- Combobox: fixed navigation support
- Draggable: added Target property to drag the specified target instead of self
- DragSupport: added AllowDrag field
- DropSupport: added ReceiveItems and ReceiveNodes fields for the base classes
- ListView: not selectable items are no more highlighted and navigated
- ListViewPaginator, ScrollRectPaginator: added LastPageFullSize option to change the last page size to full-page size
- Resizable: AllowResize renamed to Interactable
- Resizable: added resize type to change between size and scale
- Resizable: added Target property to resize the specified target instead of self
- ScrollRectEvents: RequiredMovement replaced with Thresholds to support separate thresholds for each pull direction
- Splitter: AllowResize renamed to Interactable
- Widgets Generation: added option to manually specify the type name if the type cannot be detected from the MonoScript

14.4 Release 1.11.2

- added TracksView to create custom schedule or time-line widgets
- added InputFieldAdapter to improve TextMesh Pro support
- added ListComponentPool
- added SplitButton
- Dialog: added RectTransform content and Action onClose parameters to Show(...) method
- Dialog: added OpenedDialogs property to get list of the opened dialog
- Dialog: DefaultButton replaced with ButtonsTemplates and DialogActions now has option to specify button index for the button template
- Dialog: type of the "buttons" parameter in the Show() method changed to IList<DialogButton>
- Dialog: added "Func<int, bool> onCancel" parameter to the Show() method, called with -1 parameter when dialog closed with top right close button
- DragListener: OnDragListener renamed to DragListener
- DragSupport: added optional DragHandle property, you can use it drag ListView items by specified handle instead of the whole item

- DragSupport: added StartDragEvent and EndDragEvent
- EasyLayout: added ElementsRotate and ElementsRotationStart for Ellipse layout
- ListView: improved navigation support
- ListView: added optional parameter minVisiblePart to IsVisible() method
- ListView: replaced old ListView with ListViewString
- ListView: added Virtualization setting to disable Virtualization
- ListViewDropSupport: added DropPosition parameter
- ListViewPaginator: now use ListView.ScrollToAnimatedPosition instead of the own animation
- Notify: fixed incorrect size and rotation of next notification if previous notification was closed during hide animation
- Resizable: added AllowResize property to enable/disable resize without removing component
- ScrollBlock: SetText() renamed to UpdateView()
- ScrollRectPaginator: ForceScrollOnPage replaced with ForcedPosition to support different positions

14.5 Release 1.11.1

- added AutocompleteCombobox
- ListView: fixed scrolling bug with variable size list types
- Notify: renamed AnimationRotate to AnimationRotateVertical, AnimationCollapse to AnimationCollapseVertical
- Notify: added animations AnimationRotateHorizontal, AnimationCollapseHorizontal, AnimationSlideRight, AnimationSlideLeft, AnimationSlideUp, AnimationSlideDown
- Notify: added configurable animations AnimationRotateBase, AnimationCollapseBase, AnimationSlideBase
- Resizable: added OnResize event
- Splitter: added OnResize event
- Tabs: added SelectedTabIndex property

14.6 Release 1.11.0

- added ScrollRectHeader (example of usage in Examples/ListView/ListViewHeader scene)
- added EasyLayoutEllipseScroll
- Combobox: added OnShowListView and OnHideListView events
- EasyLayout: added new layout type Ellipse
- EasyLayout: added new option ResetRotation
- ListView: added DestroyDefaultItemsCache, if enabled instances of the previous DefaultItem will be destroyed when replacing DefaultItem
- ListView: added new ListViewEllipse list type
- Scroller: renamed to ScrollBlock

14.7 Release 1.10.4

- added DateScroller, DateTimeScroller, DateTimeScrollerSeparate, TimeScroller widgets
- added EditorCondition attributes to use with MonoBehaviourConditional and UIBehaviourConditional
- added LayoutElementMax: allow to control the maximum preferred sizes of the LayoutGroup
- added UIFlare shader
- Combobox: added HideAfterItemToggle option
- DateTime: fixed init and time errors
- DatePicker: added DateChangeOnly option to allow to select date on change or on click
- EasyLayout: fixed FitContainer
- ListView: added null value support for the GraphicsForeground and GraphicsBackground properties
- ListView: added AllowColoring option
- ListView: added StateDefault(), StateSelected() and StateHighlighted() functions to the base default item class as addition to coloring functions
- ListView: added loading example with UIFlare shader use

14.8 Release 1.10.3

- added GroupedTileView example
- DragRedirect: improved support for the multiple redirects
- GroupedList: added ItemsPerBlock, EmptyGroupItem, EmptyItem properties for the TileView support
- EasyLayout: added Flex layout type
- EasyLayout: added Staggered layout type
- EasyLayout: renamed Stacking to MainAxis
- ListView: HighlightedBackgroundColor and HighlightedColor now applied automatically after changed
- ListView: fixed scrolling when List Type is fixed, ListScrollValue enabled and DefaultItem have Layout Group
- ListView: fixed rare bug for the ListView with items of the variable sizes.
- ListView: added missing fields in the Inspector window for the simple ListView
- ListView: added TileViewStaggered renderer
- ScrollRectPaginator: fixed displayed buttons at the start
- Style: fixed error when style created not in the folder or outside Assets folder
- TextMesh Pro support: improved support for the Unity 2019.1
- Tooltip: fixed displayed tooltip after parent gameobject was disabled (thanks to Gladyon)
- Widget Generation: fixed bug when type has only one field of the supported types

14.9 Release 1.10.2

- added ScrollbarMinSize component - allow set minimum size of the scrollbar handle
- added DragOneDirection component - it changes drag event to work only with one direction
- added LayoutDropIndicator component to use with TableHeader
- added Project Settings support for Unity 2018.3 and later
- Accordion: fixed problems when content size changed
- Accordion: added ForceOpen() and ForceClose() functions to open and close items without animation
- Accordion: added fields AnimationOpen, AnimationOpenFlexible, AnimationClose, AnimationCloseFlexible to change animations
- AudioPlayer: added setter for Source property
- LayoutSwitcher: added LayoutSelector field to control layout selection
- ListView: added CanSelect(index) and CanDeselect(index) fields
- ListView: added PrecalculateItemSizes, disabling this option increase performance with huge lists of items with variable sizes
- ListView: fixed LimitScrollValue when scroll to end
- ListView: fixed error when drag-and-drop position after the last item
- ObservableList: added INofityPropertyChanged implementation
- ObservableList: added ObserveItems field
- ObservableList: now allowed null items
- RangeSlider: now correctly works when enabled or disabled inside layout groups
- ResizableHeader: renamed to TableHeader with related class
- TableHeader: no more required IResizableItem implementation for the ListView.DefaultItem
- TableHeader: added GetColumnsOrder() and SetColumnsOrder() functions
- TableHeader: added DropIndicator support
- Sidebar: added prefab and styles support
- Spinner: now use InputField component instead of the inheritance
- Spinner: added TextMesh Pro support
- Switch: SetStatus() now does not invocate events for other Switches in the same group
- TextMesh Pro support: widgets created with default menu "UI / New UI Widgets / . . . " if support enabled
- TextMesh Pro support: removed menu "UI / UIWidgets with TextMesh Pro / . . . "
- TextMesh Pro support: added menu "Edit / Project / Settings / New UI Widgets / Import TextMesh Pro support package" to import TMPro prefabs after update to new version
- Widget Generation: added ScriptableObject support
- Widget Generation: added Data Bind support
- Other: fixes related using instantiate with inited complicated widgets
- Other: "UIWidgets" in the menu replaced with "New UI Widgets" to match with the package name

- Other: Time used with animations can be controlled with Utilities.GetTime field (You can use own Time manager instead of the default Time.time)

14.10 Release 1.10.1

- ListView: added ScrollTo(item) and ScrollToAnimated(item) functions
- Paginator: added StopAnimation() function
- ListViewPaginator: fixed direction problem
- TreeView: added ScrollTo(node) and ScrollToAnimated(node) functions
- TreeView: added FindNode() function
- TreeView: now ScrollTo(..) and ScrollToAnimated(...) correctly work with node indentation
- Widget Generation: added interface types support
- Widget Generation: fixed property support

14.11 Release 1.10.0

- Added styles support (Styles folder, new styles can be created from context menu "Create / UIWidget - Style")
- Added widget generation (context menu "Create / UIWidget - Widgets" on file with item class definition)
- Added DateTime, Time24 and Time12 widgets
- Added DateTimePicker and TimePicker widgets
- Added ColorPickerRangeHSV widget
- Added ColorsList widget to display list of the selected colors, should be used with ColorPicker or ColorPickerRange.
- Added "Data Bind for Unity" support (requires Unity 5.6 or later)
- Added base ListView Picker class for the custom ListView
- Added base TreeView Picker class for the custom TreeView
- Added base drop support class for the custom TreeView
- Added base drop support class for the custom TreeView node
- Added assembly definitions
- Improvement: Drag can be canceled with Cancel button
- Accordion: added AllItemsCanBeClosed option
- Autocomplete: added GetInputFieldText() function
- Calendar: added DateMin and DateMax properties
- Calendar: added currentDateAsDefault option
- ColorPicker: added Hex block
- ColorPicker: added new palette mode HSVCircle
- ColorPickerRange: DefaultShader replaced with DefaultShaderHorizontal and DefaultShaderVertical
- Connectors: now works correctly with "Screen Space - Camera"
- EasyLayout: reduced memory allocations

- EasyLayout: EasyLayout namespace renamed to EasyLayoutNS to avoid problems with Unity 2018.2 and later
- Interfaces: IItemWidth, IItemHeight, IListViewItemHeight, IListViewItemWidth not used anymore
- ListView: added CenterTheItems property
- ListView: added overridable functions CanBeSelected() and CanBeDeselected()
- ListView: added LoopedList option
- ListView: added Interactable option
- ListView: added IsTable option (required to valid stylization)
- ListView and TileView: ListViewCustomWidth, ListViewCustomHeight, TileViewCustom and TileViewCustomSize replaced with ListViewCustom with List Type option
- ListViewCustomWidth: TItem now does not require IItemWidth implementation
- ListViewCustomHeight: TItem now does not require IItemHeight implementation
- ListViewDropIndicator: added styles support
- ResizableHeader: fixed resize on touch devices
- Sidebar: added OnOpeningStarted and OnClosingStarted, called when appropriated animation started
- other: prefabs in "Sample Assets" folder replaced with scenes
- other: "Standart Assets" folder renamed to "Scripts"
- other: "Sample Assets" folder renamed to "Examples"
- other: removed ListViewGameObjects prefab
- other: removed outdated prefabs and sprites
- other: namespace "UIWidgetsSamples" renamed to "UIWidget.Examples"

14.12 Release 1.9.3

- Accordion: now works with content with dynamically change size
- ListView's, TileView's, TreeView's: added GetItemPositionMiddle()
- ListView's, TileView's, TreeView's: added ScrollToPosition()
- ListView's, TileView's, TreeView's: added ScrollToPositionAnimated()
- ResizableHeader: added ColumnEnable, ColumnDisable and ColumnToggle
- ResizableHeader: fixed problem with adding columns
- ResizableHeader: improvements

14.13 Release 1.9.2

- added TreeViewCustomNodeDragSupport
- added ScrollButtons
- Autocomplete: fixed problem with resizing
- Autocomplete: added SearchDelay and MinLength options
- ColorPicker: fixed incorrect display in linear colorspace

- ColorPicker: now click on palette or image will change color
- Draggable: added Horizontal and Vertical options
- Draggable: added Restriction option
- ListViewCustomDragSupport: added DeleteAfterDrop parameter
- ListView's, TileView's, TreeView's: added SetContentSizeFitter parameter
- ListView's, TileView's, TreeView's: added Navigation parameter
- ListView's, TileView's, TreeView's: added IsVisible() function to check if item is visible
- ListView's, TileView's, TreeView's: added animated scrolling to items - ScrollToTime() and ScrollToSpeed()
- ListView's, TileView's, TreeView's: Multiple renamed to MultipleSelect
- RangeSlider: added RangeSliderType; it's allow or disable handles overlay
- Resizable: fixed error with allowed directions
- Sidebar: added new animation type ScaleDownAndPush
- Spinner: fixed input parsing problem
- Splitter: added Mode option, so you can specify left and right targers, instead using previous and next siblings in hierarchy
- TreeView: added serialization support with TreeNode<T>.Serialize() and TreeNode<T>.Deserialize()
- TreeView: fixed error when deleting selected node with disabled DeselectCollapsedNodes
- TreeView: added ExpandParentNodes() and CollapseParentNodes() functions
- TreeView's DefaultItem: Filler renamed to Indentation
- Dialog, Notify, Picker, Popup: Template() renamed to Clone()

14.14 Release 1.9.1

- Fixed CenteredSlider
- Fixed missing links in prefabs
- Fixed demo scene

14.15 Release 1.9.0

- Added AudioPlayer
- Added Calendar
- Added DatePicker
- Added DirectoryTreeView
- Added FileDialog
- Added FileListView
- Added FolderDialog
- Added PickerBool (can be used as Confirmation dialog with Yes/No/Cancel options)
- Accordion: added ResizeMethod property

- Accordion: protected Items property replaced with public DataSource property with type ObservableList<T>
- Accordion: added DisableClosed option
- ColorPicker: added Image palette, you can use it to get colors from custom Texture2D. The texture must have the Read/Write Enabled flag set in the import settings, otherwise this function will fail.
- ColorPicker: fixed bug with wrong axes with Hue palette
- Drag&Drop: added generic classes ListViewCustomDragSupport and ListViewCustomDropSupport, using them to add Drap&Drop functionality for own ListView's become more easily. Check ListViewIconsDragSupport and ListViewIconsDropSupport as reference (ignore TreeNode region).
- EasyLayout: fixed "dirty" scene bug when using FitContainer or ShrinkOnOverflow
- ListView's: DataSource can be safely used from other threads
- ListView's: added GroupedListView sample
- ListView's: added .Select(int index, bool raiseEvents) function, you can use it to select items without raising events
- ListView's: added Owner field to ListViewItem (base class for any DefaultItem), it contains link to parent ListView
- ListView's: you can implement IViewData<T> to DefaultItem component class to avoid overriding ListView.SetData() function
- ListView's: added virtual properties Graphic[] GraphicsForeground and Graphic[] GraphicsBackground to ListViewItem, you can them to specify grapgics for coloring, instead overriding coloring functions
- Resizable: mark events as used
- SlideBlock renamed to Sidebar
- Sidebar: added new animation types Overlay (default), Push, Uncover, ScaleDown, SlideAlong, SlideOut, Resize
- Sidebar: added AnimateWithLayout option for Resize animation, use it if you need more than one Sidebar with Resize on same Content object
- Spinner: added AllowHold option, so you can disable increasing/decreasing value during pointer hold
- Switch: added .SetStatus(bool value), you can change state without raising corresponding events
- TileView's: added TileViewCustomSize
- Tooltip: added UnscaledTime option
- TreeNode: added RootNode property, used to check if nodes belong to same tree
- TreeView's and TreeNode: Nodes type change from IObservableList<TreeNode<TItem>> to ObservableList<TreeNode<TItem>>
- TreeView: added SelectedNodes property
- TreeView: added DeselectCollapsedNodes property, enabled by default
- TreeView: added .Node2Index(TreeNode<TItem> node) function
- TreeView: added .SelectNode(TreeNode<TItem> node) and .SelectNodeWithSubnodes(TreeNode<TItem> node) functions
- TreeViewDataSource: fixed incorrect branch bug (thanks to Heiko Berres)
- ProgressBar: added SpeedType option

14.16 Release 1.8.5

- IInputFieldProxy: properties onValueChange, onValueChanged, onEndEdit type changed to UnityEvent<string> and get only.
- ListView: now is possible change DefaultItem in runtime
- ListViewItem: now works without ImageAdvanced
- SlideBlock: added Modal property, if enabled SlideBlock will be closed on click outside SlideBlock
- Tabs: added EnableTab and DisableTab functions

14.17 Release 1.8.4

- Added ColorPickerRange - allow selecting color from a range of two colors.
- Fixed Combobox bug.

14.18 Release 1.8.3

- Added SelectableHelper - allow controlling additional Graphic component according to selection state of current gameobject. So you can control button background color with Button component and Button text color with SelectableHelper
- Added ListViewInt
- Added Picker - base class for creating own pickers
- Added PickerInt, PickerString, PickerIcons
- Added LayoutSwitcher
- SpinnerFloat - added property Culture, specified how the number will be displayed and how input will be parsed
- SpinnerFloat - added field DecimalSeparators, along with decimal separator within Culture determine valid decimal separators for input (Warning: incompatible types with different Unity versions - Unity 4.x use string[] and Unity 5.x use char[])
- Spinner, SpinnerFloat - fixed overflow exception
- Resizable - added corners directions for resize
- ListView's - added FadeDuration for colors change

14.19 Release 1.8.2

- EasyLayout - added Shrink on Overflow option
- EasyLayout - added CompactConstraint and CompactConstraintCount options
- Splitter - fixed problem with using more than one splitter with the same container
- Tabs - added prefab for left side Tabs
- Added ScrollRectRestictedDrag
- TextMeshPro support available with separate unitypackage
- Beta: Added Connectors. Add SingleConnector or MultipleConnector to empty gameobject

14.20 Release 1.8.0

- Added ScrollRectPaginator
- Added ListViewPaginator
- Added Autocomplete
- Added Popup
- TreeView: added TreeViewDataSource component with nodes editor
- ListView's: added ScrollTo()
- EasyLayout: reduced memory allocation
- EasyLayout: added row/column constraint for Grid layout
- Tabs: added DefaultTabName property
- TreeNode: added Path property - return list of parent nodes
- TreeViewComponent: added OnNodeExpand property with Rotate (rotate toggle) and ChangeSprite (change toggle sprite) values
- Notify and Dialog: added Template() method, now you can use notifyPrefab.Template().Show(...) instead Notify.Template("template name").Show(...)
- CenteredSlider: added ValueMin, ValueMax and UseValueLimits. If UseValueLimits enabled then ValueMin <= Value <= ValueMax
- Tabs: added TabButtonComponent, use derived class with overridden SetButtonData() to control how tab name will be displayed. For TabsIcons you can use TabIconButton.
- Dialog: added DialogButtonComponent, use derived class with overridden SetButtonName() to control how button name will be displayed.
- Dialog: added DialogInfoBase, use derived class with overridden SetInfo() to control how info will be displayed.
- ListView's, TileView: added DropIndicator for Drag-and-Drop
- TileView: added TileViewScrollRectFitter, ScrollRect will be resized to display whole number of items.

14.21 Release 1.7.4

- Added Switch
- Resizable: added KeepAspectRatio property
- Tabs: added SelectedTab property
- Tabs: added OnTabSelect event
- Known problems: Accordion with EasyLayout and Canvas.PixelPerfect enabled in Unity 5.3 cause error "Trying to add (Layout Rebuilder for) {ObjectName} (UnityEngine.RectTransform) for layout rebuild while we are already inside a layout rebuild loop. This is not supported." in some cases. Workaround - use Vertical or Horizontal Layout Group instead EasyLayout.

14.22 Release 1.7.2

- Fixed errors in WinStore builds.
- IDropSupport: added DropCanceled method.

- DragSupport: added DragPoint property (empty gameobject on cursor/touch position), you can use it to attach custom gameobject with information about draggable object.
- ListViewIconsDragSupport, TreeViewNodeDragSupport: show information about draggable object.
- Tabs: added Tabs with icons.

14.23 Release 1.7.0

- Added Drag and Drop support.
- ComboboxCustom and ComboboxIcons: Added Multiselect support.
- ResizableHeader: Added drag column support.
- TreeViewItem: Added Tag property.
- SlideBlock: Optional support for children ScrollRect.
- Accordion: Added Direction.
- Accordion: Added support Horizontal Layout Group and Vertical Layout Group (Content Objects should have LayoutElement component).
- ListViews: Added limited support Horizontal Layout Group and Vertical Layout Group (you cannot change ListView direction in runtime).
- ObservableList: Added events OnCollectionChange (raised when items added, removed or replaced) and OnCollectionItemChange (raised when item in collection raise OnChange or PropertyChanged events).
- ObservableList: Added Comparison, ResortOnCollectionChanged, ResortOnCollectionItemChanged properties.
- TreeNode: Added Parent property. Now you can remove node from tree using Node.Parent = null or move node to another subtree Node.Parent = AnotherNode.

14.24 Release 1.6.5

- Added Resizable.
- Added Splitter.
- Added SlideBlock.
- Added ScrollRectEvents component with PullUp, PullDown, PullLeft, PullRight events (use it for refresh or load more options).
- ListViewCustom: Removed properties SelectedComponent and SelectedComponents.
- ObservableList: Now you can disable items observe in constructor.
- ListViewItem: Added MovedToCache function, called when item moved to cache, you can use it to free used resources.
- Added Table sample (ListViewCustom + ResizableHeader + Tooltip).
- TileView sample - added Resizable for TileView and TileViewItems and toggle direction.
- Bug fixes.
- Optimization.

14.25 Release 1.6.0

- ColorPicker
- For ListView, ListViewIcons, ListViewCustom, ListViewCustomHeight, TileView added support for ObservableList
- Items property marked obsolete but can be used.
- Added optional sequence parameters for Notify - notifications can be showed one by one, not only all at once like before.
- For ListViewIcons items and TreeView nodes added field LocalizedName, so now can be easily added localization support.
- **EasyLayout - Control Width, Max Width, Control Height, Max Height replaced with "Children Width" and "Children H**
  - Do Nothing
  - Set Preferred - Set width/height to preferred, like Control Width/Height
  - Set Max from Preferred - Set width/height to maximum preferred width/height of items, like Max Width/Height
  - Fit Container - similar to "Child Force Expand" from Horizontal/Vertical Layout Group
- ListViewCustomHeight - implementation of IListViewItemHeight for components now optional, but you still can implement it for optimization purpose.

14.26 Release 1.5.0

- Added TileView
- Added TreeView
- Added ResizableHeader
- Direction option for ListView's
- Value option for ListViewIcons items

14.27 Release 1.4.2

- Added ListViewCustomHeight (support items of variable heights)

14.28 Release 1.4.1

- Added CenteredSlider.

14.29 Release 1.4

- Added RangeSlider
- Added Accordion
- Bugfixes. Thanks to Nox from Purple Pwny Studios (http://purplepwny.com) for helping fix a mobile combobox bug.

14.30 Release 1.3

- Added ListViewIcons
- Added ComboboxIcons
- Added ListViewCustom
- Added ComboboxCustom

14.31 Release 1.2

- Added Dialog
- Added Draggable

14.32 Release 1.1

- Added Notify
- Added EasyLayout

14.33 Release 1.0

- Initial release