New UI Widgets Documentation

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Ilia Novikov

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CONTENTS

CHAPTER

ONE

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 by *Widgets Generator*.

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

- **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

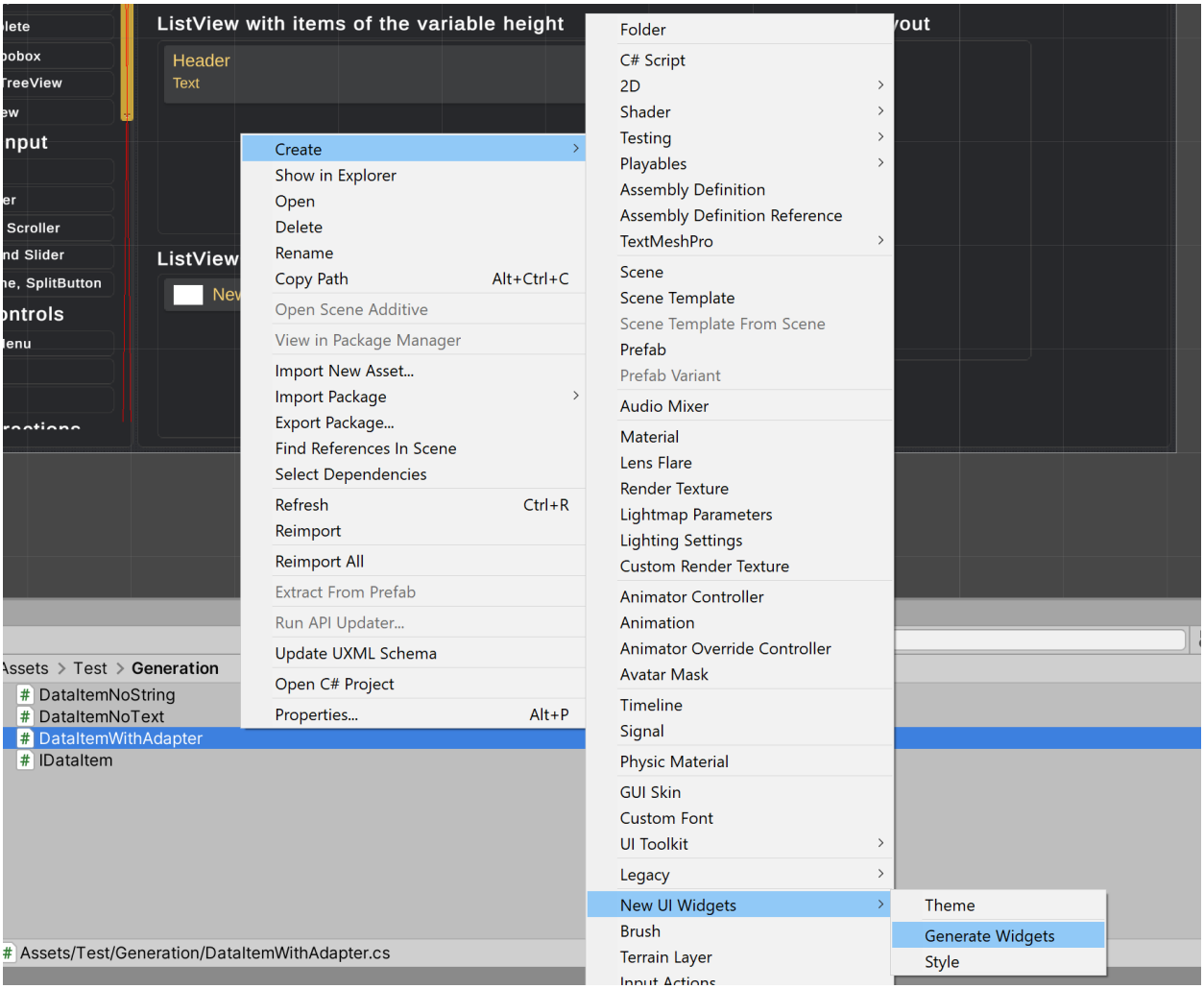
* not available on platforms with restricted access to file system (like WebGL and UWP).

CHAPTER

TWO

WIDGETS GENERATOR

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



2.1 List of Generated Widgets

- *Autocomplete*: requires at least one field or property of `string` type.
- *AutoCombobox*: `Combobox` with `Autocomplete` to filter and select items by typing; requires at least one field or property of `string` type.
- *Combobox*
- *ComboboxMultiselect*: same `Combobox` configured to display multiple selected values.
- *DragInfo*: displays content of dragged data
- *ListView*
- *Table*
- *TileView*
- *Tooltip*
- *TreeGraph*
- *TreeView*
- *PickerListView*: `Picker` to select the value from `ListView`
- *PickerTreeView*: `Picker` to select the value from `TreeView`

2.2 Requirements

Data type should have at least one public field or public readable property of the supported types.
To be available in the inspector window data type should have `[System.Serializable]` attribute.

2.3 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`

2.4 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.

2.5 Attributes

- `[GeneratorIgnore]` to mark fields or properties that should not be used in widgets
- `[GeneratorAutocomplete]` to mark the field or property that should be used for autocomplete (will be used only first field with this attribute)

2.6 Known Problems

Widget generator 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 generator and return type to `interface` or `struct`.

2.7 Extending and Overriding Classes

All generated classes are marked as `partial` to make possible it to split the definition of a class over two or more source files. The recommended way to extending generated class is to create a new source file with class definition and add new methods or overridden methods to it. It will prevent code loss in case of a new run of widgets generator for the same data type.

2.8 INotifyPropertyChanged and IObservable Support

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

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

   public string Name
   {
      get
      {
         return name;
      }

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

   public event PropertyChangedEventHandler PropertyChanged;

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

   ...
}
```

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

   public string Name
   {
      get
      {
         return name;
      }

      set
      {
         if (name != value)
         {
            name = value;
            Changed();
         }
      }
```

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```
    }

    public event OnChange OnChange;

    protected void Changed()
    {
        OnChange?.Invoke(this);
    }

    ...
}
```

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";
```

2.9 Replacing generated code

Generated code can be freely modified.

Important:

Be careful not to overwrite modified scripts if you decide re-run widget generator for the same data type.

2.9.1 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 generator 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>
   /// 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>
   {
      ...

      /// <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)
```

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```
        {
            Item = item;

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

            ...
        }

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

    ...
}
```

2.9.2 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>
```

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```
   /// 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);
         }

         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());
      }
```

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```
    }
}
```

CHAPTER

THREE

WIDGETS

3.1 Collections

3.1.1 AutoCombobox

Combobox widget combined with Autocomplete widget which allows select item by typing.

Note:

Difference between AutocompleteCombobox and AutoCombobox:
- AutocompleteCombobox basically is InputField with autocomplete feature, so you can get only string, not selected item.
- AutoCombobox is Combobox with the option to select items by typing, with it you can get selected items.

Options

- Autocomplete `TAutocomplete`

  ListView with items.

- Combobox `TCombobox`

  Button to show and hide ListView on click.

- AddItems `bool`

  Create a new item and add it to list if item not found with specified input. Requires overrided `TItem Input2Item(string input)` method.

- KeepSelection `bool`

  Keep selected items for Autocomplete.DisplayListView.

3.1.2 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`

  The event raised when ListView showed.

- OnHideListView `UnityEvent`

  The event raised when ListView hidden.

- OnCurrentClick `UnityEvent<int, TItem>`

  The event raised on click on displayed selected item.

3.1.3 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*.

Options

Options 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.

Methods

- `TreeNode<FileSystemEntry> ExpandPath(string path, bool scrollToNode = true)`

  Expand nodes to the specified path. Returns `null` if node not found.

- `TreeNode<FileSystemEntry> Path2Node(string path)`

  Get node of the specified path. Returns `null` if node not found.

- `TreeNode<FileSystemEntry> Path2NearestNode(string path)`

  Get exact node or nearest existing parent node of the specified path.

- `void RefreshDirectories()`

  Refresh displayed directories according to current state of the file system.

3.1.4 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*.

Options

Options 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.

3.1.5 Grouped ListView, Grouped TileView

You can create grouped ListView with `GroupedList<TItem>` (group items does not exists and will be automatically created) or `LinearGroupedList<TItem>` (group items already exists in `DataSource`).

Grouped ListView

```
public class GroupedItem
{
   public string Name;
   public bool IsGroup = false;
   public bool IsEmpty = false;
}

public class GroupedItems : GroupedList<GroupedItem>
{
   /// <summary>
   /// Get group for specified item.
   /// </summary>
   /// <param name="item">Item.</param>
   /// <returns>Group for specified item.</returns>
   protected override GroupedItem GetGroup(GroupedItem item)
   {
      var name = item.Name.Length > 0 ? item.Name[0].ToString() : string.Empty;

      foreach (var key in GroupsWithItems.Keys)
      {
         if (key.Name == name)
         {
            return key;
         }
      }
```

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```
        return new GroupedItem() { Name = name, IsGroup = true, };
    }
}

public class GroupedView : ListViewCustom<GroupedListViewComponent, GroupedItem>
{
    // GroupedData used to add and remove items instead of the DataSource.
    public GroupedItems GroupedData = new GroupedItems();

    bool isGroupedViewInited;

    public override void Init()
    {
        if (isGroupedViewInited)
        {
            return;
        }

        isGroupedViewInited = true;

        base.Init();

        GroupedData.GroupComparison = (x, y) => x.Name.CompareTo(y.Name);
        GroupedData.Data = DataSource;

        CanSelect = index => !DataSource[index].IsGroup;
    }
}
```

Grouped TileView

```
using UIWidgets;
using UnityEngine;

public class GroupedTileView : ListViewCustom<GroupedListViewComponent, GroupedItem>
{
    public GroupedItems GroupedData = new GroupedItems();

    [SerializeField]
    protected GroupedListViewComponent HeaderTemplate;

    [SerializeField]
    protected GroupedListViewComponent HeaderEmptyTemplate;

    [SerializeField]
    protected GroupedListViewComponent ItemTemplate;

    [SerializeField]
    protected GroupedListViewComponent ItemEmptyTemplate;
```

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```
    class Selector : IListViewTemplateSelector<GroupedListViewComponent, GroupedItem>
    {
        GroupedListViewComponent headerTemplate;

        GroupedListViewComponent headerEmptyTemplate;

        GroupedListViewComponent itemTemplate;

        GroupedListViewComponent itemEmptyTemplate;

        GroupedListViewComponent[] templates;

        public Selector(
            GroupedListViewComponent headerTemplate,
            GroupedListViewComponent headerEmptyTemplate,
            GroupedListViewComponent itemTemplate,
            GroupedListViewComponent itemEmptyTemplate)
        {
            this.headerTemplate = headerTemplate;
            this.headerEmptyTemplate = headerEmptyTemplate;
            this.itemTemplate = itemTemplate;
            this.itemEmptyTemplate = itemEmptyTemplate;

            templates = new[] { this.headerTemplate, this.headerEmptyTemplate, this.
↪itemTemplate, this.itemEmptyTemplate, };
        }

        public GroupedListViewComponent[] AllTemplates() => templates;

        public GroupedListViewComponent Select(int index, GroupedItem item)
        {
            if (item.IsGroup)
            {
                return item.IsEmpty ? headerEmptyTemplate : headerTemplate;
            }
            else
            {
                return item.IsEmpty ? itemEmptyTemplate : itemTemplate;
            }
        }
    }

    bool isGroupedListViewInited;

    public override void Init()
    {
        if (isGroupedListViewInited)
        {
            return;
        }
```

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```
      isGroupedListViewInited = true;

      TemplateSelector = new Selector(HeaderTemplate, HeaderEmptyTemplate, ItemTemplate,␣
↪ItemEmptyTemplate);

      base.Init();

      GroupedData.GroupComparison = (x, y) => x.Created.CompareTo(y.Created);
      GroupedData.Data = DataSource;

      GroupedData.EmptyGroupItem = new Photo() { IsGroup = true, IsEmpty = true };
      GroupedData.EmptyItem = new Photo() { IsEmpty = true };
      GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();
   }

   public override void UpdateItems()
   {
      base.UpdateItems();

      GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();
   }

   public override void Resize()
   {
      base.Resize();

      GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();
   }
}
```

Linear GroupedTileView

```
public class LinearGroupedTileView : ListViewCustom<GroupedListViewComponent,␣
↪GroupedItem>
{
   // Real DataSource (use instead of DataSource).
   public ObservableList<GroupedItem> RealDataSource = new ObservableList<GroupedItem>();

   public LinearGroupedList<GroupedItem> GroupedData = new LinearGroupedList<GroupedItem>
↪(x => x.IsGroup);

   [SerializeField]
   protected GroupedListViewComponent HeaderTemplate;

   [SerializeField]
   protected GroupedListViewComponent HeaderEmptyTemplate;

   [SerializeField]
   protected GroupedListViewComponent ItemTemplate;
```

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```
    [SerializeField]
    protected GroupedListViewComponent ItemEmptyTemplate;

    class Selector : IListViewTemplateSelector<GroupedListViewComponent, GroupedItem>
    {
        GroupedListViewComponent headerTemplate;

        GroupedListViewComponent headerEmptyTemplate;

        GroupedListViewComponent itemTemplate;

        GroupedListViewComponent itemEmptyTemplate;

        GroupedListViewComponent[] templates;

        public Selector(
            GroupedListViewComponent headerTemplate,
            GroupedListViewComponent headerEmptyTemplate,
            GroupedListViewComponent itemTemplate,
            GroupedListViewComponent itemEmptyTemplate)
        {
            this.headerTemplate = headerTemplate;
            this.headerEmptyTemplate = headerEmptyTemplate;
            this.itemTemplate = itemTemplate;
            this.itemEmptyTemplate = itemEmptyTemplate;

            templates = new[] { this.headerTemplate, this.headerEmptyTemplate, this.
↪itemTemplate, this.itemEmptyTemplate, };
        }

        public GroupedListViewComponent[] AllTemplates() => templates;

        public GroupedListViewComponent Select(int index, GroupedItem item)
        {
            if (item.IsGroup)
            {
                return item.IsEmpty ? headerEmptyTemplate : headerTemplate;
            }
            else
            {
                return item.IsEmpty ? itemEmptyTemplate : itemTemplate;
            }
        }
    }

    bool isGroupedListViewInited;

    public override void Init()
    {
        if (isGroupedListViewInited)
        {
            return;
```

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```
        }

        isGroupedListViewInited = true;

        TemplateSelector = new Selector(HeaderTemplate, HeaderEmptyTemplate, ItemTemplate,␣
↪ItemEmptyTemplate);

        base.Init();

        GroupedData.EmptyHeaderItem = new GroupedItem() { IsGroup = true, IsEmpty = true };
        GroupedData.EmptyItem = new GroupedItem() { IsEmpty = true };
        GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();

        GroupedData.Input = RealDataSource;
        GroupedData.Output = DataSource;
    }

    public override void UpdateItems()
    {
        base.UpdateItems();

        GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();
    }

    public override void Resize()
    {
        base.Resize();

        GroupedData.ItemsPerBlock = ListRenderer.GetItemsPerBlock();
    }
}
```

3.1.6 ListView, TileView and Table

Note: **Table** is **ListView** with specific `DefaultItem` and *Table Header* (it also provides **Table** specific methods). Widget with scripts should be created by *Widgets Generator*.

- All collections widgets support virtualization: gameobjects created only for the visible items.
- Different **ListView**, **TileView** and **Table** can display the same list simultaneously.
- In most cases `ToggleGroup` and `SwitchGroup` components used by widgets under *DefaultItem* hierarchy should be placed outside *DefaultItem* gameobject. And on value changed callbacks should process all items, not only the current one, since invisible items do not receive callbacks because of the virtualization.

List View Type

Fig. 1: ListView with Fixed Size.

Fig. 2: ListView with Variable Size.

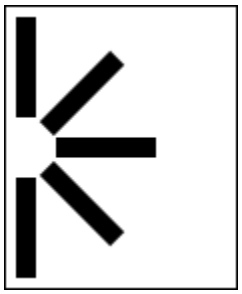


Fig. 3: ListView with Ellipse layout.

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.

Fig. 4: TileView with Fixed Size.

Fig. 5: TileView with Variable Size.

Options

- 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`

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

  - `ListViewEllipse`

    Works with EasyLayout.

  - `TileViewWithFixedSize`

    Works with EasyLayout.

  - `TileViewWithVariableSize`

    Works with EasyLayout.

  - `TileViewStaggered`

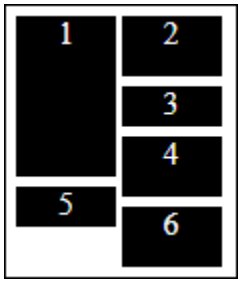


Fig. 6: TileView Staggered.

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.

- Range Mode `RangeSelectionMode`

  Specify range selection mode (multiple items selection with `Shift` key).

  - `StartFromFirst`

    Select all items from the first selected item to the newly selected item.

  - `StartFromLast`

    Select all items from the last selected item to the newly selected item.

- Selected Index `int`

  Index of the last selected item.

- Selected Indices `List<int>`

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

- Selected Item `TItem`

  Not available in the Inspector window Last selected item.

- Selected Items `List<TItem>`

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

- Direction `ListViewDirection`

  ListView direction.

  - `Horizontal`
  - `Vertical`

- Reversed Order `bool`

  Display first item at bottom and last item at top.

- Default Item `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.

- Allow Coloring `bool`

  Change colors of the highlighted and selected items.

  If you want to more precise control on item colors, like different colors depending of item data, then you can override `StateDefault()`, `StateHighlighted()`, `StateSelected()` methods of `TComponent` class.

- 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.

- Keep Highlight `bool`

  Keep item highlight on pointer enter until will be selected another gameobject.

- Only One Highlighted `bool`

  Allows only one highlighted item. If disabled then two can be highlighted: first from pointer over, second from navigation by keyboard or gamepad.

- 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`

  Specify time type used by scroll animation.

If enabled then will be used `Time.unscaledTime`; otherwise will be used `Time.time`.

- Scroll Movement `AnimationCurve`

  Animation curve for the ScrollTo functions.
  Specify how long scroll animation will be and what speed will it have.

- 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.

- Auto Scroll Area `float`

  ListView will be automatically scrolled if the pointer in less then a specified distance from the border during drag&drop.

- Auto Scroll Speed `float`

  Speed of auto-scroll.

- Can Select `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.

- Can Deselect `Func<int, bool>`

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

- Scroll Inertia Until Item Center `bool`

  Enable custom scroll inertia.
  It is replace ScrollRect inertia in such a way so that after the end of scrolling the item will be exactly in the center.
  Intended to use with `ListViewEllipse` but works with other types too.

- Scroll Inertia `AnimationCurve`

  Similar to Scroll Movement, but only for the scroll inertia.

Events

- OnSelect `UnityEvent<int, ListViewItem>`

  The event raised when item selected.

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

- OnDeselect `UnityEvent<int, ListViewItem>`

  The event raised when item deselected.

  Arguments: index of the deselected item and DefaultItem instance for the deselected item.
  If an item associated with this index is removed the index can be invalid (`>= DataSouce.Count`) or point to different item.

- OnSelectObject `UnityEvent<int>`

  The event raised when item selected.

  Arguments: index of the selected item.

- OnDeselectObject `UnityEvent<int>`

  The event raised when item deselected.

  Arguments: index of the deselected item. If an item associated with this index is removed the index can be invalid (`>= DataSouce.Count`) or point to different item.

- OnStartScrolling `UnityEvent`

  The event raised when scrolling starts.

- OnEndScrolling `UnityEvent`

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

- onSubmit `UnityEvent`

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

- onCancel `UnityEvent`

  The event raised when ListView gameobject has been deselected.

- onItemSelect `UnityEvent`

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

- onItemCancel `UnityEvent`

  The event raised when ListView item gameobject has been deselected.

- OnUpdateView `UnityEvent`

  The event raised when ListView view was updated.

- OnFocusIn `UnityEvent<BaseEventData>`

  The event raised when ListView gameobject received focus.

- OnFocusOut `UnityEvent<BaseEventData>`

  The event raised when ListView gameobject lost focus.

- OnPointerEnterObject `UnityEvent<int>`

  The event raised when pointer entered on ListView item gameobject.

  Arguments: index of the item.

- OnPointerExitObject `UnityEvent<int>`

  The event raised when pointer exited on ListView item gameobject.

  Arguments: index of the item.

- OnDataSourceChanged `UnityEvent<ListViewCustom<TComponent, TItem>>`

  The event raised when DataSource replaced with the new list.

  Arguments: ListView instance.

Items Events

It is `ListView.ItemsEvents` field with list of items events. First argument is item index, second is item instance instance, third is event data.

- PointerClick `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on every pointer click on item instance.

- FirstClick `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on first pointer click with left mouse button on item instance.

- DoubleClick `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on second pointer click with left mouse button on item instance.

- PointerUp `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on pointer up on item instance.

- PointerDown `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on pointer down on item instance.

- PointerEnter `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on pointer enter on item instance.

- PointerExit `UnityEvent<int, ListViewItem, PointerEventData>`

  The event raised on pointer exit on item instance.

- Move `UnityEvent<int, ListViewItem, AxisEventData>`

  The event raised on move with keyboard or gamepad on item instance.

- Submit `UnityEvent<int, ListViewItem, BaseEventData>`

  The event raised on submit on item instance.

- Cancel `UnityEvent<int, ListViewItem, BaseEventData>`

  The event raised on cancel on item instance.

- Select `UnityEvent<int, ListViewItem, BaseEventData>`

  The event raised when item instance has been selected by EventSystem.

- Deselect `UnityEvent<int, ListViewItem, BaseEventData>`

  The event raised when item instance has been deselected by EventSystem.

- Resize `UnityEvent<int, ListViewItem, Vector2>`

  The event raised when item instance size was changed.

- MovedToCache `UnityEvent<ListViewItem>`

  The event raised before item instance recycled.
  Use this event to clean data, unload sprites, stop instance animations.

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.

- DisableRecycling `bool`

  Disable recycling of this instance. Used in Drag&Drop or animations (enable at the start of the animation and disable at the end).

- GraphicsForeground `Graphic[]`

  References to the foreground objects like Text.

- GraphicsBackground `Graphic[]`

  References to the background objects.

- DisableRecycling `bool`

  If enabled prevent instance recycling until this option is disabled.

Methods

- SetData(`TItem` item)

  Set data.

- SelectItem()

  Select current item.

- DeselectItem()

  Deselect current item.

- RemoveItem()

  Remove current item from the ListView.DataSource.

- 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 to unload unused resources like sprites.

- StateDefault()

  Called by ListView when item in the default state.

- StateSelected()

  Called by ListView when item selected.

- StateHighlighted()

  Called by ListView when item highlighted.

- `Vector2` GetInstanceSize(`int` index)

  Get the size of the instance for the item with the specified index. Used to animate items resize without problems with virtualization.

- SetInstanceSize(`int` index, `Vector2` size)

  Set the size of the instance for the item with the specified index. `UpdateView()` should be called after it to apply changes. Used to animate items resize without problems with virtualization.

- ResetInstanceSize(`int` index)

  Reset the size to the default for the item with the specified index. `UpdateView()` should be called after it to apply changes. Used to animate items resize without problems with virtualization.

Auto-Resize DefaultItem instances on ListView Resize Maintaing Aspect Ratio

- DefaultItem.RectTransform anchors should be set to the horizontal or vertical stretch depending on ListView.Direction
- Add `Aspect Ratio Fitter` to the DefaultItem and set `Aspect Mode` = `Width Controls Height` or `Height Controls Width` depending on ListView.Direction
- Change ListView.ListType to `List View With Variable Size` or `Tile View With Variable Size`
- Make sure that ListView.Container.EasyLayout children size set to `Do Nothing`.

ListView with Items of Variable Size

ListView and TileView can display items with different heights *or* widths (it cannot be both at the same time).

1. ***ListView.DefaultItem*: add layout group component (it can be `Horizontal Layout Group`, `Vertical Layout Group`, or `EasyLayout`)**

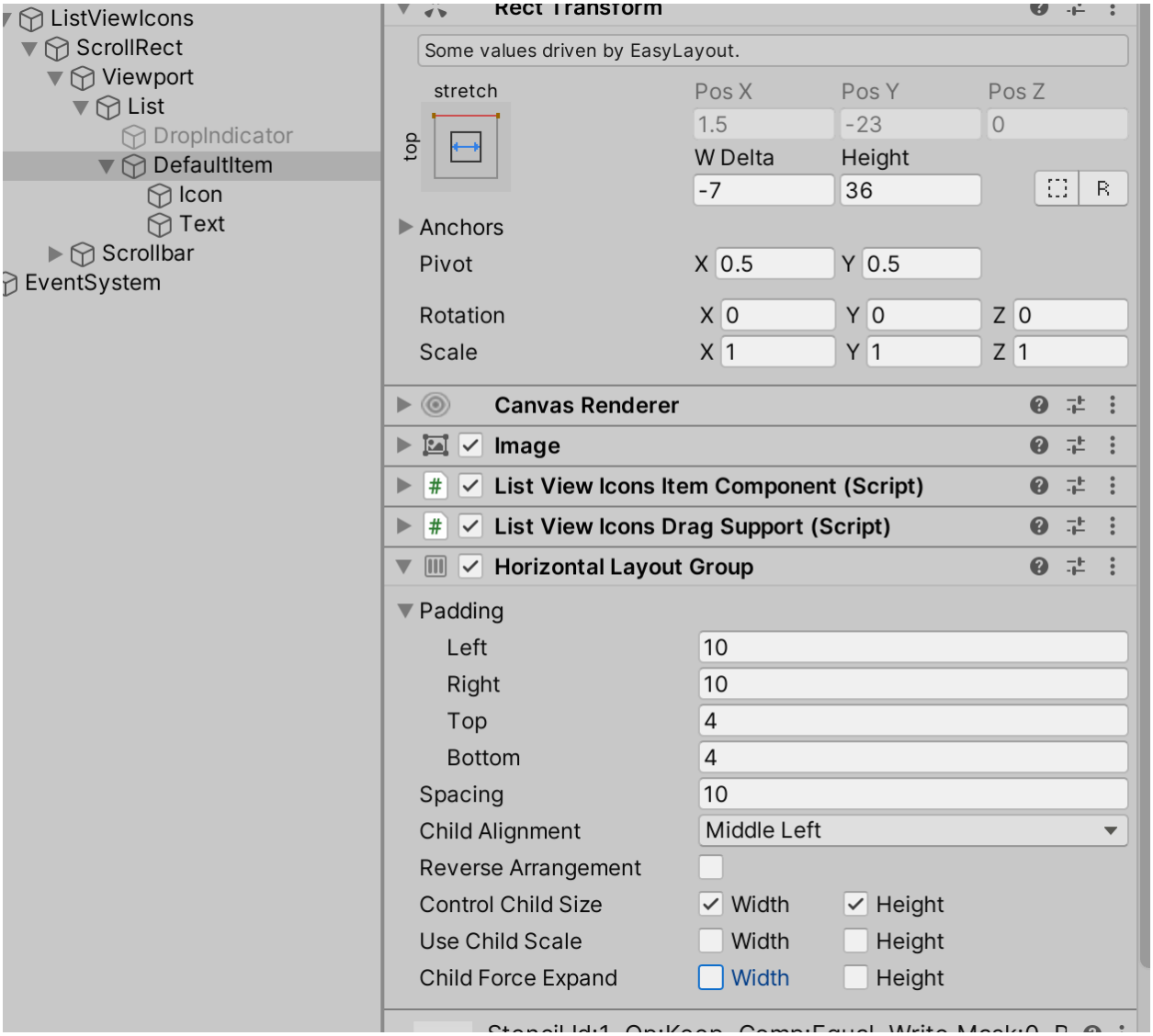
   - in case of `Horizontal Layout Group` or `Vertical Layout Group`: enable `Height` for `Control Child Size`, specify `Padding` and `Spacing` if needed.
   - in case of `EasyLayout`: change `Children Height` to `Set Preferred`, specify `Margin` and `Spacing` if needed.

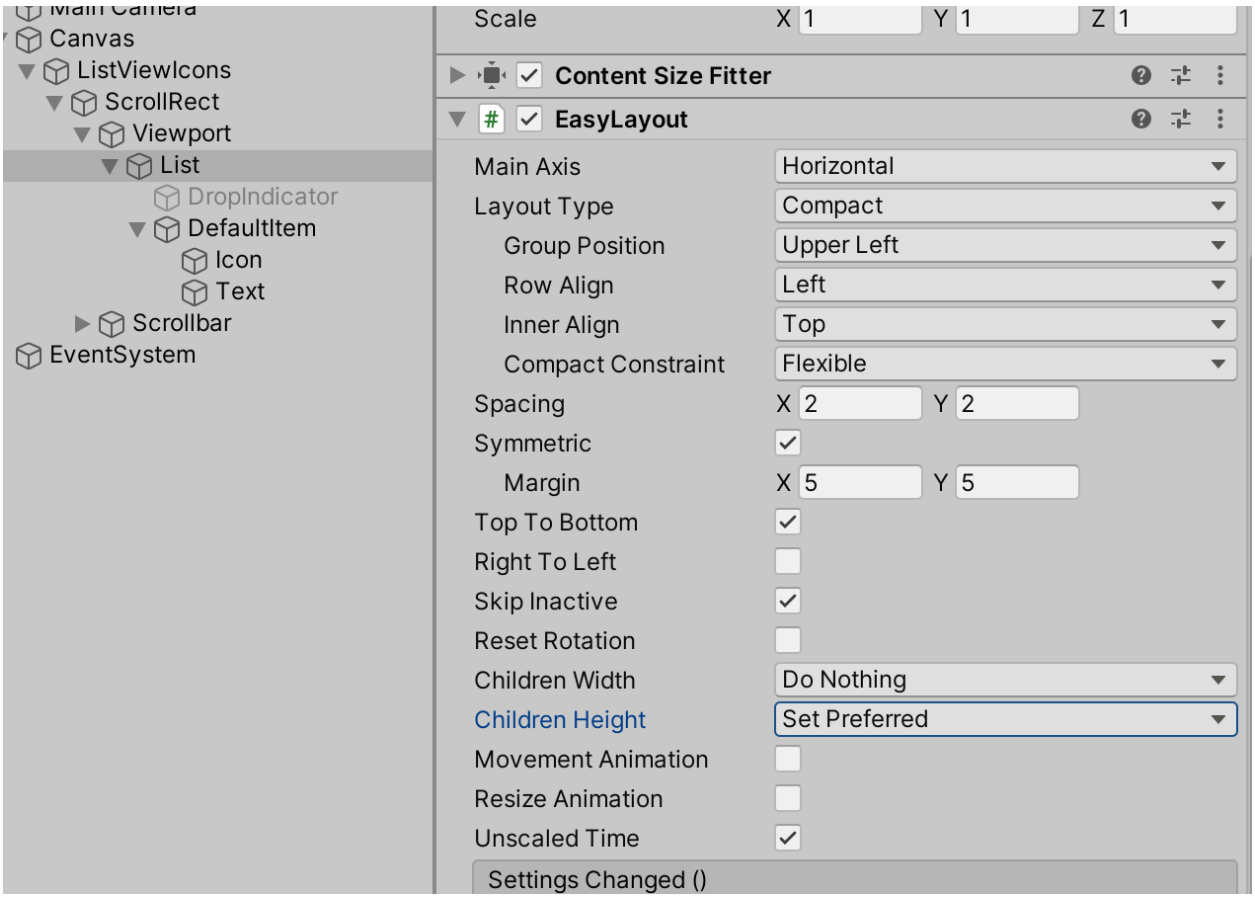
   If the ListView `Direction` is `Horizontal` then use *width* related options instead of *height*. `LayoutElement` component can be to **DefaultItem** to specify minimal width or height and other options.

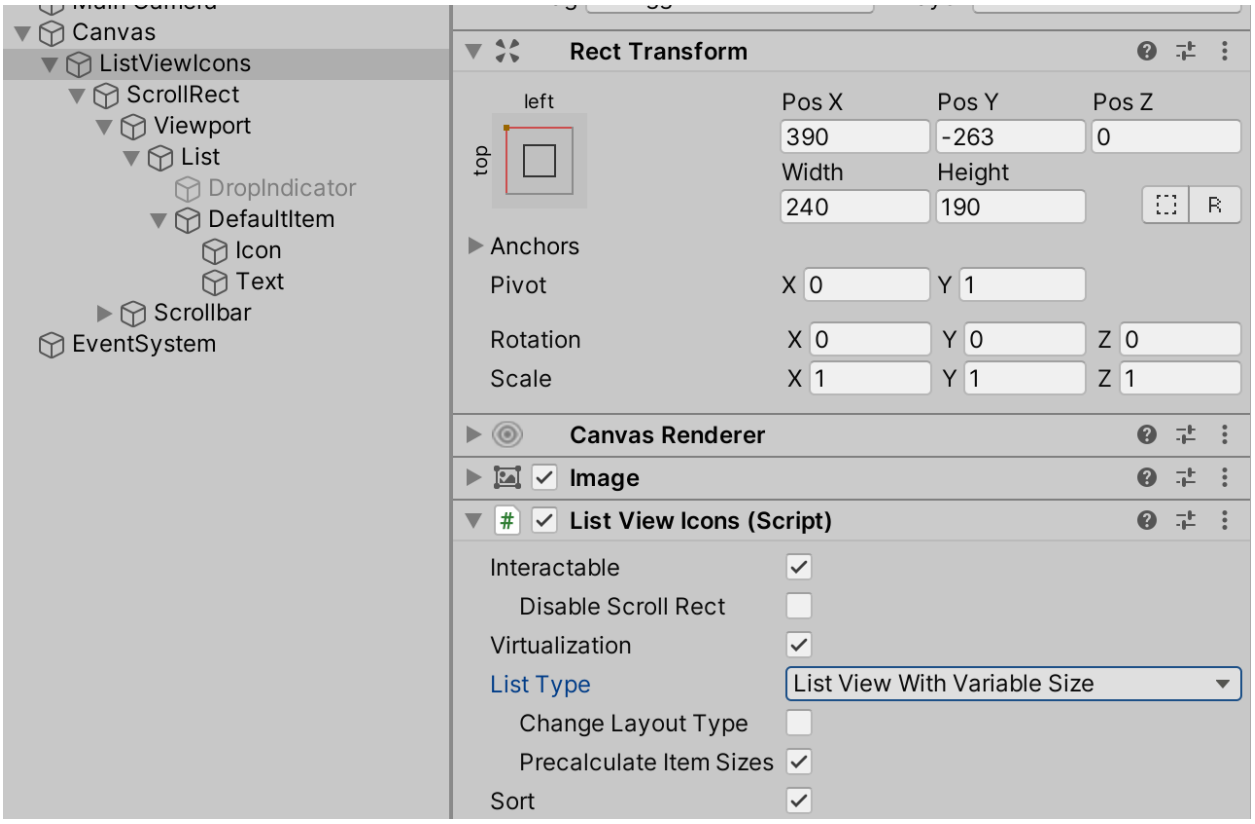
2. ***ListView.Container*: change `Children Height` to `Set Preferred` in `EasyLayout` component**

3 *ListView*: change `List Type` to `List View With Variable Size`, `Tile View With Variable Size`, or `Tile View Staggered`

Layout group will resize nested game objects and determine the size of each item. `EasyLayout` will resize those items and `ListView` will correctly process items with different sizes.


ListViewIcons
ScrollRect
Viewport
List
DropIndicator
DefaultItem
Icon
Text
Scrollbar
EventSystem
Rect Transform
Some values driven by EasyLayout.
stretch
top
Pos X
Pos Y
Pos Z
1.5
-23
0
W Delta
Height
-7
36
Anchors
Pivot
X 0.5
Y 0.5
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Canvas Renderer
Image
List View Icons Item Component (Script)
List View Icons Drag Support (Script)
Horizontal Layout Group
Padding
Left
10
Right
10
Top
4
Bottom
4
Spacing
10
Child Alignment
Middle Left
Reverse Arrangement
Control Child Size
Width
Height
Use Child Scale
Width
Height
Child Force Expand
Width
Height


Canvas
ListViewIcons
ScrollRect
Viewport
List
DropIndicator
DefaultItem
Icon
Text
Scrollbar
EventSystem
Scale
X 1
Y 1
Z 1
Content Size Fitter
EasyLayout
Main Axis
Horizontal
Layout Type
Compact
Group Position
Upper Left
Row Align
Left
Inner Align
Top
Compact Constraint
Flexible
Spacing
X 2
Y 2
Symmetric
Margin
X 5
Y 5
Top To Bottom
Right To Left
Skip Inactive
Reset Rotation
Children Width
Do Nothing
Children Height
Set Preferred
Movement Animation
Resize Animation
Unscaled Time
Settings Changed ()


Canvas
ListViewIcons
ScrollRect
Viewport
List
DropIndicator
DefaultItem
Icon
Text
Scrollbar
EventSystem
Rect Transform
left
top
Pos X
Pos Y
Pos Z
390
-263
0
Width
Height
240
190
Anchors
Pivot
X 0
Y 1
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Canvas Renderer
Image
List View Icons (Script)
Interactable
Disable Scroll Rect
Virtualization
List Type
List View With Variable Size
Change Layout Type
Precalculate Item Sizes
Sort

Multiple DefaultItems

ListView has the `TemplateSelector` property, it allow to use of different templates depending on the item or index.

```
namespace UIWidgets.Examples
{
   using UnityEngine;

   public class TreeViewMultipleDefaultItems : MonoBehaviour, IListViewTemplateSelector
↪<TreeViewSampleComponent, ListNode<ITreeViewSampleItem>>
   {
      [SerializeField]
      protected TreeViewSample TreeView;

      [SerializeField]
      protected TreeViewSampleComponentContinent ContinentTemplate;

      [SerializeField]
      protected TreeViewSampleComponentCountry CountryTemplate;

      protected virtual void Start()
      {
         TreeView.TemplateSelector = this;
      }

      public TreeViewSampleComponent[] AllTemplates()
      {
         return new TreeViewSampleComponent[] { ContinentTemplate, CountryTemplate };
      }

      public TreeViewSampleComponent Select(int index, ListNode<ITreeViewSampleItem>␣
↪item)
      {
         if (item.Node.Item is TreeViewSampleItemContinent)
         {
            return ContinentTemplate;
         }

         return CountryTemplate;
      }
   }
}
```

IListViewTemplateSelector Interface

Methods:

- `TComponent[]` AllTemplates()

  Get all possible templates.

- `TComponent` Select(`int` index, `TItem` item);

  Returns template to use for specified item with index.

DefaultItem Instances

```
// also available .Active and .Cache modes
foreach (var instance in ListView.GetComponentsEnumerator(PoolEnumeratorMode.All))
{
   // do somethind with DefaultItem instance
}
```

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);
```

Disable Items

```
protected virtual void Start()
{
   listView.CanSelect = CanBuy;
}

bool CanBuy(Item item)
{
   return player.Money >= item.Price;
}
```

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;
            }
```

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```
            return originalItems;
        }

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

            originalItems = value;

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

    /// <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);
```

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```
        }

        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;
        }

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

Stop Animations

```
protected virtual void Start()
{
  ListView.ItemsEvents.MovedToCache.AddListener(StopAnimations);
}

void StopAnimations(int index, ListViewItem instance)
{
  instance.StopSelectableAnimations();
  instance.Animator.ResetTrigger("customState");
}
```

Prevent Instance Recycling

You can prevent instance recycling if some action is running (like drag&drop) and the instance should be available until it ends.

```
protected override void InitDrag(PointerEventData eventData)
{
   Instance.DisableRecycling = true;
   // ....
}

public override void Dropped(bool success)
{
   Instance.DisableRecycling = false;
   // ...
}
```

3.1.7 ListViewEnum

Special *ListView, TileView and Table* to work with `enum`. Used in combination with `ListViewEnum<TEnum>`.

ListViewEnum<TEnum> Constructor Arguments

- listView `ListViewEnum`

  ListView to display `enum` values.

- showObsolete `bool` = `false`

  Show obsolete values.

- long2enum `Func<long, TEnum>` (optional)

  Custom converter from `long` to `TEnum`, use it to avoid memory allocations by default converter.

- enum2long `Func<TEnum, long>` (optional)

  Custom converter from `TEnum` to `long`, use it to avoid memory allocations by default converter.

ListViewEnum<TEnum> Properties

- Selected `TEnum`

  Selected value.

Example

```
public class TestListViewEnum : MonoBehaviour
{
   [SerializeField]
   protected ListViewEnum ListView;

   ListViewEnum<AdditionalCanvasShaderChannels> Wrapper;
```

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```
    protected void Start()
    {
        ListView.OnSelectObject.AddListener(ValueChanged);
        ListView.OnDeselectObject.AddListener(ValueChanged);

        Wrapper = ListView.UseEnum<AdditionalCanvasShaderChannels>(false, x =>␣
↪(AdditionalCanvasShaderChannels)x);
    }

    protected void OnDestroy()
    {
        if (ListView != null)
        {
            ListView.OnSelectObject.RemoveListener(ValueChanged);
            ListView.OnDeselectObject.RemoveListener(ValueChanged);
        }
    }

    void ValueChanged(int index)
    {
        Debug.Log(string.Format("selected: {0}", EnumHelper<AdditionalCanvasShaderChannels>
↪.ToString(Wrapper.Selected)));
    }

    /// <summary>
    /// Select values.
    /// </summary>
    public void Select()
    {
        WrapperWithFlags.Selected = AdditionalCanvasShaderChannels.Normal |␣
↪AdditionalCanvasShaderChannels.TexCoord1;
    }
}
```

3.1.8 TracksView

Can be used for the schedule-like or timeline-like widgets.

Consists on three main blocks: - PointNamesView: used to display the name of points, for example, time or date. - TracksNamesView: used to display the names of tracks. - TrackDataView: used to display tracks items.

Options

- Tracks `ObservableList<Track<TData, TPoint>>`

  List of tracks with items.

- TrackDataView `ScrollRect`

  Used to display tracks items.

- TrackNamesView `ScrollRect`

  Used to display the names of tracks.

- PointNamesView `ScrollBlockBase`

  Used to display the name of points, for example, time or date.

- Items Spacing `float`

  Empty space between items on Y axis.

- Tracks Spacing `float`

  Empty space between tracks on Y axis.

- Allow Drag Outside `bool`

  Allow to drag items outside of the TrackDataView.

- Items to Top `bool`

  Push items to the top if there is empty space.

- Compact `bool`

  Compact items position.

- Allow Intersection `bool`

  Allow temporary intersection during drag; overlapped item will be moved to another line after drag.

- Allow Auto Scroll `bool`

  Allow auto-scroll if the cursor is near the border on less the specified distance.

- Auto Scroll Border Distance `float`

  Distance to the border where auto-scroll start working.

- Auto Scroll Speed `float`

  Speed of the auto-scroll.

- Default Item `TDataView`

  A prefab used to display item.

- Default Track Header `TTrackView`

  A prefab used to display track header.

- Default Track Background `TTrackBackground`

  A prefab used to display track background.

- Track Data Dialog `TTrackDataDialog`

  Dialog to add/edit item.

- Track Dialog `TTrackDialog`

  Dialog to add/edit track.

3.1.9 TreeGraph

Options

- Nodes `ObservableList<TreeNode<TItem>>`

  Not available in the inspector window.

- DefaultItem `TComponent`

  A prefab used to display item.

- Direction `TreeGraphDirections`

  Directions: `TopToBottom`, `BottomToTop`, `LeftToRight`, `RightToLeft`.

- Container `RectTransform`

  The container of the instantiated gameobjects used to display items.

- Spacing `Vector2`

  Minimal space between items.

- Line Type `ConnectorType`

  Line type: `Straight` or `Rectangular`.

- Line Thickness `float`

  Line thickness.

- Line Margin `float`

  The minimum space from the border before the turn of the line. Supported only by `Rectangular` lines.

3.1.10 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 the same nodes, unlike ListView, TileView, and Table.

Options

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

- Nodes `ObservableList<TreeNode<TItem>>`

  Not available in the inspector window.

- Deselect Collapsed Nodes `bool`

  Deselect nested nodes when parent node collapsed.

- Scroll With Indent `bool`

  Scrolling with node indent in the secondary direction.

- Container Max Size `bool`

Prevent scrollbar blink caused by virtualization: the container will have the maximum width of all items. By default, the container has the maximum width of only visible items.

Require `List Type` = `List View with Variable Size`.

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);
}

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();
}

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();
}
```

Nodes Serialization

You can use helper class `TreeNodeJson<TItem>` for the node serialization and deserialization.

Warning: Unity `JsonUtility` does not support recursive types so it cannot be used. `Newtonsoft.Json` can be used instead.

```
// serialize
var nodes = TreeNodeJson<TreeViewItem>.ConvertNodes(TreeView.Nodes);
var json = JsonConvert.SerializeObject(nodes);

// deserialize
var decoded = JsonConvert.DeserializeObject<TreeNodeJson<TreeViewItem>[]>(json);
TreeView.Nodes = TreeNodeJson<TreeViewItem>.ConvertNodes(decoded);
```

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>`
- OnStartToggleAnimation `UnityEvent<AccordionItem>`
- OnDataSourceChanged `UnityEvent`

AccordionHighlight

`AccordionHighlight` is a separate component to highlight ToggleObjects of the opened item.

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,
      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.

- ImmediateSelect `bool`

Open the tab immediately if the tab header is under focus (gameobject selected by EventSystem), useful in a keyboard or gamepad navigation.

- CanSelectTab `Func<Tab, bool>`

  Function to check is tab can be selected.

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 Controls

3.3.1 Context Menu

To use the menu, you need to add a ContextMenu component and ContextMenu template. Different menus can use the same template.
Menu items are edited in a separate window which can be opened from the ContextMenu component.
In this window, you can specify menu items: name, icon, checkmark, item template, hotkey, and action when the item is clicked.
Initially, two item templates are available: the default template and the delimiter template; a minus sign is used as the key of the delimiter.
Any string can be used as a template key, not just signs.

The keyboard is supported: you can open the menu and navigate between menu items.
Hotkeys work out of the box with both legacy input and a new input system.

Options

- Interactable `bool`

  Allow users interact with the ListView.

- Template `ContextMenuTemplate`

  Context menu template.

- MenuItems `ObservableList<MenuItem>`

  Menu items.

- Is Default `bool`

  Is default menu? Default menu will be opened on context menu key press.

- Navigation `bool`

  Enable keyboard and gamepad navigation.

- Open On Right Button Click `bool`

  Open context menu on right mouse button click.

- Open On Context Menu Key `bool`

  Open context menu on context menu key press.

- Submenu Delay `float`

  Delay before open and close sub menu.

- Unscaled Time `bool`

  Use unscaled time.

MenuItem Options

- Visible `bool`

  Is item visible?

- Interactable `bool`

  Is item interactable?

- Icon `Sprite`

  Icon.

- Checked `bool`

  Is item checked?

- Name `string`

  Name.

- HotKey `HotKey`

  HotKey can be enabled with `MenuItem.EnableHotKey()` even if item not used in menu (Supported only of InputSystem enabled).

- Action `UnityEvent<MenuItem>`

  Action on item click.

- Items `ObservableList<MenuItem>`

  Nested items.

Events

- OnOpen `UnityEvent<ContextMenu>`

  The event raised when context menu opened.

  Arguments: opened context menu.

- OnClose `UnityEvent<ContextMenu>`

  The event raised when context menu closed.

  Arguments: closed context menu.

- OnItemSelect `UnityEvent<MenuItem>`

  The event raised when menu item selected.

  Arguments: selected menu item.

- OnItemDeselect `UnityEvent<ContextMenu>`

  The event raised when menu item deselected.

  Arguments: selected menu item.

ContextMenu for non-UI Gameobjects

You can add the `OpenContextMenu` component with the `ContextMenu` reference to a non-UI game object and the menu will be opened on the right mouse button click.
Or you can open the menu with the script:

```
contextMenu.Open(eventData);
```

3.3.2 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.

Options

- 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.

Animation

Animation work with `AnimationCurve`. Width is the length of the animation in seconds; height is a relative distance (0 is start position; 1 is end position).

ScrollRectPaginator use own `Movement` field. ListViewPaginator uses `ListView.ScrollMovement` field.

Tile View ScrollRect Fitter

Component to resize ListView.ScrollRect to fit the whole number of columns and rows.

3.3.3 Sidebar

Component to drag sidebar from behind the screen.

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.

- Modal Color `Color`

Modal background color.

Events

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

3.3.4 SplitButton

Button with the additional dropdown list of the buttons.

Options

- 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.

3.4 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.

3.4.1 DatePicker, DateTimePicker, TimePicker

Nested Widgets Replacement

Nested widgets can be safely replaced with their analogs:

- time can be displayed with *Time24*, *Time12*, *TimeAnalog*, *TimeScroller*
- date can be displayed with *Calendar*, *DateScroller*
- datetime can be displayed with *DateTime*, *DateTimeScroller*.

DatePicker Options

- CloseButton `Button`

  Button to close picker without selected value.

- HideOnModalClick `bool`

  Close picker on background click outside of picker.

- Mode `PickerMode`

  Picker mode:

  - Close On Select

    Close picker right after value selected.

  - Close On OK

    Close picker on OK click.

- Date Change Only `bool`

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

- OkButton `Button`

  OK button with selected value.

- Calendar `DateBase`

  Reference to the Date widget.

DateTimePicker Options

- CloseButton `Button`

  Button to close picker without selected value.

- HideOnModalClick `bool`

  Close picker on background click outside of picker.

- DateTimeWidget `DateTimeWidget`

  Reference to the DateTime widget.

TimePicker Options

- CloseButton `Button`

  Button to close picker without selected value.

- HideOnModalClick `bool`

  Close picker on background click outside of picker.

- Time `TimeBase`

  Reference to the Time widget.

Minimal Code

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

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

      [SerializeField]
      Text Result;

      DateTime currentValue = DateTime.Today;

      /// <summary>
      /// Open picker and log selected value.
      /// </summary>
      public async void TestAsync()
      {
         // create picker by template
```

(continues on next page)

(continued from previous page)

```
        var picker = PickerTemplate.Clone();

        // show picker
        var value = await picker.ShowAsync(currentValue);
        if (value.Success)
        {
            currentValue = value;
            Debug.Log("value: " + value);
        }
        else
        {
            Debug.Log("canceled");
        }
    }

    /// <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");
    }
  }
}
```

3.4.2 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.

- Close Button `Button`

  Button to close dialog.

- Buttons Container `RectTransform`

  Buttons container. If container not specified will be used parent of the button template.

- Hide on Modal Click `bool`

  Close dialog on click on the background if the `modal` option enabled.

Show() Method Parameters

All parameters are optional.
`title` and `message` also can be specified with `SetInfo()`
to use formatted strings.

- title `string`

  Dialog title.
  Can be changed with `SetInfo()` method.

- message `string`

  Dialog message.
  Can be changed with `SetInfo()` method.

- buttons `ButtonsPool`

  Dialog buttons.
  Can be changed with `SetButtons()` method.
  `DialogButton` fields:

  - Label `string`

    Button label.

  - Action `Func<DialogBase, int, bool>`

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

  - Template Index `int`

    Index of the button template.

- focusButton `string`

  Button with focus by default.

Can be changed with `SetButtons()` or `FocusButton()`.

- position `Vector3?`

  Dialog position.
  Can be changed with `SetPosition()`.

- icon `Sprite`

  Dialog icon.
  Can be changed with `SetInfo()` method.

- modal `bool`

  Modal dialog.
  Can be changed with `SetModal()`.

- modalSprite `Sprite`

  Background image for the modal dialog.
  Can be changed with `SetModal()`.

- modalColor `Color?`

  Background color for the modal dialog.
  Can be changed with `SetModal()`.

- canvas `Canvas`

  Canvas to display dialog. Required if dialog template is prefab.
  Can be changed with `SetCanvas()`.

- content `RectTransform`

  Dialog content. Can be used instead of the *message* and *icon*.
  Can be changed with `SetContent()`.

- onClose `Action`

  Action to run when dialog closed.
  Can be changed with `OnClose` field.

- onCancel `Func<int, bool>`

  Function to run when dialog canceled. Receive dialog instance and -1 as button index, return `true` if dialog should be closed.
  Obsolete, use `Func<DialogBase, int, bool> OnDialogCancel` field instead.

ShowAsync() Method Parameters

All parameters are optional.
`title` and `message` also can be specified with `SetInfo()` to use formatted strings.
Returns index of the clicked button or `-1` in case of `Cancel()` method.

- title `string`

  Dialog title.
  Can be changed with `SetInfo()` method.

- message `string`

  Dialog message.
  Can be changed with `SetInfo()` method.

- buttons `ButtonsPool`

  Dialog buttons.
  Can be changed with `SetButtons()` method.
  `DialogButton` fields:

  - Label `string`

    Button label.

  - Action `Func<DialogBase, int, bool>`

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

  - Template Index `int`

    Index of the button template.

- focusButton `string`

  Button with focus by default.
  Can be changed with `SetButtons()` or `FocusButton()`.

- position `Vector3?`

  Dialog position.
  Can be changed with `SetPosition()`.

- icon `Sprite`

  Dialog icon.
  Can be changed with `SetInfo()` method.

- modal `bool`

  Modal dialog.
  Can be changed with `SetModal()`.

- modalSprite `Sprite`

  Background image for the modal dialog.
  Can be changed with `SetModal()`.

- modalColor `Color?`

  Background color for the modal dialog.
  Can be changed with `SetModal()`.

- canvas `Canvas`

  Canvas to display dialog. Required if dialog template is prefab.
  Can be changed with `SetCanvas()`.

- content `RectTransform`

  Dialog content. Can be used instead of the *message* and *icon*.
  Can be changed with `SetContent()`.

- closeOnButtonClick `bool`

Close dialog on button click.

Minimal code

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

Advanced

```
// create dialog instance
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
        DialogBase.DefaultClose, // Func<DialogBase, int, bool>, receive dialog instance␣
↪and button index, return true to close dialog, otherwise false
        0 // button index in ButtonsTemplates
      ),
   },
   focusButton: "Close",
   modal: true,
   modalColor: new Color(0, 0, 0, 0.8f)
);
```

Async

```
// create dialog instance
var dialog = dialogPrefab.Clone();
// show dialog with following parameters
var button_index = await dialog.ShowAsync(
   title: "Modal Dialog",
   message: "Simple Modal Dialog.",
   buttons: new DialogButton[]
   {
      "Do Some Action",
      "Do Other Action",
      "Close",
   },
   focusButton: "Close",
   modal: true,
```

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

if (button_index == 0)
{
   Debug.Log("Do Some Action");
}
else if (button_index == 1)
{
   Debug.Log("Do Other Action");
}
```

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", SignInNotify),

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

bool SignInNotify(DialogBase dialog, int index)
{
   var helper = dialog.GetComponent<DialogInputHelper>();
   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;
}
```

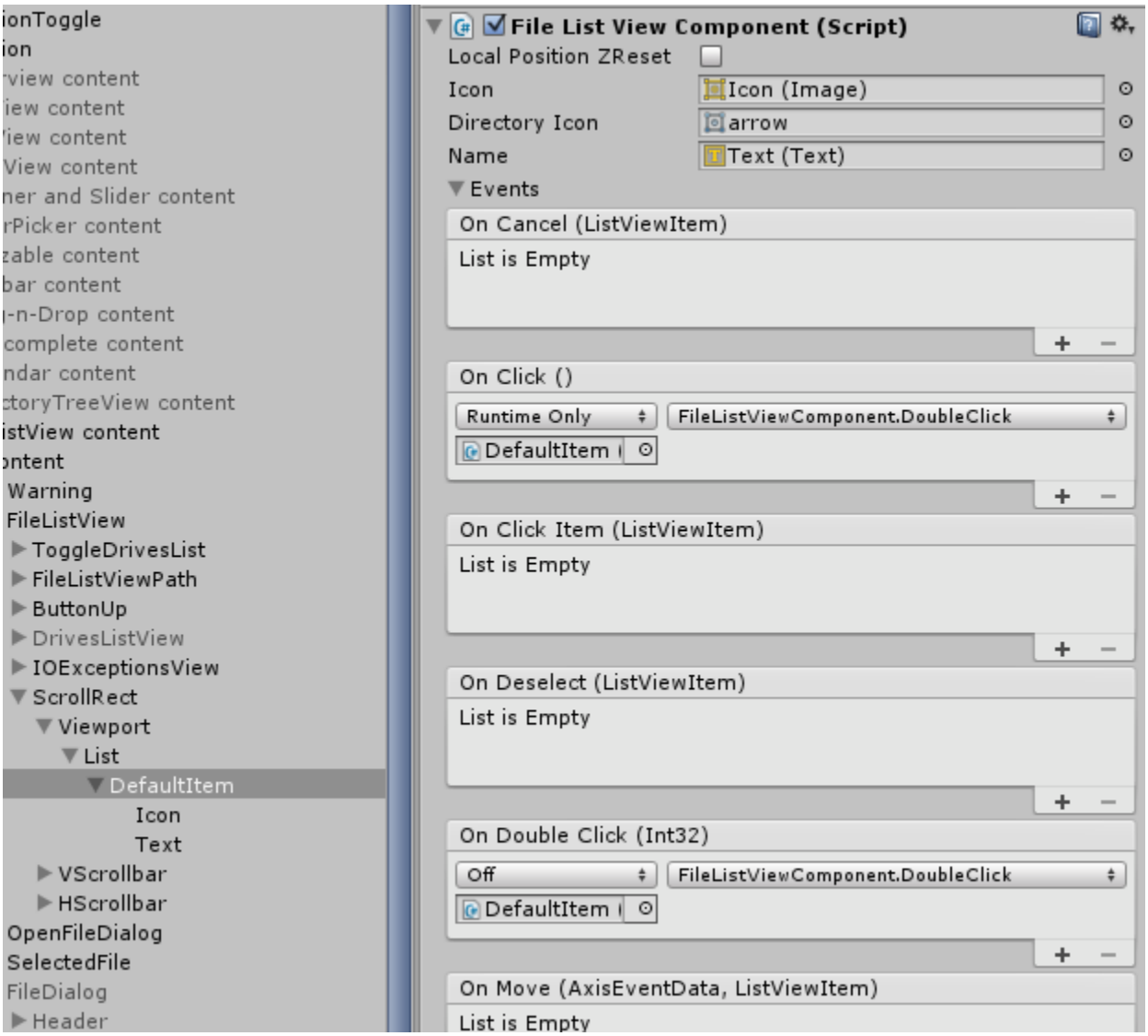
Custom Dialogs

You can create derived class with own methods and fields.

```
public class MyDialog : DialogCustom<MyDialog>
{
   // ...
}
```

3.4.3 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;

        string currentValue = string.Empty;

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

            // show picker
            var value = await picker.ShowAsync(currentValue);
            if (value.Success)
            {
                currentValue = value;
                Debug.Log("value: " + value);
            }
            else
            {
                Debug.Log("canceled");
            }
        }
    }
}
```

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

                     // show picker
                     var value = await picker.Show(currentValue);
         if (value.Success)
         {
            currentValue = value;
            Debug.Log("value: " + value);
         }
         else
         {
            Debug.Log("canceled");
         }
             }

             /// <summary>
             /// Show picker and display selected value.
             /// </summary>
```

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```
        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";
        }
    }
}
```

3.4.5 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.

- Slide Up On Hide `bool`

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

- Notify Info `NotifyInfoBase`

  Component to display the notification message.

- Close Button `Button`

Button to close notification.

- Buttons Container `RectTransform`

  Buttons container. If container not specified will be used parent of the button template.

Show() Method Parameters

All parameters are optional.
`message` also can be specified with `SetMessage()`
to use formatted strings.

- message `string`

  Notification message.
  Can be changed with `SetMessage()` method.

- customHideDelay `float?`

  Time before notification hidden or `hideAnimation` start running.
  Can be changed with `HideDelay` field.

- container `Transform?`

  Notifications container. Should have `Layout Group` component
  to display multiple notifications.
  Can be changed with `SetContainer()` method.

- showAnimation `Func<TNotification, IEnumerator>`

  Show animation.
  Can be changed with `ShowAnimation` field.

- hideAnimation `Func<TNotification, IEnumerator>`

  Hide animation.
  Can be changed with `HideAnimation` field.

- slideUpOnHide `bool?`

  Start slide up animations after hide current notification.
  Can be changed with `SlideUpOnHide` field.

- sequenceType `NotifySequence`

  Add notification to sequence and display in order according to the specified `sequenceType`.

- sequenceDelay `float`

  Time between previous notification was hidden and this will be displayed.
  Can be changed with `SequenceDelay` field.

- clearSequence `bool`

  Clear notifications sequence.

- newUnscaledTime `bool?`

  Animations will use unscaled time.

- content `RectTransform`

  Notification content.

Can be changed with `SetContent()`.

- onReturn `Action`

  Action called when instance return to the cache.
  Can be changed with `OnReturn` field.

- onHide `Action<TNotification>`

  Action called when instance return to the cache.
  Can be changed with `OnNotificationHide` field.

ShowAsync() Method Parameters

All parameters are optional.
`message` also can be specified with `SetMessage()`
to use formatted strings.
Returns index of the clicked button or `-1` if notification was hidden after delay or on hide button click.

- message `string`

  Notification message.
  Can be changed with `SetMessage()` method.

- customHideDelay `float?`

  Time before notification hidden or `hideAnimation` start running.
  Can be changed with `HideDelay` field.

- container `Transform?`

  Notifications container. Should have `Layout Group` component
  to display multiple notifications.
  Can be changed with `SetContainer()` method.

- showAnimation `Func<TNotification, IEnumerator>`

  Show animation.
  Can be changed with `ShowAnimation` field.

- hideAnimation `Func<TNotification, IEnumerator>`

  Hide animation.
  Can be changed with `HideAnimation` field.

- slideUpOnHide `bool?`

  Start slide up animations after hide current notification.
  Can be changed with `SlideUpOnHide` field.

- sequenceType `NotifySequence`

  Add notification to sequence and display in order according to the specified `sequenceType`.

- sequenceDelay `float`

  Time between previous notification was hidden and this will be displayed.
  Can be changed with `SequenceDelay` field.

- clearSequence `bool`

Clear notifications sequence.

- newUnscaledTime `bool?`

  Animations will use unscaled time.

- content `RectTransform`

  Notification content.
  Can be changed with `SetContent()`.

- closeOnButtonClick `bool`

  Close notification on button click.

Minimal code

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

Advanced

```
var notification = notificatetionTemplate.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 = NotificationBase.AnimationCollapseVertical,
   // without SlideUpOnHide
   slideUpOnHide = false
);
```

Notification with Buttons

Nofications can have buttons with custom actions. Buttons callback receive notification instance and button index, return `true` to close notification; otherwise `false`.

```
[SerializeField]
protected Notify NotificationTemplate;

/// <summary>
/// Show notification.
/// </summary>
public void ShowNotify()
{
   var actions = new NotificationButton[]
```

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```
    {
        new NotificationButton("Close", NotificationClose),
        new NotificationButton("Log", NotificationClick),
    };

    var instance = NotificationTemplate.Clone();
    instance.Show("Notification with buttons. Hide after 5 seconds.", customHideDelay:␣
↪5f);
    instance.SetButtons(actions);
}

bool NotificationClose(NotificationBase notification, int index)
{
    Debug.Log("close notification");
    return true;
}

bool NotificationClick(NotificationBase notification, int index)
{
    Debug.Log("click notification button");
    return false;
}
```

Async Notification with Buttons

```
[SerializeField]
protected Notify NotificationTemplate;

/// <summary>
/// Show notification.
/// </summary>
async public void ShowNotify()
{
    var actions = new NotificationButton[]
    {
        new NotificationButton("Close"),
        new NotificationButton("Log"),
    };

    var instance = NotificationTemplate.Clone();
    instance.SetButtons(actions);
    var button_index = await instance.ShowAsync("Notification with buttons. Hide after 5␣
↪seconds.",
        customHideDelay: 5f, closeOnButtonClick: false);

    while (button_index == 1)
    {
        Debug.Log("click notification button");
        button_index = await instance;
    }
```

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```
    if (button_index == 0)
    {
        Debug.Log("close notification");
        instance.Hide();
    }
    else
    {
        Debug.Log("hide button");
        instance.Hide();
    }
}
```

Default Hide Animations

Note: Hide Animation is coroutine that accepts `NotificationBase` 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.

Default Show Animations

Note: Show Animation is coroutine that accepts `NotificationBase` instance and play show animation for this instance. You can specify any custom coroutine.

- **ShowAnimationRotateHorizontal**
  Rotate notification on X axis.
- **ShowAnimationRotateVertical**
  Rotate notification on Y axis.

- **ShowAnimationCollapseHorizontal**
  Resize width of the notification.
- **ShowAnimationCollapseVertical**
  Resize height of the notification.
- **ShowAnimationSlideRight**
  Slide notification from right.
- **ShowAnimationSlideLeft**
  Slide notification from left.
- **ShowAnimationSlideUp**
  Slide notification from top.
- **ShowAnimationSlideDown**
  Slide notification from bottom.

Configurable Hide Animations

- **HideAnimationRotateBase**

  Arguments:

  - **`NotificationBase` notification**
    Notification instance.
  - **`bool` isHorizontal**
    Rotate in horizontal or vertical direction.
  - **`float` timeLength**
    Length of animations in seconds.

- **HideAnimationCollapseBase**

  Arguments:

  - **`NotificationBase` notification**
    Notification instance.
  - **`bool` isHorizontal**
    Resize in horizontal or vertical direction.
  - **`float` speed**
    Resize speed in points per second.

- **HideAnimationSlideBase**

  Arguments:

  - **`NotificationBase` notification**
    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.

```
NotificationTemplate.Clone().Show(
   "Notification message.",
   customHideDelay: 3f,
   hideAnimation: x => NotificationBase.HideAnimationSlideBase(x, true, -1f, 200f, true)
);
```

Configurable Show Animations

- **ShowAnimationRotateBase**

  Arguments:

  - **`NotificationBase` notification**
    Notification instance.
  - **`bool` isHorizontal**
    Rotate in horizontal or vertical direction.
  - **`float` timeLength**
    Length of animations in seconds.

- **ShowAnimationCollapseBase**

  Arguments:

  - **`NotificationBase` notification**
    Notification instance.
  - **`bool` isHorizontal**
    Resize in horizontal or vertical direction.
  - **`float` speed**
    Resize speed in points per second.

- **ShowAnimationSlideBase**

  Arguments:

  - **`NotificationBase` notification**
    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.

```
NotificationTemplate.Clone().Show(
   "Notification message.",
   customHideDelay: 3f,
   showAnimation: x => NotificationBase.ShowAnimationSlideBase(x, true, -1f, 200f, true)
);
```

Custom Notifications

You can create derived class with own methods.

```
public class MyNotify : NotificationCustom<MyNotify>
{
    // ...
}
```

3.4.6 Pickers

Base class for the custom pickers.

Options

- Close Button `Button`

  Button to close picker.

- Hide on Modal Click `bool`

  Close picker on click on the background if the `modal` option enabled.

Show() Method Parameters

All parameters are optional.

- defaultValue `TValue`

  Default value.</param>

- onSelect `Action<TValue>`

  Callback with selected value.

- onCancel `Action`

  Callback when picker closed without any value selected.

- modalSprite `Sprite`

  Background image for the modal dialog.
  Can be changed with `SetModal()`.

- modalColor `Color?`

  Background color for the modal dialog.
  Can be changed with `SetModal()`.

- canvas `Canvas`

  Canvas. Can be changed with `SetCanvas()`.

ShowAsync() Method Parameters

All parameters are optional.
Returns `TPicker.Result` with selected value or success mark.

- defaultValue `TValue`

  Default value.</param>

- modalSprite `Sprite`

  Background image for the modal dialog.
  Can be changed with `SetModal()`.

- modalColor `Color?`

  Background color for the modal dialog.
  Can be changed with `SetModal()`.

- canvas `Canvas`

  Canvas. Can be changed with `SetCanvas()`.

TPicker.Result Fields

- Value `TValue`

  Selected value or a default value if nothing is selected.

- Success `bool`

  `true` if the value was selected; `false` if the picker was canceled or closed without a value chosen.

Example

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

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

                int currentValue = 0;

                async public void TestAsync()
                {
                        // create picker instance
                        var picker = PickerTemplate.Clone();

                        // copy values
                        picker.ListView.DataSource = PickerTemplate.ListView.DataSource;
```

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```
                        // show picker
                        var value = await picker.ShowAsync(currentValue);
                        if (value.Success)
                        {
                                currentValue = value;
                                Debug.Log("value: " + value);
                        }
                        else
                        {
                                Debug.Log("canceled");
                        }
                }

                /// <summary>
                /// Show picker with callbacks and log selected value.
                /// </summary>
                public void TestCallbacks()
                {
                        // create picker instance
                        var picker = PickerTemplate.Clone();

                        // copy values
                        picker.ListView.DataSource = PickerTemplate.ListView.DataSource;

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

                void ValueSelected(int value)
                {
                        currentValue = value;
                        Debug.Log(string.Format("value: {0}", value));
                }

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

3.4.7 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.

- CloseButton `Button`

  Button to close popup.

- Hide on Modal Click `bool`

  Close popup on click on the background if the `modal` option enabled.

Show() Method Parameters

All parameters are optional.
`title` and `message` also can be specified with `SetInfo()` to use formatted strings.

- title `string`

  Popup title.
  Can be changed with `SetInfo()` method.

- message `string`

  Popup message.
  Can be changed with `SetInfo()` method.

- position `Vector3?`

  Popup position.
  Can be changed with `SetPosition()`.

- icon `Sprite`

  Popup icon.
  Can be changed with `SetInfo()` method.

- modal `bool`

  Modal popup.
  Can be changed with `SetModal()`.

- modalSprite `Sprite`

  Background image for the modal popup.
  Can be changed with `SetModal()`.

- modalColor `Color?`

  Background color for the modal popup.
  Can be changed with `SetModal()`.

- canvas `Canvas`

  Canvas to display popup. Required if popup template is prefab.
  Can be changed with `SetCanvas()`.

- content `RectTransform`

Dialog content. Can be used instead of the *message* and *icon*.
Can be changed with `SetContent()`.

- onClose `Action`

  Action to run when dialog closed.
  Can be changed with `OnClose` field.

Minimal code

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

Advanced

```
// create popup instance
var popup = popupTemplate.Clone();
// show popup with following parameters
popup.Show(
   title: "Modal popup",
   message: "Simple Modal popup.",
   modal: true,
   modalColor: new Color(0, 0, 0, 0.8f)
);
```

Async

```
var popup = popupTemplate.Clone();
await popup.ShowAsync();
```

3.5 Input

3.5.1 Autocomplete

Note:

Difference between AutocompleteCombobox and AutoCombobox:
- AutocompleteCombobox basically is InputField with autocomplete feature, so you can get only string, not selected item.
- AutoCombobox is Combobox with the option to select items by typing, with it you can get selected items.

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.

- ResetListViewSelection `bool`

Deselect selected items in the DisplayListView.

- AllowCancelOnDeselect `Func<BaseEventData, AutocompleteCustom<TValue, TListViewComponent, TListView>, bool>`

  Allow to cancel DisplayListView close on deselect event.

Events

- OnOptionSelected `UnityEvent`
- OnOptionSelectedItem `UnityEvent<TValue>`
- OnItemNotFound `UnityEvent<string>`
- OnCancelInput `UnityEvent`
- OnSearchCompleted `UnityEvent`

```
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;
      }
   }
}
```

3.5.2 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>
```

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```
    /// 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);

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

            // change culture (display days and months in english)
            Calendar.Culture = new System.Globalization.CultureInfo("en-US");

            // change culture (display days and months in french)
            Calendar.Culture = new System.Globalization.CultureInfo("fr-FR");

            // 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();
        }
    }
}
```

3.5.3 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.

- Value Max `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

- OnValueChanged `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;
```

3.5.4 Circular Slider

Options

- Interactable `bool`

  Is interactable?

- Handle `DragListener`

  Handle to drag.

- Arrow `RectTransform`

  Arrow.

- Value `int`

  Current value.

- Min Value `int`

  Minimal value.

- Max Value``int``

  Maximal value.

- Step `int`

  Value step.

- Start Angle `float`

  Angle for the Min Value.

Events

- OnValueChanged `UnityEvent<int>`
- OnChange `UnityEvent`

Set value

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

Set value limits

```
slider.MinValue = 100;
slider.MaxValue = 200;
```

3.5.5 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);
}
```

3.5.6 DateTime

Nested widgets can be safely replaced with their analogs:

- time can be displayed with *Time24*, *Time12*, *TimeAnalog*, *TimeScroller*
- date can be displayed with *Calendar*, *DateScroller*

DateScroller Options

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

    Format to parse **Default Date Time**.
- Calendar `DateBase`

  Widget to select date.
- Time `TimeBase`

  Widget to select time.
- Is Scroll Blocks Used `bool`

  Is Calendar and Time widgets are *scrollers*? Required for the styles support.

Events

- OnDateTimeChanged `UnityEvent<DateTime>`

  The event raised when date changed.

  Arguments: selected datetime.

3.5.7 DateScroller, DateTimeScroller, TimeScroller

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

Note: DateTime Formats Strings

DateScroller Options

- 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>`

    The event raised when date changed.

    Arguments: selected datetime.

  - OnDateClick `UnityEvent<DateTime>`

    The event raised when date setted or changed.

    Arguments: selected datetime.

DateTimeScroller Options

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 Options

- 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>`

    The 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;

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

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```
        // 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);
    }
  }
}
```

Customization

ScrollBlock has `OnItemChanged(int index, ScrollBlockItem item)` event. You can subscribe to this event to customize items depending on index or value.

- selected item has `Index = 0`
- items before it have a negative index
- items after it have a positive index
- step of the index is 1.

```
public class ScrollBlockCustomization : MonoBehaviour
{
   [SerializeField]
   ScrollBlock YearsScrollBlock;

   protected void Start()
   {
      YearsScrollBlock.OnItemChanged += ItemChanged;
   }

   protected void OnDestroy()
   {
      if (YearsScrollBlock != null)
      {
         YearsScrollBlock.OnItemChanged -= ItemChanged;
      }
   }

   protected void ItemChanged(int index, ScrollBlockItem item)
   {
      item.Text.Bold = index == 0;
      item.Text.fontSize = index == 0 ? 20 : 14;
```

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```
    }
}
```

3.5.8 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

- OnValuesChanged `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));
   }
}
```

3.5.9 Rating

Options

- Interactable `bool`

  User can interact with Time widget.

- Value `int`

  Default rating value.

- Value Max `int`

  Maximal rating value.

- Star Empty `RatingStar`

  Template of an empty start.

- Star Full `RatingStar`

  Template of a full start.

- Color Min `Color`

  Color for the lowest rating.

- Color Max `Color`

  Color for the highest rating.

- Lerp Mode `ColorLerpMode`

  Color lerp mode: `RGB` or `HSV`.

Events

- OnChange `UnityEvent<int>`

  The event raised when rating changed.

  Arguments: rating.

3.5.10 Scale

Scale for the sliders: default Slider, *RangeSlider* (`Disable Handle Overlay` is not supported), *CenteredSlider*. To use add the appropriate SliderScale / RangeSliderScale / CenteredSliderScale component to the Slider, then create and specify Scale gameobject.

Options

- Container `RectTransform`

  Marks container.

- Main Line `Image`

  Main line.

- Show Current Value `bool`

Show marks for the current values.

- Current Mark Template `ScaleMarkTemplate`

  Template for the current mark.

- Show Min Value `bool`

  Show mark for the min value.

- Min Mark `ScaleMarkTemplate`

  Minimum mark.

- Show Max Value `bool`

  Maximum mark.

- Scale Marks `List<ScaleMark>`

  Marks templates.

- MarkValuesGenerator `Action<float min, float max, float step, List<float> output>`

  Fill output list with values where marks should be displayed.

ScaleMark

- Step `float`

  Value difference between marks.

- Template `ScaleMarkTemplate`

  Mark template.

SliderScale and RangeSliderScale Components

- Scale `Scale`

  Scale gameobject.

- Format `string`

  Format to display mark value.

  - https://docs.microsoft.com/en-us/dotnet/standard/base-types/standard-numeric-format-strings
  - https://docs.microsoft.com/en-us/dotnet/standard/base-types/custom-numeric-format-strings

- Formatter `Func<float, string>`

  Custom formatter to use instead of format string.

CenteredSliderScale Component

- Scale `Scale`

  Scale gameobject.

- Format `string`

  Format to display mark value.

  - https://docs.microsoft.com/en-us/dotnet/standard/base-types/standard-numeric-format-strings
  - https://docs.microsoft.com/en-us/dotnet/standard/base-types/custom-numeric-format-strings

- Formatter `Func<float, string>`

  Custom formatter to use instead of format string.

- Negative Step Rate `float`

  Multiplicator for marks at negative side of the scale.

- Positive Step Rate `float`

  Multiplicator for marks at positive side of the scale.

3.5.11 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);
```

3.5.12 Time

Time24 has 24-hour format.
Time12 has 12-hour format with AM/PM toggle.

Options

- Interactable `bool`

  User can interact with Time widget.

- Current Time As Default `bool`
  - Time `TimeSpan` (`string` in Inspector window)
- Time Min `TimeSpan` (`string` in Inspector window)

  Minimal selectable time.

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

  Maximum selectable time.

- Input Hours Adapter `InputFieldAdapter`

  InputField for the hours.

- Input Minutes Adapter `InputFieldAdapter`

  InputField for the minutes.

- Input Seconds Adapter `InputFieldAdapter`

  InputField for the seconds.

- Button Hours Increase `ButtonAdvanced`

  Button to increase hours.

- Button Hours Decrease `ButtonAdvanced`

  Button to decrease hours.
- Button Minutes Increase `ButtonAdvanced`

  Button to increase minutes.
- Button Minutes Decrease `ButtonAdvanced`

  Button to decrease minutes.
- Button Seconds Increase `ButtonAdvanced`

  Button to increase seconds.
- Button Seconds Decrease `ButtonAdvanced`

  Button to decrease seconds.
- Allow Hold `bool`

  Allow button hold after `Hold Start Delay` to increase/decrease time with each `Hold Change Delay`.
- Hold Start Delay `float`

  Seconds from button press to start increase/decrease on hold.
- Hold Change Delay `float`

  Seconds to single increase/decrease during hold.
- AMPM Button `Button`

  Button to toggle AM/PM.
- AMPM Text Adapter `TextAdapter`

  Text to display AM/PM.

Events

- OnTimeChanged `UnityEvent<TimeSpan>`

  The event raised when time changed.

  Arguments: selected time.

3.5.13 TimeAnalog

Options

- Interactable `bool`

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

  Minimal selectable time.
- Time Max `TimeSpan` (`string` in Inspector window)

Maximum selectable time.

- Slider `CircularSlider`

  Time slider.

- Step `int`

  Time step at minutes.

- AMPM Button `Button`

  Button to toggle AM/PM.

- AMPM Text `TextAdapter`

  Text to display AM/PM.

- Hours Labels `List<GameObject>`

  Hours labels, required for the styles support.

Events

- OnTimeChanged `UnityEvent<TimeSpan>`

  The event raised when time changed.

  Arguments: selected time.

3.6 Miscellaneous

3.6.1 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();
```

3.6.2 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();
```

3.6.3 Simple Tooltip

Display the tooltip when cursor over gameobject or gameobject get focus.
`SimpleTootip` cannot be used by multiple gameobjcts unlike *Tooltip*.

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.

Events

- OnShow `UnityEvent`
- OnHide `UnityEvent`

3.6.4 Tooltip

Display the generic tooltip when cursor over gameobject or gameobject get focus.
Different gameobjects can use the same tooltip gameobject.
Tooltip for custom type can be created by *Widgets Generator*.
Tooltip is automatically updated if custom types implements `IObservable` or `INotifyPropertyChanged` interface.

Using Tooltip

Add tooltip to gameobject:

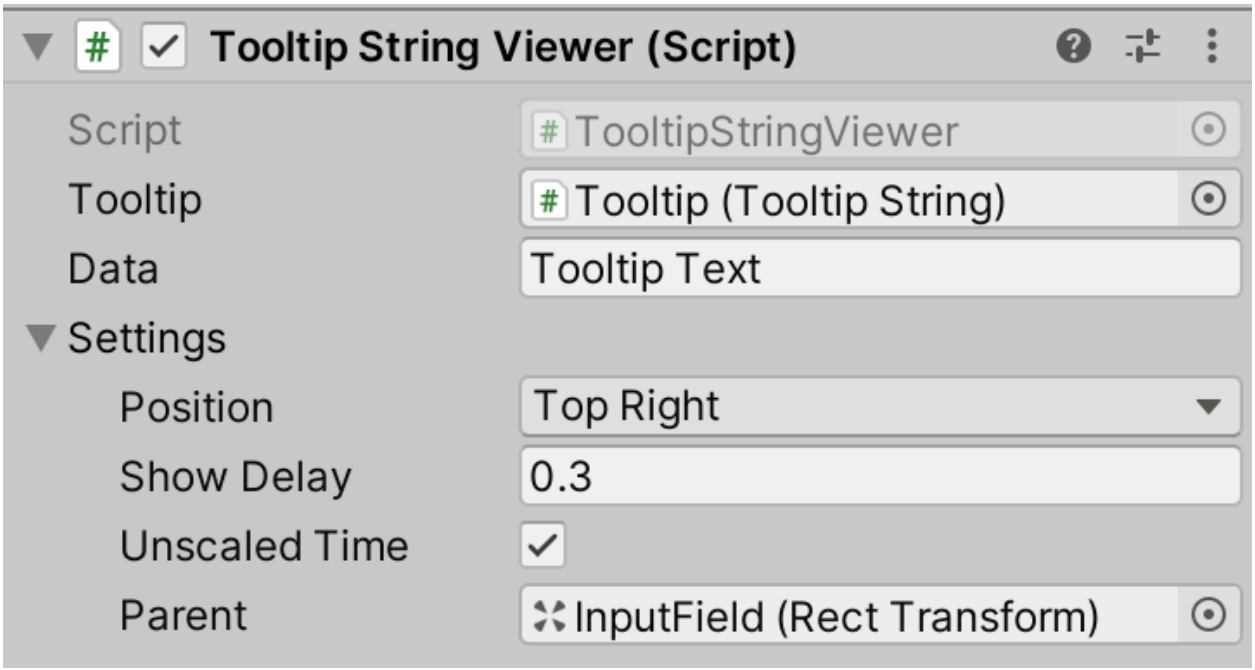
```
Tooltip.Register(
   TargetGO, // gameobject to add tooltip
   Data, // data to display
   new TooltipSettings(TooltipPosition.TopCenter, delay = 0.3f, unscaledTime = true)
);
```

Remove tooltip:

```
Tooltip.Unregister(TargetGO);
```

Also tooltip can be added with Tooltip Viewer component.

Destroy Tooltip Viewer component to remove tooltip.



Tooltip Fields and Properties

- `TData` CurrentData
- `GameObject` CurrentTarget

Tooltip Methods

- Register(`GameObject` target, `TData` data, `TooltipSettings` settings)
- Unregister(`GameObject` target)
- Show(`GameObject` target)
- Hide()
- `TData` GetData(`GameObject` target)
- `bool` UpdateData(`GameObject` target, `TData` data)
- `TooltipSettings` GetSettings(`GameObject` target)
- UpdateSettings(`GameObject` target, `TooltipSettings` settings)

Tooltip Events

- OnShow `UnityEvent<TTooltip, GameObject>`
- OnHide `UnityEvent<TTooltip, GameObject>`

Tooltip Settings

- Position `TooltipPosition`

  Tooltip position relative to target gameobject.

- Delay `float`

  Delay before tooltip displayed.

- Parent `RectTransform`

  Tooltip parent.

- UnscaledTime `bool`

  Delay specified in unscaled time.

TooltipPosition

- Top Left
- Top Center
- Top Right
- Middle Left
- Middle Center
- Middle Right
- Bottom Left
- Bottom Center
- Bottom Right

Tooltip Viewer Fields

- Tooltip `TTooltip`
- Data `TData`

  Data to display.

- Settings `TooltipSettings`

  Tooltip display settings.

Tooltip Code Example

```
namespace UIWidgets
{
   /// <summary>
   /// Tooltip string.
   /// </summary>
   public class TooltipString : Tooltip<string, TooltipString>
   {
      /// <summary>
```

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```
        /// Text.
        /// </summary>
        public TextAdapter Text;

        /// <summary>
        /// Item.
        /// </summary>
        public string Item
        {
            get;
            protected set;
        }

        /// <inheritdoc/>
        protected override void SetData(string data)
        {
            Item = data;
            UpdateView();
        }

        /// <inheritdoc/>
        protected override void UpdateView()
        {
            Text.text = Item;
        }
    }
}
```

Tooltip Viewer Code Example

```
namespace UIWidgets
{
    /// <summary>
    /// TooltipString viewer.
    /// </summary>
    public class TooltipStringViewer : TooltipViewer<string, TooltipString>
    {
    }
}
```

CHAPTER

FOUR

COMPONENTS

4.1 Async Helpers

Using async will simplify the code and helps get rid of callbacks, especially useful in case of multiple nested callbacks.

For this reason, helper scripts have been added to make it easier to implement async support for the own scripts or widgets.

The target script should implement an `IAwaitable<TResult>` or `IAwaitable` interface.

Script example:

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

   public class ConfirmExample : MonoBehaviour, IAwaitable<bool>
   {
      [SerializeField]
      protected Text Message;

      [SerializeField]
      protected Button ButtonOk;

      [SerializeField]
      protected Button ButtonCancel;

      event Action<bool> EvOnComplete;

      public event Action<bool> OnComplete
      {
         add => EvOnComplete += value;
         remove => EvOnComplete -= value;
      }

      public Awaiter<bool> GetAwaiter() => new Awaiter<bool>(this);
```

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```
        protected virtual void Start() => AddListeners();

        protected virtual void OnDestroy()
        {
            RemoveListeners();
            Cancel();
        }

        void AddListeners()
        {
            ButtonOk.onClick.AddListener(Confirm);
            ButtonCancel.onClick.AddListener(Cancel);
        }

        void RemoveListeners()
        {
            ButtonOk.onClick.RemoveListener(Confirm);
            ButtonCancel.onClick.RemoveListener(Cancel);
        }

        public void Confirm() => Complete(true);

        public void Cancel() => Complete(false);

        void Complete(bool result)
        {
            gameObject.SetActive(false);
            EvOnComplete?.Invoke(result);
        }

        public ConfirmExample Open(string message)
        {
            Message.text = message;
            gameObject.SetActive(true);
            EventSystem.current.SetSelectedGameObject(ButtonOk.gameObject);

            return this;
        }
    }
}
```

Using:

```
namespace UIWidgets.Examples
{
    using UnityEngine;

    public class TestConfirm : MonoBehaviour
    {
        [SerializeField]
        public ConfirmExample Confirm;
```

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```
        public async void Test()
        {
            if (await Confirm.Open("Quit?"))
            {
                Application.Quit();
            }
        }
    }
}
```

4.2 Bring to Front

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

4.2.1 Options

- With Parents `bool`

  Bring to front GameObject with parents GameObjects.

4.3 Single Line and Multi Line Connectors

Draw a line between current gameobject and specified targets.

4.3.1 SingleConnector Options

- Material `Material`
- Color `Color`
- Raycast Target `bool`
- Sprite `Sprite`
- Line `ConnectorLine`
- Builder `ILineBuilder`

  Builder to draw custom lines.

4.3.2 MultipleConnector Options

- Material `Material`
- Color `Color`
- Raycast Target `bool`
- Sprite `Sprite`
- Lines `ObservableList<ConnectorLine>`

Lines list.

- Builder `ILineBuilder`

  Builder to draw custom lines.

4.3.3 Connector Line

- Target `RectTransform`
- Start `ConnectorPosition`

  Start point of the line: `Top`, `Bottom`, `Left`, `Right`, `Center`.

- End `ConnectorPosition`

  End point of the line: `Top`, `Bottom`, `Left`, `Right`, `Center`.

- Type `ConnectorType`

  Line type: `Straight` or `Rectangular`.

- Thickness `float`

  Line thickness.

- Margin `float`

  The minimum space from the border before the turn of the line. Supported only by `Rectangular` lines.

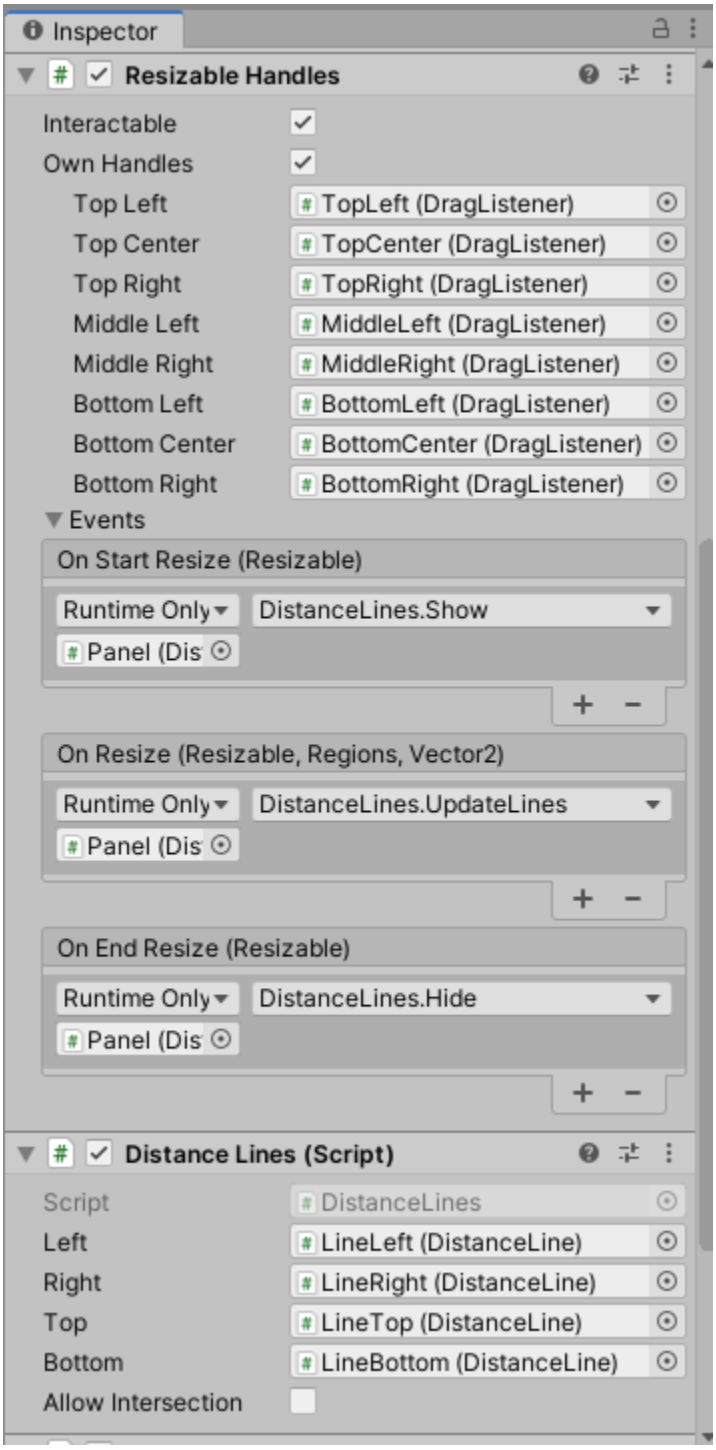
4.3.4 ILineBuilder

Interface to build connectors mesh with a single method:

```
int Build(ConnectorBase connector, RectTransform source, ConnectorLine line, VertexHelper
vh, int index)
```

4.4 Distance Lines

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


Inspector
Resizable Handles
Interactable
Own Handles
Top Left
TopLeft (DragListener)
Top Center
TopCenter (DragListener)
Top Right
TopRight (DragListener)
Middle Left
MiddleLeft (DragListener)
Middle Right
MiddleRight (DragListener)
Bottom Left
BottomLeft (DragListener)
Bottom Center
BottomCenter (DragListener)
Bottom Right
BottomRight (DragListener)
Events
On Start Resize (Resizable)
Runtime Only
DistanceLines.Show
Panel (Dis
On Resize (Resizable, Regions, Vector2)
Runtime Only
DistanceLines.UpdateLines
Panel (Dis
On End Resize (Resizable)
Runtime Only
DistanceLines.Hide
Panel (Dis
Distance Lines (Script)
Script
DistanceLines
Left
LineLeft (DistanceLine)
Right
LineRight (DistanceLine)
Top
LineTop (DistanceLine)
Bottom
LineBottom (DistanceLine)
Allow Intersection

4.4.1 Options

- 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.

4.5 Drag and Drop components

4.5.1 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 (ListView, TreeView) 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 gameobjects to disable drag-and-drop functionality.

4.5.2 How Drag&Drop works:

- there are two components: one process drag and another process drop
- Drop component implements `IDropSupport<TItem>` interface (it can implement multiple interfaces with different types). It is used to check if the dragged item can be received and process drop (for example add item to the ListView)
- Drag component is inherited from `DragSupport<TItem>` and attached to a game object with data to drag (for the ListView, it's attached to ListView.DefaultItem)
- when dragging, it looks for target with drop component that can accept a `TItem` and call `bool CanReceiveDrop(TItem data, PointerEventData eventData)` to check if target can receive dragged item
- on end drag called `Drop(TItem data, PointerEventData eventData)` for the drop component and then `Dropped(bool success)` for the drag component

4.5.3 Collections Drag Options

- Allow Drag `bool`

  Allow drag.

- Handle `DragSupportHandle` *optional*

  Custom handle to drag, it not specified will be dragged by current instance.

- ListView `TListView` *optional*

  ListView instance.
  Not available for TreeView.

- DragInfo `TComponent` *optional*

  Component to display the dragged data.

- DragInfo Offset `Vector3`

  Offset from the cursor position for the DragInfo.

- Delete After Drop `bool`

  Delete item from collection after drop.
  Not available for TreeView.

- Cursors `Cursors`

  Custom cursors to show the allowed and denied drop states.

4.5.4 Collections Drop Options

- Drop Position `NearestType`

  Drop position.

  - `Auto` insert dropped item to the nearest position.
  - `Before` insert dropped item before item under pointer.
  - `After` insert dropped item after item under pointer.

- Drop Indicator `ListViewDropIndicator`

  Indicator to display position where dropped item will be inserted.

- Delete Node After Drop `bool`

  Delete dropped node from TreeView.
  Not available for TreeView.

- Receive Items `bool`

  Receive dropped items.

- Receive Nodes `bool`

  Receive dropped nodes.

4.5.5 TreeView Drop Options

- Drop Position `NearestType`

  Drop position.

  - `Auto` insert dropped item to the nearest position
  - `Before` insert dropped item before item under pointer
  - `After` insert dropped item after item under pointer

- Drop Indicator `ListViewDropIndicator`

  Indicator to display position where dropped item will be inserted.

- Receive Items `bool`

  Receive dropped items.

- Receive Nodes `bool`

  Receive dropped nodes.

4.5.6 TreeView Node Drop Options

- Drop Indicator `ListViewDropIndicator`

  Indicator to display position where dropped item will be inserted.

- Delete Node After Drop `bool`

  Delete dropped node from TreeView.

- Receive Items `bool`

  Receive dropped items.

- Reorder Area `float`

  Distance in percent of height from border to add dropped node before/after instead of drop as sub-node. Allowed value range is 0f..0.5f

4.5.7 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>
```

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```
    /// 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>
        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);
```

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```
    }

    /// <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);

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

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

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

4.5.8 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>

        /// <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>();
```

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```
        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>
    /// <param name="eventData">Event data.</param>
    public bool CanReceiveDrop(TreeNode<TreeViewItem> data, PointerEventData eventData)
    {
```

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```
            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
    }
}
```

4.5.9 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);
         }

         ResetCursor();
      }
   }
}
```

4.5.10 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);
      }
   }
}
```

4.6 Draggable

Dragging gameobject.

4.6.1 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.

- Unscaled Time `bool`

  Run animation with unscaled time.

- Snap Grids `List<SnapGridBase>`

  Allow snapping the `RectTransform` position to the nearest line.
  See *SnapGrid* and *SnapLines*.

- Snap Distance `Vector2`

  Maximum distance to lines where snapping is available.

4.6.2 Properties

- Target `RectTransform`

  Target to drag; the self is by default.

4.6.3 Events

- OnStartDrag `UnityEvent<Draggable>`
- OnDrag `UnityEvent<Draggable>`
- OnEndDrag `UnityEvent<Draggable>`
- OnSnap = `UnityEvent<Draggable, SnapGridBase.Result>`
- OnEndSnap = `UnityEvent<Draggable, SnapGridBase.Result>`
- OnTargetChanged `UnityEvent<Draggable>`

4.7 EasyLayout

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

4.7.1 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.
- Reset Rotation `bool`

  Reset rotation of the elements to 0.
- Movement Animation `bool`

  Animate elements repositioning.
- Movement Curve `AnimationCurve`

  Movement animation curve.
- Resize Animation `bool`

  Animate elements resizing.

- Resize Curve `AnimationCurve`

  Resize animation curve.

- 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`: change children size in range from minimal to preferred to fit container.
  - `Set Preferred and Fit Container`: set children size to preferred, then increase size proportionally `Flexible Width` to fit parent width if required.
  - `Shrink On Overflow`: decrease elements width if summary width more than parent width including margin.
- Children Height `ChildrenSize`

  Similar to `Children Width`

4.7.2 Events

- Settings Changed `UnityEvent`

  Event, raised after any setting was changed.

4.8 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`

4.8.1 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.

4.8.2 Events

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

4.9 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.

4.9.1 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).

4.9.2 Events

- LayoutChanged `UnityEvent<UILayout>`

4.10 Lightbox

Lightbox is a component used to display overlay image.

4.11 ListViewAutoResize

Auto-resizes ListView or TileView according to item counts until specified maximum size reached. The component implements the `ILayoutElement` interface, so it can be used with `LayoutGroup`.

4.11.1 Options

- MaxSize `float`

  Maximum size.

- UpdateRectTransform `size`

  Set RectTransform size.

4.12 Object Sliding

Component to drag GameObject horizontally or vertically between specified positions.

4.12.1 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.

4.12.2 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.

4.13 Pinchable

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

4.13.1 Options

- Interactable `bool`

  Allows users interaction.
- AllowDrag `bool`

  Allows drag.
- AllowResize `bool`

  Allows resize.
- AllowRotate `bool`

  Allows rotation.

4.13.2 Events

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

4.14 Resizable

Allows resizing gameobject by size or scale.

4.14.1 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.

- Include Corners `bool`

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

- Integer Size `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.

- Cursors `Cursors`

Custom cursors to the allowed resize state.

- Snap Grids `List<SnapGridBase>`

  Allow snapping the `RectTransform` position to the nearest line.
  See *SnapGrid* and *SnapLines*.

- Snap Distance `Vector2`

  Maximum distance to lines where snapping is available.

4.14.2 Events

- OnStartResize `UnityEvent<Resizable>`
- OnResize `UnityEvent<Resizable>`
- OnEndResize `UnityEvent<Resizable>`
- OnResizeDelta = `UnityEvent<Resizable, Resizable.Regions, Vector2>`
- OnResizeDirectionsChanged `UnityEvent<Resizable>`
- OnTargetChanged `UnityEvent<Resizable>`

4.14.3 Properties

- Target `RectTransform`

  Target to resize; the self is by default.

4.14.4 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`, Easy-Layout) 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.

4.15 Resizable Handles

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

4.15.1 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.

- HandleState `Func<ResizableHandles, BaseEventData, bool, bool>` *optional*

  Return handle state (enabled/disabled) on select/deselect event (got or lost focus).

  Use case: show Rotatable and Resizable handles only if target (or one of handles) is selected, otherwise deselect.

4.15.2 Events

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

4.16 Rotatable

Allows rotating gameobject around its pivot.

4.16.1 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.
- Cursors `Cursors`

  Custom cursors to show the allowed rotation state.

4.16.2 Events

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

4.16.3 Properties

- Target `RectTransform`

  Target to rotate; the self is by default.

4.17 Rotatable Handle

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

4.17.1 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.

- HandleState `Func<RotatableHandle, BaseEventData, bool, bool>` *optional*

  Return handle state (enabled/disabled) on select/deselect event (got or lost focus).
  Use case: show Rotatable and Resizable handles only if target (or one of handles) is selected, otherwise deselect.

4.17.2 Events

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

4.18 Scrollbar Min Size

Allow to set minimal scrollbars sizes of the ScrollRect.

4.18.1 Options

- Horizontal Min Size `float`

  Minimal size of the horizontal scrollbar.

- Vertical Min Size `float`

  Minimal size of the vertical scrollbar.

4.19 ScrollRect DragSensitivity

Allows to change ScrollRect *Drag Sensitivity* similar to *Scroll Sensitivity*.

- 1f is the default drag speed
- more than 1 to increase (2f is two time faster)
- less than 1 to decrease (0.5f is two time slower)
- negative to drag in a reverse direction

4.20 ScrollRect Events

Provide pull events for the ScrollRect.

4.20.1 Options

- Thresholds `PullThreshold`

  Separate thresholds values for each pull direction to raise events.

4.20.2 Events

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

4.21 ScrollRect Footer

Footer for the ScrollRect; visible when scrolled to the bottom.

4.21.1 Options

- ScrollRect `ScrollRect`

  ScrollRect.

- Block `RectTransform`

  Actual footer block.

- IsHorizontal `bool`

  ScrollRect direction.

- DisplayType `ScrollRectHeaderType`

  Display type.

  - `Reveal`

    Show block when scrolled to the bottom and hide on scroll up.

  - `Resize`

    Resize block from current size at the bottom to the minimal size on scroll up.

- MinSize `float`

  Minimal size of the footer.

4.22 ScrollRect Header

Header for the ScrollRect; visible when scrolled to the top.

4.22.1 Options

- ScrollRect `ScrollRect`

  ScrollRect.

- Block `RectTransform`

  Actual header block.

- IsHorizontal `bool`

  ScrollRect direction.

- DisplayType `ScrollRectHeaderType`

  Display type.

  - `Reveal`

    Show block when scrolled to the top and hide on scroll down.

  - `Resize`

Resize block from current size at the top to the minimal size on scroll down.

- MinSize `float`

  Minimal size of the header.

4.23 Selectable Helper

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

4.24 SnapGrid

Allow snapping the `RectTransform` position or size to the nearest line. Does not work on its own, should be used together with *Resizable*, *Draggable*, or `DropRectTransform`

4.24.1 Options

- Snap Border Inside `SnapGridBase.Border`

  Allow snapping to the inner side of the border.

- Snap Border Outside `SnapGridBase.Border`

  Allow snapping to the outer side of the border.

- Padding `Vector2`

  Padding from borders.

- Step `Vector2`

  Size of the grid cells.

- Spacing `Vector`

  Empty space between cells.

- Snap To Spacing `bool`

  Allow spacing to inner sides of the spacing lines.

4.24.2 SnapGridBase.Border

- Left `bool`
- Right `bool`
- Top `bool`
- Boottom `bool`

4.24.3 Events

- OnLinesChanged `UnityEvent`

  Raised when lines changed.

4.25 SnapLines

Allow snapping the `RectTransform` position or size to the nearest line. Does not work on its own, should be used together with *Resizable*, *Draggable*, or `DropRectTransform`

4.25.1 Options

- Snap Border Inside `SnapGridBase.Border`

  Allow snapping to the inner side of the border.

- Snap Border Outside `SnapGridBase.Border`

  Allow snapping to the outer side of the border.

- Lines X `ObservableList<SnapGridBase.LineX>`

  Lines on X axis.

- Lines Y `ObservableList<SnapGridBase.LineY>`

  Lines on Y axis.

4.25.2 SnapGridBase.LineX

- X `float`

  Position on X axis.

- Snap Left `bool`

  Allow snapping by left side of the `RectTranform` (right of the line).

- Snap Right `bool`

  Allow snapping by right side of the `RectTranform` (left of the line).

4.25.3 SnapGridBase.LineY

- Y `float`

  Position on Y axis.

- Snap Top `bool`

  Allow snapping by top side of the `RectTranform` (bottom of the line).

- Snap Bottom `bool`

  Allow snapping by bottom side of the `RectTranform` (top of the line).

4.25.4 Events

- OnLinesChanged `UnityEvent`

  Raised when lines changed.

4.26 Splitter

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

4.26.1 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.

4.26.2 Events

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

4.27 Switch Group

Same as Toggle Group, but for the Switch widget.

4.27.1 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.

4.28 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).

4.28.1 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.

- Cursors `Cursors`

  Custom cursors to show the allowed column resize state, allowed, and denied drop states.

4.28.2 Cet Current Columns Order

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

4.28.3 Change Columns Order

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

4.28.4 Restore Original Columns Order

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

4.28.5 Disable Column

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

4.28.6 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);
```

4.29 TreeView DataSource

Used in editor mode, allow to edit TreeView nodes.

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

4.30 TreeView Toggle Animation

Helper generic script to animate collapse and expand nodes.

4.30.1 Options

- TreeView `TTreeView`

  Target TreeView.

- Mode `ModeType`

  Animation mode.

  - `ConstantTime`
  - `ConstantSpeed`

- Time `float`

  Time in seconds to expand or collapse all nested nodes.

- Speed `float`

  Animation speed in points per second.

- Unscaled Time `bool`

  Run animation with unscaled time.

4.31 SafeArea

Change RectTransform size to fit Screen.safeArea.

4.32 Swipe

Provide swipe events.

4.32.1 Options

- Unscaled Time `bool`

  Use unscaled time.

- Max Time `float`

  If dragged longer than the specified time then it is not swipe event.

- Required Distance `float`

  Minimum distance to be swiped.

- Min Distance `float`

  Minimum distance at X or Y axis to be swiped at those axes.

4.32.2 Events

- OnSwipe `UnityEvent<Swipe.Direction>`

CHAPTER

FIVE

EFFECTS

5.1 Flare Effect

Shader based. Create material with *Custom / New UI Widgets / UIFlareTransparent* or *Custom / New UI Widgets / UIFlareGlobal* shader and set it to `Image` component.

Note: *UIFlareGlobal* works only in Render Mode = Screen Space - Overlay.

5.1.1 Options

- Flare Color `Color`

  Color of the flare.

- Flare Size `float`

  Size of the flare in range [0..1].

- Flare Speed `float`

  Speed of the flare relative to the image size: how much times it will move from left to right in one second.

- Flare Delay `float`

  Delay between appearances of the flare. Examples:

  - 0 - no delay
  - 1 - delay is travel time from left to right
  - 2 - delay is doubled travel time from left to right

5.2 Lines Drawer

Draw straight lines on X or Y axis.

Note: Requires enabled TexCoord1 at Canvas.AdditionalShaderChannells.

5.2.1 Options

- Line Color `Color`

  Line color.

- Line Thickness `float`

  Line thickness.

- Transparent Background `bool`

  Change color of the `Graphic` component to transparent.

- LinesX `ObservableList<float>`

  Position on X axis where vertical line should be drawn in range [0..width], 0 at left.

- LinesY `ObservableList<float>`

  Position on Y axis where horizontal line should be drawn in range [0..height], 0 at bottom.

5.3 Ring Effect

Draw ring or circle. Shader based effect. To use add `RingEffect` component to gameobject with `Graphic` component.

Note: Requires enabled TexCoord1 at Canvas.AdditionalShaderChannells.

5.3.1 Options

- Ring Color `Color`

  Color of the ring.

- Thickness `float`

  Ring thickness.

- Padding `float`

  Padding from border.

- Transparent Background `bool`

  Change color of the `Graphic` component to transparent.

5.4 Ripple Effect

Draw ripples on the click position. Maximum 10 ripples per gameobject. Shader based effect. To use add `RippleEffect` component to gameobject with `Graphic` component.

Note: Requires enabled TexCoord1 at Canvas.AdditionalShaderChannells.

5.4.1 Options

- Start Color `Color`

  Initial color of the ripple.

- End Color `Color`

  End color of the ripple.

- Speed `float`

  Growth speed of the ripple.

- Max Size `float`

  Maximum size of the ripple in range [0..1].

5.5 Snap Grid Drawer

Draw straight lines on X or Y axis, lines position provided by `SnapGrid` or `SnapLines` components.

Note: Requires enabled TexCoord1 at Canvas.AdditionalShaderChannells.

5.5.1 Options

- Line Color `Color`

  Line color.

- Line Thickness `float`

  Line thickness.

- Transparent Background `bool`

  Change color of the `Graphic` component to transparent.

- Include Borders `bool`

  Draw borders if borders enabled in `SnapGrid` or `SnapLines` components.

5.6 Tsunami Effect

RectTransform size is changed from `MinSize` to `MaxSize` with distance from gameobject to the pointer. To use add `TsunamiEffect` component.

5.6.1 Options

- MinSize `Vector2`

  Minimal size of the component.

- MaxSize `Vector2`

  Maximum size of the component.

- Distance `float`

  Effect distance.

CHAPTER

SIX

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.

CHAPTER

SEVEN

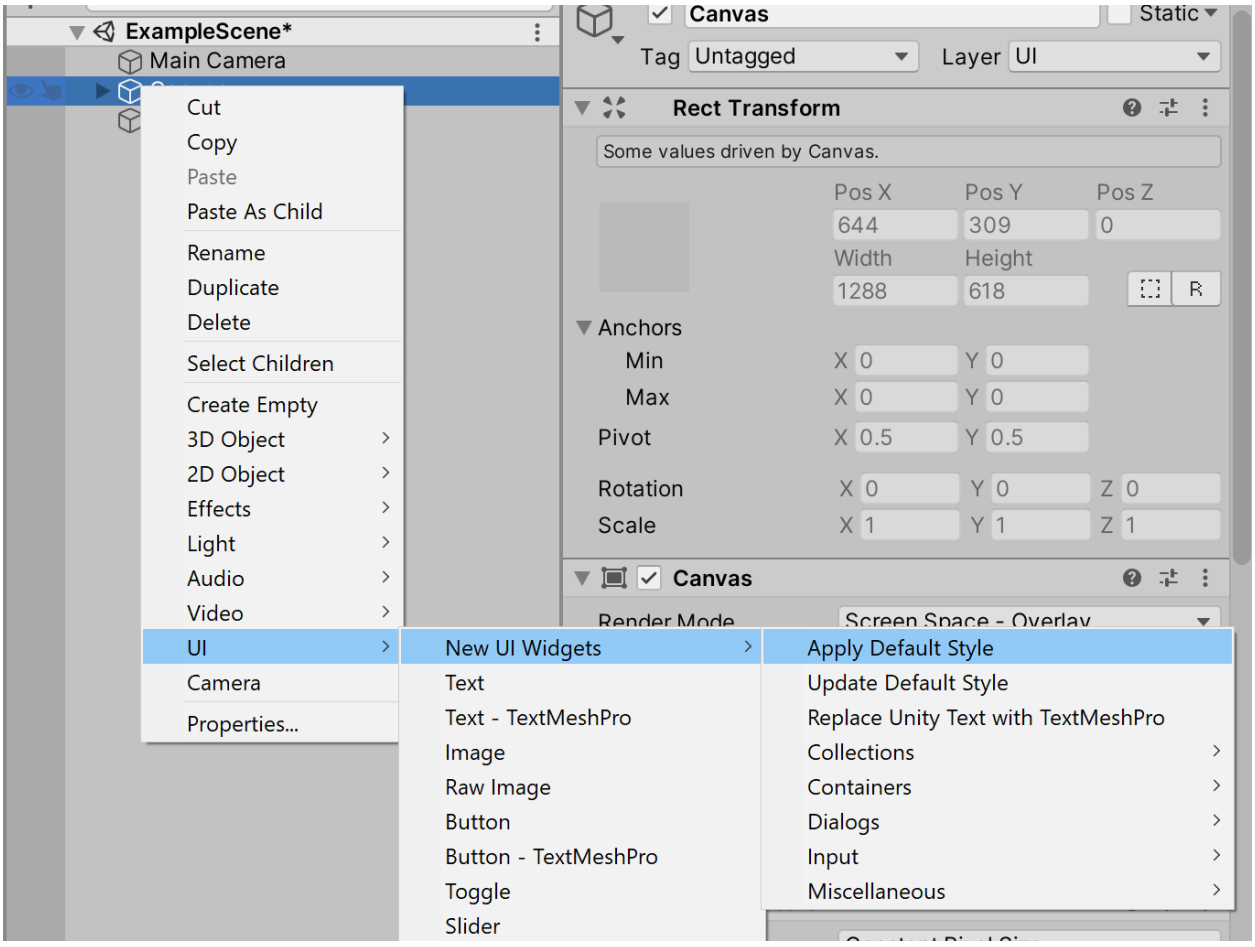
STYLES (SKINS)

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*.



You can change widgets settings and then save them to the style with *UI / New UI Widgets / Update 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: For the style support for the nested widgets (for example, Switch or Spinner in the ListView.DefaultItem), you should add the `StyleSupportAny` component to the gameobject of the parent widget and specify nested widgets at the `Objects` field.

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 children gameobjects was processed; otherwise false.
   }

   public virtual bool GetStyle(Style style)
   {
      style.Collections.MainBackground.GetFrom(GetComponent<Image>());

      return true; // true if children gameobjects was processed; otherwise false.
   }
}
```

Note: Widgets created by *Widgets Generator* already have style support.

CHAPTER

EIGHT

INTEGRATION

8.1 Assembly Definitions

The package does not have assembly definitions, but you can add them with all required references.

Why no assembly definitions by default:

- changes in the *.asmdef* files are lost with the package update
- supported third-party packages do not use assembly definitions, so they cannot be referenced to be used in a separate assembly
- version defines works only for Unity packages, so only direct references to assembly definitions are available

8.1.1 Recommended Settings

- asmdef for the runtime should be created in the *New UI Widgets* folder
- asmdef for the editor should be created in the *New UI Widgets / Editor* folder
- references to `TextMeshPro` and `InputSystem` should be added if you use them

8.2 Cursor

- Cursors

  A scriptable object that contains a list of different cursors types.
  Asset can be created with the *Context menu / Create / New UI Widgets / Cursors*.

- UICursor

  Static class, wrapper for the `Cursor.SetCursor()` to avoid cursor conflicts between different widgets and components. For example :doc:/components/resizable` component should not change the cursor if currently controlled by the :doc:/components/drag-and-drop` component.

- CursorDPISelector

  This component selects the most appropriate `Cursors` asset by `Screen.dpi` from the available cursors list and sets it as default cursors (`UICursor.Cursors`).
  Components like Resizable have the `Cursors` field, so they can have custom cursors to use instead of the default one.

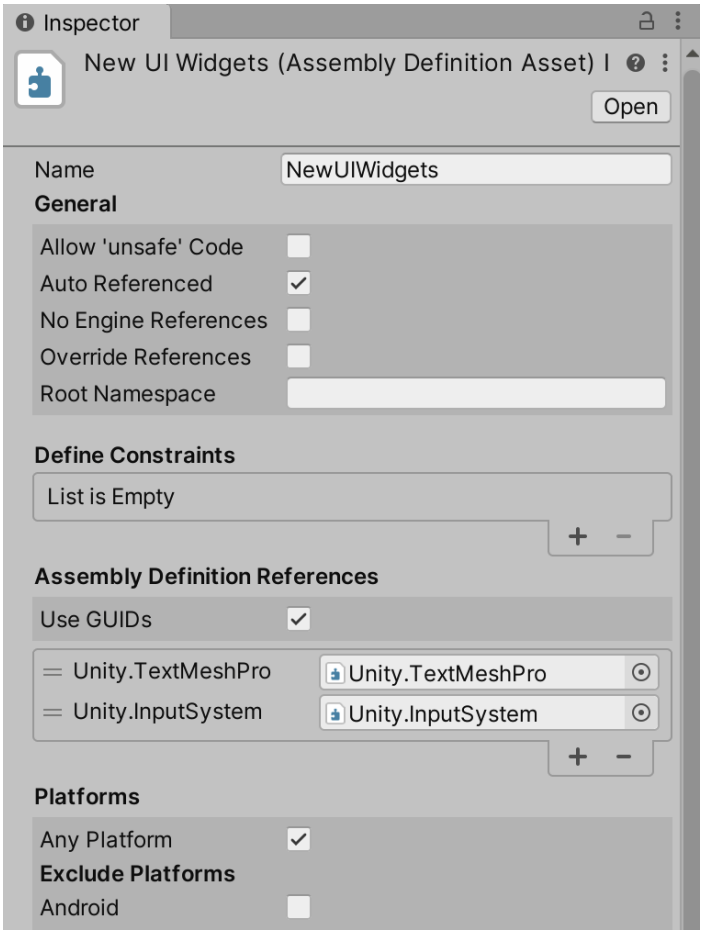


Fig. 1: Runtime

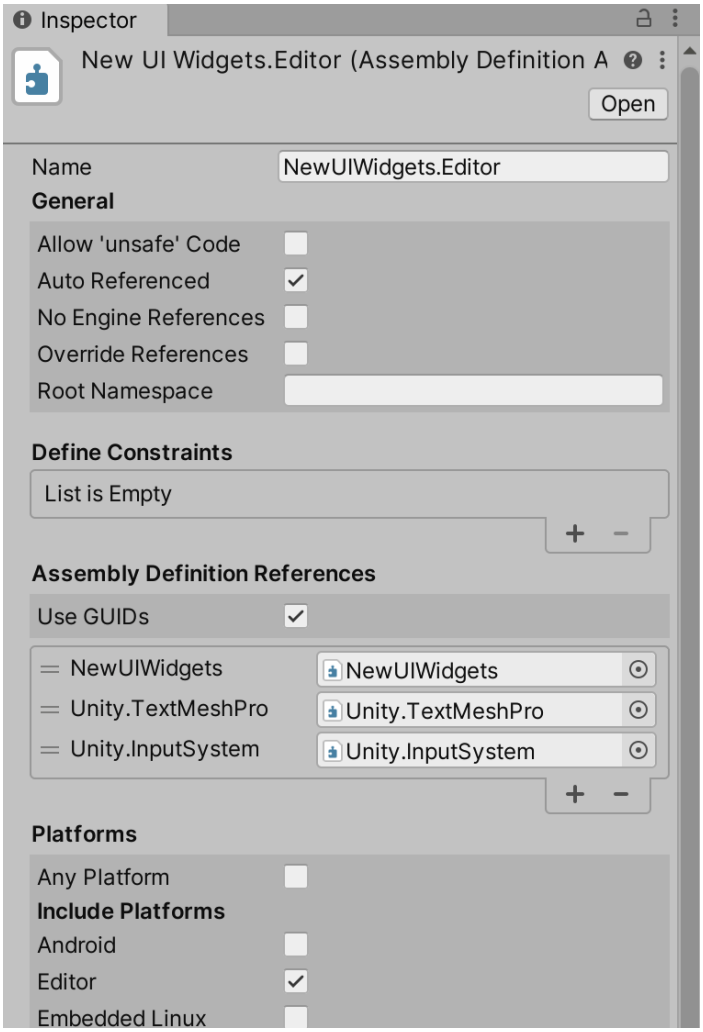

Inspector
New UI Widgets.Editor (Assembly Definition A
Open
Name
NewUIWidgets.Editor
General
Allow 'unsafe' Code
Auto Referenced
No Engine References
Override References
Root Namespace
Define Constraints
List is Empty
Assembly Definition References
Use GUIDs
NewUIWidgets
NewUIWidgets
Unity.TextMeshPro
Unity.TextMeshPro
Unity.InputSystem
Unity.InputSystem
Platforms
Any Platform
Include Platforms
Android
Editor
Embedded Linux

Fig. 2: Editor

8.2.1 Cursors Fields

- Default `Cursors.Cursor`

  Default cursor.

- Allowed `Cursors.Cursor`

  Cursor for the allowed actions.

- Denied `Cursors.Cursor`

  Cursor for the not allowed actions

- NorthSouthArrow `Cursors.Cursor`

  North <-> South arrow.

- EastWestArrow `Cursors.Cursor`

  East <-> West arrow.

- NorthEastSouthWestArrow `Cursors.Cursor`

  NorthEast <-> SouthWest arrow.

- NorthWestSouthEastArrow `Cursors.Cursor`

  NorthWest <-> SouthEast arrow.

- NorthWestRotateArrow `Cursors.Cursor`

  North <-> West arrow.

- NorthEastRotateArrow `Cursors.Cursor`

  North <-> East arrow.

- SouthWestRotateArrow `Cursors.Cursor`

  South <-> West arrow.

- SouthEastRotateArrow `Cursors.Cursor`

  South <-> East arrow.

8.2.2 Cursors.Cursor Fields

- Texture `Texture2D`

  Cursor texture.

- Hotspot `Vector2`

  Cursor hot spot.

8.2.3 UICursor Static Fields

- Cursors `Cursors`

  Different default cursors.

- CanSet `Func<Component, bool>`

  Is can the specified component set the cursor?
  `true` if cursor does not have an owner or the owner is the same.

- Set `Action<Component, Cursors.Cursor>`

  Set the cursor and current owner.
  The cursor will be changed only if `CanSet(owner)` returns `true`.

- Reset `Action<Component>`

  Reset cursor and its owner to the default.

8.3 Localization

Most widgets have localization support, exceptions are:

- AutocompleteString
- ComboboxString
- ListViewString

Integration with custom localization system can done with `UIWidgets.l10n.Localization` class.

Example for the **I2 Localization**:

```
protected virtual void Start()
{
   Localization.GetTranslation = I2Translation;
   Localization.GetCountryCode = I2CountryCode; // used by Calendar and similar widgets
   I2.Loc.LocalizationManager.OnLocalizeEvent += Localization.LocaleChanged;
}

public static string I2Translation(string input)
{
   var result = I2.Loc.LocalizationManager.GetTranslation(input);
   if (result == null)
   {
      return input;
   }

   return result;
}

public static string I2CountryCode()
{
   return I2.Loc.LocalizationManager.CurrentLanguageCode;
}
```

8.3.1 Dialog, Popup Localization

Dialog and Popup widgets requires enabled `LocalizationSupport` in `DialogInfoBase` component.

Formatted strings can be used with the `SetInfo` method:

```
public void Dialog()
{
   var actions = new DialogButton[]
   {
      new DialogButton("OK", DialogClose),
      new DialogButton("Cancel", DialogClose),
   };

   var instance = DialogTemplate.Clone();
   instance.DialogInfo.LocalizationSupport = true;
   instance.Show(
      buttons: actions,
      focusButton: "Close",
      modal: false,
      onCancel: DialogClose);
   instance.SetInfo("Welcome, {0}", new object[] { "username", }, "Value 1: {0}\nValue␣
↪2: {1}", new object[] { "argument 1", "argument 2" });
}

bool DialogClose(int buttonIndex)
{
   return true;
}
```

8.3.2 Notify Localization

Notify widget requires enabled `LocalizationSupport` in `NotifyInfoBase` component.

Formatted strings can be used with the `SetMessage` method:

```
public void NotificationFormatted()
{
   var instance = NotificationTemplate.Clone();

   instance.NotifyInfo.LocalizationSupport = true;
   instance.Show(customHideDelay: 0f);
   instance.SetMessage("Welcome, {0} {1}", "FirstName", "LastName");
}
```

8.3.3 Generated Widgets

The easiest way to add localization support is to implement property returning a localized string in the data class. Widgets are automatically updated on locale changes.

```
public class Item
{
   public string LocalizedName
   {
      get
      {
         return I2.Loc.LocalizationManager.GetTranslation(Name);
      }
   }

   public string Name;
}
```

8.4 String Comparison and Culture

All widgets and components use `UtilitiesCompare` to compare strings. You can change comparison settings with the following fields:

- UtilitiesCompare.Culture `CultureInfo`

  Culture used to compare strings, by default used `CultureInfo.InvariantCulture`.

- UtilitiesCompare.OptionsCaseSensitive `CompareOptions`

  Options to compare strings with case sensitive.

- UtilitiesCompare.OptionsCaseIgnore `CompareOptions`

  Options to compare strings with case ignore.

8.5 Timer and Animations

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 own timer instead of the default one. To do this, you need to set the following fields:

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

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

- UtilitiesTime.GetDeltaTime `Func<float>`

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

8.6 Unity Update Methods Replacement

Update manager is used to optimize the performance of `Update()`, `LateUpdate()`, `FixedUpdate()` calls and same calls required only for one frame.

You can replace the update manager with a custom one which implements `IUpdaterProxy` interface:

```
Updater.Proxy = custom_updater;
```

8.6.1 Interfaces to Replace Unity Update Methods

- `IUpdatable` replace `Update()` method

  Methods:

  - `RunUpdate()`

- `ILateUpdatable` replace `LateUpdate()` method

  Methods:

  - `RunLateUpdate()`

- `IFixedUpdatable` replace `FixedUpdate()` method

  Methods:

  - `RunFixedUpdate()`

CHAPTER

NINE

SUPPORTED PACKAGES

9.1 Data Bind for Unity Support

You can enable Data Bind for Unity support with *Project Settings… / New UI Widgets / DataBind support / Enable*. 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*.

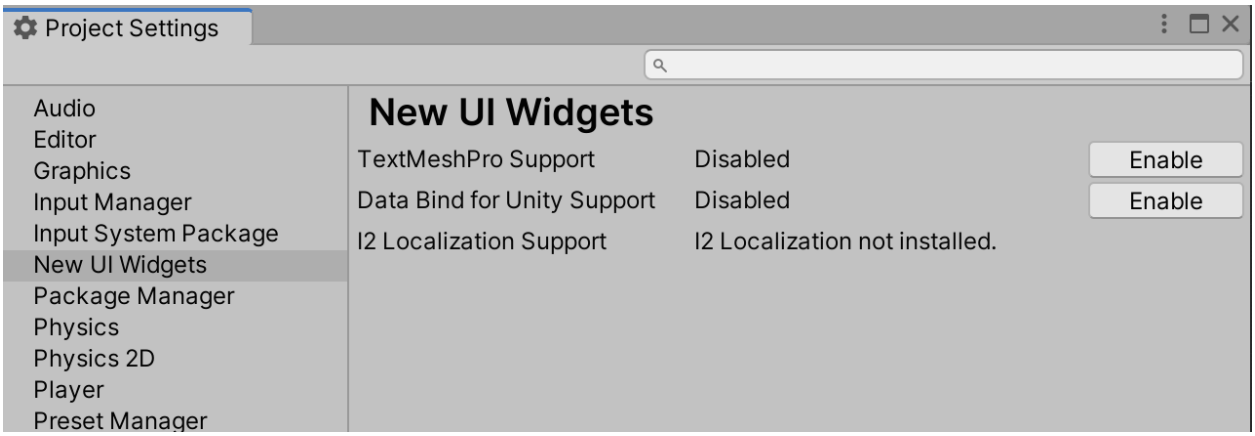
Note: Support is enabled only to installed platforms. Platforms that were added after it requires enabling support again.

9.2 I2 Localization Support

You can enable I2 Localization support with *Project Settings... / New UI Widgets / I2 Localization Support / Enable*. If **I2 Localization** not installed option will not be available.

Localization Support Details

Disable support with *Project Settings... / New UI Widgets / I2 Localization Support / Disable*.



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

9.3 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*.

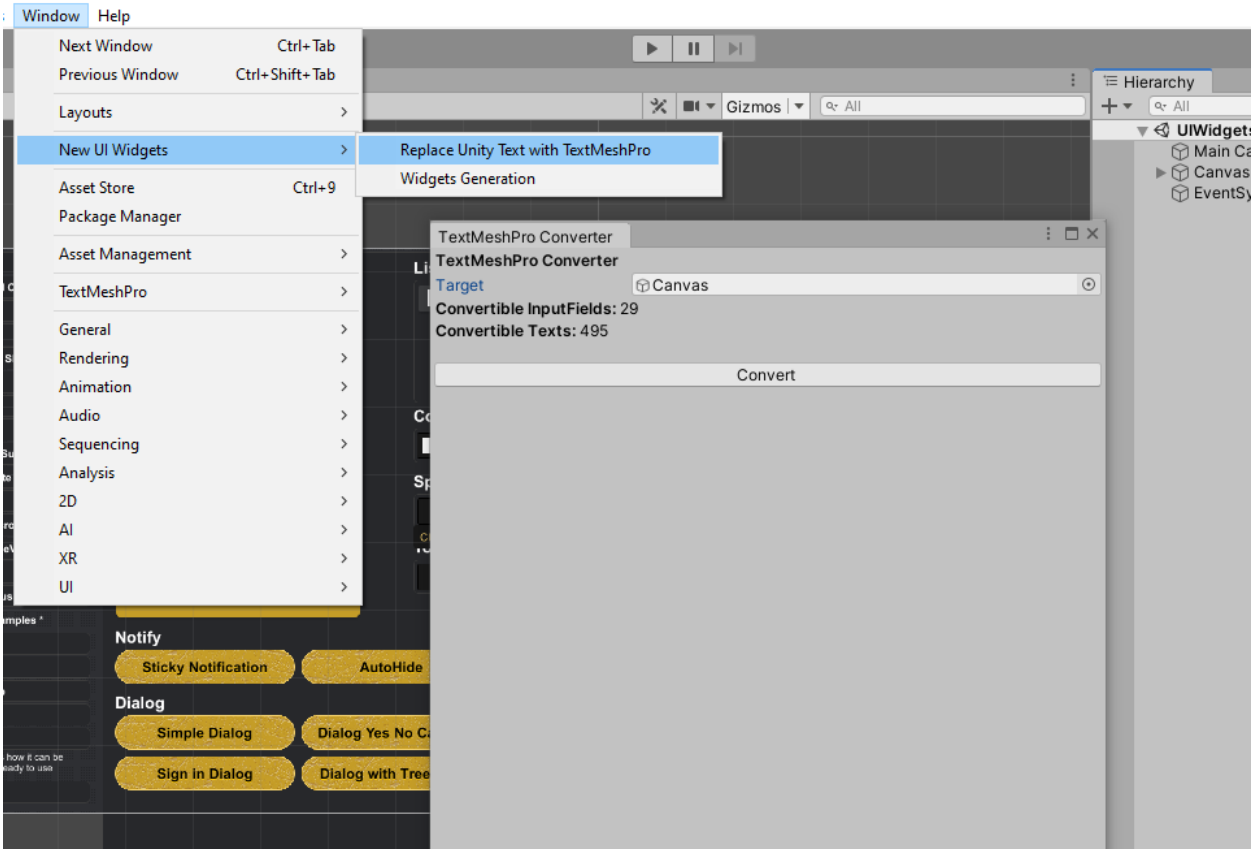
Note: Support is enabled only to installed platforms. Platforms that were added after it requires enabling support again.

9.3.1 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.

9.4 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

9.4.1 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

TEN

KNOWN PROBLEMS

10.1 Missing References or Scripts

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

10.2 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.

10.3 Newly Created Widgets are White

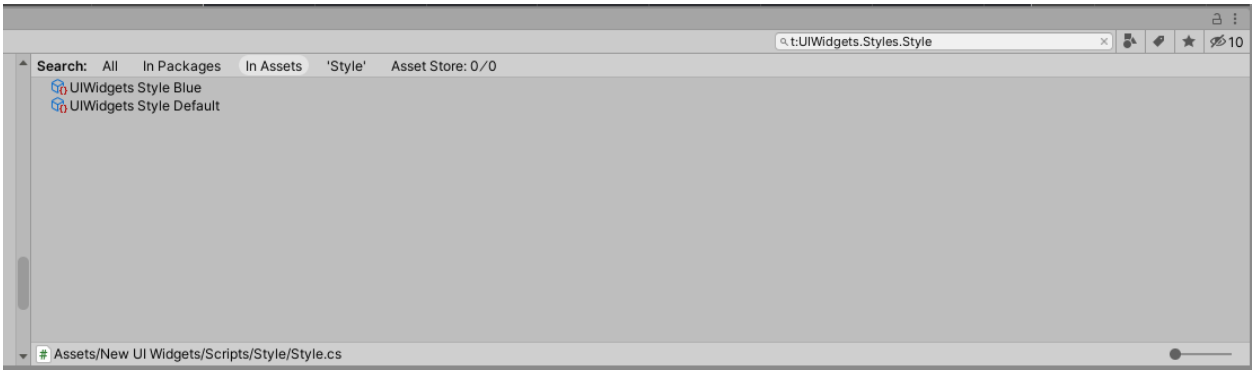
It happens because of the empty style used as default and it automatically applied to newly created widgets.
Please open *New UI Widgets/Styles/UIWidgets Style Default* and check it settings (it should not be all white color or null), and set it as default.
If UIWidgets Style Default values are all white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

10.4 ListView Item Highlight or Selection Goes to Next Items Automatically

Reason are navigation events raised by a gamepad or joystick, sometimes unintentionally because of sticks drift.
Solutions for the different input modules:

- Standalone Input Module:
  - open *Project Settings / Input Manager*



  - find **Horizontal** and **Vertical** records with `Type` = `Joystick Axis` (there are two of each, another one for keyboard)
  - rename those **Horizontal** and **Vertical** records to names not used by `Standalone Input Module`
- Input System UI Input Module:
  - open *Project Settings / Input System Package*
  - add keyboard, mouse, and other required devices to the `Supported Devices`

CHAPTER

ELEVEN

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
- Email: support@ilih.name

CHAPTER

TWELVE

CHANGELOG

12.1 Release 1.15.10

- Unity 2022.2 support
- domain reload support: fixed null reference exception
- Autocomplete: now input with tags is correctly parsed
- Combobox: now correctly updated when item properties changed
- Combobox: position in hierarchy correctly restored after ListView closed
- Combobox: fixed use ListView.Select()/Deselect() with raiseEvents = false
- EasyLayout: fixed Grid layout bug
- ListView: fixed GetComponentsEnumerator() return not all instances
- ListView: minor fixes
- ListViewPaginator: fixed LoopedList support
- ResizableHandles: added HandlesState field to control handles visibility on select/deselect events
- RotatableHandles: added HandleState field to control handles visibility on select/deselect events
- TreeView: fixed ContainerMaxSize, now the size is correct if TreeView has collapsed nodes

12.2 Release 1.15.9

- ListView: fixed undisplayed properties in the Inspector window
- Rating: fixed Interactable does not work correctly when disabled
- TreeView: added ContainerMaxSize option to prevent scrollbar blink caused by virtualization: the container will have the maximum width of all items. By default, the container has the maximum width of only visible items. Require ListType = List View with Variable Size.

12.3 Release 1.15.8

- added Rating widget (Text can be replaced with an Image or any other Graphic component)
- added async helpers scripts
- DatePicker, PickerInt, PickerString, and custom PickerListView: added an optional OK button and Mode option to choose between "close on select" and "close on OK click"
- Dialog, Notification, Picker, Popup: added OnBaseInstanceOpen and OnBaseInstanceClose static events
- Dialog, Notification, Picker: added OnInstanceOpen and OnInstanceClose static events for the custom types
- Popup: added ShowAsync() method to use with async/await
- Styles: fixed missing font in some Unity versions
- TileView: added LinearGroupedTileView example
- TracksView: added Timeline
- menu "New UI Widgets/Dialogs" renamed to "New UI Widgets/Dialogs Templates"

12.4 Release 1.15.7

- added LoadAnimation widget
- Dialog, Lightbox, Picker, Popup: added HideOnModalClick option
- added workaround to avoid ReSharper RRSRP-489023 bug
- Combobox: fixed bug when items were removed but still displayed as selected
- ListView: added ChangeLayoutType option: if enabled changes EasyLayout.LayoutType to match ListType.
- ListView, TreeView: now the deselect events invoked for the removed indices/nodes

12.5 Release 1.15.6

- now the oldest supported version is Unity 2018.4
- added Grayscale effect
- added LocalizationSupport option to disable translation for widgets with localization support
- added LimitMaxSize script to limit size when using anchors stretch
- added ProgressbarCircular prefab and menu option
- added SafeArea script to resize RectTransform to fit the safe area
- added Swipe script
- Dialog, Notification, Picker: added ShowAsync() method to use with async/await
- Dialog, Notification, Picker: added IsDestroyed property to check if is instance destroyed
- Dialog, Notification, Picker: now destroying instances will raise cancel or hide events
- Effects (derived from UVEffect): improved filled image type support
- Calendar: add OtherMonthWeekend and OutOfRangeDate colors to the Date component

- ContextMenu: fixed bug occurring with opened "ContextMenu Items Editor" window in play mode
- ListView, TreeView: fixed incorrect drop indicator position in some cases
- ListView: added GetInstanceSize(), SetInstanceSize(), ResetInstanceSize() methods to animate items resize without problems with virtualization
- ListView: fixed wrong drop position and indicator if enabled CenterTheItems
- Ring Effect: added Fill option
- TreeView Drop Support: added AutoDropPosition and DropPosition options
- TreeView: added AllowToggle option
- TreeView: added TreeViewToggleAnimation script to animate node toggle
- Widgets Generator: fixed bug with "const" fields
- Widgets Generator: now you can select the fields that will be used in the widgets, including the field for the autocomplete; it also can be done with [GeneratorIgnore] and [GeneratorAutocomplete] attributes

12.6 Release 1.15.5

- improved Unity 2021.3 LTS support
- COMPATIBILITY-BREAKING CHANGES: ListView: methods ComponentCreated, ComponentDestroyed, ComponentActivated, ComponentCached changed to public
- ListView: added SetSharedTemplates() method
- Widgets Generation: fixed bug when data type has a parameterless constructor

12.7 Release 1.15.4

- added ScrollRectDragSensitivity
- added UtilitiesScrollRect: get time for ScrollRect stop by inertia
- ListView: added ReversedOrder option (items displayed from end to start)
- ListView: added OnlyOneHighlighted option
- ScrollRectHeader, ScrollRectFooter: added Visible option to show and hide header (or footer)
- ScrollRectHeader, ScrollRectFooter: added layout support if DisplayType is Reveal
- ScrollRectFooter: added ChangeLayout option
- ScrollRectPaginator: added RoundingError option to avoid excess last page
- Switch: added AnimationCurve option
- Widgets Generation: fixed enum related bug
- Widgets Generation: improved support of latest Unity versions (2022.1.0+)
- Style: fixed "Create Style" bug

12.8 Release 1.15.3

- COMPATIBILITY-BREAKING CHANGES: LateUpdateAdd and LateUpdateRemove methods of IUpdaterProxy renamed to AddLateUpdate and RemoveLateUpdate, added RemoveRunOnce and RemoveRunOnceNextFrame methods
- ContextMenu: added helper script OpenContextMenu to open the menu by clicking on non-UI gameobject, requires PhysicsRaycaster and/or PhysicsRaycaster2D on the main camera
- DateTimeScroller and DateScroller: fixed AMPM change on hours scroll if IndependentScroll enabled
- EasyLayout: added optional movement and resize animation support; warning: can decrease performance
- Effects: RingEffect, RippleEffect, LinesDrawer, SnapGridDrawer no more requires enabled TexCoord1 channel on Canvas
- ListView: fixed item instance visibility if ListViewItem.DisableRecycling enabled
- ListView: added OnNavigate event; called after navigating to the other item instance with keyboard or gamepad
- ListView: added ItemsEvents.MovedToCache event
- ListView: FixHighlightItemUnderPointer option now obsolete
- ListView: added KeepHighlight option to keep item highlight on pointer enter until will be selected another gameobject
- ListView: fixed wrong events processing order in some cases
- ListViewItem: added StopSelectableAnimations() method to ListViewItem class
- Notification: added OpenedNotifications, AllNotifications and InactiveNotifications properties
- Picker: added OpenedPickers, AllPickers, and InactivePickers properties
- Spinner: fixed bug with Unity Text and OnKeyDown validation
- Tabs: added EventSystemSelectActiveHeader option
- Tabs: added ImmediateSelect option
- Tabs: added NextTab() and PreviousTab() methods
- TimeScroller: added SingleAMPM property to disable multiple AM PM options in scroll block
- TreeNode: added HasNodes and HasVisibleNodes properties
- TreeView: added ToggleOnNavigate option, if enabled expand node on move right event and collapse node on move left event
- TreeView: added ToggleOnSubmitCancel option, if enabled expand node on submit event and collapse node on cancel event

12.9 Release 1.15.2

- added Updater static class to control scripts updates IUpdatable.RunUpdate() without reflection instead of the default MonoBehaviour.Update()
- added SnapGrid: sticks draggable or resizable UI game objects to the nearest grid lines
- added LinesDrawer and SnapGridDrawer effects
- COMPATIBILITY-BREAKING CHANGES: MonoBehaviour.Update() replaced with IUpdatable.RunUpdate()

- Autocomplete: added AllowCancelOnDeselect to cancel DisplayListView close on deselect event.
- Autocomplete: added OnSearchCompleted event
- Autocomplete: added ResetListViewSelection option
- AutoCombobox: fixed InputField display bug
- AutoCombobox: fixed coloring bug
- AutoCombobox: added KeepSelection option (set Autocomplete.DisplayListView selected items)
- Connectors: fixed incorrect positions when CanvasMode is WorldSpace and its scale is not 1
- Dialog: added ButtonsContainer option
- ListView: fixed bug with incorrect item sizes when using variable size type
- ListView: fixed highlighting bug
- ListView: fixed wrong background color for the last items in table mode
- ListView: added RangeMode property to determine which element is the start when selecting a range with the Shift key.
- ListView: fixed instance recycling if ListViewItem.IsDragged enabled
- ListViewItem: IsDragged renamed to DisableRecycling
- ListViewString: now sort can be disabled with EnableSort in the Inspector window
- Notification: added ButtonsContainer option
- Paginator: added SetPage method to change current page without animation
- Sidebar: added ModalColor field
- shaders: now should support stereo instanced rendering and SRP batcher (thanks to David Watt)
- Tooltip: added generic Tooltip
- TreeView: added FindNodes method
- Widgets Generation: added Tooltip generation

12.10 Release 1.15.1

- COMPATIBILITY-BREAKING CHANGES: cursors fields at components (Resizable, Rotatable, Splitter, TableHeader, *DragSupport) are no more used and replaced with Cursors asset and CursorsDPISelector component (recommended to have only one CursorsDPISelector component at the scene)
- Accordion: added Curve property to use in animations
- ContextMenu: fixed HotKey null bug
- ListView: added OnComponentCreated, OnComponentEnabled, OnComponentDisabled, OnComponentDestroyed events
- ListView: renamed StopScrollAtItemCenter to ScrollInertiaUntilItemCenter and StopScrollInertia to ScrollInertia
- TreeView: fixed node remove bug when different nodes using the same item
- TreeView: fixed multiple selection bug when selecting a collapsed node
- TreeViewNodeDropSupport: added “Expand Node On Hold” option with customizable delay

- UICursors: static methods replaced to fields so they can be replaced

12.11 Release 1.15.0

- added ListViewEnum with ListViewEnum<T> wrapper to work with any enums
- reduced memory allocations
- all classes with INotifyPropertyChanged support now also implements IObservable which works without memory allocations
- Autocomplete, Combobox: added field ParentCanvas, it used as ListView parent on open
- Combobox: toggle-button is now full width
- ContextMenu: now works correctly with all canvas render modes
- DateScroller/DateTimeScroller/TimeScroller: ScrollBlock replaced with ScrollBlockBase
- Dialog: added InactiveDialogs and AllDialogs properties to get access to the template instances
- Dialog: DialogButton now support callback with Func<DialogBase dialog, int buttonIndex, bool closeDialog> type
- EasyLayout: small improvements
- EasyLayout: Filter property is obsolete and replaced with ShouldIgnore
- Input System support: fixed bug on mobile devices
- ListView: added property TemplateSelector, its allow to use of different templates (not only DefaultItem) depending on the item
- ListView: added GetDebugInfo and PringDebugInfo methods
- ListView: added "AnimationCurve animation, bool unscaledTime, Action after = null" parameters to the ScrollTo*Animated methods
- ListView: StopScrollAtItemCenter and StopScrollInertia properties
- ListView: fixed problem with not displayed items for ListType with variable sizes
- ListView: added GetComponentsEnumerator to iterate through DefaultItems instances as allocation free replacement of the ForEachComponent method
- ListView: added support of Container with custom scale
- ListView: fixed AutoScroll bug
- Notification: NotificationButton now support callback with Func<NotificationBase notification, int buttonIndex, bool closeNotification> type
- Paginators: added OnMovement event
- Popup: added content and onClose parameters to the Show method, added SetContent() method, added OnClose field, works the same way as dialog
- Resizable: added UseCanvasScaler option, if enabled ActiveRegion will be changed according to the CanvasScaler settings
- ScrollBlock: added OnItemChanged event to customize items depending on index and value
- ScrollBlock: added ScrollBlockBase and ScrollBlockCustom<T> classes
- TracksViewBase: ScrollBlock replaced with ScrollBlockBase

- TreeView: fixed drop support bug
- TreeView prefabs: toggle arrow is now nested
- UICursor: added Replacement function to replace cursor (can be used to replace cursor on High DPI screens)
- Utilities: more functions moved to the new UtilitiesUI and UtilitiesRectTransform classes

12.12 Release 1.14.2

- added CircularSlider widget
- added SliderScale widget
- added TimeAnalog widget
- Accordion: added OnStartToggleAnimation and OnDataSourceChanged events
- Accordion: added AccordionHighlight component
- AutoComplete: added OnItemNotFound and OnCancelInput events
- AutoCombobox: added AddItems option (requires overrided Input2Item method)
- CenteredSlider: event OnValuesChange renamed to OnValueChanged
- Connectors: fixed bug related to "Scale With Screen Size"
- Connectors: added rectangular lines support
- Cursor: fixed flickering
- DatePicker and DateTimePicker: fixed initial date
- DirectoryTreeView: nested nodes are automatically loaded on expand from script
- DirectoryTreeView: added ExpandPath(), Path2Node(), Path2NearestNode(), RefreshDirectories() methods
- ListView: fixed highlight coloring on navigation
- ListView: fixed unstoppable auto scroll bug
- ListView Drop Support: added ReceiveOnlyEmptyNode option
- RangeSlider: event OnValuesChange renamed to OnValuesChanged
- Resizable: fixed position change
- ScrollBlock: added AllowIncrease and AllowDecrease fields
- Spinner: added SetValue() method to change value without OnChangeEvent invocation
- Styles: fixed error when creating a new style
- Styles: added PixelsPerUnitMultiplier property to the Image styles
- TreeGraph: small performance improvement
- TreeGraph: added LineThickness, LineType, LineMargin options
- TreeView: added ScrollWithIndent option
- Widgets Generation: improved localization support

12.13 Release 1.14.1

- EasyLayout: reduced memory allocations
- Widgets Generation: fixed type name error
- Widgets Generation: fixed missing reference

12.14 Release 1.14.0

- added localizations integration support
- added I2 Localization support
- added ContextMenu
- added Input System support
- added UtilitiesCompare class
- added ScrollRectFooter
- added AutoComboboxIcons prefab
- Dialog, Picker, Popup: added CloseButton property
- EasyLayout: added SetPreferredAndFitContainer option for the Children Size
- ListView: added Header property
- ListViewPaginator: added LoopedList support
- Notification: added "content" and "onReturn" parameters to the Show() method
- Style: fixed unchangeable settings after "Apply Fast Settings" use
- Style: added "Update Default Style" option, which is opposite of the "Apply Default Style", it gets style settings from widgets and saves them to the current style
- Tabs: added CanSelectTab field to check if tab can be selected with a button click
- TabsCustom: TabButton class changed to the generic class TabButton<T>
- Widgets Generation: generated classes are partial now
- Widgets Generation: added AutoCombobox widget
- Utilities: most functions moved to the new Utilities* classes

12.15 Release 1.12.6

- ListViewItem: added ToggleOnClick and ToggleOnSubmit fields
- Widgets Generation fixes

12.16 Release 1.12.5

- added UIFlareGlobal shader: flare at global space
- added Ripple effect
- UIWidgets extensions methods moved to UIWidgets.Extensions namespace
- EasyLayout extensions methods moved to EasyLayoutNS.Extensions namespace
- shaders: replaced properties names with properties IDs
- Dialog: Show() arguments can later be changed with other methods: SetInfo(), SetButtons(), FocusButton(), SetPosition(), SetContent(), SetCanvas(), SetModal().
- EasyLayout: added GetElementPosition to get position in group
- InputFieldExtended: fixed bug with Value property (thanks to RickSaada1)
- ListView: added ItemsEvents field
- ListViewItem: now foreground and background graphics are serialized properties
- Notify: added buttons support with SetButtons(IList<DialogButton> buttons) method
- ProgressbarIndeterminate: fixed bar jump at the start
- TableHeader: fixed bug with ColumnToggle (thanks to jbw)
- UIFlare shaders: added flare delay property

12.17 Release 1.12.4

- Unity 4.6+ and Unity 5.x no more supported, now the oldest supported version is 2017.4
- fixed SendMessage warnings in Unity 2019.3 and later versions
- assembly definitions removed because all changes in .asmdef files are deleted on package update
- ListView: DefaultItem no more disabled by default in Editor mode
- ListViewDragSupport: added auto-scroll when the drag is near the border
- Notify: now you can create derived classes with NotificationCustom<T>
- TreeView Drag&Drop: now nodes can be reordered

12.18 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

12.19 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

12.20 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

12.21 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

12.22 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

12.23 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

12.24 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

12.25 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

12.26 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)

12.27 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

12.28 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"

12.29 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

12.30 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()

12.31 Release 1.9.1

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

12.32 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

12.33 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

12.34 Release 1.8.4

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

12.35 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

12.36 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

12.37 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.

12.38 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.

12.39 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.

12.40 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.

12.41 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.

12.42 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 Height" with options:**
  - 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.

12.43 Release 1.5.0

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

12.44 Release 1.4.2

- Added ListViewCustomHeight (support items of variable heights)

12.45 Release 1.4.1

- Added CenteredSlider.

12.46 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.

12.47 Release 1.3

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

12.48 Release 1.2

- Added Dialog
- Added Draggable

12.49 Release 1.1

- Added Notify
- Added EasyLayout

12.50 Release 1.0

- Initial release