Namespace PAC.Colour

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A colour in HSL (Hue, Saturation, Lightness) form with no alpha component.

HSLA

A colour in HSL (Hue, Saturation, Lightness) form with an alpha component.

HSV

A colour in HSV (Hue, Saturation, Value) form with no alpha component.

HSVA

A colour in HSV (Hue, Saturation, Value) form with an alpha component.

RGB

A colour in RGB (red, green, blue) format with no alpha channel.

Struct HSL

Namespace: PAC.Colour

A colour in HSL (Hue, Saturation, Lightness) form with no alpha component.

```
public readonly struct HSL : IEquatable<HSL>
```

Implements
IEquatable<HSL>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

HSL(float, float, float)

Creates an HSL with the given components without clamping or wrapping.

```
public HSL(float hue, float saturation, float lightness)
```

Parameters

`hue` float

See h.

`saturation` float

See s.

`lightness` float

See l.

Properties

h

Hue.

```
public float h { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive-exclusive range `[0, 1)`, but can be outside.

l

Lightness.

```
public float l { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

s

Saturation.

```
public float s { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

Methods

Equals(HSL)

See operator ==(HSL, HSL).

```
public bool Equals(HSL other)
```

Parameters

`other` HSL

Returns

bool

Equals(HSL, float)

Returns whether each component of `other` differs from the corresponding component of this by <= `tolerance`.

```
public bool Equals(HSL other, float tolerance)
```

Parameters

`other` HSL

`tolerance` float

Returns

bool

Equals(object)

See Equals(HSL).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

ToString(string)

Applies `format` to each component.

```
public string ToString(string format)
```

Parameters

`format` string

Returns

string

WithAlpha(float)

Returns an HSLA with the same HSL values and with the given alpha.

```
public HSLA WithAlpha(float alpha)
```

Parameters

`alpha` float

Returns

HSLA

Operators

operator ==(HSL, HSL)

Component-wise equality.

```
public static bool operator ==(HSL x, HSL y)
```

Parameters

`x` HSL

`y` HSL

Returns

bool

explicit operator HSV(HSL)

Converts from HSL to HSV.

```
public static explicit operator HSV(HSL hsl)
```

Parameters

`hsl` HSL

Returns

HSV

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator RGB(HSL)

Converts from HSL to RGB.

```
public static explicit operator RGB(HSL hsl)
```

Parameters

`hsl` HSL

Returns

RGB

Remarks

Does not do any clamping.

This is independent of colour space.

operator !=(HSL, HSL)

See operator ==(HSL, HSL).

```
public static bool operator !=(HSL x, HSL y)
```

Parameters

x HSL

y HSL

Returns

bool

See Also

HSLA

Struct HSLA

Namespace: PAC.Colour

A colour in HSL (Hue, Saturation, Lightness) form with an alpha component.

```
public readonly struct HSLA : IEquatable<HSLA>
```

Implements
IEquatable<HSLA>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

HSLA(float, float, float, float)

Creates an HSLA with the given components without clamping or wrapping.

```
public HSLA(float hue, float saturation, float lightness, float alpha)
```

Parameters

`hue` float

See h.

`saturation` float

See s.

`lightness` float

See l.

`alpha` float

See a.

Properties

a

Alpha.

```
public float a { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

h

Hue.

```
public float h { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive-exclusive range `[0, 1)`, but can be outside.

l

Lightness.

```
public float l { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

s

Saturation.

```
public float s { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

Methods

Equals(HSLA)

See operator ==(HSLA, HSLA).

```
public bool Equals(HSLA other)
```

Parameters

`other` HSLA

Returns

bool

Equals(HSLA, float)

Returns whether each component of `other` differs from the corresponding component of this by <= `tolerance`.

```
public bool Equals(HSLA other, float tolerance)
```

Parameters

`other` HSLA

`tolerance` float

Returns

bool

Equals(object)

See Equals(HSLA).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

ToString(string)

Applies `format` to each component.

```
public string ToString(string format)
```

Parameters

`format` string

Returns

string

Operators

operator ==(HSLA, HSLA)

Component-wise equality.

```
public static bool operator ==(HSLA x, HSLA y)
```

Parameters

`x` HSLA

`y` HSLA

Returns

bool

explicit operator HSLA(Color)

Converts from Color to HSLA.

```
public static explicit operator HSLA(Color rgba)
```

Parameters

`rgba` Color

Returns

HSLA

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator Color(HSLA)

Converts from HSLA to Color.

```
public static explicit operator Color(HSLA hsla)
```

Parameters

`hsla` HSLA

Returns

Color

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator HSL(HSLA)

Returns an HSL with the same HSL values as the HSLA, but discarding the alpha.

```
public static explicit operator HSL(HSLA hsla)
```

Parameters

`hsla` HSLA

Returns

HSL

explicit operator HSVA(HSLA)

Converts from HSLA to HSVA.

```
public static explicit operator HSVA(HSLA hsla)
```

Parameters

`hsla` HSLA

Returns

HSVA

Remarks

Does not do any clamping.

This is independent of colour space.

operator !=(HSLA, HSLA)

See operator ==(HSLA, HSLA).

```
public static bool operator !=(HSLA x, HSLA y)
```

Parameters

`x` HSLA

`y` HSLA

Returns

bool

See Also

HSL

Class HSLAExtensions

Namespace: PAC.Colour

Extension methods for HSLA.

```
public static class HSLAExtensions
```

Inheritance

object ← HSLAExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextHSLA(Random)

Generates a random HSLA by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static HSLA NextHSLA(this Random random)
```

Parameters

`random` Random

Returns

HSLA

Class HSLExtensions

Namespace: PAC.Colour

Extension methods for HSL.

```
public static class HSLExtensions
```

Inheritance

object ← HSLExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextHSL(Random)

Generates a random HSL by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static HSL NextHSL(this Random random)
```

Parameters

`random` Random

Returns

HSL

Struct HSV

Namespace: PAC.Colour

A colour in HSV (Hue, Saturation, Value) form with no alpha component.

```
public readonly struct HSV : IEquatable<HSV>
```

Implements
IEquatable<HSV>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

HSV(float, float, float)

Creates an HSV with the given components without clamping or wrapping.

```
public HSV(float hue, float saturation, float value)
```

Parameters

`hue` float

See h.

`saturation` float

See s.

`value` float

See v.

Properties

h

Hue.

```
public float h { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive-exclusive range `[0, 1)`, but can be outside.

s

Saturation.

```
public float s { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

v

Value.

```
public float v { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

Methods

Equals(HSV)

See operator ==(HSV, HSV).

```
public bool Equals(HSV other)
```

Parameters

`other` HSV

Returns

bool

Equals(HSV, float)

Returns whether each component of `other` differs from the corresponding component of this by <= `tolerance`.

```
public bool Equals(HSV other, float tolerance)
```

Parameters

`other` HSV

`tolerance` float

Returns

bool

Equals(object)

See Equals(HSV).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

ToString(string)

Applies `format` to each component.

```
public string ToString(string format)
```

Parameters

`format` string

Returns

string

WithAlpha(float)

Returns an HSVA with the same HSV values and with the given alpha.

```
public HSVA WithAlpha(float alpha)
```

Parameters

`alpha` float

Returns

HSVA

Operators

operator ==(HSV, HSV)

Component-wise equality.

```
public static bool operator ==(HSV x, HSV y)
```

Parameters

x HSV

y HSV

Returns

bool

explicit operator HSL(HSV)

Converts from HSV to HSL.

```
public static explicit operator HSL(HSV hsv)
```

Parameters

hsv HSV

Returns

HSL

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator RGB(HSV)

Converts from HSV to RGB.

```
public static explicit operator RGB(HSV hsv)
```

Parameters

hsv HSV

Returns

RGB

Remarks

Does not do any clamping.

This is independent of colour space.

operator !=(HSV, HSV)

See operator ==(HSV, HSV).

```
public static bool operator !=(HSV x, HSV y)
```

Parameters

x HSV

y HSV

Returns

bool

See Also

HSVA

Struct HSVA

Namespace: PAC.Colour

A colour in HSV (Hue, Saturation, Value) form with an alpha component.

```
public readonly struct HSVA : IEquatable<HSVA>
```

Implements
IEquatable<HSVA>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

HSVA(float, float, float, float)

Creates an HSV with the given components without clamping or wrapping.

```
public HSVA(float hue, float saturation, float value, float alpha)
```

Parameters

`hue` float

See h.

`saturation` float

See s.

`value` float

See v.

`alpha` float

See a.

Properties

a

Alpha.

```
public float a { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

h

Hue.

```
public float h { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive-exclusive range `[0, 1)`, but can be outside.

s

Saturation.

```
public float s { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

V

Value.

```
public float v { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

Methods

Equals(HSVA)

See operator ==(HSVA, HSVA).

```
public bool Equals(HSVA other)
```

Parameters

`other` HSVA

Returns

bool

Equals(HSVA, float)

Returns whether each component of `other` differs from the corresponding component of this by <= `tolerance`.

```
public bool Equals(HSVA other, float tolerance)
```

Parameters

`other` HSVA

`tolerance` float

Returns

bool

Equals(object)

See Equals(HSVA).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

ToString(string)

Applies `format` to each component.

```
public string ToString(string format)
```

Parameters

`format` string

Returns

string

Operators

operator ==(HSVA, HSVA)

Component-wise equality.

```
public static bool operator ==(HSVA x, HSVA y)
```

Parameters

`x` HSVA

`y` HSVA

Returns

bool

explicit operator HSVA(Color)

Converts from Color to HSVA.

```
public static explicit operator HSVA(Color rgba)
```

Parameters

`rgba` Color

Returns

HSVA

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator Color(HSVA)

Converts from HSVA to Color.

```
public static explicit operator Color(HSVA hsva)
```

Parameters

`hsva` HSVA

Returns

Color

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator HSLA(HSVA)

Converts from HSVA to HSLA.

```
public static explicit operator HSLA(HSVA hsva)
```

Parameters

`hsva` HSVA

Returns

HSLA

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator HSV(HSVA)

Returns an HSV with the same HSV values as the HSVA, but discarding the alpha.

```
public static explicit operator HSV(HSVA hsva)
```

Parameters

`hsva` HSVA

Returns

HSV

operator !=(HSVA, HSVA)

See operator ==(HSVA, HSVA).

```
public static bool operator !=(HSVA x, HSVA y)
```

Parameters

`x` HSVA

`y` HSVA

Returns

bool

See Also

HSV

Class HSVAExtensions

Namespace: PAC.Colour

Extension methods for HSVA.

```
public static class HSVAExtensions
```

Inheritance

object ← HSVAExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextHSVA(Random)

Generates a random HSVA by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static HSVA NextHSVA(this Random random)
```

Parameters

`random` Random

Returns

HSVA

Class HSVExtensions

Namespace: PAC.Colour

Extension methods for HSV.

```
public static class HSVExtensions
```

Inheritance

object ← HSVExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextHSV(Random)

Generates a random HSV by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static HSV NextHSV(this Random random)
```

Parameters

`random` Random

Returns

HSV

Struct RGB

Namespace: PAC.Colour

A colour in RGB (red, green, blue) format with no alpha channel.

```
public readonly struct RGB : IEquatable<RGB>
```

Implements
IEquatable<RGB>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

The RGB values are in the inclusive range `[0, 1]`.

Constructors

RGB(float, float, float)

Creates an RGB with the given channels without clamping.

```
public RGB(float r, float g, float b)
```

Parameters

r float

See r.

g float

See g.

`b` float

See b.

Fields

Black

The colour `(0, 0, 0)`.

```
public static readonly RGB Black
```

Field Value

RGB

Blue

The colour `(0, 0, 1)`.

```
public static readonly RGB Blue
```

Field Value

RGB

Green

The colour `(0, 1, 0)`.

```
public static readonly RGB Green
```

Field Value

RGB

Red

The colour `(1, 0, 0)`.

```
public static readonly RGB Red
```

Field Value

RGB

White

The colour `(1, 1, 1)`.

```
public static readonly RGB White
```

Field Value

RGB

Properties

b

The blue channel of the colour.

```
public float b { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

g

The green channel of the colour.

```
public float g { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

r

The red channel of the colour.

```
public float r { get; init; }
```

Property Value

float

Remarks

This is intended to be in the inclusive range `[0, 1]`, but can be outside.

Methods

Clamp01()

Returns the RGB with each component clamped to the inclusive range `[0, 1]`.

```
public RGB Clamp01()
```

Returns

RGB

Equals(RGB)

See operator ==(RGB, RGB).

```
public bool Equals(RGB other)
```

Parameters

`other` RGB

Returns

bool

Equals(RGB, float)

Returns whether each component of `other` differs from the corresponding component of this by <= `tolerance`.

```
public bool Equals(RGB other, float tolerance)
```

Parameters

`other` RGB

`tolerance` float

Returns

bool

Equals(object)

See Equals(RGB).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

LerpClamped(RGB, RGB, float)

Linearly interpolates component-wise from `start` (`t` = 0) to `end` (`t` = 1), clamping `t` to the inclusive range `[0, 1]`.

```
public static RGB LerpClamped(RGB start, RGB end, float t)
```

Parameters

`start` RGB

`end` RGB

`t` float

Returns

RGB

See Also
LerpUnclamped(RGB, RGB, float)

LerpUnclamped(RGB, RGB, float)

Linearly interpolates component-wise from `start` (`t` = 0) to `end` (`t` = 1), without clamping `t`.

```
public static RGB LerpUnclamped(RGB start, RGB end, float t)
```

Parameters

`start` RGB

`end` RGB

`t` float

Returns

RGB

Remarks

Values of `t` outside the range `[0, 1]` will give outputs beyond `start` or `end`.

See Also
LerpClamped(RGB, RGB, float)

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

ToString(string)

Applies `format` to each component.

```
public string ToString(string format)
```

Parameters

`format` string

Returns

string

WithAlpha(float)

Returns a Color with the same RGB values and with the given alpha.

```
public Color WithAlpha(float alpha)
```

Parameters

`alpha` float

Returns

Color

Operators

operator +(RGB, RGB)

Adds component-wise, with no clamping.

```
public static RGB operator +(RGB x, RGB y)
```

Parameters

`x` RGB

`y` RGB

Returns

RGB

operator /(RGB, RGB)

Divides component-wise, with no clamping.

```
public static RGB operator /(RGB x, RGB y)
```

Parameters

`x` RGB

`y` RGB

Returns

RGB

operator /(RGB, float)

Divides each component of `rgb` by `scalar` with no clamping.

```
public static RGB operator /(RGB rgb, float scalar)
```

Parameters

`rgb` RGB

`scalar` float

Returns

RGB

operator ==(RGB, RGB)

Component-wise equality.

```
public static bool operator ==(RGB x, RGB y)
```

Parameters

`x` RGB

`y` RGB

Returns

bool

explicit operator RGB(Color)

Returns an RGB with the same RGB values as the Color, but discarding the alpha.

```
public static explicit operator RGB(Color rgba)
```

Parameters

`rgba` Color

Returns

RGB

explicit operator HSL(RGB)

Converts from RGB to HSL.

```
public static explicit operator HSL(RGB rgb)
```

Parameters

`rgb` RGB

Returns

HSL

Remarks

Does not do any clamping.

This is independent of colour space.

explicit operator HSV(RGB)

Converts from RGB to HSV.

```
public static explicit operator HSV(RGB rgb)
```

Parameters

`rgb` RGB

Returns

HSV

Remarks

Does not do any clamping.

This is independent of colour space.

operator !=(RGB, RGB)

See operator ==(RGB, RGB).

```
public static bool operator !=(RGB x, RGB y)
```

Parameters

x RGB

y RGB

Returns

bool

operator *(RGB, RGB)

Multiplies component-wise, with no clamping.

```
public static RGB operator *(RGB x, RGB y)
```

Parameters

x RGB

y RGB

Returns

RGB

operator *(RGB, float)

Multiplies each component of `rgb` by `scalar` with no clamping.

```
public static RGB operator *(RGB rgb, float scalar)
```

Parameters

`rgb` RGB

`scalar` float

Returns

RGB

operator *(float, RGB)

Multiplies each component of `rgb` by `scalar` with no clamping.

```
public static RGB operator *(float scalar, RGB rgb)
```

Parameters

`scalar` float

`rgb` RGB

Returns

RGB

operator -(RGB, RGB)

Subtracts component-wise, with no clamping.

```
public static RGB operator -(RGB x, RGB y)
```

Parameters

`x` RGB

`y` RGB

Returns

RGB

Class RGBExtensions

Namespace: PAC.Colour

Extension methods for RGB.

```
public static class RGBExtensions
```

Inheritance

object ← RGBExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextRGB(Random)

Generates a random RGB by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static RGB NextRGB(this Random random)
```

Parameters

`random` Random

Returns

RGB

Namespace PAC.Colour.Compositing

Classes

AlphaCompositing

Methods for combining two colours based on their alpha values.

AlphaCompositing.Premultiplied

Alpha compositing methods where the colours are in premultiplied alpha form.

AlphaCompositing.Straight

Alpha compositing methods where the colours are in straight alpha form.

BlendMode

Defines how a foreground colour (the *top* colour) is blended onto a background colour (the *bottom* colour) to form a new colour, ignoring their alpha.

BlendMode.JsonConverter

Class AlphaCompositing

Namespace: PAC.Colour.Compositing

Methods for combining two colours based on their alpha values.

```
public abstract record AlphaCompositing : IEquatable<AlphaCompositing>
```

Inheritance

object ← AlphaCompositing

Implements

IEquatable<AlphaCompositing>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

See Also

https://en.wikipedia.org/wiki/Alpha_compositing

Class AlphaCompositing.Premultiplied

Namespace: PAC.Colour.Compositing

Alpha compositing methods where the colours are in premultiplied alpha form.

```
public static class AlphaCompositing.Premultiplied
```

Inheritance

object ← AlphaCompositing.Premultiplied

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

SourceOver(Color, Color)

The Porter-Duff *source-over* operator. Also known as *simple alpha compositing*.

```
public static Color SourceOver(Color source, Color destination)
```

Parameters

`source` Color

The foreground colour.

`destination` Color

The background colour.

Returns

Color

The composited colour in premultiplied alpha form.

Remarks

`source` and `destination` should be in premultiplied alpha form. This method does not check they are valid premultiplied colours.

Does not do any colour space conversion.

Class AlphaCompositing.Straight

Namespace: PAC.Colour.Compositing

Alpha compositing methods where the colours are in straight alpha form.

```
public static class AlphaCompositing.Straight
```

Inheritance

object ← AlphaCompositing.Straight

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

SourceOver(Color, Color)

The Porter-Duff *source-over* operator. Also known as *simple alpha compositing*.

```
public static Color SourceOver(Color source, Color destination)
```

Parameters

`source` Color

The foreground colour.

`destination` Color

The background colour.

Returns

Color

The composited colour in straight alpha form.

Remarks

`source` and `destination` should be in straight alpha form.

Does not do any colour space conversion.

Class BlendMode

Namespace: PAC.Colour.Compositing

Defines how a foreground colour (the *top* colour) is blended onto a background colour (the *bottom* colour) to form a new colour, ignoring their alpha.

```
public abstract record BlendMode : IEquatable<BlendMode>
```

Inheritance

object ← BlendMode

Implements

IEquatable<BlendMode>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ImageEdit.Blend(BlendMode, Color, Texture2D) , ImageEdit.Blend(BlendMode, Texture2D, Texture2D) , ImageEdit.Blend(BlendMode, Texture2D, Texture2D, IntVector2) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

Add

The *Add* blend mode.

```
public static readonly BlendMode Add
```

Field Value

BlendMode

Remarks

Also known as *Linear Dodge*.

This follows the specification from https://docs.krita.org/en/reference_manual/blending_modes/arithmetic.html#addition.

BlendModes

All BlendModes implemented in BlendMode.

```
public static readonly BlendMode[] BlendModes
```

Field Value

BlendMode[]

Remarks

There is no guarantee as to what order this is in.

Multiply

The *Multiply* blend mode.

```
public static readonly BlendMode Multiply
```

Field Value

BlendMode

Remarks

This follows the specification from https://www.w3.org/TR/compositing-1/#blendingmultiply.

Normal

The *Normal* blend mode.

```
public static readonly BlendMode Normal
```

Field Value

BlendMode

Remarks

This follows the specification from https://www.w3.org/TR/compositing-1/#blendingnormal.

Overlay

The *Overlay* blend mode.

```
public static readonly BlendMode Overlay
```

Field Value

BlendMode

Remarks

This follows the specification from https://www.w3.org/TR/compositing-1/#blendingoverlay.

Screen

The *Screen* blend mode.

```
public static readonly BlendMode Screen
```

Field Value

BlendMode

Remarks

This follows the specification from https://www.w3.org/TR/compositing-1/#blendingscreen.

Subtract

The *Subtract* blend mode.

```
public static readonly BlendMode Subtract
```

Field Value

BlendMode

Remarks

This follows the specification from https://docs.krita.org/en/reference_manual/blending_modes/arithmetic.html#subtract.

Properties

name

The display name of the blend mode.

```
public abstract string name { get; }
```

Property Value

string

Methods

Blend(Color, Color)

Applies the blend mode with source-over alpha compositing.

```
public Color Blend(Color top, Color bottom)
```

Parameters

`top` Color

`bottom` Color

Returns

Color

The blended colour in straight alpha form.

Remarks

`top` and `bottom` should be in straight alpha form.

This follows the specification from https://www.w3.org/TR/compositing-1/#generalformula.

No clamping is performed on `top` or `bottom`, but the output may be clamped depending on the BlendMode.

Does not do any colour space conversion.

Blend(RGB, RGB)

Applies the blend mode to the two colours.

```
public abstract RGB Blend(RGB top, RGB bottom)
```

Parameters

`top` RGB

`bottom` RGB

Returns

RGB

The blended colour in straight alpha form.

Remarks

`top` and `bottom` should be in straight alpha form.

No clamping is performed on `top` or `bottom`, but the output may be clamped depending on the BlendMode.

Does not do any colour space conversion.

Parse(string)

Returns the blend mode with that name (case-insensitive).

```
public static BlendMode Parse(string blendModeName)
```

Parameters

`blendModeName` string

Returns

BlendMode

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

See Also

https://en.wikipedia.org/wiki/Blend_modes

Class BlendMode.JsonConverter

Namespace: PAC.Colour.Compositing

```
public class BlendMode.JsonConverter : JsonConversion.JsonConverter<BlendMode,
JsonData.String>
```

Inheritance

object ← JsonConversion.JsonConverter<BlendMode, JsonData.String> ← BlendMode.JsonConverter

Inherited Members

JsonConversion.JsonConverter<BlendMode, JsonData.String>.ToJson(BlendMode) , JsonConversion.JsonConverter<BlendMode, JsonData.String>.FromJson(JsonData.String) , JsonConversion.JsonConverter<BlendMode, JsonData.String>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(String)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override BlendMode FromJson(JsonData.String jsonData)
```

Parameters

`jsonData` JsonData.String

Returns

BlendMode

ToJson(BlendMode)

Attempts to convert the C# object into JSON data.

```
public override JsonData.String ToJson(BlendMode blendMode)
```

Parameters

`blendMode` BlendMode

Returns

JsonData.String

Namespace PAC.Config

Classes

Colours

Files

Preferences

Preferences.Preference<T>

Tools

Class Colours

Namespace: PAC.Config

```
public static class Colours
```

Inheritance

object ← Colours

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

brushOutlineDark

```
public static readonly Color brushOutlineDark
```

Field Value

Color

brushOutlineLight

```
public static readonly Color brushOutlineLight
```

Field Value

Color

mask

```
public static readonly Color mask
```

Field Value

Color

transparent

```
public static readonly Color32 transparent
```

Field Value

Color32

Class Files

Namespace: PAC.Config

```
public static class Files
```

Inheritance

object ← Files

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

fileFormatVersion

```
public static readonly SemanticVersion fileFormatVersion
```

Field Value

SemanticVersion

pacFileExtension

```
public const string pacFileExtension = "pac"
```

Field Value

string

Class Preferences

Namespace: PAC.Config

```
public static class Preferences
```

Inheritance

object ← Preferences

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

startupAnimationFramerate

```
public static readonly Preferences.Preference<int> startupAnimationFramerate
```

Field Value

Preferences.Preference<int>

startupBrushSize

```
public static readonly Preferences.Preference<int> startupBrushSize
```

Field Value

Preferences.Preference<int>

startupFileHeight

```
public static readonly Preferences.Preference<int> startupFileHeight
```

Field Value

Preferences.Preference<int>

startupFileWidth

```
public static readonly Preferences.Preference<int> startupFileWidth
```

Field Value

Preferences.Preference<int>

startupPrimaryColour

```
public static readonly Preferences.Preference<Color> startupPrimaryColour
```

Field Value

Preferences.Preference<Color>

startupSecondaryColour

```
public static readonly Preferences.Preference<Color> startupSecondaryColour
```

Field Value

Preferences.Preference<Color>

transparentCheckerboardColour1

This is the colour that will be in the bottom left / top right of the checkerboard.

```
public static readonly Preferences.Preference<Color32>
transparentCheckerboardColour1
```

Field Value

Preferences.Preference<Color32>

transparentCheckerboardColour2

This is the colour that will be in the bottom right / top left of the checkerboard.

```
public static readonly Preferences.Preference<Color32>
transparentCheckerboardColour2
```

Field Value

Preferences.Preference<Color32>

Methods

CreatePreference(string, string, Color)

```
public static Preferences.Preference<Color> CreatePreference(string displayName,
string playerPrefsKey, Color defaultValue)
```

Parameters

`displayName` string

`playerPrefsKey` string

`defaultValue` Color

Returns

Preferences.Preference<Color>

CreatePreference(string, string, Color32)

```
public static Preferences.Preference<Color32> CreatePreference(string displayName,
string playerPrefsKey, Color32 defaultValue)
```

Parameters

`displayName` string

`playerPrefsKey` string

`defaultValue` Color32

Returns

Preferences.Preference<Color32>

CreatePreference(string, string, int, int, int)

```
public static Preferences.Preference<int> CreatePreference(string displayName,
string playerPrefsKey, int defaultValue, int minValue = -2147483648, int maxValue
= 2147483647)
```

Parameters

`displayName` string

`playerPrefsKey` string

`defaultValue` int

`minValue` int

`maxValue` int

Returns

Preferences.Preference<int>

Class Preferences.Preference<T>

Namespace: PAC.Config

```
public class Preferences.Preference<T>
```

Type Parameters

T

Inheritance

object ← Preferences.Preference<T>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Preference(string, Func<T>, Action<T>)

```
public Preference(string displayName, Func<T> getter, Action<T> setter)
```

Parameters

displayName string

getter Func<T>

setter Action<T>

Properties

displayName

```
public string displayName { get; }
```

Property Value

string

Methods

Get()

Gets the value of the preference. Can also be done via casting.

```
public T Get()
```

Returns

T

Set(T)

Change the value of the preference and save it.

```
public void Set(T value)
```

Parameters

`value` T

Operators

implicit operator T(Preference<T>)

Gets the value of the preference.

```
public static implicit operator T(Preferences.Preference<T> pref)
```

Parameters

`pref` Preferences.Preference<T>

Returns

T

Class Tools

Namespace: PAC.Config

```
public static class Tools
```

Inheritance

object ← Tools

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

maxBrushSize

```
public const int maxBrushSize = 25
```

Field Value

int

minBrushSize

```
public const int minBrushSize = 1
```

Field Value

int

Namespace PAC.DataStructures

Classes

CustomStack<T>

A custom implementation of a stack to allow removal of items at a specific index.

SemanticVersion.JsonConverter

Structs

IntRange

A set of consecutive integers.

Rational

A fraction a / b (where a and b are integers) kept in simplest form.

SemanticVersion

Class CustomStack<T>

Namespace: PAC.DataStructures

A custom implementation of a stack to allow removal of items at a specific index.

```
public class CustomStack<T>
```

Type Parameters

T

Inheritance

object ← CustomStack<T>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

Count

```
public int Count { get; }
```

Property Value

int

Methods

Clear()

Removes all items from the stack.

```
public void Clear()
```

Peek()

Returns the item on top of the stack.

```
public T Peek()
```

Returns

T

Pop()

Removes and returns the item on top of the stack.

```
public T Pop()
```

Returns

T

Push(T)

Adds the item to the top of the stack.

```
public void Push(T item)
```

Parameters

`item` T

Remove(T)

Removes the first occurrence (starting from the top) of the item in the stack.

```
public bool Remove(T item)
```

Parameters

`item` T

Returns

bool

true if the item is successfully removed.

RemoveAll(T)

Removes all occurrences of the item in the stack.

```
public void RemoveAll(T item)
```

Parameters

`item` T

RemoveAt(int)

Removes the item at the given index and returns it.

```
public T RemoveAt(int index)
```

Parameters

`index` int

Returns

T

ToArray()

```
public T[] ToArray()
```

Returns

T[]

ToList()

```
public List<T> ToList()
```

Returns

List <T>

Struct IntRange

Namespace: PAC.DataStructures

A set of consecutive integers.

```
public readonly struct IntRange : IReadOnlyList<int>, IReadOnlyContains<int>,
IReadOnlyCollection<int>, IEnumerable<int>, IEnumerable, IEquatable<IntRange>,
ISetComparable<IntRange>
```

Implements

IReadOnlyList<int>, IReadOnlyContains<int>, IReadOnlyCollection<int>, IEnumerable<int>, IEnumerable, IEquatable<IntRange>, ISetComparable<IntRange>

Inherited Members

object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IntRangeExtensions.Range(IEnumerable<int>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,

IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Product(IEnumerable<int>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>,
IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int) ,
IntRangeExtensions.GetRange<T>(IReadOnlyList<T>, IntRange) ,
IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, int, int) ,
IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, Range)

Remarks

The enumerator iterates throught the elements from startElement to endElement.

If startBoundary and endBoundary are equal but their being inclusive / exclusive do not match, we define the range to be empty. This definition is useful in situations such as

```
foreach (int index in IntRange.InclExcl(0, array.Length))
{
    Console.WriteLine($"Element {index}: {array[index]}");
}
```

so that it's equivalent to

```
for (int index = 0; index < array.Length; index++)
{
    Console.WriteLine($"Element {index}: {array[index]}");
}
```

Constructors

IntRange(int, int, bool, bool)

Creates a new range.

```
public IntRange(int startBoundary, int endBoundary, bool startBoundaryInclusive,
bool endBoundaryInclusive)
```

Parameters

`startBoundary` int

The start of the range. Can be inclusive or exclusive.

`endBoundary` int

The end of the range. Can be inclusive or exclusive.

`startBoundaryInclusive` bool

Whether the start boundary is inclusive or exclusive.

`endBoundaryInclusive` bool

Whether the end boundary is inclusive or exclusive.

Remarks

If `startBoundary` and `endBoundary` are equal but their being inclusive / exclusive do not match, we define the range to be empty. See IntRange for more details.

Fields

All

The range from MinValue (inclusive) to MaxValue (inclusive).

```
public static readonly IntRange All
```

Field Value

IntRange

Empty

The range from 0 (exclusive) to 0 (exclusive), which contains no elements.

```
public static readonly IntRange Empty
```

Field Value

IntRange

endBoundary

The end of the range. Can be inclusive or exclusive.

```
public readonly int endBoundary
```

Field Value

int

Remarks

Will be different from endElement if this boundary is exclusive.

See Also
endBoundaryInclusive, startBoundary

endBoundaryInclusive

Whether endBoundary is inclusive or exclusive.

```
public readonly bool endBoundaryInclusive
```

Field Value

bool

See Also
startBoundaryInclusive

startBoundary

The start of the range. Can be inclusive or exclusive.

```
public readonly int startBoundary
```

Field Value

int

Remarks

Will be different from startElement if this boundary is exclusive.

See Also
startBoundaryInclusive, endBoundary

startBoundaryInclusive

Whether startBoundary is inclusive or exclusive.

```
public readonly bool startBoundaryInclusive
```

Field Value

bool

See Also
endBoundaryInclusive

Properties

Count

The number of elements in the range.

```
public int Count { get; }
```

Property Value

int

Remarks

May throw an OverflowException. For example, the Count of a range from MinValue to MaxValue cannot be expressed as an int. Using LongCount instead will never encounter this issue.

Exceptions

OverflowException

The number of elements is too large to represent as an int.

this[int]

Indexes the elements of the range from startElement to endElement.

```
public int this[int index] { get; }
```

Parameters

`index` int

Property Value

int

Remarks

Some ranges, such as a range from MinValue to MaxValue, are too long for every element to be indexed by an int. Using this[long] instead will never have this issue.

Exceptions

ArgumentOutOfRangeException

`index` is not a valid index in the range.

this[long]

Indexes the elements of the range from startElement to endElement.

```
public int this[long index] { get; }
```

Parameters

`index` long

Property Value

int

Remarks

Unlike this[int], every element in a range can be indexed with a long. For example, the range from MinValue to MaxValue is too long for every element to be indexed by an int, but every element can be indexed by a long.

Exceptions

ArgumentOutOfRangeException

`index` is not a valid index in the range.

LongCount

The same as Count but computed as a long.

```
public long LongCount { get; }
```

Property Value

long

Remarks

Unlike Count, this will never throw an OverflowException. For example, the largest range, MinValue to MaxValue, cannot be expressed as an int but can be expressed as a long.

asDecreasing

A range with the same elements, in decreasing order.

```
public IntRange asDecreasing { get; }
```

Property Value

IntRange

Either the range unchanged or reverse.

See Also
asIncreasing

asExclExcl

A range with the same elements, in the same order, but expressed with startBoundary exclusive and endBoundary exclusive.

```
public IntRange asExclExcl { get; }
```

Property Value

IntRange

See Also
asExclIncl, asInclExcl, asInclIncl

asExclIncl

A range with the same elements, in the same order, but expressed with startBoundary exclusive and endBoundary inclusive.

```
public IntRange asExclIncl { get; }
```

Property Value

IntRange

See Also
asExclExcl, asInclExcl, asInclIncl

asInclExcl

A range with the same elements, in the same order, but expressed with startBoundary inclusive and endBoundary exclusive.

```
public IntRange asInclExcl { get; }
```

Property Value

IntRange

See Also

asExclExcl, asExclIncl, asInclIncl

asInclIncl

A range with the same elements, in the same order, but expressed with startBoundary inclusive and endBoundary inclusive.

```
public IntRange asInclIncl { get; }
```

Property Value

IntRange

Exceptions

InvalidOperationException

The range is empty.

See Also
asExclExcl, asExclIncl, asInclExcl

asIncreasing

A range with the same elements, in increasing order.

```
public IntRange asIncreasing { get; }
```

Property Value

IntRange

Either the range unchanged or reverse.

See Also
asDecreasing

endElement

The last element when iterating through the range (from start to end).

```
public int endElement { get; }
```

Property Value

int

Remarks

Will be different from endBoundary if that boundary is exclusive.

See Also
startElement

isEmpty

Whether the range has no elements.

```
public bool isEmpty { get; }
```

Property Value

bool

isExclExcl

Whether startBoundary is exclusive and endBoundary is exclusive.

```
public bool isExclExcl { get; }
```

Property Value

bool

Remarks

Equivalent to `!startBoundaryInclusive && !endBoundaryInclusive`.

See Also
isExclIncl, isInclExcl, isInclIncl

isExclIncl

Whether startBoundary is exclusive and endBoundary is inclusive.

```
public bool isExclIncl { get; }
```

Property Value

bool

Remarks

Equivalent to `!startBoundaryInclusive && endBoundaryInclusive`.

See Also
isExclExcl, isInclExcl, isInclIncl

isInclExcl

Whether startBoundary is inclusive and endBoundary is exclusive.

```
public bool isInclExcl { get; }
```

Property Value

bool

Remarks

Equivalent to `startBoundaryInclusive && !endBoundaryInclusive`.

See Also
isExclExcl, isExclIncl, isInclIncl

isInclIncl

Whether startBoundary is inclusive and endBoundary is inclusive.

```
public bool isInclIncl { get; }
```

Property Value

bool

Remarks

Equivalent to `startBoundaryInclusive && endBoundaryInclusive`.

See Also
isExclExcl, isExclIncl, isInclExcl

maxBoundary

The higher of startBoundary and endBoundary.

```
public int maxBoundary { get; }
```

Property Value

int

Remarks

Will be different from maxElement if this boundary is exclusive.

See Also
maxBoundaryInclusive, minBoundary

maxBoundaryInclusive

Whether maxBoundary is inclusive or exclusive.

```
public bool maxBoundaryInclusive { get; }
```

Property Value

bool

Remarks

If startBoundary and endBoundary are equal but their being inclusive / exclusive do not match, we define this to be exclusive. See IntRange for more details.

See Also
minBoundaryInclusive

maxElement

The highest element in the range.

```
public int maxElement { get; }
```

Property Value

int

Remarks

Will be different from maxBoundary if that boundary is exclusive.

See Also
minElement

minBoundary

The lower of startBoundary and endBoundary.

```
public int minBoundary { get; }
```

Property Value

int

Remarks

Will be different from minElement if this boundary is exclusive.

See Also
minBoundaryInclusive, maxBoundary

minBoundaryInclusive

Whether minBoundary is inclusive or exclusive.

```
public bool minBoundaryInclusive { get; }
```

Property Value

bool

Remarks

If startBoundary and endBoundary are equal but their being inclusive / exclusive do not match, we define this to be exclusive. See IntRange for more details.

See Also
maxBoundaryInclusive

minElement

The lowest element in the range.

```
public int minElement { get; }
```

Property Value

int

Remarks

Will be different from minBoundary if that boundary is exclusive.

See Also

maxElement

reverse

The range with startBoundary and endBoundary swapped, and startBoundaryInclusive and endBoundaryInclusive swapped.

```
public IntRange reverse { get; }
```

Property Value

IntRange

startElement

The first element when iterating through the range (from start to end).

```
public int startElement { get; }
```

Property Value

int

Remarks

Will be different from startBoundary if that boundary is exclusive.

See Also
endElement

Methods

AtLeast(int)

Creates a range from `x` (inclusive) to MaxValue (inclusive).

```
public static IntRange AtLeast(int x)
```

Parameters

x int

Returns

IntRange

See Also
AtMost(int), LessThan(int), MoreThan(int)

AtMost(int)

Creates a range from x (inclusive) to MinValue (inclusive).

```
public static IntRange AtMost(int x)
```

Parameters

x int

Returns

IntRange

See Also
LessThan(int), AtLeast(int), MoreThan(int)

Clamp(int)

Clamps the given integer to be within the IntRange.

```
public int Clamp(int n)
```

Parameters

n int

The value to clamp.

Returns

int

- `n` if minElement <= `n` <= maxElement
- minElement if `n` < minElement
- maxElement if maxElement < `n`

Exceptions

InvalidOperationException

The range is empty.

See Also
Clamp(int, int, int)

Contains(int)

Whether the given integer is in the range.

```
public bool Contains(int x)
```

Parameters

`x` int

Returns

bool

Equals(IntRange)

The same as operator ==(IntRange, IntRange).

```
public bool Equals(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

See Also
SequenceEquals(IntRange), SetEquals(IntRange)

Equals(object)

The same as Equals(IntRange).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

See Also
SequenceEquals(IntRange), SetEquals(IntRange)

ExclExcl(int, int)

Creates a range from `startBoundary` (exclusive) to `endBoundary` (exclusive).

```
public static IntRange ExclExcl(int startBoundary, int endBoundary)
```

Parameters

`startBoundary` int

`endBoundary` int

Returns

IntRange

See Also
ExclIncl(int, int), InclExcl(int, int), InclIncl(int, int)

ExclIncl(int, int)

Creates a range from `startBoundary` (exclusive) to `endBoundary` (inclusive).

```
public static IntRange ExclIncl(int startBoundary, int endBoundary)
```

Parameters

`startBoundary` int

`endBoundary` int

Returns

IntRange

Remarks

If `startBoundary` and `endBoundary` are equal, we define the range to be empty. See IntRange for more details.

See Also
ExclExcl(int, int), InclExcl(int, int), InclIncl(int, int)

Extend(int, int)

Adds `startBoundaryOffset` to startBoundary and adds `endBoundaryOffset` to endBoundary.

```
public IntRange Extend(int startBoundaryOffset, int endBoundaryOffset)
```

Parameters

`startBoundaryOffset` int

`endBoundaryOffset` int

Returns

IntRange

Remarks

Preserves startBoundaryInclusive and endBoundaryInclusive.

GetEnumerator()

Iterates throught the elements from startElement to endElement.

```
public IEnumerator<int> GetEnumerator()
```

Returns

IEnumerator<int>

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

InclExcl(int, int)

Creates a range from `startBoundary` (inclusive) to `endBoundary` (exclusive).

```
public static IntRange InclExcl(int startBoundary, int endBoundary)
```

Parameters

`startBoundary` int

`endBoundary` int

Returns

IntRange

Remarks

If `startBoundary` and `endBoundary` are equal, we define the range to be empty. See IntRange for more details.

See Also
ExclExcl(int, int), ExclIncl(int, int), IncllncI(int, int)

IncllncI(int, int)

Creates a range from `startBoundary` (inclusive) to `endBoundary` (inclusive).

```
public static IntRange IncllncI(int startBoundary, int endBoundary)
```

Parameters

`startBoundary` int

`endBoundary` int

Returns

IntRange

See Also
ExclExcl(int, int), ExclIncl(int, int), InclExcl(int, int)

Intersect(IntRange, IntRange)

Whether the two ranges have any elements in common.

```
public static bool Intersect(IntRange a, IntRange b)
```

Parameters

`a` IntRange

`b` IntRange

Returns

bool

See Also
Intersects(IntRange)

Intersection(IntRange)

Returns the elements the two ranges have in common.

```
public IntRange Intersection(IntRange other)
```

Parameters

`other` IntRange

Returns

IntRange

The intersection of the two ranges, expressed with both boundaries inclusive, unless the intersection is empty, in which case it will be expressed with both boundaries exclusive.

See Also
Intersection(IntRange, IntRange)

Intersection(IntRange, IntRange)

Returns the elements the two ranges have in common.

```
public static IntRange Intersection(IntRange a, IntRange b)
```

Parameters

`a` IntRange

`b` IntRange

Returns

IntRange

The intersection of the two ranges. It will be expressed with both boundaries inclusive, unless the intersection is empty, in which case it will be expressed with both boundaries exclusive.

See Also
Intersection(IntRange)

Intersects(IntRange)

Whether the two ranges have any elements in common.

```
public bool Intersects(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

See Also
Intersect(IntRange, IntRange)

IsProperSubsequenceOf(IntRange)

```
public bool IsProperSubsequenceOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

IsProperSupersequenceOf(IntRange)

```
public bool IsProperSupersequenceOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

IsSubsequenceOf(IntRange)

```
public bool IsSubsequenceOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

IsSubsetOf(IntRange)

Whether this as a set is a subset of `other` as a set.

```
public bool IsSubsetOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

Remarks

Recall that 'this is subset of `other`' means that every element of this is an element of `other`, ignoring order and duplicate elements.

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, then `T1.IsSubsetOf(T2)` should be logically equivalent to `T2.IsSupersetOf(T1)`.

See Also
IsSupersetOf(T)

IsSupersequenceOf(IntRange)

```
public bool IsSupersequenceOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

IsSupersetOf(IntRange)

Whether this as a set is a superset of `other` as a set.

```
public bool IsSupersetOf(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

Remarks

Recall that 'this is superset of `other`' means that every element of `other` is an element of this, ignoring order and duplicate elements.

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, then `T1.IsSupersetOf(T2)` should be logically equivalent to `T2.IsSubsetOf(T1)`.

See Also
IsSubsetOf(T)

LessThan(int)

Creates a range from `x` (exclusive) to MinValue (inclusive).

```
public static IntRange LessThan(int x)
```

Parameters

`x` int

Returns

IntRange

See Also
AtMost(int), AtLeast(int), MoreThan(int)

MoreThan(int)

Creates a range from `x` (exclusive) to MaxValue (inclusive).

```
public static IntRange MoreThan(int x)
```

Parameters

`x` int

Returns

IntRange

See Also
AtMost(int), LessThan(int), AtLeast(int)

SequenceEqual(IntRange, IntRange)

Whether the two ranges have exactly the same elements in the same order.

```
public static bool SequenceEqual(IntRange a, IntRange b)
```

Parameters

`a` IntRange

`b` IntRange

Returns

bool

Remarks

Note that ranges with different boundaries can give the same sequence (and therefore be considered sequence-equal), due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SetEquals(IntRange)

SequenceEquals(IntRange)

Whether the two ranges have exactly the same elements in the same order.

```
public bool SequenceEquals(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

Remarks

Note that ranges with different boundaries can give the same sequence (and therefore be considered sequence-equal), due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SetEquals(IntRange)

SetEqual(IntRange, IntRange)

Whether the two ranges have exactly the same elements, ignoring order.

```
public static bool SetEqual(IntRange a, IntRange b)
```

Parameters

`a` IntRange

`b` IntRange

Returns

bool

Remarks

Note that ranges with different boundaries can have the same elements (and therefore be considered set-equal), due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SequenceEquals(IntRange)

SetEquals(IntRange)

Whether the two ranges have exactly the same elements, ignoring order.

```
public bool SetEquals(IntRange other)
```

Parameters

`other` IntRange

Returns

bool

Remarks

Note that ranges with different boundaries can have the same elements (and therefore be considered set-equal), due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SequenceEquals(IntRange)

Singleton(int)

Creates a range from `x` (inclusive) to `x` (inclusive).

```
public static IntRange Singleton(int x)
```

Parameters

`x` int

Returns

IntRange

ToString()

Represents the range as a string using the mathematical notation for intervals - i.e. square brackets denote an inclusive boundary and round brackets denote an exclusive boundary.

For example, the range from -1 (inclusive) to 5 (exclusive) will be represented as `"[-1, 5)"`.

```
public override string ToString()
```

Returns

string

Operators

operator +(IntRange, int)

Translates the range by the given integer.

```
public static IntRange operator +(IntRange range, int integer)
```

Parameters

`range` IntRange

`integer` int

Returns

IntRange

Exceptions

OverflowException

If any translated elements cannot be expressed as an int.

operator +(int, IntRange)

Translates the range by the given integer.

```
public static IntRange operator +(int integer, IntRange range)
```

Parameters

`integer` int

`range` IntRange

Returns

IntRange

Exceptions

OverflowException

If any translated elements cannot be expressed as an int.

operator ==(IntRange, IntRange)

Whether the two ranges have the same start boundary and end boundary and the same inclusivity at each boundary - i.e. compares the struct s' fields.

```
public static bool operator ==(IntRange a, IntRange b)
```

Parameters

`a` IntRange

`b` IntRange

Returns

bool

Remarks

Note that having the same elements does not necessarily mean they are ==, due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SequenceEquals(IntRange), SetEquals(IntRange)

operator !=(IntRange, IntRange)

Whether the two ranges have the same start boundary and end boundary and the same inclusivity at each boundary - i.e. compares the struct's' fields.

```
public static bool operator !=(IntRange a, IntRange b)
```

Parameters

a IntRange

b IntRange

Returns

bool

Remarks

Note that being != does not necessarily mean they have different elements, due to the boundaries being inclusive or exclusive.

See Also
Equals(IntRange), SequenceEquals(IntRange), SetEquals(IntRange)

operator -(IntRange, int)

Translates the range by the given integer.

```
public static IntRange operator -(IntRange range, int integer)
```

Parameters

`range` IntRange

`integer` int

Returns

IntRange

Exceptions

OverflowException

If any translated elements cannot be expressed as an int.

operator -(int, IntRange)

Subtracts each element of the range from the given integer.

```
public static IntRange operator -(int integer, IntRange range)
```

Parameters

`integer` int

`range` IntRange

Returns

IntRange

Exceptions

OverflowException

If any translated elements cannot be expressed as an int.

operator -(IntRange)

Negates each element of the range.

```
public static IntRange operator -(IntRange range)
```

Parameters

`range` IntRange

Returns

IntRange

Exceptions

OverflowException

If any negated elements cannot be expressed as an int. This only occurs if the range contains MinValue.

Struct Rational

Namespace: PAC.DataStructures

A fraction a / b (where a and b are integers) kept in simplest form.

```
public readonly struct Rational : IEquatable<Rational>, IEquatable<int>
```

Implements
IEquatable<Rational>, IEquatable<int>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

Note that small values can have large numerators and denominators, which could cause overflow in e.g. operator +(Rational, Rational).

Constructors

Rational(int, int)

```
public Rational(int numerator, int denominator)
```

Parameters

`numerator` int

See numerator.

`denominator` int

See denominator.

Remarks

Will simplify the fraction.

Exceptions

ArgumentOutOfRangeException

- `numerator` or `denominator` are MinValue.

Fields

Epsilon

The smallest positive value that can be represented.

```
public static readonly Rational Epsilon
```

Field Value

Rational

Half

The value 1/2.

```
public static readonly Rational Half
```

Field Value

Rational

MaxValue

The most positive value that can be represented.

```
public static readonly Rational MaxValue
```

Field Value

Rational

See Also
MinValue

MinValue

The most negative value that can be represented.

```
public static readonly Rational MinValue
```

Field Value

Rational

See Also
MaxValue

Undefined

Represents any value with denominator 0, but is stored as 0/0.

```
public static readonly Rational Undefined
```

Field Value

Rational

Remarks

Note that this will not be considered == to itself. Use isUndefined instead to determine if a Rational is Undefined.

denominator

The bottom number of the fraction.

```
public readonly int denominator
```

Field Value

int

Remarks

This will always be non-negative and coprime to the numerator.

If the numerator is 0 and this is not 0, this will be 1.

numerator

The top number of the fraction.

```
public readonly int numerator
```

Field Value

int

Remarks

This will always be coprime to the denominator and its sign will always be the sign of the Rational.

If the denominator is 0, this will be 0 (and this Rational represents an undefined value).

See Also
denominator

Properties

isInteger

Whether the denominator is 1.

```
public bool isInteger { get; }
```

Property Value

bool

isUndefined

Whether the Rational is Undefined.

```
public bool isUndefined { get; }
```

Property Value

bool

Remarks

Note that two Undefined values are not considered ==, so use this method to check if a Rational is Undefined.

sign

The sign of the Rational.

```
public int sign { get; }
```

Property Value

int

- 1 if the value is positive
- 0 if the value is zero or Undefined
- -1 if the value is negative

Remarks

This will match the sign of the numerator.

Methods

Abs(Rational)

Returns the absolute value of `a`.

```
public static Rational Abs(Rational a)
```

Parameters

`a` Rational

Returns

Rational

Remarks

If `a` is Undefined, it will return Undefined.

Equals(Rational)

See operator ==(Rational, Rational).

```
public bool Equals(Rational other)
```

Parameters

`other` Rational

Returns

bool

Equals(int)

See implicit operator Rational(int) and operator ==(Rational, Rational).

```
public bool Equals(int other)
```

Parameters

`other` int

Returns

bool

Equals(object)

See Equals(Rational).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

Operators

operator +(Rational, Rational)

```
public static Rational operator +(Rational a, Rational b)
```

Parameters

a Rational

b Rational

Returns

Rational

Remarks

If either of a and b are Undefined, it will return Undefined.

operator /(Rational, Rational)

```
public static Rational operator /(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

Rational

Remarks

If either of `a` and `b` are Undefined, or if `b` is 0, it will return Undefined.

operator ==(Rational, Rational)

Whether the two Rationals represent the same fraction.

```
public static bool operator ==(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

bool

Remarks

Two Undefined values are not considered ==. Use isUndefined to check if a Rational is Undefined.

explicit operator int(Rational)

Rounds the Rational towards zero.

```
public static explicit operator int(Rational rational)
```

Parameters

`rational` Rational

Returns

int

Exceptions

DivideByZeroException

`rational` is Undefined.

operator >(Rational, Rational)

Whether `a` > `b`.

```
public static bool operator >(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

bool

Remarks

Returns false if either of `a` or `b` are Undefined.

operator >=(Rational, Rational)

Whether `a` >= `b`.

```
public static bool operator >=(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

bool

Remarks

Returns false if either of `a` or `b` are Undefined.

implicit operator float(Rational)

Converts the Rational to a float.

```
public static implicit operator float(Rational rational)
```

Parameters

`rational` Rational

Returns

float

Remarks

Undefined will be converted to NaN.

implicit operator Rational(int)

Converts the integer into a Rational with denominator 1.

```
public static implicit operator Rational(int integer)
```

Parameters

`integer` int

Returns

Rational

operator !=(Rational, Rational)

See operator ==(Rational, Rational).

```
public static bool operator !=(Rational a, Rational b)
```

Parameters

a Rational

b Rational

Returns

bool

operator <(Rational, Rational)

Whether `a` < `b`.

```
public static bool operator <(Rational a, Rational b)
```

Parameters

a Rational

b Rational

Returns

bool

Remarks

Returns false if either of `a` or `b` are Undefined.

operator <=(Rational, Rational)

Whether `a` <= `b`.

```
public static bool operator <=(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

bool

Remarks

Returns false if either of `a` or `b` are Undefined.

operator %(Rational, Rational)

Returns the smallest non-negative Rational r such that there is an integer q such that `a` = q * `b` + r.

```
public static Rational operator %(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

Rational

Remarks

If either of `a` and `b` are Undefined, it will return Undefined.

operator *(Rational, Rational)

```
public static Rational operator *(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

Rational

Remarks

If either of `a` and `b` are Undefined, it will return Undefined.

operator -(Rational, Rational)

```
public static Rational operator -(Rational a, Rational b)
```

Parameters

`a` Rational

`b` Rational

Returns

Rational

Remarks

If either of `a` and `b` are Undefined, it will return Undefined.

operator -(Rational)

```
public static Rational operator -(Rational a)
```

Parameters

`a` Rational

Returns

Rational

Remarks

If `a` is Undefined, it will return Undefined.

Struct SemanticVersion

Namespace: PAC.DataStructures

```
public struct SemanticVersion
```

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

SemanticVersion(int, int, int)

```
public SemanticVersion(int major, int minor, int patch)
```

Parameters

`major` int

`minor` int

`patch` int

Properties

major

```
public int major { get; set; }
```

Property Value

int

minor

```
public int minor { get; set; }
```

Property Value

int

patch

```
public int patch { get; set; }
```

Property Value

int

Methods

Equals(object)

Indicates whether this instance and a specified object are equal.

```
public override bool Equals(object obj)
```

Parameters

`obj` object

The object to compare with the current instance.

Returns

bool

true if `obj` and this instance are the same type and represent the same value; otherwise, false.

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

IncrementMajor()

Adds 1 to the major and resets the minor and patch to 0.

```
public void IncrementMajor()
```

IncrementMinor()

Adds 1 to the minor and resets the patch to 0. (The major is unchanged.)

```
public void IncrementMinor()
```

IncrementPatch()

Adds 1 to the patch. (The major and minor are unchanged.)

```
public void IncrementPatch()
```

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

Operators

operator ==(SemanticVersion, SemanticVersion)

```
public static bool operator ==(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator >(SemanticVersion, SemanticVersion)

```
public static bool operator >(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator >=(SemanticVersion, SemanticVersion)

```
public static bool operator >=(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator !=(SemanticVersion, SemanticVersion)

```
public static bool operator !=(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator <(SemanticVersion, SemanticVersion)

```
public static bool operator <(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator <=(SemanticVersion, SemanticVersion)

```
public static bool operator <=(SemanticVersion version1, SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

bool

operator -(SemanticVersion, SemanticVersion)

Returns a Version such that the most important field in which the operands differ (in the order major, minor, patch) is set to the positive difference of them in this field, and the other two fields are set to 0.

NOTE: This operation is commutative (swapping the order of the operands doesn't affect the result).

Example:

```
Version(1, 4, 3) - Version(1, 6, 10) = Version(0, 2, 0)
```

```
public static SemanticVersion operator -(SemanticVersion version1,
SemanticVersion version2)
```

Parameters

`version1` SemanticVersion

`version2` SemanticVersion

Returns

SemanticVersion

Class SemanticVersion.JsonConverter

Namespace: PAC.DataStructures

```
public class SemanticVersion.JsonConverter :
JsonConversion.JsonConverter<SemanticVersion, JsonData.String>
```

Inheritance

object ← JsonConversion.JsonConverter<SemanticVersion, JsonData.String> ← SemanticVersion.JsonConverter

Inherited Members

JsonConversion.JsonConverter<SemanticVersion, JsonData.String>.ToJson(SemanticVersion) , JsonConversion.JsonConverter<SemanticVersion, JsonData.String>.FromJson(JsonData.String) , JsonConversion.JsonConverter<SemanticVersion, JsonData.String>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(String)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override SemanticVersion FromJson(JsonData.String jsonData)
```

Parameters

`jsonData` JsonData.String

Returns

SemanticVersion

ToJson(SemanticVersion)

Attempts to convert the C# object into JSON data.

```
public override JsonData.String ToJson(SemanticVersion version)
```

Parameters

`version` SemanticVersion

Returns

JsonData.String

Namespace PAC.DataStructures.Extensions

Classes

IntRangeExtensions

Extension methods involving IntRange.

Class IntRangeExtensions

Namespace: PAC.DataStructures.Extensions

Extension methods involving IntRange.

```
public static class IntRangeExtensions
```

Inheritance

object ← IntRangeExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetRange<T>(IReadOnlyList<T>, IntRange)

Lazily iterates over the indices in the IntRange and yields the IReadOnlyList<T>'s element at that position.

```
public static IEnumerable<T> GetRange<T>(this IReadOnlyList<T> list,
IntRange indices)
```

Parameters

`list` IReadOnlyList<T>

`indices` IntRange

The range of indices to iterate over.

Returns

IEnumerable<T>

Type Parameters

`T`

Exceptions

ArgumentNullException

`list` is empty.

Next(Random, IntRange)

Returns a random integer within the given range.

```
public static int Next(this Random random, IntRange range)
```

Parameters

`random` Random

`range` IntRange

Returns

int

Range(IEnumerable<int>)

Returns the smallest IntRange containing all the given values.

```
public static IntRange Range(this IEnumerable<int> integers)
```

Parameters

`integers` IEnumerable<int>

Returns

IntRange

The smallest IntRange containing all the given values. It will be expressed with both boundaries inclusive, unless the sequence of values is empty, in which case it will be expressed with both boundaries exclusive.

Exceptions

ArgumentNullException

`integers` is null.

Namespace PAC.Exceptions

Classes

TestException

Indicates that an exception arose when running a test. Used to add an extra message, such as printing the test case, on top of the exception that occurred in the test.

UnderflowException

UnreachableException

Indicates that logically this code should not be reachable.

Class TestException

Namespace: PAC.Exceptions

Indicates that an exception arose when running a test. Used to add an extra message, such as printing the test case, on top of the exception that occurred in the test.

```
public class TestException : AggregateException, ISerializable
```

Inheritance

object ← Exception ← AggregateException ← TestException

Implements

ISerializable

Inherited Members

AggregateException.Flatten() , AggregateException.GetBaseException() , AggregateException.Handle(Func<Exception, bool>) , AggregateException.ToString() , AggregateException.InnerExceptions , AggregateException.Message , Exception.GetType() , Exception.Data , Exception.HelpLink , Exception.HResult , Exception.InnerException , Exception.Source , Exception.StackTrace , Exception.TargetSite , Exception.SerializeObjectState , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

TestException(string, Exception)

```
public TestException(string message, Exception innerException)
```

Parameters

`message` string

`innerException` Exception

Class UnderflowException

Namespace: PAC.Exceptions

```
public class UnderflowException : ArithmeticException, ISerializable
```

Inheritance

object ← Exception ← SystemException ← ArithmeticException ← UnderflowException

Implements

ISerializable

Inherited Members

Exception.GetBaseException() , Exception.GetType() , Exception.ToString() , Exception.Data , Exception.HelpLink , Exception.HResult , Exception.InnerException , Exception.Message , Exception.Source , Exception.StackTrace , Exception.TargetSite , Exception.SerializeObjectState , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

UnderflowException(string)

```
public UnderflowException(string message)
```

Parameters

`message` string

Class UnreachableException

Namespace: PAC.Exceptions

Indicates that logically this code should not be reachable.

```
public class UnreachableException : Exception, ISerializable
```

Inheritance

object ← Exception ← UnreachableException

Implements

ISerializable

Inherited Members

Exception.GetBaseException() , Exception.GetType() , Exception.ToString() , Exception.Data , Exception.HelpLink , Exception.HResult , Exception.InnerException , Exception.Message , Exception.Source , Exception.StackTrace , Exception.TargetSite , Exception.SerializeObjectState , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

UnreachableException()

Indicates that logically this code should not be reachable.

```
public UnreachableException()
```

UnreachableException(string)

Indicates that logically this code should not be reachable.

```
public UnreachableException(string message)
```

Parameters

`message` string

Namespace PAC.Extensions.System

Classes

RandomExtensions

Extension methods for Random.

TypeExtensions

ValueTupleExtensions

Class RandomExtensions

Namespace: PAC.Extensions.System

Extension methods for Random.

```
public static class RandomExtensions
```

Inheritance

object ← RandomExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

NextBool(Random)

Generates a uniformly random bool value.

```
public static bool NextBool(this Random random)
```

Parameters

`random` Random

Returns

bool

NextElement<T>(Random, IReadOnlyList<T>)

Selects a uniformly random element from `elements`.

```
public static T NextElement<T>(this Random random, IReadOnlyList<T> elements)
```

Parameters

`random` Random

`elements` IReadOnlyList<T>

Returns

T

Type Parameters

`T`

Exceptions

ArgumentException

`elements` is empty.

NextFloat(Random)

Returns a random float in the range `[0, 1)`.

```
public static float NextFloat(this Random random)
```

Parameters

`random` Random

Returns

float

ToSequence(Random)

Creates an infinite random sequence, lazily generated using Next().

```
public static IEnumerable<int> ToSequence(this Random random)
```

Parameters

`random` Random

Returns

IEnumerable<int>

Remarks

This does not deep-copy the Random, so calling Next() on this Random between the generation of two elements will affect the sequence. This also means that iterating over the sequence more than once will most likely give a different sequence each time; you may want to 'save' a portion of the sequence using `new Random().ToSequence().Take(10).ToArray()` or similar.

ToSequence(Random, int, int)

Creates an infinite random sequence, lazily generated using Next(int, int).

```
public static IEnumerable<int> ToSequence(this Random random, int minValue,
int maxValue)
```

Parameters

`random` Random

`minValue` int

The inclusive lower bound of the random numbers generated.

`maxValue` int

The exclusive upper bound of the random numbers generated. `maxValue` must be greater than or equal to `minValue`.

Returns

IEnumerable<int>

Remarks

This does not deep-copy the Random, so calling Next(int, int) on this Random between the generation of two elements will affect the sequence. This also means that iterating over the sequence more than once will most likely give a different sequence each time; you may want to 'save' a portion of the sequence using `new Random().ToSequence(minValue, maxValue).Take(10).ToArray()` or similar.

Exceptions

ArgumentOutOfRangeException

- `minValue` is greater than `maxValue`.

Class TypeExtensions

Namespace: PAC.Extensions.System

```
public static class TypeExtensions
```

Inheritance

object ← TypeExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetTypeOfRawGenericSuperclass(Type, Type)

Gets the concrete version of the given raw generic type that `subType` inherits from - e.g. `List<int>` inherits from the raw generic `IEnumerable<>`, with the concrete type returned by this method being `IEnumerable<int>`.

Throws an exception if `rawGeneric` is not a raw generic. For example, `List<>` is a raw generic, but `List<int>` is not.

Throws an exception if `subType` does not inherit from `rawGeneric`.

```
public static Type GetTypeOfRawGenericSuperclass(this Type subType, Type rawGeneric)
```

Parameters

`subType` Type

`rawGeneric` Type

Returns

Type

GetValues<T>()

Gets all possible values of the enum type `T`.

```
public static T[] GetValues<T>() where T : Enum
```

Returns

T[]

Type Parameters

`T`

IsAutoProperty(PropertyInfo)

Determines if the given property is an auto property - i.e. it has both a getter and setter with no body, for example

```
public string name { get; set; }
```

```
public static bool IsAutoProperty(this PropertyInfo property)
```

Parameters

`property` PropertyInfo

Returns

bool

IsGenericList(Type)

Determines if the given type is List<T> for some type `T`.

```
public static bool IsGenericList(this Type type)
```

Parameters

`type` Type

Returns

bool

IsRawGeneric(Type)

Determines if the given type is a raw generic - e.g. `List<>` is a raw generic, but `List<int>` is not. Also returns false for non-generic types.

```
public static bool IsRawGeneric(this Type type)
```

Parameters

`type` Type

Returns

bool

IsStruct(Type)

Determiens if the given type is a struct or not.

```
public static bool IsStruct(this Type type)
```

Parameters

`type` Type

Returns

bool

IsSubclassOfRawGeneric(Type, Type)

Determines if the given type inherits from the given some concrete version of the given raw generic type - e.g. `List<int>` inherits from the raw generic `IEnumerable<>`.

Throws an exception if `rawGeneric` is not a raw generic. For example, `List<>` is a raw generic, but `List<int>` is not.

```
public static bool IsSubclassOfRawGeneric(this Type subType, Type rawGeneric)
```

Parameters

`subType` Type

`rawGeneric` Type

Returns

bool

Class ValueTupleExtensions

Namespace: PAC.Extensions.System

```
public static class ValueTupleExtensions
```

Inheritance

object ← ValueTupleExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

AsEnumerable<T>((T, T, T, T, T, T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T, T, T, T, T, T) valueTuple)
```

Parameters

`valueTuple` (T, T, T, T, T, T, T)

Returns

IEnumerable<T>

Type Parameters

`T`

AsEnumerable<T>((T, T, T, T, T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T, T, T, T, T) valueTuple)
```

Parameters

`valueTuple` (T, T, T, T, T, T)

Returns

IEnumerable<T>

Type Parameters

`T`

AsEnumerable<T>((T, T, T, T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T, T, T, T) valueTuple)
```

Parameters

`valueTuple` (T, T, T, T, T)

Returns

IEnumerable<T>

Type Parameters

`T`

AsEnumerable<T>((T, T, T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T, T, T) valueTuple)
```

Parameters

`valueTuple` (T, T, T, T)

Returns

IEnumerable<T>

Type Parameters

T

AsEnumerable<T>((T, T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T, T) valueTuple)
```

Parameters

valueTuple (T, T, T)

Returns

IEnumerable<T>

Type Parameters

T

AsEnumerable<T>((T, T))

```
public static IEnumerable<T> AsEnumerable<T>(this (T, T) valueTuple)
```

Parameters

valueTuple (T, T)

Returns

IEnumerable<T>

Type Parameters

T

AsEnumerable<T>(ValueTuple<T>)

```
public static IEnumerable<T> AsEnumerable<T>(this ValueTuple<T> valueTuple)
```

Parameters

`valueTuple` ValueTuple<T>

Returns

IEnumerable<T>

Type Parameters

`T`

Index<T>((T, T, T, T, T, T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T, T, T, T, T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T, T, T, T, T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>((T, T, T, T, T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T, T, T, T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T, T, T, T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>((T, T, T, T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T, T, T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T, T, T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>((T, T, T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T, T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T, T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>((T, T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>((T, T), int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this (T, T) valueTuple, int index)
```

Parameters

`valueTuple` (T, T)

`index` int

Returns

T

Type Parameters

`T`

Index<T>(ValueTuple<T>, int)

Returns the element at the given index in the tuple.

```
public static T Index<T>(this ValueTuple<T> valueTuple, int index)
```

Parameters

`valueTuple` ValueTuple<T>

`index` int

Returns

T

Type Parameters

`T`

Namespace PAC.Extensions.System.Collections

Classes

ICollectionExtensions

IDictionaryExtensions

Extension methods for IDictionary<TKey, TValue>.

IEnumerableExtensions

Extension methods for IEnumerable<T>.

IReadOnlyListExtensions

Extension methods for IReadOnlyList<T>.

Class ICollectionExtensions

Namespace: PAC.Extensions.System.Collections

```
public static class ICollectionExtensions
```

Inheritance

object ← ICollectionExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ContainsAll<T>(ICollection<T>, IEnumerable<T>)

Whether all the given elements are in the ICollection<T>.

```
public static bool ContainsAll<T>(this ICollection<T> iCollection,
IEnumerable<T> elements)
```

Parameters

`iCollection` ICollection<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsAll<T>(ICollection<T>, params T[])

Whether all the given elements are in the ICollection<T>.

```
public static bool ContainsAll<T>(this ICollection<T> iCollection, params
T[] elements)
```

Parameters

`iCollection` ICollection<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

ContainsAny<T>(ICollection<T>, IEnumerable<T>)

Whether any of the given elements are in the ICollection<T>.

```
public static bool ContainsAny<T>(this ICollection<T> iCollection,
IEnumerable<T> elements)
```

Parameters

`iCollection` ICollection<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsAny<T>(ICollection<T>, params T[])

Whether any of the given elements are in the ICollection<T>.

```
public static bool ContainsAny<T>(this ICollection<T> iCollection, params
T[] elements)
```

Parameters

`iCollection` ICollection<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

ContainsNone<T>(ICollection<T>, IEnumerable<T>)

Whether none of the given elements are in the ICollection<T>.

```
public static bool ContainsNone<T>(this ICollection<T> iCollection,
IEnumerable<T> elements)
```

Parameters

`iCollection` ICollection<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsNone<T>(ICollection<T>, params T[])

Whether none of the given elements are in the ICollection<T>.

```
public static bool ContainsNone<T>(this ICollection<T> iCollection, params
T[] elements)
```

Parameters

`iCollection` ICollection<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

ContainsNotAll<T>(ICollection<T>, IEnumerable<T>)

Whether at least one of the given elements is not in the ICollection<T>.

```
public static bool ContainsNotAll<T>(this ICollection<T> iCollection,
IEnumerable<T> elements)
```

Parameters

`iCollection` ICollection<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

T

ContainsNotAll<T>(ICollection<T>, params T[])

Whether at least one of the given elements is not in the ICollection<T>.

```
public static bool ContainsNotAll<T>(this ICollection<T> iCollection, params
T[] elements)
```

Parameters

iCollection ICollection<T>

elements T[]

Returns

bool

Type Parameters

T

Class IDictionaryExtensions

Namespace: PAC.Extensions.System.Collections

Extension methods for IDictionary<TKey, TValue>.

```
public static class IDictionaryExtensions
```

Inheritance

object ← IDictionaryExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetOrAdd<TKey, TValue>(IDictionary<TKey, TValue>, TKey, TValue)

If the IDictionary already contains the key, it will return the existing value associated with it. If the key is not present, it will add it with the given value and return that value.

```
public static TValue GetOrAdd<TKey, TValue>(this IDictionary<TKey, TValue> dict,
TKey key, TValue value)
```

Parameters

`dict` IDictionary<TKey, TValue>

`key` TKey

`value` TValue

Returns

TValue

Type Parameters

`TKey`

`TValue`

Class IEnumerableExtensions

Namespace: PAC.Extensions.System.Collections

Extension methods for IEnumerable<T>.

```
public static class IEnumerableExtensions
```

Inheritance

object ← IEnumerableExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

AreAllDistinct<T>(IEnumerable<T>)

Returns whether all the elements in the IEnumerable<T> are distinct. Uses the default equality comparer for type `T`.

```
public static bool AreAllDistinct<T>(this IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ArgMax<TElement, TCompare> (IEnumerable<TElement>, Func<TElement, TCompare>)

Applies the function to each element and returns the element that gives the highest output. If multiple elements give the highest output, the first one will be returned.

```
public static TElement ArgMax<TElement, TCompare>(this IEnumerable<TElement>
elements, Func<TElement, TCompare> function) where TCompare : IComparable<TCompare>
```

Parameters

`elements` IEnumerable<TElement>

`function` Func<TElement, TCompare>

Returns

TElement

Type Parameters

`TElement`

`TCompare`

ArgMin<TElement, TCompare> (IEnumerable<TElement>, Func<TElement, TCompare>)

Applies the function to each element and returns the element that gives the lowest output. If multiple elements give the lowest output, the first one will be returned.

```
public static TElement ArgMin<TElement, TCompare>(this IEnumerable<TElement>
elements, Func<TElement, TCompare> function) where TCompare : IComparable<TCompare>
```

Parameters

`elements` IEnumerable<TElement>

`function` Func<TElement, TCompare>

Returns

TElement

Type Parameters

`TElement`

`TCompare`

Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[])

Creates a new IEnumerable<T> that iterates through all of this one, then all of second, etc. Extends Concat<TSource>(IEnumerable<TSource>, IEnumerable<TSource>) to allow concating multiple IEnumerable<T>s.

```
public static IEnumerable<T> Concat<T>(this IEnumerable<T> first, IEnumerable<T>
second, IEnumerable<T> third, params IEnumerable<T>[] subsequent)
```

Parameters

`first` IEnumerable<T>

`second` IEnumerable<T>

`third` IEnumerable<T>

`subsequent` IEnumerable<T>[]

Returns

IEnumerable<T>

Type Parameters

`T`

ContainsAll<T>(IEnumerable<T>, IEnumerable<T>)

Whether all the given elements are in the ICollection<T>.

```
public static bool ContainsAll<T>(this IEnumerable<T> iEnumerable,
IEnumerable<T> elements)
```

Parameters

`iEnumerable` IEnumerable<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsAll<T>(IEnumerable<T>, params T[])

Whether all the given elements are in the IEnumerable<T>.

```
public static bool ContainsAll<T>(this IEnumerable<T> iEnumerable, params
T[] elements)
```

Parameters

`iEnumerable` IEnumerable<T>

`elements` T[]

Returns

bool

Type Parameters

T

ContainsAny<T>(IEnumerable<T>, IEnumerable<T>)

Whether any of the given elements are in the IEnumerable<T>.

```
public static bool ContainsAny<T>(this IEnumerable<T> iEnumerable,
IEnumerable<T> elements)
```

Parameters

iEnumerable IEnumerable<T>

elements IEnumerable<T>

Returns

bool

Type Parameters

T

ContainsAny<T>(IEnumerable<T>, params T[])

Whether any of the given elements are in the IEnumerable<T>.

```
public static bool ContainsAny<T>(this IEnumerable<T> iEnumerable, params
T[] elements)
```

Parameters

iEnumerable IEnumerable<T>

elements T[]

Returns

bool

Type Parameters

`T`

ContainsNone<T>(IEnumerable<T>, IEnumerable<T>)

Whether none of the given elements are in the IEnumerable<T>.

```
public static bool ContainsNone<T>(this IEnumerable<T> iEnumerable,
IEnumerable<T> elements)
```

Parameters

`iEnumerable` IEnumerable<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsNone<T>(IEnumerable<T>, params T[])

Whether none of the given elements are in the IEnumerable<T>.

```
public static bool ContainsNone<T>(this IEnumerable<T> iEnumerable, params
T[] elements)
```

Parameters

`iEnumerable` IEnumerable<T>

`elements` T[]

Returns

bool

Type Parameters

T

ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>)

Whether at least one of the given elements is not in the ICollection<T>.

```
public static bool ContainsNotAll<T>(this IEnumerable<T> iEnumerable,
IEnumerable<T> elements)
```

Parameters

iEnumerable IEnumerable<T>

elements IEnumerable<T>

Returns

bool

Type Parameters

T

ContainsNotAll<T>(IEnumerable<T>, params T[])

Whether at least one of the given elements is not in the IEnumerable<T>.

```
public static bool ContainsNotAll<T>(this IEnumerable<T> iEnumerable, params
T[] elements)
```

Parameters

iEnumerable IEnumerable<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

CountIsAtLeast<T>(IEnumerable<T>, int)

Returns whether the given IEnumerable<T> has >= `n` elements.

```
public static bool CountIsAtLeast<T>(this IEnumerable<T> elements, int n)
```

Parameters

`elements` IEnumerable<T>

`n` int

Returns

bool

Type Parameters

`T`

Remarks

Iterates through at most `n` elements of the IEnumerable<T>.

CountIsAtMost<T>(IEnumerable<T>, int)

Returns whether the given IEnumerable<T> has <= `n` elements.

```
public static bool CountIsAtMost<T>(this IEnumerable<T> elements, int n)
```

Parameters

`elements` IEnumerable<T>

`n` int

Returns

bool

Type Parameters

`T`

Remarks

Iterates through at most `n` + 1 elements of the IEnumerable<T>.

CountIsExactly<T>(IEnumerable<T>, int)

Returns whether the given IEnumerable<T> has exactly `n` elements.

```
public static bool CountIsExactly<T>(this IEnumerable<T> elements, int n)
```

Parameters

`elements` IEnumerable<T>

`n` int

Returns

bool

Type Parameters

`T`

Remarks

Iterates through at most `n` + 1 elements of the IEnumerable<T>.

EnumerateOccurrences<T>(IEnumerable<T>)

Pairs each element with the number of times that element has already occurred.

```
char[] actual = new char[] { 'a', 'b', 'a', 'c', 'b', 'a' }.EnumerateOccurrences();
char[] expected = new (char, int)[] { ('a', 0), ('b', 0), ('a', 1), ('c', 0), ('b',
1), ('a', 2) };
expected.SequenceEqual(actual);  // true
```

```
public static IEnumerable<(T element, int occurrence)> EnumerateOccurrences<T>(this
IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

IEnumerable<(T element, int index)>

Type Parameters

`T`

Remarks

Uses the default equality comparer for type `T`.

Enumerate<T>(IEnumerable<T>)

Returns (`elements`[0], 0), (`elements`[1], 1), ..., (`elements`[^1], `elements`.Count - 1).

```
public static IEnumerable<(T element, int index)> Enumerate<T>(this
IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

IEnumerable<(T element, int index)>

Type Parameters

`T`

Flatten<T>(IEnumerable<IEnumerable<T>>)

Flattens a sequence of sequences into one sequence, by first iterating over the first sequence, then the second sequence, etc. For example, `{ { 1, 2, 3 }, { 4, 5 }, { }, { 6, 7, 8, 9, 10 } }` flattens to `{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 }`.

```
public static IEnumerable<T> Flatten<T>(this IEnumerable<IEnumerable<T>> sequences)
```

Parameters

`sequences` IEnumerable<IEnumerable<T>>

Returns

IEnumerable<T>

Type Parameters

`T`

Exceptions

ArgumentNullException

`sequences` is null.

ArgumentException

One of the sequences in `sequences` is null.

IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>)

Returns whether this IEnumerable<T> is a subsequence of `otherSequence`; that is, `otherSequence` is this IEnumerable<T> with potentially extra elements added anywhere in the sequence.

```
public static bool IsSubsequenceOf<T>(this IEnumerable<T> sequence,
IEnumerable<T> otherSequence)
```

Parameters

`sequence` IEnumerable<T>

`otherSequence` IEnumerable<T>

Returns

bool

Type Parameters

`T`

See Also
IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>)

IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>)

Returns whether this IEnumerable<T> is a supersequence of `otherSequence`; that is, this IEnumerable<T> is `otherSequence` with potentially extra elements added anywhere in the sequence.

```
public static bool IsSupersequenceOf<T>(this IEnumerable<T> sequence,
IEnumerable<T> otherSequence)
```

Parameters

`sequence` IEnumerable<T>

`otherSequence` IEnumerable<T>

Returns

bool

Type Parameters

`T`

See Also
IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>)

MinAndMax<T>(IEnumerable<T>)

Returns the minimum and maximum element of the IEnumerable<T>. Can be more efficient than calling Min<TSource>(IEnumerable<TSource>) and Max<TSource>(IEnumerable<TSource>) as this only iterates through the IEnumerable<T> once.

Throws an exception if `T` doesn't have a default comparer.

```
public static (T min, T max) MinAndMax<T>(this IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

(T, T)

Type Parameters

`T`

None<T>(IEnumerable<T>)

Returns true iff the given sequence is empty.

```
public static bool None<T>(this IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

None<T>(IEnumerable<T>, Func<T, bool>)

Returns true iff none of the elements satisfy the predicate.

```
public static bool None<T>(this IEnumerable<T> elements, Func<T, bool> predicate)
```

Parameters

`elements` IEnumerable<T>

`predicate` Func<T, bool>

Returns

bool

Type Parameters

`T`

NotAll<T>(IEnumerable<T>, Func<T, bool>)

Returns true iff at least one of the elements doesn't satisfy the predicate.

```
public static bool NotAll<T>(this IEnumerable<T> elements, Func<T, bool> predicate)
```

Parameters

`elements` IEnumerable<T>

`predicate` Func<T, bool>

Returns

bool

Type Parameters

`T`

Product(IEnumerable<decimal>)

Returns the product of all elements in the sequence, or 1 if the sequence is empty.

```
public static decimal Product(this IEnumerable<decimal> elements)
```

Parameters

`elements` IEnumerable<decimal>

Returns

decimal

Product(IEnumerable<double>)

Returns the product of all elements in the sequence, or 1 if the sequence is empty.

```
public static double Product(this IEnumerable<double> elements)
```

Parameters

`elements` IEnumerable<double>

Returns

double

Product(IEnumerable<int>)

Returns the product of all elements in the sequence, or 1 if the sequence is empty.

```
public static int Product(this IEnumerable<int> elements)
```

Parameters

`elements` IEnumerable<int>

Returns

int

Product(IEnumerable<long>)

Returns the product of all elements in the sequence, or 1 if the sequence is empty.

```
public static long Product(this IEnumerable<long> elements)
```

Parameters

`elements` IEnumerable<long>

Returns

long

Product(IEnumerable<float>)

Returns the product of all elements in the sequence, or 1 if the sequence is empty.

```
public static float Product(this IEnumerable<float> elements)
```

Parameters

`elements` IEnumerable<float>

Returns

float

RepeatIEnumerable<T>(IEnumerable<T>)

Creates an IEnumerable<T> that repeats the given IEnumerable<T> indefinitely, looping back round to the beginning when it reaches the end.

```
public static IEnumerable<T> RepeatIEnumerable<T>(IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

IEnumerable<T>

Type Parameters

`T`

Repeat<T>(T)

Creates an IEnumerable<T> that repeats the given element indefinitely.

```
public static IEnumerable<T> Repeat<T>(T element)
```

Parameters

`element` T

Returns

IEnumerable<T>

Type Parameters

`T`

Replace<T>(IEnumerable<T>, T, T)

Replaces all occurrences of `toReplace` with `replaceWith`. Uses the default equality comparer for type `T`.

```
public static IEnumerable<T> Replace<T>(this IEnumerable<T> elements, T toReplace,
T replaceWith)
```

Parameters

`elements` IEnumerable<T>

`toReplace` T

`replaceWith` T

Returns

IEnumerable<T>

Type Parameters

`T`

Singleton<T>(T)

Creates an IEnumerable<T> with only one element.

```
public static IEnumerable<T> Singleton<T>(T element)
```

Parameters

`element` T

Returns

IEnumerable<T>

Type Parameters

`T`

SkipIndex<T>(IEnumerable<T>, int)

Returns the given sequence but without the element at the given index. If the index is outside the range of the sequence, the sequence will be unaffected.

```
public static IEnumerable<T> SkipIndex<T>(this IEnumerable<T> elements, int index)
```

Parameters

`elements` IEnumerable<T>

`index` int

Returns

IEnumerable<T>

Type Parameters

`T`

ToPrettyString<T>(IEnumerable<T>)

Formats `elements` into a string of the form `"{ elements[0], ..., elements[^1] }"` (with the '...' replaced by elements).

```
public static string ToPrettyString<T>(this IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

string

Type Parameters

`T`

ZipCurrentAndNext<T>(IEnumerable<T>)

Returns `(elements[0], elements[1]), (elements[1], elements[2]), ..., (elements[^2], elements[^1])`.

Returns an empty IEnumerable<T> if `elements` has length 0 or 1.

```
public static IEnumerable<(T current, T next)> ZipCurrentAndNext<T>(this
IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

IEnumerable<(T current, T next)>

Type Parameters

`T`

Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>)

Returns `(left[0], right[0]), (left[1], right[1]), ...,` until either `left` or `right` ends.

```
public static IEnumerable<(T1 left, T2 right)> Zip<T1, T2>(this IEnumerable<T1>
left, IEnumerable<T2> right)
```

Parameters

`left` IEnumerable<T1>

`right` IEnumerable<T2>

Returns

IEnumerable<(T1 left, T2 right)>

Type Parameters

`T1`

`T2`

Class IReadOnlyListExtensions

Namespace: PAC.Extensions.System.Collections

Extension methods for IReadOnlyList<T>.

```
public static class IReadOnlyListExtensions
```

Inheritance

object ← IReadOnlyListExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetRange<T>(IReadOnlyList<T>, int, int)

Lazily iterates over the IReadOnlyList<T>'s elements from position `index` (inclusive) to `index` + `count` (exclusive). This is defined even if `count` is negative.

```
public static IEnumerable<T> GetRange<T>(this IReadOnlyList<T> list, int index,
int count)
```

Parameters

`list` IReadOnlyList<T>

`index` int

The index to start iterating from.

`count` int

The number of elements to iterate over, starting from `index`. If negative, it will iterate from `index` backwards.

Returns

IEnumerable<T>

Type Parameters

`T`

Exceptions

ArgumentNullException

`list` is empty.

GetRange<T>(IReadOnlyList<T>, Range)

Lazily iterates over the indices in the Range and yields the IReadOnlyList<T>'s element at that position.

```
public static IEnumerable<T> GetRange<T>(this IReadOnlyList<T> list, Range indices)
```

Parameters

`list` IReadOnlyList<T>

`indices` Range

The range of indices to iterate over.

Returns

IEnumerable<T>

Type Parameters

`T`

Exceptions

ArgumentNullException

`list` is empty.

Namespace PAC.Extensions.System.IO

Classes

TextReaderExtensions

Class TextReaderExtensions

Namespace: PAC.Extensions.System.IO

```
public static class TextReaderExtensions
```

Inheritance

object ← TextReaderExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ReadMatch(TextReader, IEnumerable<char>)

Reads, checking if it reads the given sequence of characters (starting at the current point). Returns the characters it matched before it found a non-match. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static string ReadMatch(this TextReader reader, IEnumerable<char> text)
```

Parameters

`reader` TextReader

`text` IEnumerable<char>

Returns

string

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatch(TextReader, IEnumerable<ICollection<char>>)

Reads, checking if the first read character is in the first collection of characters, then if the second is in the second collection, etc. until all character collections have been matched or until a character doesn't match. Returns the characters it matched before it found a non-match. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static string ReadMatch(this TextReader reader,
IEnumerable<ICollection<char>> charSets)
```

Parameters

`reader` TextReader

`charSets` IEnumerable<ICollection<char>>

Returns

string

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatch(TextReader, IEnumerable<Func<char, bool>>)

Reads, checking if the first read character satisfies the first match condition, then if the second matches the second condition, etc. until all character collections have been matched or until a character doesn't match. Returns the characters it matched before it found a non-match. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static string ReadMatch(this TextReader reader, IEnumerable<Func<char,
bool>> matchConditions)
```

Parameters

`reader` TextReader

`matchConditions` IEnumerable<Func<char, bool>>

Returns

string

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatch(TextReader, string)

Reads, checking if it reads the given string (starting at the current point). Returns the characters it matched before it found a non-match. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static string ReadMatch(this TextReader reader, string text)
```

Parameters

`reader` TextReader

`text` string

Returns

string

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatchAll(TextReader, IEnumerable<char>)

Reads, checking if it reads the given sequence of characters (starting at the current point).

```
public static bool ReadMatchAll(this TextReader reader, IEnumerable<char> text)
```

Parameters

`reader` TextReader

`text` IEnumerable<char>

Returns

bool

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatchAll(TextReader, IEnumerable<ICollection<char>>)

Reads, checking if the first read character is in the first collection of characters, then if the second is in the second collection, etc. until all character collections have been matched. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static bool ReadMatchAll(this TextReader reader,
IEnumerable<ICollection<char>> charSets)
```

Parameters

`reader` TextReader

`charSets` IEnumerable<ICollection<char>>

Returns

bool

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

ReadMatchAll(TextReader, string)

Reads, checking if it reads the given string (starting at the current point). Doesn't reach the non-match character / the next character after all have characters been matched. Doesn't reach the non-match character / the next character after all have characters been matched.

```
public static bool ReadMatchAll(this TextReader reader, string text)
```

Parameters

`reader` TextReader

`text` string

Returns

bool

Exceptions

EndOfStreamException

If there is nothing left for the reader to read at the start of the method.

TryReadIntoChar(TextReader, ref char)

If the TextReader can read another character, it will read it into chr and return true. Otherwise, it will return false without changing chr and without reading.

```
public static bool TryReadIntoChar(this TextReader reader, ref char chr)
```

Parameters

`reader` TextReader

`chr` char

Returns

bool

Namespace PAC.Extensions.UnityEngine

Classes

ColorExtensions

Extension methods for Color.

KeyCodeExtensions

Extension methods for Unity's KeyCode.

Texture2DExtensions

Extension methods for Unity's Texture2D.

Class ColorExtensions

Namespace: PAC.Extensions.UnityEngine

Extension methods for Color.

```
public static class ColorExtensions
```

Inheritance

object ← ColorExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

Equals(Color, Color, float)

Returns whether each component of `colour` differs from the corresponding component of `otherColour` by <= `tolerance`.

```
public static bool Equals(this Color colour, Color otherColour, float tolerance)
```

Parameters

`colour` Color

`otherColour` Color

`tolerance` float

Returns

bool

NextColor(Random)

Generates a random Color by independently generating a uniformly random value in `[0, 1)` for each component.

```
public static Color NextColor(this Random random)
```

Parameters

`random` Random

Returns

Color

Remarks

Note that this will always be a valid colour in straight alpha form, but not necessarily in premultiplied alpha form.

Premultiplied(Color)

Returns the Color with its RGB values multiplied by its alpha.

```
public static Color Premultiplied(this Color colour)
```

Parameters

`colour` Color

Returns

Color

See Also
Straight(Color)

Straight(Color)

Returns the Color with its RGB values divided by its alpha, and its alpha unchanged.

```
public static Color Straight(this Color colour)
```

Parameters

`colour` Color

Returns

Color

- If `colour` has non-zero alpha: `colour` with its RGB values divided by its alpha, and its alpha unchanged
- If `colour` has zero alpha: `(0, 0, 0, 0)`

See Also
Premultiplied(Color)

Class KeyCodeExtensions

Namespace: PAC.Extensions.UnityEngine

Extension methods for Unity's KeyCode.

```
public static class KeyCodeExtensions
```

Inheritance

object ← KeyCodeExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

Parse(string)

Parses the given string as a Unity KeyCode.

```
public static KeyCode Parse(string str)
```

Parameters

`str` string

Returns

KeyCode

Exceptions

ArgumentException

`str` couldn't been parsed as a KeyCode.

TryParse(string, out KeyCode)

Tries parsing the given string as a Unity KeyCode, returning whether the parsing was successful.

```
public static bool TryParse(string str, out KeyCode parsed)
```

Parameters

`str` string

`parsed` KeyCode

The result of the parsing, if successful. If unsuccessful, it will be KeyCode.None.

Returns

bool

Whether the parsing was successful.

Class Texture2DExtensions

Namespace: PAC.Extensions.UnityEngine

Extension methods for Unity's Texture2D.

```
public static class Texture2DExtensions
```

Inheritance

object ← Texture2DExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

Applied(Texture2D)

Calls Texture2D.Apply() on the Texture2D then returns it.

```
public static Texture2D Applied(this Texture2D texture)
```

Parameters

`texture` Texture2D

Returns

Texture2D

AssertValidTextureDimensions(int, int, string, string)

Checks that `width` and `height` are both > 0, and throws an ArgumentOutOfRangeException otherwise.

```
public static void AssertValidTextureDimensions(int width, int height, string
widthParamName, string heightParamName)
```

Parameters

`width` int

`height` int

`widthParamName` string

`heightParamName` string

ContainsPixel(Texture2D, int, int)

Returns whether the coordinates `(x, y)` are within the bounds of the Texture2D.

```
public static bool ContainsPixel(this Texture2D texture, int x, int y)
```

Parameters

`texture` Texture2D

`x` int

`y` int

Returns

bool

DeepCopy(Texture2D)

Creates a deep copy of the Texture2D.

```
public static Texture2D DeepCopy(this Texture2D texture)
```

Parameters

`texture` Texture2D

Returns

Texture2D

LoadFromFile(string)

Loads a Texture2D from the file at the given file path.

```
public static Texture2D LoadFromFile(string filePath)
```

Parameters

`filePath` string

Returns

Texture2D

Remarks

Does not call Texture2D.Apply() on the returned Texture2D.

Exceptions

FileNotFoundException

The file path `filePath` does not exist.

Solid(int, int, Color)

Creates a Texture2D of size `width` x `height`, filled with the given colour.

```
public static Texture2D Solid(int width, int height, Color colour)
```

Parameters

`width` int

`height` int

`colour` Color

Returns

Texture2D

Remarks

Solid(int, int, Color32) is faster.

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`width` or `height` is <= 0.

Solid(int, int, Color32)

Creates a Texture2D of size `width` x `height`, filled with the given colour.

```
public static Texture2D Solid(int width, int height, Color32 colour)
```

Parameters

`width` int

`height` int

`colour` Color32

Returns

Texture2D

Remarks

This is faster than Solid(int, int, Color).

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`width` or `height` is <= 0.

ToSprite(Texture2D)

Creates a Sprite from the Texture2D, using the FilterMode.Point filter mode.

```
public static Sprite ToSprite(this Texture2D texture)
```

Parameters

`texture` Texture2D

Returns

Sprite

Remarks

This does not deep copy the Texture2D. This means that subsequent changes to the Texture2D will affect the Sprite once Texture2D.Apply() is called.

Does not call Texture2D.Apply() on the Texture2D.

Transparent(int, int)

Creates a transparent (alpha 0) Texture2D of size `width` x `height`.

```
public static Texture2D Transparent(int width, int height)
```

Parameters

`width` int

`height` int

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`width` or `height` is <= 0.

Namespace PAC.Geometry

Classes

Plane2D

Provides ways to deal with the 2D plane.

Structs

Direction8

One of the following 8 directions:

- Up
- Down
- Left
- Right
- Up-Right
- Up-Left
- Down-Right
- Down-Left

IntRect

A non-empty rectangular region of integer coordinates.

IntVector2

A 2-dimensional vector with integer coordinates.

Enums

Plane2D.Octant

One of 8 regions of the 2D plane.

QuadrantalAngle

An angle that's a multiple of 90 degrees.

Struct Direction8

Namespace: PAC.Geometry

One of the following 8 directions:

- Up
- Down
- Left
- Right
- Up-Right
- Up-Left
- Down-Right
- Down-Left

```
public readonly struct Direction8 : IEquatable<Direction8>
```

Implements
IEquatable<Direction8>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

Can be implicitly cast to IntVector2.

Fields

All

All 8 directions.

```
public static readonly IEnumerable<Direction8> All
```

Field Value

IEnumerable<Direction8>

Diagonals

The directions UpRight, UpLeft, DownRight and DownLeft.

```
public static readonly IEnumerable<Direction8> Diagonals
```

Field Value

IEnumerable<Direction8>

Down

The direction `(0, -1)`.

```
public static readonly Direction8 Down
```

Field Value

Direction8

DownLeft

The direction `(-1, -1)`.

```
public static readonly Direction8 DownLeft
```

Field Value

Direction8

DownRight

The direction `(1, -1)`.

```
public static readonly Direction8 DownRight
```

Field Value

[Direction8](#)

Left

The direction `(-1, 0)`.

```
public static readonly Direction8 Left
```

Field Value

[Direction8](#)

Right

The direction `(1, 0)`.

```
public static readonly Direction8 Right
```

Field Value

[Direction8](#)

Up

The direction `(0, 1)`.

```
public static readonly Direction8 Up
```

Field Value

Direction8

UpDownLeftRight

The directions Up, Down, Left and Right.

```
public static readonly IEnumerable<Direction8> UpDownLeftRight
```

Field Value

IEnumerable<Direction8>

UpLeft

The direction `(-1, 1)`.

```
public static readonly Direction8 UpLeft
```

Field Value

Direction8

UpRight

The direction `(1, 1)`.

```
public static readonly Direction8 UpRight
```

Field Value

Direction8

Methods

Deconstruct(out int, out int)

```
public void Deconstruct(out int x, out int y)
```

Parameters

`x` int

`y` int

Equals(Direction8)

Indicates whether the current object is equal to another object of the same type.

```
public bool Equals(Direction8 other)
```

Parameters

`other` Direction8

An object to compare with this object.

Returns

bool

true if the current object is equal to the `other` parameter; otherwise, false.

Equals(object)

Indicates whether this instance and a specified object are equal.

```
public override bool Equals(object obj)
```

Parameters

`obj` object

The object to compare with the current instance.

Returns

bool

true if `obj` and this instance are the same type and represent the same value; otherwise, false.

Flip(CardinalOrdinalAxis)

Returns the direction flipped across the given axis.

```
public Direction8 Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Direction8

Exceptions

ArgumentNullException

`axis` is null.

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

Rotate(QuadrantalAngle)

Returns the direction rotated by the given angle.

```
public Direction8 Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Direction8

ToString()

Returns the fully qualified type name of this instance.

```
public override string ToString()
```

Returns

string

The fully qualified type name.

Operators

operator ==(Direction8, Direction8)

```
public static bool operator ==(Direction8 a, Direction8 b)
```

Parameters

`a` Direction8

`b` Direction8

Returns

bool

explicit operator Direction8(IntVector2)

Converts an IntVector2 with supNorm 1 into the corresponding Direction8.

```
public static explicit operator Direction8(IntVector2 direction)
```

Parameters

`direction` IntVector2

Returns

Direction8

Exceptions

ArgumentException

`direction` does not have supNorm 1.

implicit operator IntVector2(Direction8)

Converts the Direction8 into the corresponding IntVector2 with supNorm 1.

```
public static implicit operator IntVector2(Direction8 direction)
```

Parameters

`direction` Direction8

Returns

IntVector2

operator !=(Direction8, Direction8)

```
public static bool operator !=(Direction8 a, Direction8 b)
```

Parameters

`a` Direction8

`b` Direction8

Returns

bool

operator -(Direction8)

Returns the direction rotated 180 degrees.

```
public static Direction8 operator -(Direction8 direction)
```

Parameters

`direction` Direction8

Returns

Direction8

Struct IntRect

Namespace: PAC.Geometry

A non-empty rectangular region of integer coordinates.

```
public readonly struct IntRect : IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable,
IEquatable<IntRect>, ISetComparable<IntRect>
```

Implements

IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<IntRect>, ISetComparable<IntRect>

Inherited Members

object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,

IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

When we say an IntVector2 is in the rect, we mean that whole grid square is in the rect. For example, the rect with corners `(0, 0), (0, 4), (3, 0), (3, 4)` is a 4x5 rectangle:

```
(0, 4) -> # # # # <- (3, 4)
          # # # #
          # # # #
```

```
          # # # #
(0, 0) -> # # # # <- (3, 0)
```

The enumerator iterates over the points in the rect, starting with the bottom row, read left to right, then the next row, etc. This ordering is useful since it matches the expected order of pixels in Unity's Texture2D.SetPixels(Color[]).

Constructors

IntRect(IntRange, IntRange)

Creates a rect with the given ranges of x and y coordinates.

```
public IntRect(IntRange xRange, IntRange yRange)
```

Parameters

`xRange` IntRange

The range of x coordinates.

`yRange` IntRange

The range of y coordinates.

Remarks

The x and y ranges must be non-empty, as IntRects are non-empty.

Exceptions

ArgumentException

`xRange` is empty and/or `yRange` is empty.

IntRect(IntVector2, IntVector2)

Creates an IntRect with the two given points as opposite corners (inclusive) of the rect.

```
public IntRect(IntVector2 corner, IntVector2 oppositeCorner)
```

Parameters

`corner` IntVector2

The corner diagonally opposite `oppositeCorner`.

`oppositeCorner` IntVector2

The corner diagonally opposite `corner`.

Remarks

For example, with `corner = (3, 0)` and `oppositeCorner = (0, 4)`, the rect will have corners `(0, 0), (0, 4), (3, 0), (3, 4)`:

```
(0, 4) -> # # # # <- (3, 4)
          # # # #
          # # # #
          # # # #
(0, 0) -> # # # # <- (3, 0)
```

Fields

bottomLeft

The coordinates of the bottom-left point in the rect (inclusive).

```
public readonly IntVector2 bottomLeft
```

Field Value

IntVector2

See Also
topRight, bottomRight, topLeft

topRight

The coordinates of the top-right point in the rect (inclusive).

```
public readonly IntVector2 topRight
```

Field Value

IntVector2

See Also
bottomLeft, bottomRight, topLeft

Properties

Count

The number of points in the rect.

```
public int Count { get; }
```

Property Value

int

bottomRight

The coordinates of the bottom-right point in the rect (inclusive).

```
public IntVector2 bottomRight { get; }
```

Property Value

IntVector2

See Also
bottomLeft, topRight, topLeft

height

The number of integer points the rect covers vertically.

```
public int height { get; }
```

Property Value

int

See Also
width, size

isSquare

Whether the rect is a square - i.e. the width and height are equal.

```
public bool isSquare { get; }
```

Property Value

bool

See Also
IsSquare(IntRect)

maxX

The maximum x coordinate of points in the rect.

```
public int maxX { get; }
```

Property Value

int

See Also
minX, minY, maxY

maxY

The maximum y coordinate of points in the rect.

```
public int maxY { get; }
```

Property Value

int

See Also
minX, maxX, minY

minX

The minimum x coordinate of points in the rect.

```
public int minX { get; }
```

Property Value

int

See Also
maxX, minY, maxY

minY

The minimum y coordinate of points in the rect.

```
public int minY { get; }
```

Property Value

int

See Also
minX, maxX, maxY

size

The vector (width, height).

```
public IntVector2 size { get; }
```

Property Value

IntVector2

See Also
width, height

topLeft

The coordinates of the top-left point in the rect (inclusive).

```
public IntVector2 topLeft { get; }
```

Property Value

IntVector2

See Also
bottomLeft, topRight, bottomRight

width

The number of integer points the rect covers horizontally.

```
public int width { get; }
```

Property Value

int

See Also
height, size

xRange

The inclusive range of x coordinates in the rect, in increasing order.

```
public IntRange xRange { get; }
```

Property Value

IntRange

See Also
yRange

yRange

The inclusive range of y coordinates in the rect, in increasing order.

```
public IntRange yRange { get; }
```

Property Value

IntRange

Methods

BoundingRect(IntRect, IntRect)

Returns the smallest rect containing both the given rects.

```
public static IntRect BoundingRect(IntRect a, IntRect b)
```

Parameters

a IntRect

b IntRect

Returns

IntRect

BoundingRect(params IntRect[])

Returns the smallest rect containing all the given rects.

```
public static IntRect BoundingRect(params IntRect[] rects)
```

Parameters

`rects` IntRect[]

Returns

IntRect

Exceptions

ArgumentNullException

`rects` is null.

ArgumentException

`rects` is empty.

BoundingRect(params IntVector2[])

Returns the smallest rect containing all the given vectors.

```
public static IntRect BoundingRect(params IntVector2[] vectors)
```

Parameters

`vectors` IntVector2[]

Returns

IntRect

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

BoundingRect(IEnumerable<IntRect>)

Returns the smallest rect containing all the given rects.

```
public static IntRect BoundingRect(IEnumerable<IntRect> rects)
```

Parameters

`rects` IEnumerable<IntRect>

Returns

IntRect

Exceptions

ArgumentNullException

`rects` is null.

ArgumentException

`rects` is empty.

BoundingRect(IEnumerable<IntVector2>)

Returns the smallest rect containing all the given vectors.

```
public static IntRect BoundingRect(IEnumerable<IntVector2> vectors)
```

Parameters

`vectors` IEnumerable<IntVector2>

Returns

IntRect

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

Clamp(IntVector2)

Returns the point in the rect that is closest to the given vector. Equivalently, it clamps the vector's x coord to be in the rect's range of x coords, and clamps the vector's y coord to be in the rect's range of y coords.

```
public IntVector2 Clamp(IntVector2 vector)
```

Parameters

`vector` IntVector2

Returns

IntVector2

See Also
Clamp(int, int, int)

Contains(IntVector2)

Whether the point is in the rect.

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

See Also
Contains(int, int)

Contains(int, int)

Whether the point `(x, y)` is in the rect.

```
public bool Contains(int x, int y)
```

Parameters

`x` int

`y` int

Returns

bool

See Also
Contains(IntVector2)

ContainsX(int)

Returns whether the rect contains any points with the given x coord.

```
public bool ContainsX(int x)
```

Parameters

x int

Returns

bool

See Also
ContainsY(int)

ContainsY(int)

Returns whether the rect contains any points with the given y coord.

```
public bool ContainsY(int y)
```

Parameters

y int

Returns

bool

See Also
ContainsX(int)

Equals(IntRect)

The same as operator ==(IntRect, IntRect).

```
public bool Equals(IntRect other)
```

Parameters

other IntRect

Returns

bool

Equals(object)

The same as Equals(IntRect).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

FilterPointsInside(IEnumerable<IntVector2>)

Returns the elements of the sequence that are in this rect.

```
public IEnumerable<IntVector2> FilterPointsInside(IEnumerable<IntVector2> vectors)
```

Parameters

`vectors` IEnumerable<IntVector2>

Returns

IEnumerable<IntVector2>

A lazily-generated sequence containing the elements of `vectors` that are in this rect.

Remarks

Preserves the order of the sequence.

Exceptions

ArgumentNullException

`vectors` is null.

See Also
FilterPointsOutside(IEnumerable<IntVector2>)

FilterPointsOutside(IEnumerable<IntVector2>)

Returns the elements of the sequence that are outside this rect.

```
public IEnumerable<IntVector2> FilterPointsOutside(IEnumerable<IntVector2> vectors)
```

Parameters

`vectors` IEnumerable<IntVector2>

Returns

IEnumerable<IntVector2>

A lazily-generated sequence containing the elements of `vectors` that are not in this rect.

Remarks

Preserves the order of the sequence.

Exceptions

ArgumentNullException

`vectors` is null.

See Also
FilterPointsInside(IEnumerable<IntVector2>)

Flip(CardinalOrdinalAxis)

Returns the rect flipped across the given axis.

```
public IntRect Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

IntRect

Exceptions

ArgumentNullException

`axis` is null.

See Also
Flip(CardinalOrdinalAxis)

GetEnumerator()

Iterates over the points in the rect, starting with the bottom row, read left to right, then the next row, etc.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

Remarks

The ordering of this enumerator is useful since it matches the expected order of pixels in Unity's Texture2D.SetPixels(Color[]).

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

Intersection(IntRect)

Returns the set intersection of the two rects.

```
public IntRect Intersection(IntRect other)
```

Parameters

`other` IntRect

Returns

IntRect

Exceptions

InvalidOperationException

This rect and `other` do not intersect.

See Also
Intersection(IntRect, IntRect)

Intersection(IntRect, IntRect)

Returns the set intersection of the two rects.

```
public static IntRect Intersection(IntRect a, IntRect b)
```

Parameters

`a` IntRect

`b` IntRect

Returns

IntRect

Exceptions

InvalidOperationException

`a` and `b` do not intersect.

See Also
Intersection(IntRect)

IsSquare(IntRect)

Whether the rect is a square - i.e. the width and height are equal.

```
public static bool IsSquare(IntRect rect)
```

Parameters

`rect` IntRect

Returns

bool

See Also
isSquare

IsSubsetOf(IntRect)

Whether this rect is a subset of `other`.

```
public bool IsSubsetOf(IntRect other)
```

Parameters

`other` IntRect

Returns

bool

See Also
IsSupersetOf(IntRect)

IsSupersetOf(IntRect)

Whether this rect is a superset of `other`.

```
public bool IsSupersetOf(IntRect other)
```

Parameters

`other` IntRect

Returns

bool

See Also
IsSubsetOf(IntRect)

Overlap(IntRect, IntRect)

Whether the two rects have any points in common.

```
public static bool Overlap(IntRect a, IntRect b)
```

Parameters

a IntRect

b IntRect

Returns

bool

See Also
Overlaps(IntRect)

Overlaps(IntRect)

Whether the two rects have any points in common.

```
public bool Overlaps(IntRect rect)
```

Parameters

`rect` IntRect

Returns

bool

See Also
Overlap(IntRect, IntRect)

RandomPoint(Random)

Generates a uniformly random point within the rect.

```
public IntVector2 RandomPoint(Random random)
```

Parameters

`random` Random

Returns

IntVector2

RandomSubRect(Random)

Returns the rect defined by two independently uniformly randomly generated points within the rect.

```
public IntRect RandomSubRect(Random random)
```

Parameters

`random` Random

Returns

IntRect

Rotate(QuadrantalAngle)

Returns the rect rotated clockwise by the given angle.

```
public IntRect Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

IntRect

See Also
Rotate(QuadrantalAngle)

SetEquals(IntRect)

Whether the two rects describe the same set of points.

```
public bool SetEquals(IntRect other)
```

Parameters

`other` IntRect

Returns

bool

Remarks

The is the same as operator ==(IntRect, IntRect).

ToString()

Represents the rect as a string in the form `"((bottom-left x coord, bottom-left y coord), (top-right x coord, top-right y coord))"`.

```
public override string ToString()
```

Returns

string

TranslateClamp(IntRect)

Translates `toClamp` so it is a subset of this rect. Chooses the smallest such translation.

```
public IntRect TranslateClamp(IntRect toClamp)
```

Parameters

`toClamp` IntRect

Returns

IntRect

Remarks

Note this is only possible when `toClamp` is at most as wide and at most as tall as this rect.

Exceptions

ArgumentException

`toClamp` is wider and/or taller than this rect.

Operators

operator +(IntRect, IntVector2)

Translates the rect by the given vector.

```
public static IntRect operator +(IntRect rect, IntVector2 vector)
```

Parameters

`rect` IntRect

`vector` IntVector2

Returns

IntRect

operator +(IntVector2, IntRect)

Translates the rect by the given vector.

```
public static IntRect operator +(IntVector2 vector, IntRect rect)
```

Parameters

`vector` IntVector2

`rect` IntRect

Returns

IntRect

operator ==(IntRect, IntRect)

Whether the two rects describe the same set of points.

```
public static bool operator ==(IntRect a, IntRect b)
```

Parameters

`a` IntRect

`b` IntRect

Returns

bool

Remarks

This is just the default struct comparison (comparing fields).

See Also
Equals(IntRect), SetEquals(IntRect)

implicit operator RectInt(IntRect)

Casts to Unity's RectInt.

```
public static implicit operator RectInt(IntRect rect)
```

Parameters

`rect` IntRect

Returns

implicit operator IntRect(RectInt)

Casts from Unity's RectInt.

```
public static implicit operator IntRect(RectInt rect)
```

Parameters

`rect` RectInt

Returns

IntRect

operator !=(IntRect, IntRect)

Whether the two rects describe different sets of points.

```
public static bool operator !=(IntRect a, IntRect b)
```

Parameters

`a` IntRect

`b` IntRect

Returns

bool

Remarks

This is just the default struct comparison (comparing fields).

See Also
Equals(IntRect), SetEquals(IntRect)

operator -(IntRect, IntVector2)

Translates the rect by the given vector.

```
public static IntRect operator -(IntRect rect, IntVector2 vector)
```

Parameters

`rect` IntRect

`vector` IntVector2

Returns

IntRect

operator -(IntRect)

Negates each point in the rect.

```
public static IntRect operator -(IntRect rect)
```

Parameters

`rect` IntRect

Returns

IntRect

See Also

IntVector2
IntRange

Struct IntVector2

Namespace: PAC.Geometry

A 2-dimensional vector with integer coordinates.

```
public readonly struct IntVector2 : IEquatable<IntVector2>
```

Implements
IEquatable<IntVector2>

Inherited Members
object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

Can be implicitly cast to/from `(int x, int y)`. This allows writing IntVector2s in a more readable way. For example,

```
IntVector2 point = (5, 3);
```

instead of

```
IntVector2 point = new IntVector2(5, 3);
```

Constructors

IntVector2(int, int)

Creates a new vector with the given x and y coordinates.

```
public IntVector2(int x, int y)
```

Parameters

x int

y int

Fields

down

The vector (0, -1).

```
public static readonly IntVector2 down
```

Field Value

IntVector2

See Also
right, left, up, upRight, upLeft, downRight, downLeft

downLeft

The vector (-1, -1).

```
public static readonly IntVector2 downLeft
```

Field Value

IntVector2

See Also
right, left, up, down, upRight, upLeft, downRight

downRight

The vector (1, -1).

```
public static readonly IntVector2 downRight
```

Field Value

IntVector2

See Also
right, left, up, down, upRight, upLeft, downLeft

left

The vector (-1, 0).

```
public static readonly IntVector2 left
```

Field Value

IntVector2

See Also
right, up, down, upRight, upLeft, downRight, downLeft

one

The vector (1, 1).

```
public static readonly IntVector2 one
```

Field Value

IntVector2

Remarks

An alias for upRight.

right

The vector (1, 0).

```
public static readonly IntVector2 right
```

Field Value

IntVector2

See Also
left, up, down, upRight, upLeft, downRight, downLeft

up

The vector (0, 1).

```
public static readonly IntVector2 up
```

Field Value

IntVector2

See Also
right, left, down, upRight, upLeft, downRight, downLeft

upDownLeftRight

An IEnumerable<T> over the vectors `(0, 1), (0, -1), (-1, 0), (1, 0)`.

```
public static readonly IEnumerable<IntVector2> upDownLeftRight
```

Field Value

IEnumerable<IntVector2>

See Also
up, down, left, right

upLeft

The vector (-1, 1).

```
public static readonly IntVector2 upLeft
```

Field Value

IntVector2

See Also
right, left, up, down, upRight, downRight, downLeft

upRight

The vector (1, 1).

```
public static readonly IntVector2 upRight
```

Field Value

IntVector2

Remarks

An alias for one.

See Also
right, left, up, down, upLeft, downRight, downLeft

x

The x coordinate.

```
public readonly int x
```

Field Value

int

See Also

y

y

The y coordinate.

```
public readonly int y
```

Field Value

int

See Also

x

zero

The vector (0, 0).

```
public static readonly IntVector2 zero
```

Field Value

IntVector2

Properties

l1Norm

The l1 norm of the vector, which is `abs(x) + abs(y)`. Also known as the taxicab/Manhattan norm.

```
public int l1Norm { get; }
```

Property Value

int

See Also
L1Norm(IntVector2), L1Distance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Norm_(mathematics)#Taxicab_norm_or_Manhattan_norm

magnitude

The standard Euclidean magnitude of the vector, which is `sqrt(x^2 + y^2)`.

```
public float magnitude { get; }
```

Property Value

float

See Also
Magnitude(IntVector2), Distance(IntVector2, IntVector2), sqrMagnitude, https://en.wikipedia.org/wiki/Norm_(mathematics)#Euclidean_norm

sign

The sign of each component of the vector.

```
public IntVector2 sign { get; }
```

Property Value

IntVector2

Remarks

The sign of a component that is 0 is defined to be 0.

See Also
Sign(IntVector2)

sqrMagnitude

The square of the Euclidean magnitude of the vector, so `x^2 + y^2`.

```
public int sqrMagnitude { get; }
```

Property Value

int

Remarks

This is faster than squaring magnitude.

See Also
SqrMagnitude(IntVector2), SqrDistance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Norm_(mathematics)#Euclidean_norm

supNorm

The supremum norm of the vector, which is `max(abs(x), abs(y))`. Also known as the Chebyshev norm or l-infinity norm.

```
public int supNorm { get; }
```

Property Value

int

See Also
SupNorm(IntVector2), SupDistance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Uniform_norm

Methods

Abs(IntVector2)

Takes the absolute value component-wise.

```
public static IntVector2 Abs(IntVector2 a)
```

Parameters

a IntVector2

Returns

IntVector2

AreColinear(IntVector2, IntVector2)

Returns whether the two vectors lie on the same real line through `(0, 0)`. This is equivalent to whether there is an IntVector2 dividing both of them.

```
public static bool AreColinear(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

Remarks

For a proof that the two statements given in the summary are logically equivalent, see the source code for this method.

See Also
Divides(IntVector2)

ArePerpendicular(IntVector2, IntVector2)

Determines whether the two vectors are perpendicular to each other.

```
public static bool ArePerpendicular(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

Remarks

Being *perpendicular* is also known as being *orthogonal*.

See Also
Dot(IntVector2, IntVector2)

CeilToIntVector2(Vector2)

Ceils the vector component-wise.

```
public static IntVector2 CeilToIntVector2(Vector2 vector2)
```

Parameters

vector2 Vector2

Returns

IntVector2

Remarks

Uses Mathf.CeilToInt(float).

See Also
FloorToIntVector2(Vector2), RoundToIntVector2(Vector2)

Deconstruct(out int, out int)

Deconstructs the vector into its x and y coordinates.

```
public void Deconstruct(out int x, out int y)
```

Parameters

x int

y int

Distance(IntVector2, IntVector2)

Computes the standard Euclidean distance between the two vectors - i.e. the Magnitude(IntVector2) of `a - b`.

```
public static float Distance(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

float

See Also
SqrDistance(IntVector2, IntVector2)

Divides(IntVector2)

Returns whether `dividend` is an integer multiple of this vector.

For example, `(1, 2)` divides `(3, 6)` as `(3, 6) = 3 * (1, 2)`.

```
public bool Divides(IntVector2 dividend)
```

Parameters

`dividend` IntVector2

Returns

bool

Remarks

More precisely, this determines whether there exists an integer `n` such that `dividend = n * this`. This means, for example, that `(0, 3)` divides `(0, 6)`, and that everything divides `(0, 0)`.

See Also
IsMultipleOf(IntVector2)

Dot(IntVector2, IntVector2)

Computes the dot product of the two vectors.

```
public static int Dot(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

`b` IntVector2

Returns

int

Equals(IntVector2)

The same as operator ==(IntVector2, IntVector2)

```
public bool Equals(IntVector2 other)
```

Parameters

`other` IntVector2

Returns

bool

Equals(object)

The same as Equals(IntVector2)

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns the vector flipped across the given axis.

```
public IntVector2 Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

IntVector2

Exceptions

ArgumentNullException

`axis` is null.

FloorToIntVector2(Vector2)

Floors the vector component-wise.

```
public static IntVector2 FloorToIntVector2(Vector2 vector2)
```

Parameters

`vector2` Vector2

Returns

IntVector2

Remarks

Uses Mathf.FloorToInt(float).

See Also
CeilToIntVector2(Vector2), RoundToIntVector2(Vector2)

GetHashCode()

Returns the hash code for this instance.

```
public override int GetHashCode()
```

Returns

int

A 32-bit signed integer that is the hash code for this instance.

IsMultipleOf(IntVector2)

Returns whether this vector is an integer multiple of `divisor`.

For example, `(3, 6)` is a multiple of `(1, 2)` as `(3, 6) = 3 * (1, 2)`.

```
public bool IsMultipleOf(IntVector2 divisor)
```

Parameters

`divisor` IntVector2

Returns

bool

Remarks

More precisely, this determines whether there exists an integer `n` such that `this = n * divisor`. This means, for example, that `(0, 6)` is a multiple of `(0, 3)`, and that `(0, 0)` is a multiple of everything.

See Also
Divides(IntVector2)

L1Distance(IntVector2, IntVector2)

Computes the l1 distance between the two vectors - i.e. the L1Norm(IntVector2) of `a - b`. Also known as the taxicab/Manhattan distance or rectilinear distance.

```
public static int L1Distance(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

`b` IntVector2

Returns

int

L1Norm(IntVector2)

The l1 norm of the vector, which is `abs(x) + abs(y)`. Also known as the taxicab/Manhattan norm.

```
public static int L1Norm(IntVector2 a)
```

Parameters

a IntVector2

Returns

int

See Also
l1Norm, L1Distance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Norm_(mathematics)#Taxicab_norm_or_Manhattan_norm

Magnitude(IntVector2)

The standard Euclidean magnitude of the vector, which is `sqrt(x^2 + y^2)`.

```
public static float Magnitude(IntVector2 a)
```

Parameters

a IntVector2

Returns

float

See Also
magnitude, Distance(IntVector2, IntVector2), SqrMagnitude(IntVector2), https://en.wikipedia.org/wiki/Norm_(mathematics)#Euclidean_norm

Max(IntVector2, IntVector2)

Takes the maximum of the two vectors component-wise.

```
public static IntVector2 Max(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

`b` IntVector2

Returns

IntVector2

See Also
Min(IntVector2, IntVector2)

Max(params IntVector2[])

Takes the maximum of the vectors component-wise.

```
public static IntVector2 Max(params IntVector2[] vectors)
```

Parameters

`vectors` IntVector2[]

Returns

IntVector2

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

See Also
Min(params IntVector2[])

Max(IEnumerable<IntVector2>)

Takes the maximum of the vectors component-wise.

```
public static IntVector2 Max(IEnumerable<IntVector2> vectors)
```

Parameters

`vectors` IEnumerable<IntVector2>

Returns

IntVector2

Remarks

This is not provided as an IEnumerable<T> extension method since it seems C# will favour using the LINQ Max<TSource>(IEnumerable<TSource>) instead, which causes errors.

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

See Also
Min(IEnumerable<IntVector2>)

Min(IntVector2, IntVector2)

Takes the minimum of the two vectors component-wise.

```
public static IntVector2 Min(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

`b` IntVector2

Returns

IntVector2

See Also
Max(IntVector2, IntVector2)

Min(params IntVector2[])

Takes the minmum of the vectors component-wise.

```
public static IntVector2 Min(params IntVector2[] vectors)
```

Parameters

`vectors` IntVector2[]

Returns

IntVector2

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

See Also

Max(params IntVector2[])

Min(IEnumerable<IntVector2>)

Takes the minmum of the vectors component-wise.

```
public static IntVector2 Min(IEnumerable<IntVector2> vectors)
```

Parameters

`vectors` IEnumerable<IntVector2>

Returns

IntVector2

Remarks

This is not provided as an IEnumerable<T> extension method since it seems C# will favour using the LINQ Min<TSource>(IEnumerable<TSource>) instead, which causes errors.

Exceptions

ArgumentNullException

`vectors` is null.

ArgumentException

`vectors` is empty.

See Also
Max(IEnumerable<IntVector2>)

Rotate(QuadrantalAngle)

Returns the vector rotated by the given angle.

```
public IntVector2 Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

IntVector2

RoundToIntVector2(Vector2)

Rounds the vector component-wise.

```
public static IntVector2 RoundToIntVector2(Vector2 vector2)
```

Parameters

`vector2` Vector2

Returns

IntVector2

Remarks

Uses Mathf.RoundToInt(float).

See Also
FloorToIntVector2(Vector2), CeilToIntVector2(Vector2)

Sign(IntVector2)

Returns the sign of each component of the vector.

```
public static IntVector2 Sign(IntVector2 a)
```

Parameters

`a` IntVector2

Returns

IntVector2

Remarks

The sign of a component that is 0 is defined to be 0.

See Also
sign

Simplify(IntVector2)

Scales the vector down so its components are coprime (have no common divisors). In other words, it computes the smallest IntVector2 dividing `a`.

```
public static IntVector2 Simplify(IntVector2 a)
```

Parameters

`a` IntVector2

Returns

IntVector2

Remarks

Preserves signs.

SqrDistance(IntVector2, IntVector2)

Computes the square of the Euclidean distance between the two vectors - i.e. the Sqr Magnitude(IntVector2) of `a - b`.

```
public static int SqrDistance(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

int

Remarks

This is faster than squaring Distance(IntVector2, IntVector2).

SqrMagnitude(IntVector2)

The square of the Euclidean magnitude of the vector, so `x^2 + y^2`.

```
public static int SqrMagnitude(IntVector2 a)
```

Parameters

a IntVector2

Returns

int

Remarks

This is faster than squaring Magnitude(IntVector2).

See Also
sqrMagnitude, SqrDistance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Norm_(mathematics)#Euclidean_norm

SupDistance(IntVector2, IntVector2)

Computes the supremum distance between the two vectors - i.e. the SupNorm(IntVector2) of `a - b`. Also known as the Chebyshev distance or l-infinity distance.

```
public static int SupDistance(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

int

SupNorm(IntVector2)

The supremum norm of the vector, which is `max(abs(x), abs(y))`. Also known as the Chebyshev norm or l-infinity norm.

```
public static int SupNorm(IntVector2 a)
```

Parameters

a IntVector2

Returns

int

See Also
supNorm, SupDistance(IntVector2, IntVector2), https://en.wikipedia.org/wiki/Uniform_norm

ToString()

Represents the vector as a string in the form `"(x, y)"`.

```
public override string ToString()
```

Returns

string

Operators

operator +(IntVector2, IntVector2)

Adds the two vectors component-wise.

```
public static IntVector2 operator +(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

IntVector2

operator /(IntVector2, IntVector2)

Divides (integer division) the two vectors component-wise.

```
public static IntVector2 operator /(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

IntVector2

operator /(IntVector2, int)

Divides (integer division) each component of the vector by `scalar`.

```
public static IntVector2 operator /(IntVector2 vector, int scalar)
```

Parameters

`vector` IntVector2

`scalar` int

Returns

IntVector2

operator ==(IntVector2, IntVector2)

Whether the two vectors have identical x and y coords.

```
public static bool operator ==(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

`b` IntVector2

Returns

bool

See Also
Equals(IntVector2)

explicit operator IntVector2(Vector2)

Casts from Unity's Vector2, by casting each coordinate to int, which truncates them towards zero.

```
public static explicit operator IntVector2(Vector2 vector)
```

Parameters

`vector` Vector2

Returns

IntVector2

explicit operator IntVector2(Vector3)

Casts from Unity's Vector3, by casting each coordinate to int, which truncates them towards zero. The z coordinate is ignored.

```
public static explicit operator IntVector2(Vector3 vector)
```

Parameters

`vector` Vector3

Returns

IntVector2

operator >(IntVector2, IntVector2)

Returns true iff > holds for both components.

```
public static bool operator >(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

operator >=(IntVector2, IntVector2)

Returns true iff >= holds for both components.

```
public static bool operator >=(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

implicit operator (int x, int y)(IntVector2)

```
public static implicit operator (int x, int y)(IntVector2 vector)
```

Parameters

vector IntVector2

Returns

(int x, int y)

Remarks

This conversion should be inlined by the JIT compiler.

implicit operator Vector2(IntVector2)

Casts to Unity's Vector2, by casting each coordinate to float.

```
public static implicit operator Vector2(IntVector2 vector)
```

Parameters

`vector` IntVector2

Returns

Vector2

implicit operator Vector2Int(IntVector2)

Casts to Unity's Vector2Int.

```
public static implicit operator Vector2Int(IntVector2 vector)
```

Parameters

`vector` IntVector2

Returns

Vector2Int

implicit operator Vector3(IntVector2)

Casts to Unity's Vector3, by casting each coordinate to float, with a 0 in the z-coord.

```
public static implicit operator Vector3(IntVector2 vector)
```

Parameters

`vector` IntVector2

Returns

Vector3

implicit operator IntVector2((int x, int y))

Allows writing IntVector2s in a more readable way

For example,

```
IntVector2 point = (5, 3);
```

instead of

```
IntVector2 point = new IntVector2(5, 3);
```

```
public static implicit operator IntVector2((int x, int y) tuple)
```

Parameters

`tuple` (int x, int y)

Returns

IntVector2

Remarks

This conversion should be inlined by the JIT compiler.

implicit operator IntVector2(Vector2Int)

Casts from Unity's Vector2Int.

```
public static implicit operator IntVector2(Vector2Int vector)
```

Parameters

`vector` Vector2Int

Returns

IntVector2

operator !=(IntVector2, IntVector2)

Whether the two vectors differ in their x and/or y coords.

```
public static bool operator !=(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

See Also
Equals(IntVector2)

operator <(IntVector2, IntVector2)

Returns true iff < holds for both components.

```
public static bool operator <(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

operator <=(IntVector2, IntVector2)

Returns true iff <= holds for both components.

```
public static bool operator <=(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

bool

operator *(IntVector2, IntVector2)

Multiplies the two vectors component-wise.

```
public static IntVector2 operator *(IntVector2 a, IntVector2 b)
```

Parameters

a IntVector2

b IntVector2

Returns

IntVector2

operator *(IntVector2, int)

Multiplies each component of the vector by `scalar`.

```
public static IntVector2 operator *(IntVector2 vector, int scalar)
```

Parameters

`vector` IntVector2

`scalar` int

Returns

IntVector2

operator *(int, IntVector2)

Multiplies each component of the vector by `scalar`.

```
public static IntVector2 operator *(int scalar, IntVector2 vector)
```

Parameters

`scalar` int

`vector` IntVector2

Returns

IntVector2

operator -(IntVector2, IntVector2)

Subtracts the two vectors component-wise.

```
public static IntVector2 operator -(IntVector2 a, IntVector2 b)
```

Parameters

`a` IntVector2

b IntVector2

Returns

IntVector2

operator -(IntVector2)

Negates each component of the vector.

```
public static IntVector2 operator -(IntVector2 a)
```

Parameters

a IntVector2

Returns

IntVector2

Class Plane2D

Namespace: PAC.Geometry

Provides ways to deal with the 2D plane.

```
public static class Plane2D
```

Inheritance

object ← Plane2D

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetOctant(IntVector2)

Returns which Plane2D.Octant(s) the given point is in.

```
public static Plane2D.Octant GetOctant(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

Plane2D.Octant

Remarks

For this method, Plane2D.Octants include their boundaries and hence overlap. For example, NorthNortheast and NorthNorthwest both contain the half-line `{ (0, y) : y >= 0 }`. In this case, the flag nature of Plane2D.Octant is used to return multiple values.

Enum Plane2D.Octant

Namespace: PAC.Geometry

One of 8 regions of the 2D plane.

```
[Flags]
public enum Plane2D.Octant : byte
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`EastNortheast = 2`

The east-northeast octant.

`EastSoutheast = 4`

The east-southeast octant.

`NorthNortheast = 1`

The north-northeast octant.

`NorthNorthwest = 128`

The north-northwest octant.

`SouthSoutheast = 8`

The south-southeast octant.

`SouthSouthwest = 16`

The south-southwest octant.

`WestNorthwest = 64`

The west-northwest octant.

`WestSouthwest = 32`

The west-southwest octant.

Enum QuadrantalAngle

Namespace: PAC.Geometry

An angle that's a multiple of 90 degrees.

```
public enum QuadrantalAngle : byte
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Anticlockwise90 = 3`

90 degrees in the anticlockwise direction.

`Clockwise90 = 1`

90 degrees in the clockwise direction.

`_0 = 0`

0 degrees.

`_180 = 2`

180 degrees.

Namespace PAC.Geometry.Axes

Classes

Axes
Provides axes and groups of axes.

CardinalAxis
HorizontalAxis or VerticalAxis.

CardinalOrdinalAxis
Either a CardinalAxis or OrdinalAxis.

Diagonal45Axis
The type of OrdinalAxis.Diagonal45.

HorizontalAxis
The type of CardinalAxis.Horizontal.

Minus45Axis
The type of OrdinalAxis.Minus45.

OrdinalAxis
Diagonal45Axis or Minus45Axis.

VerticalAxis
The type of CardinalAxis.Vertical.

Class Axes

Namespace: PAC.Geometry.Axes

Provides axes and groups of axes.

```
public static class Axes
```

Inheritance

object ← Axes

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Remarks

Each axis has its own type, so that axes can be abstracted in a type-safe way. For example, shapes can specify exactly which axes they can reflected across, and this is enforced at compile time via types.

Fields

CardinalAxes

Horizontal and Vertical.

```
public static readonly IEnumerable<CardinalAxis> CardinalAxes
```

Field Value

IEnumerable<CardinalAxis>

CardinalOrdinalAxes

Horizontal, Vertical, Diagonal45 and Minus45.

```
public static readonly IEnumerable<CardinalOrdinalAxis> CardinalOrdinalAxes
```

Field Value

IEnumerable<CardinalOrdinalAxis>

Diagonal45

A 45-degree axis (going from southwest to northeast).

```
public static readonly Diagonal45Axis Diagonal45
```

Field Value

Diagonal45Axis

See Also
Minus45

Horizontal

A horizontal axis.

```
public static readonly HorizontalAxis Horizontal
```

Field Value

HorizontalAxis

See Also
Vertical

Minus45

A -45-degree axis (going from northwest to southeast).

```
public static readonly Minus45Axis Minus45
```

Field Value

Minus45Axis

See Also
Diagonal45

OrdinalAxes

Diagonal45 and Minus45.

```
public static readonly IEnumerable<OrdinalAxis> OrdinalAxes
```

Field Value

IEnumerable<OrdinalAxis>

Vertical

A vertical axis.

```
public static readonly VerticalAxis Vertical
```

Field Value

VerticalAxis

See Also
Horizontal

Class CardinalAxis

Namespace: PAC.Geometry.Axes

HorizontalAxis or VerticalAxis.

```
public abstract record CardinalAxis : CardinalOrdinalAxis,
IEquatable<CardinalOrdinalAxis>, IEquatable<CardinalAxis>
```

Inheritance

object ← CardinalOrdinalAxis ← CardinalAxis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<CardinalAxis>

Derived

HorizontalAxis, VerticalAxis

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Class CardinalOrdinalAxis

Namespace: PAC.Geometry.Axes

Either a CardinalAxis or OrdinalAxis.

```
public abstract record CardinalOrdinalAxis : IEquatable<CardinalOrdinalAxis>
```

Inheritance

object ← CardinalOrdinalAxis

Implements

IEquatable<CardinalOrdinalAxis>

Derived

CardinalAxis, OrdinalAxis

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Class Diagonal45Axis

Namespace: PAC.Geometry.Axes

The type of OrdinalAxis.Diagonal45.

```
public sealed record Diagonal45Axis : OrdinalAxis, IEquatable<CardinalOrdinalAxis>,
IEquatable<OrdinalAxis>, IEquatable<Diagonal45Axis>
```

Inheritance

object ← CardinalOrdinalAxis ← OrdinalAxis ← Diagonal45Axis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<OrdinalAxis>, IEquatable<Diagonal45Axis>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Class HorizontalAxis

Namespace: PAC.Geometry.Axes

The type of CardinalAxis.Horizontal.

```
public sealed record HorizontalAxis : CardinalAxis, IEquatable<CardinalOrdinalAxis>,
IEquatable<CardinalAxis>, IEquatable<HorizontalAxis>
```

Inheritance

object ← CardinalOrdinalAxis ← CardinalAxis ← HorizontalAxis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<CardinalAxis>, IEquatable<HorizontalAxis>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Class Minus45Axis

Namespace: PAC.Geometry.Axes

The type of OrdinalAxis.Minus45.

```
public sealed record Minus45Axis : OrdinalAxis, IEquatable<CardinalOrdinalAxis>,
IEquatable<OrdinalAxis>, IEquatable<Minus45Axis>
```

Inheritance

object ← CardinalOrdinalAxis ← OrdinalAxis ← Minus45Axis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<OrdinalAxis>, IEquatable<Minus45Axis>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Class OrdinalAxis

Namespace: PAC.Geometry.Axes

Diagonal45Axis or Minus45Axis.

```
public abstract record OrdinalAxis : CardinalOrdinalAxis,
IEquatable<CardinalOrdinalAxis>, IEquatable<OrdinalAxis>
```

Inheritance

object ← CardinalOrdinalAxis ← OrdinalAxis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<OrdinalAxis>

Derived

Diagonal45Axis, Minus45Axis

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Class VerticalAxis

Namespace: PAC.Geometry.Axes

The type of CardinalAxis.Vertical.

```
public sealed record VerticalAxis : CardinalAxis, IEquatable<CardinalOrdinalAxis>,
IEquatable<CardinalAxis>, IEquatable<VerticalAxis>
```

Inheritance

object ← CardinalOrdinalAxis ← CardinalAxis ← VerticalAxis

Implements

IEquatable<CardinalOrdinalAxis>, IEquatable<CardinalAxis>, IEquatable<VerticalAxis>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Namespace PAC.Geometry.Extensions

Classes

IntRectExtensions

Extension methods for IntRect.

IntVector2Extensions

Extension methods for IntVector2.

Class IntRectExtensions

Namespace: PAC.Geometry.Extensions

Extension methods for IntRect.

```
public static class IntRectExtensions
```

Inheritance

object ← IntRectExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetRect(Texture2D)

Returns an IntRect containing precisely the coordinates within the bounds of the Texture2D.

```
public static IntRect GetRect(this Texture2D texture)
```

Parameters

`texture` Texture2D

Returns

IntRect

Class IntVector2Extensions

Namespace: PAC.Geometry.Extensions

Extension methods for IntVector2.

```
public static class IntVector2Extensions
```

Inheritance

object ← IntVector2Extensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ContainsPixel(Texture2D, IntVector2)

Returns whether the given coordinates are within the bounds of the Texture2D.

```
public static bool ContainsPixel(this Texture2D texture, IntVector2 pixel)
```

Parameters

`texture` Texture2D

`pixel` IntVector2

Returns

bool

GetPixel(Texture2D, IntVector2)

Gets the pixel colour at the given coordinates.

```
public static Color GetPixel(this Texture2D texture, IntVector2 pixel)
```

Parameters

`texture` Texture2D

`pixel` IntVector2

Returns

Color

SetPixel(Texture2D, IntVector2, Color)

Sets the pixel colour at the given coordinates.

```
public static void SetPixel(this Texture2D texture, IntVector2 pixel, Color colour)
```

Parameters

`texture` Texture2D

`pixel` IntVector2

`colour` Color

Namespace PAC.Geometry.Shapes

Classes

Diamond

A pixel art diamond shape. For example,

```
    #
    #
  #   #
  #   #
#       #
#       #
  #   #
  #   #
    #
    #
```

Ellipse

A pixel art ellipse shape. For example,

```
    # # # #
  #         #
#             #
#             #
  #         #
    # # # #
```

IsometricCuboid

An isometric pixel art cuboid shape. For example,

```
        # #
    # #     # #
# #             # #
#   # #             # #
#       # #     # #   #
#           # #       #
# #           #       #
    # #       #     # #
        # #   # # #
            # #
```

IsometricRectangle

An isometric pixel art rectangle shape. For example,

```
        # #
    # #     # #
# #             # #
    # #             # #
        # #     # #
            # #
```

Line

A pixel art straight line. For example,

```
            #
        # #
      #
  # #
#
```

Path

A sequence of connected Lines. For example,

```
       end of line 1
      start of line 2    # < end of line 3
             v           #
             # #         #
           #     # #     # < start of line 3
         #           # #
       #               ^
       ^         end of line 2
start of line 1
```

Rectangle

A pixel art rectangle shape. For example,

```
# # # #
#     #
# # # #
```

RightTriangle

A pixel art right-angled triangle shape. For example,

```
            # #
        # #   #
      #       #
  # #         #
#             #
# # # # # # # #
```

Enums

RightTriangle.RightAngleLocation

Which corner of the boundingRect the right angle is in.

Class Diamond

Namespace: PAC.Geometry.Shapes

A pixel art diamond shape. For example,

```
    #
    #
  #   #
  #   #
#       #
#       #
  #   #
  #   #
    #
    #
```

```
public class Diamond : I2DShape<Diamond>, IFillableShape,
ITransformableShape<Diamond, CardinalOrdinalAxis>, ITranslatableShape<Diamond>,
IFlippableShape<Diamond, CardinalOrdinalAxis>, IRotatableShape<Diamond>,
IDeepCopyableShape<Diamond>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<Diamond>
```

Inheritance

object ← Diamond

Implements

I2DShape<Diamond>, IFillableShape, ITransformableShape<Diamond, CardinalOrdinalAxis>, ITranslatableShape<Diamond>, IFlippableShape<Diamond, CardinalOrdinalAxis>, IRotatableShape<Diamond>, IDeepCopyableShape<Diamond>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<Diamond>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) ,
ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,
IShapeExtensions.ToTexture(IShape, Color) ,
IShapeExtensions.ToTexture(IShape, Color, IntRect) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,

IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) , IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) , IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) , IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) , IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Shape:

If the border can be drawn using perfect Lines, it will be. (See Line for a definition of 'perfect'.)

If the width or height of the boundingRect is <= 2, it will look like a rectangle.

Enumerator:

The enumerator does not repeat any points.

Constructors

Diamond(IntRect, bool)

Creates the largest Diamond that can fit in the given rect.

```
public Diamond(IntRect boundingRect, bool filled)
```

Parameters

`boundingRect` IntRect

See boundingRect.

`filled` bool

See filled.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; set; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

isSquare

Whether the Diamond is a square (at a 45-degree angle).

```
public bool isSquare { get; }
```

Property Value

bool

Remarks

This is equivalent to its boundingRect being a square.

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public Diamond DeepCopy()
```

Returns

Diamond

Equals(Diamond)

See operator ==(Diamond, Diamond).

```
public bool Equals(Diamond other)
```

Parameters

`other` Diamond

Returns

bool

Equals(object)

See Equals(Diamond).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public Diamond Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Diamond

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public Diamond Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Diamond

See Also
operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public Diamond Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

Diamond

See Also

operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, Diamond)

Returns a deep copy of the Diamond translated by the given vector.

```
public static Diamond operator +(IntVector2 translation, Diamond diamond)
```

Parameters

`translation` IntVector2

`diamond` Diamond

Returns

Diamond

See Also
Translate(IntVector2)

operator +(Diamond, IntVector2)

Returns a deep copy of the Diamond translated by the given vector.

```
public static Diamond operator +(Diamond diamond, IntVector2 translation)
```

Parameters

`diamond` Diamond

`translation` IntVector2

Returns

Diamond

See Also
Translate(IntVector2)

operator ==(Diamond, Diamond)

Whether the two Diamonds have the same shape, and the same value for filled.

```
public static bool operator ==(Diamond a, Diamond b)
```

Parameters

a Diamond

b Diamond

Returns

bool

operator !=(Diamond, Diamond)

See operator ==(Diamond, Diamond).

```
public static bool operator !=(Diamond a, Diamond b)
```

Parameters

a Diamond

b Diamond

Returns

bool

operator -(Diamond, IntVector2)

Returns a deep copy of the Diamond translated by the given vector.

```
public static Diamond operator -(Diamond diamond, IntVector2 translation)
```

Parameters

`diamond` Diamond

`translation` IntVector2

Returns

Diamond

See Also
Translate(IntVector2)

operator -(Diamond)

Returns a deep copy of the Diamond rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static Diamond operator -(Diamond diamond)
```

Parameters

`diamond` Diamond

Returns

Diamond

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Class Ellipse

Namespace: PAC.Geometry.Shapes

A pixel art ellipse shape. For example,

```
    # # # #
  #         #
#             #
#             #
  #         #
    # # # #
```

```
public class Ellipse : I2DShape<Ellipse>, IFillableShape,
ITransformableShape<Ellipse, CardinalOrdinalAxis>, ITranslatableShape<Ellipse>,
IFlippableShape<Ellipse, CardinalOrdinalAxis>, IRotatableShape<Ellipse>,
IDeepCopyableShape<Ellipse>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<Ellipse>
```

Inheritance

object ← Ellipse

Implements

I2DShape<Ellipse>, IFillableShape, ITransformableShape<Ellipse, CardinalOrdinalAxis>, ITranslatableShape<Ellipse>, IFlippableShape<Ellipse, CardinalOrdinalAxis>, IRotatableShape<Ellipse>, IDeepCopyableShape<Ellipse>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<Ellipse>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,

IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,

Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Shape:

If the width or height of the boundingRect is <= 2, it will look like a rectangle.

Enumerator:

The enumerator does not repeat any points.

Constructors

Ellipse(IntRect, bool)

Creates the largest Ellipse that can fit in the given rect.

```
public Ellipse(IntRect boundingRect, bool filled)
```

Parameters

`boundingRect` IntRect

See boundingRect.

`filled` bool

See filled.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; set; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

isCircle

Whether the Ellipse is a circle.

```
public bool isCircle { get; }
```

Property Value

bool

Remarks

This is equivalent to its boundingRect being a square.

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public Ellipse DeepCopy()
```

Returns

Ellipse

Equals(Ellipse)

See operator ==(Ellipse, Ellipse).

```
public bool Equals(Ellipse other)
```

Parameters

`other` Ellipse

Returns

bool

Equals(object)

See Equals(Ellipse).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public Ellipse Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Ellipse

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public Ellipse Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Ellipse

See Also

operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public Ellipse Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

Ellipse

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, Ellipse)

Returns a deep copy of the Ellipse translated by the given vector.

```
public static Ellipse operator +(IntVector2 translation, Ellipse ellipse)
```

Parameters

`translation` IntVector2

`ellipse` Ellipse

Returns

Ellipse

See Also
Translate(IntVector2)

operator +(Ellipse, IntVector2)

Returns a deep copy of the Ellipse translated by the given vector.

```
public static Ellipse operator +(Ellipse ellipse, IntVector2 translation)
```

Parameters

`ellipse` Ellipse

`translation` IntVector2

Returns

Ellipse

See Also
Translate(IntVector2)

operator ==(Ellipse, Ellipse)

Whether the two Ellipses have the same shape, and the same value for filled.

```
public static bool operator ==(Ellipse a, Ellipse b)
```

Parameters

`a` Ellipse

`b` Ellipse

Returns

bool

operator !=(Ellipse, Ellipse)

See operator ==(Ellipse, Ellipse).

```
public static bool operator !=(Ellipse a, Ellipse b)
```

Parameters

`a` Ellipse

`b` Ellipse

Returns

bool

operator -(Ellipse, IntVector2)

Returns a deep copy of the Ellipse translated by the given vector.

```
public static Ellipse operator -(Ellipse ellipse, IntVector2 translation)
```

Parameters

`ellipse` Ellipse

`translation` IntVector2

Returns

Ellipse

See Also
Translate(IntVector2)

operator -(Ellipse)

Returns a deep copy of the Ellipse rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static Ellipse operator -(Ellipse ellipse)
```

Parameters

`ellipse` Ellipse

Returns

Ellipse

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Class IsometricCuboid

Namespace: PAC.Geometry.Shapes

An isometric pixel art cuboid shape. For example,

```
        # #
    # #     # #
# #             # #
#   # #             # #
#       # #     # #   #
#           # #       #
# #           #       #
    # #       #     # #
        # #   # # #
            # #
```

```
public class IsometricCuboid : IIsometricShape<IsometricCuboid>, IFillableShape,
ITranslatableShape<IsometricCuboid>, IFlippableShape<IsometricCuboid, VerticalAxis>,
IDeepCopyableShape<IsometricCuboid>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<IsometricCuboid>
```

Inheritance

object ← IsometricCuboid

Implements

IIsometricShape<IsometricCuboid>, IFillableShape, ITranslatableShape<IsometricCuboid>, IFlippableShape<IsometricCuboid, VerticalAxis>, IDeepCopyableShape<IsometricCuboid>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<IsometricCuboid>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,

IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,

IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Shape:

The top/bottom faces are identical IsometricRectangles.

If you imagine a real solid 3D cuboid, then 3 of the 12 edges are not visible in the isometric view as they are at the back of the cuboid. Whether the IsometricCuboid includes these edges or not is determined by includeBackEdges. For example, the example Isometric Cuboid diagram above has includeBackEdges set to false. Setting it to true would look like:

```
        # #
    # # #   # #
# #     #       # #
#   # # #           # #
#       # #     # #   #
#   # #     # #       #
# #           # # #   #
    # #       #     # #
        # #   # # #
            # #
```

Enumerator:

The enumerator may repeat some points.

Constructors

IsometricCuboid(IsometricRectangle, int, bool, bool)

Creates an IsometricCuboid with the given IsometricRectangle as either:

- The bottom face, if `height` >= 0
- The top face, if `height` < 0

```
public IsometricCuboid(IsometricRectangle topOrBottomFace, int height, bool filled,
bool includeBackEdges)
```

Parameters

`topOrBottomFace` IsometricRectangle

`height` int

See height.

`filled` bool

See filled.

`includeBackEdges` bool

See includeBackEdges.

Remarks

The filled property of the IsometricRectangle is ignored, and the parameter `filled` is used instead.

The IsometricRectangle is not deep-copied, so changes to it will affect the IsometricCuboid as well.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

bottomFace

The bottom face of the IsometricCuboid.

```
public IsometricRectangle bottomFace { get; }
```

Property Value

IsometricRectangle

Remarks

The filled property of this is ignored, and the filled property of the IsometricCuboid is used instead.

See Also
topFace

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

height

The height of the cuboid if you imagined it in 3D space. In other words, how much bottom Face is translated upward to form topFace.

```
public int height { get; set; }
```

Property Value

int

includeBackEdges

Whether or not to show the 3 edges at the back of the cuboid. See IsometricCuboid for more details.

```
public bool includeBackEdges { get; set; }
```

Property Value

bool

Remarks

This has no effect if filled is true.

topFace

The top face of the IsometricCuboid.

```
public IsometricRectangle topFace { get; }
```

Property Value

IsometricRectangle

Remarks

The filled property of this is ignored, and the filled property of the IsometricCuboid is used instead.

See Also
bottomFace

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public IsometricCuboid DeepCopy()
```

Returns

IsometricCuboid

Equals(IsometricCuboid)

See operator ==(IsometricCuboid, IsometricCuboid).

```
public bool Equals(IsometricCuboid other)
```

Parameters

`other` IsometricCuboid

Returns

bool

Equals(object)

See Equals(IsometricCuboid).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(VerticalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public IsometricCuboid Flip(VerticalAxis axis)
```

Parameters

`axis` VerticalAxis

Returns

IsometricCuboid

Remarks

Can only be flipped across the vertical axis (or none axis).

Exceptions

ArgumentException

`axis` is an invalid axis.

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public IsometricCuboid Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

IsometricCuboid

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, IsometricCuboid)

Returns a deep copy of the IsometricCuboid translated by the given vector.

```
public static IsometricCuboid operator +(IntVector2 translation,
IsometricCuboid isometricCuboid)
```

Parameters

`translation` IntVector2

`isometricCuboid` IsometricCuboid

Returns

IsometricCuboid

See Also
Translate(IntVector2)

operator +(IsometricCuboid, IntVector2)

Returns a deep copy of the IsometricCuboid translated by the given vector.

```
public static IsometricCuboid operator +(IsometricCuboid isometricCuboid,
IntVector2 translation)
```

Parameters

`isometricCuboid` IsometricCuboid

`translation` IntVector2

Returns

IsometricCuboid

See Also
Translate(IntVector2)

operator ==(IsometricCuboid, IsometricCuboid)

Whether the two IsometricCuboids have the same bottomFace and the same values for height, filled and includeBackEdges.

```
public static bool operator ==(IsometricCuboid a, IsometricCuboid b)
```

Parameters

a IsometricCuboid

b IsometricCuboid

Returns

bool

Remarks

Note that if two IsometricCuboids have identical values except their heights differ in sign then they will look identical but will not be considered ==.

operator !=(IsometricCuboid, IsometricCuboid)

See operator ==(IsometricCuboid, IsometricCuboid).

```
public static bool operator !=(IsometricCuboid a, IsometricCuboid b)
```

Parameters

a IsometricCuboid

b IsometricCuboid

Returns

bool

operator -(IsometricCuboid, IntVector2)

Returns a deep copy of the IsometricCuboid translated by the given vector.

```
public static IsometricCuboid operator -(IsometricCuboid isometricCuboid,
IntVector2 translation)
```

Parameters

isometricCuboid IsometricCuboid

`translation` IntVector2

Returns

IsometricCuboid

See Also
Translate(IntVector2)

Class IsometricRectangle

Namespace: PAC.Geometry.Shapes

An isometric pixel art rectangle shape. For example,

```
        # #
    # #     # #
# #             # #
    # #             # #
        # #     # #
            # #
```

```
public class IsometricRectangle : IIsometricShape<IsometricRectangle>,
IFillableShape, ITranslatableShape<IsometricRectangle>,
IFlippableShape<IsometricRectangle, VerticalAxis>,
IFlippableShape<IsometricRectangle, CardinalAxis>,
IDeepCopyableShape<IsometricRectangle>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable,
IEquatable<IsometricRectangle>
```

Inheritance

object ← IsometricRectangle

Implements

IIsometricShape<IsometricRectangle>, IFillableShape, ITranslatableShape<IsometricRectangle>, IFlippableShape<IsometricRectangle, VerticalAxis>, IFlippableShape<IsometricRectangle, CardinalAxis>, IDeepCopyableShape<IsometricRectangle>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<IsometricRectangle>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) ,

ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,

IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) , IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Shape:

The shape is determined by startCorner and endCorner, which will be opposite corners of the rectangle. The lines will always be perfect in blocks of 2, except possibly at the left/right/top/bottom blocks of the shape:

- The top/bottom will be a horizontal block of 2 or 3. They will match.
- The left/bottom will either be a single point, a horizontal block of 2 or a vertical block of 2.
  - If one is in the vertical case, so will be the other.
  - In the other two cases, they may not match, but if endCorner is in a horizontal block of 2, then so is startCorner.

Enumerator:

The enumerator does not repeat any points.

Constructors

IsometricRectangle(IntVector2, IntVector2, bool)

See IsometricRectangle for details.

```
public IsometricRectangle(IntVector2 startCorner, IntVector2 endCorner, bool filled)
```

Parameters

`startCorner` IntVector2

See startCorner.

`endCorner` IntVector2

See endCorner.

`filled` bool

See filled.

Fields

endCorner

The point the mouse has dragged to.

```
public IntVector2 endCorner
```

Field Value

IntVector2

Remarks

This will always be one of leftCorner, rightCorner, bottomCorner or topCorner.

See Also
startCorner, leftCorner, rightCorner, bottomCorner, topCorner

startCorner

The point the mouse started dragging from.

```
public IntVector2 startCorner
```

Field Value

IntVector2

Remarks

This will always be one of leftCorner, rightCorner, bottomCorner or topCorner.

See Also
endCorner, leftCorner, rightCorner, bottomCorner, topCorner

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

border

The outline of the IsometricRectangle.

```
public Path border { get; }
```

Property Value

Path

Remarks

This is the concatenation of lowerBorder and upperBorder.

bottomCorner

One of the bottommost points of the IsometricRectangle.

```
public IntVector2 bottomCorner { get; set; }
```

Property Value

IntVector2

See Also
startCorner, endCorner, leftCorner, rightCorner, topCorner

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

isIsometricSquare

Whether the sides lengths of the IsometricRectangle are all equal.

```
public bool isIsometricSquare { get; }
```

Property Value

bool

leftCorner

(One of) the leftmost point(s) of the IsometricRectangle.

```
public IntVector2 leftCorner { get; set; }
```

Property Value

IntVector2

See Also
startCorner, endCorner, rightCorner, bottomCorner, topCorner

lowerBorder

The lower edges of the border, i.e. (leftCorner, bottomCorner) and (bottomCorner, rightCorner) - not necessarily in this direction.

```
public Path lowerBorder { get; }
```

Property Value

Path

Remarks

This is precisely the set of points in border that have the lowest y coord among those with the same x coord. (Note there's at most one other point with the same x coord.)

rightCorner

(One of) the rightmost point(s) of the IsometricRectangle.

```
public IntVector2 rightCorner { get; set; }
```

Property Value

IntVector2

See Also
startCorner, endCorner, leftCorner, bottomCorner, topCorner

topCorner

One of the topmost points of the IsometricRectangle.

```
public IntVector2 topCorner { get; set; }
```

Property Value

IntVector2

See Also
startCorner, endCorner, leftCorner, rightCorner, bottomCorner

upperBorder

The upper edges of the border, i.e. (leftCorner, topCorner) and (topCorner, rightCorner) - not necessarily in this direction.

```
public Path upperBorder { get; }
```

Property Value

Path

Remarks

This is precisely the set of points in border that have the highest y coord among those with the same x coord. (Note there's at most one other point with the same x coord.)

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public IsometricRectangle DeepCopy()
```

Returns

IsometricRectangle

Equals(IsometricRectangle)

See operator ==(IsometricRectangle, IsometricRectangle).

```
public bool Equals(IsometricRectangle other)
```

Parameters

`other` IsometricRectangle

Returns

bool

Equals(object)

See Equals(IsometricRectangle).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public IsometricRectangle Flip(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

Returns

IsometricRectangle

Flip(VerticalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public IsometricRectangle Flip(VerticalAxis axis)
```

Parameters

`axis` VerticalAxis

Returns

IsometricRectangle

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public IsometricRectangle Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

IsometricRectangle

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, IsometricRectangle)

Returns a deep copy of the IsometricRectangle translated by the given vector.

```
public static IsometricRectangle operator +(IntVector2 translation,
IsometricRectangle isometricRectangle)
```

Parameters

`translation` IntVector2

`isometricRectangle` IsometricRectangle

Returns

IsometricRectangle

See Also
Translate(IntVector2)

operator +(IsometricRectangle, IntVector2)

Returns a deep copy of the IsometricRectangle translated by the given vector.

```
public static IsometricRectangle operator +(IsometricRectangle isometricRectangle,
IntVector2 translation)
```

Parameters

`isometricRectangle` IsometricRectangle

`translation` IntVector2

Returns

IsometricRectangle

See Also
Translate(IntVector2)

operator ==(IsometricRectangle, IsometricRectangle)

Whether the two IsometricRectangles have the same values for startCorner, endCorner and filled.

```
public static bool operator ==(IsometricRectangle a, IsometricRectangle b)
```

Parameters

`a` IsometricRectangle

`b` IsometricRectangle

Returns

bool

operator !=(IsometricRectangle, IsometricRectangle)

See operator ==(IsometricRectangle, IsometricRectangle).

```
public static bool operator !=(IsometricRectangle a, IsometricRectangle b)
```

Parameters

a IsometricRectangle

b IsometricRectangle

Returns

bool

operator -(IsometricRectangle, IntVector2)

Returns a deep copy of the IsometricRectangle translated by the given vector.

```
public static IsometricRectangle operator -(IsometricRectangle isometricRectangle,
IntVector2 translation)
```

Parameters

`isometricRectangle` IsometricRectangle

`translation` IntVector2

Returns

IsometricRectangle

See Also
Translate(IntVector2)

operator -(IsometricRectangle)

Returns a deep copy of the IsometricRectangle rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static IsometricRectangle operator -(IsometricRectangle isometricRectangle)
```

Parameters

`isometricRectangle` IsometricRectangle

Returns

IsometricRectangle

Class Line

Namespace: PAC.Geometry.Shapes

A pixel art straight line. For example,

```
            #
        # #
      #
  # #
#
```

```
public class Line : I1DShape<Line>, ITransformableShape<Line, CardinalOrdinalAxis>,
ITranslatableShape<Line>, IFlippableShape<Line, CardinalOrdinalAxis>,
IRotatableShape<Line>, IDeepCopyableShape<Line>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyList<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<Line>
```

Inheritance

object ← Line

Implements

I1DShape<Line>, ITransformableShape<Line, CardinalOrdinalAxis>, ITranslatableShape<Line>, IFlippableShape<Line, CardinalOrdinalAxis>, IRotatableShape<Line>, IDeepCopyableShape<Line>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyList<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<Line>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,

Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int) , IntRangeExtensions.GetRange<T>(IReadOnlyList<T>, IntRange) , IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, int, int) , IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, Range)

Remarks

Shape:

The Line will never contain 'right-angles':

```
  #
# #
```

The Line will always be 'perfect' if possible. By 'perfect', we mean it is drawn using blocks of a constant size. For example,

```
            # #
        # #
    # #
# #
```

The Line will always have 180-degree rotational symmetry, except potentially the midpoint in some odd-length Lines.

Rotating the end point by a quadrantal angle about the start point, or reflecting it across a vertical/horizontal axis through the start point, will apply the same transformation to the shape of the Line. For example, with

```
        # < end
      #
  # #
#
^start
```

rotating the end point 180 degrees about the start point gives the Line

```
        # < start
    # #
  #
#
^end
```

Even though the x-distance and y-distance between the start and end haven't changed between the two Lines, it matters which endpoint is the start and which is the end.

Enumerator:

The enumerator starts at start and ends at end.

The enumerator does not repeat any points.

Constructors

Line(IntVector2)

Creates a Line that's just a single point.

```
public Line(IntVector2 point)
```

Parameters

`point` IntVector2

Line(IntVector2, IntVector2)

Creates a Line that starts at `start` and ends at `end`.

```
public Line(IntVector2 start, IntVector2 end)
```

Parameters

`start` IntVector2

See start.

`end` IntVector2

See end.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

this[int]

Returns the point on the Line at the given index, starting at start.

```
public IntVector2 this[int index] { get; }
```

Parameters

`index` int

Property Value

IntVector2

Remarks

This is O(1).

Exceptions

ArgumentOutOfRangeException

`index` is < 0 or >= Count.

this[Range]

```
public IEnumerable<IntVector2> this[Range range] { get; }
```

Parameters

`range` Range

Property Value

IEnumerable<IntVector2>

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; }
```

Property Value

IntRect

end

The end point of the Line.

```
public IntVector2 end { get; set; }
```

Property Value

IntVector2

See Also
start

isHorizontal

True iff the Line has a constant y coord.

```
public bool isHorizontal { get; }
```

Property Value

bool

See Also
isPoint, isVertical

isPerfect

Whether this Line is divided into blocks of a constant size. E.g. a 12x4 Line is perfect as it is drawn as 4 horizontal blocks of 3 pixels.

```
public bool isPerfect { get; }
```

Property Value

bool

isPoint

True iff start and end are equal.

```
public bool isPoint { get; }
```

Property Value

bool

See Also
isVertical, isHorizontal

isVertical

True iff the Line has a constant x coord.

```
public bool isVertical { get; }
```

Property Value

bool

See Also
isPoint, isHorizontal

reverse

Returns a new Line with start and end swapped.

This will look like the original Line rotated 180 degrees, which will look the same except potentially at the midpoint of some odd-length Lines.

```
public Line reverse { get; }
```

Property Value

Line

start

The start point of the Line.

```
public IntVector2 start { get; set; }
```

Property Value

IntVector2

See Also
end

vector

end - start

```
public IntVector2 vector { get; }
```

Property Value

IntVector2

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

point IntVector2

Returns

bool

Remarks

This is O(1).

CountOnX(int)

Returns the number of pixels on the Line that have the given x coord.

```
public int CountOnX(int x)
```

Parameters

x int

Returns

int

Remarks

This is O(1).

See Also
CountOnY(int)

CountOnY(int)

Returns the number of pixels on the Line that have the given y coord.

```
public int CountOnY(int y)
```

Parameters

y int

Returns

int

Remarks

This is O(1).

See Also
CountOnX(int)

DeepCopy()

Returns a deep copy of the shape.

```
public Line DeepCopy()
```

Returns

Line

Equals(Line)

See operator ==(Line, Line).

```
public bool Equals(Line other)
```

Parameters

`other` Line

Returns

bool

Equals(object)

See Equals(Line)

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public Line Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Line

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

MaxX(int)

Returns the maximum x coord of the pixels on the Line that have the given y coord.

```
public int MaxX(int y)
```

Parameters

`y` int

Returns

int

Remarks

This is O(1).

Exceptions

ArgumentOutOfRangeException

`y` is not in the range of y coords spanned by the Line.

See Also
MinX(int), MaxY(int), MinY(int)

MaxY(int)

Returns the maximum y coord of the pixels on the Line that have the given x coord.

```
public int MaxY(int x)
```

Parameters

`x` int

Returns

int

Remarks

This is O(1).

Exceptions

ArgumentOutOfRangeException

`x` is not in the range of x coords spanned by the Line.

See Also
MinY(int), MaxX(int), MinX(int)

MinX(int)

Returns the minimum x coord of the pixels on the Line that have the given y coord.

```
public int MinX(int y)
```

Parameters

`y` int

Returns

int

Remarks

This is O(1).

Exceptions

ArgumentOutOfRangeException

`y` is not in the range of y coords spanned by the Line.

See Also
MaxX(int), MinY(int), MaxY(int)

MinY(int)

Returns the minimum y coord of the pixels on the Line that have the given x coord.

```
public int MinY(int x)
```

Parameters

`x` int

Returns

int

Remarks

This is O(1).

Exceptions

ArgumentOutOfRangeException

`x` is not in the range of x coords spanned by the Line.

See Also
MaxY(int), MinX(int), MaxX(int)

PointIsAbove(IntVector2)

Whether the point above / on the Line (and lies within the x range of the Line).

```
public bool PointIsAbove(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

Remarks

This is O(1).

See Also
PointIsToLeft(IntVector2), PointIsToRight(IntVector2), PointIsBelow(IntVector2)

PointIsBelow(IntVector2)

Whether the point below / on the Line (and lies within the x range of the Line).

```
public bool PointIsBelow(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

Remarks

This is O(1).

See Also
PointIsToLeft(IntVector2), PointIsToRight(IntVector2), PointIsAbove(IntVector2)

PointIsToLeft(IntVector2)

Whether the point lies to the left of / on the Line (and lies within the y range of the Line).

```
public bool PointIsToLeft(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

Remarks

This is O(1).

See Also

PointIsToRight(IntVector2), PointIsBelow(IntVector2), PointIsAbove(IntVector2)

PointIsToRight(IntVector2)

Whether the point lies to the right of / on the Line (and lies within the y range of the Line).

```
public bool PointIsToRight(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

Remarks

This is O(1).

See Also
PointIsToLeft(IntVector2), PointIsBelow(IntVector2), PointIsAbove(IntVector2)

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public Line Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Line

See Also
operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public Line Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

Line

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, Line)

Returns a deep copy of the Line translated by the given vector.

```
public static Line operator +(IntVector2 translation, Line line)
```

Parameters

`translation` IntVector2

`line` Line

Returns

Line

See Also
Translate(IntVector2)

operator +(Line, IntVector2)

Returns a deep copy of the Line translated by the given vector.

```
public static Line operator +(Line line, IntVector2 translation)
```

Parameters

`line` Line

`translation` IntVector2

Returns

Line

See Also
Translate(IntVector2)

operator ==(Line, Line)

Whether the two Lines have the same start and end.

```
public static bool operator ==(Line a, Line b)
```

Parameters

`a` Line

`b` Line

Returns

bool

operator !=(Line, Line)

See operator ==(Line, Line).

```
public static bool operator !=(Line a, Line b)
```

Parameters

`a` Line

`b` Line

Returns

bool

operator -(Line, IntVector2)

Returns a deep copy of the Line translated by the given vector.

```
public static Line operator -(Line line, IntVector2 translation)
```

Parameters

`line` Line

`translation` IntVector2

Returns

Line

See Also
Translate(IntVector2)

operator -(Line)

Returns a deep copy of the Line rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static Line operator -(Line line)
```

Parameters

`line` Line

Returns

Line

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Class Path

Namespace: PAC.Geometry.Shapes

A sequence of connected Lines. For example,

```
        end of line 1
       start of line 2    # < end of line 3
              v           #
              # #         #
            #     # #     # < start of line 3
          #           # #
        #               ^
        ^         end of line 2
start of line 1
```

```
public class Path : I1DShape<Path>, ITransformableShape<Path, CardinalOrdinalAxis>,
ITranslatableShape<Path>, IFlippableShape<Path, CardinalOrdinalAxis>,
IRotatableShape<Path>, IDeepCopyableShape<Path>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable, IEquatable<Path>
```

Inheritance

object ← Path

Implements

I1DShape<Path>, ITransformableShape<Path, CardinalOrdinalAxis>, ITranslatableShape<Path>, IFlippableShape<Path, CardinalOrdinalAxis>, IRotatableShape<Path>, IDeepCopyableShape<Path>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<Path>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,

IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,

IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

The Lines must connect, meaning the end of each Line must be equal to or adjacent (including diagonally) to the start of the next Line. This does not have to hold for the last Line.

Enumerator:

Points can be double-counted, but the purpose of Path is that they will never appear twice in succession. This allows iterating over the sequence of Lines without double-counting joining points between one Line and the next. Additionally, if the last point of the Path equals the first point, then the last point will not be counted, allowing iterating over a sequence of Lines that create a loop without double-counting the starting point.

Constructors

Path(params IntVector2[])

Creates a Path by connecting the sequence of points with Lines.

```
public Path(params IntVector2[] points)
```

Parameters

`points` IntVector2[]

Exceptions

ArgumentException

`points` is empty.

Path(params Line[])

Creates a Path with the given sequence of Lines.

```
public Path(params Line[] lines)
```

Parameters

`lines` Line[]

Remarks

The Lines must connect, meaning the end of each Line must be equal to or adjacent to (including diagonally) the start of the next Line.

Creates deep copies of the Lines.

Exceptions

ArgumentException

`lines` is empty or the Lines it contains do not connect.

Path(IEnumerable<IntVector2>)

Creates a Path by connecting the sequence of points with Lines.

```
public Path(IEnumerable<IntVector2> points)
```

Parameters

`points` IEnumerable<IntVector2>

Exceptions

ArgumentException

`points` is empty.

Path(IEnumerable<Line>)

Creates a Path with the given sequence of Lines.

```
public Path(IEnumerable<Line> lines)
```

Parameters

`lines` IEnumerable<Line>

Remarks

The Lines must connect, meaning the end of each Line must be equal to or adjacent to (including diagonally) the start of the next Line.

Creates deep copies of the Lines.

Exceptions

ArgumentException

`lines` is empty or the Lines it contains do not connect.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; }
```

Property Value

IntRect

end

The last point in the Path.

```
public IntVector2 end { get; }
```

Property Value

IntVector2

Remarks

This may not be the last point in the enumerator: if it's equal to start, and the enumerator has length > 1, it won't be counted at the end. Other than in that case, it will be the last point in the enumerator.

See Also
start

isHorizontal

True iff the Path never changes y coord.

```
public bool isHorizontal { get; }
```

Property Value

bool

See Also

isPoint, isVertical

isLoop

Whether the end of the Path is adjacent (including diagonally) to the start.

```
public bool isLoop { get; }
```

Property Value

bool

isPoint

True iff the Path never changes coordinate.

```
public bool isPoint { get; }
```

Property Value

bool

See Also
isVertical, isHorizontal

isVertical

True iff the Path never changes x coord.

```
public bool isVertical { get; }
```

Property Value

bool

See Also
isPoint, isHorizontal

lines

The sequence of Lines that make up the Path.

```
public ReadOnlyCollection<Line> lines { get; }
```

Property Value

ReadOnlyCollection<Line>

Remarks

Do not edit these Lines except through methods provided in Path, as editing them can potentially cause us to lose the property that the Lines connect.

reverse

Returns a new Path going through the Lines in reverse order and with their starts / ends swapped.

```
public Path reverse { get; }
```

Property Value

Path

Remarks

This is not guaranteed to give the same geometry: the midpoint of a Line can move when swapping its start / end.

selfIntersects

Whether the enumerator repeats any points.

```
public bool selfIntersects { get; }
```

Property Value

bool

start

The first point in the Path.

```
public IntVector2 start { get; }
```

Property Value

IntVector2

Remarks

This will be the first point in the enumerator.

See Also
end

Methods

Concat(params Path[])

Puts the Paths one after the other to create a new Path.

```
public static Path Concat(params Path[] paths)
```

Parameters

`paths` Path[]

Returns

Path

Remarks

The Paths must connect, meaning the end of each Path must be equal to or adjacent to (including diagonally) the start of the next Path.

Creates deep copies of the Paths.

Exceptions

ArgumentException

`paths` is empty or the Paths it contains do not connect.

Concat(IEnumerable<Path>)

Puts the Paths one after the other to create a new Path.

```
public static Path Concat(IEnumerable<Path> paths)
```

Parameters

`paths` IEnumerable<Path>

Returns

Path

Remarks

The Paths must connect, meaning the end of each Path must be equal to or adjacent to (including diagonally) the start of the next Path.

Creates deep copies of the Paths.

Exceptions

ArgumentException

`paths` is empty or the Paths it contains do not connect.

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

CountOnX(int)

Returns the number of points on the Path that have the given x coord.

```
public int CountOnX(int x)
```

Parameters

`x` int

Returns

int

Remarks

A point that appears n times in the enumerator will be counted n times.

CountOnY(int)

Returns the number of points on the Path that have the given y coord.

```
public int CountOnY(int y)
```

Parameters

`y` int

Returns

int

Remarks

A point that appears n times in the enumerator will be counted n times.

DeepCopy()

Returns a deep copy of the shape.

```
public Path DeepCopy()
```

Returns

Path

Equals(Path)

See operator ==(Path, Path).

```
public bool Equals(Path other)
```

Parameters

`other` Path

Returns

bool

Equals(object)

See Equals(Path).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public Path Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Path

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

MaxX(int)

Returns the maximum x coord of the points on the Path that have the given y coord.

```
public int MaxX(int y)
```

Parameters

y int

Returns

int

Exceptions

ArgumentOutOfRangeException

y is not in the range of y coords spanned by the Path.

MaxY(int)

Returns the maximum y coord of the points on the Path that have the given x coord.

```
public int MaxY(int x)
```

Parameters

x int

Returns

int

Exceptions

ArgumentOutOfRangeException

`x` is not in the range of x coords spanned by the Path.

MinX(int)

Returns the minimum x coord of the points on the Path that have the given y coord.

```
public int MinX(int y)
```

Parameters

`y` int

Returns

int

Exceptions

ArgumentOutOfRangeException

`y` is not in the range of y coords spanned by the Path.

MinY(int)

Returns the minimum y coord of the points on the Path that have the given x coord.

```
public int MinY(int x)
```

Parameters

`x` int

Returns

int

Exceptions

ArgumentOutOfRangeException

`x` is not in the range of x coords spanned by the Path.

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public Path Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Path

See Also
operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public Path Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

Path

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, Path)

Returns a deep copy of the Path translated by the given vector.

```
public static Path operator +(IntVector2 translation, Path path)
```

Parameters

`translation` IntVector2

`path` Path

Returns

Path

See Also
Translate(IntVector2)

operator +(Path, IntVector2)

Returns a deep copy of the Path translated by the given vector.

```
public static Path operator +(Path path, IntVector2 translation)
```

Parameters

`path` Path

`translation` IntVector2

Returns

Path

See Also
Translate(IntVector2)

operator ==(Path, Path)

Whether the two Paths have the same sequence of Lines in lines.

```
public static bool operator ==(Path a, Path b)
```

Parameters

`a` Path

`b` Path

Returns

bool

implicit operator Path(Line)

Treats the Line as a Path with one line segment.

```
public static implicit operator Path(Line line)
```

Parameters

`line` Line

Returns

Path

operator !=(Path, Path)

See operator ==(Path, Path).

```
public static bool operator !=(Path a, Path b)
```

Parameters

`a` Path

`b` Path

Returns

bool

operator -(Path, IntVector2)

Returns a deep copy of the Path translated by the given vector.

```
public static Path operator -(Path path, IntVector2 translation)
```

Parameters

`path` Path

`translation` IntVector2

Returns

Path

See Also
Translate(IntVector2)

operator -(Path)

Returns a deep copy of the Path rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static Path operator -(Path path)
```

Parameters

`path` Path

Returns

Path

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Class Rectangle

Namespace: PAC.Geometry.Shapes

A pixel art rectangle shape. For example,

```
# # # #
#     #
# # # #
```

```
public class Rectangle : I2DShape<Rectangle>, IFillableShape,
ITransformableShape<Rectangle, CardinalOrdinalAxis>, ITranslatableShape<Rectangle>,
IFlippableShape<Rectangle, CardinalOrdinalAxis>, IRotatableShape<Rectangle>,
IDeepCopyableShape<Rectangle>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<Rectangle>
```

Inheritance

object ← Rectangle

Implements

I2DShape<Rectangle>, IFillableShape, ITransformableShape<Rectangle, CardinalOrdinalAxis>, ITranslatableShape<Rectangle>, IFlippableShape<Rectangle, CardinalOrdinalAxis>, IRotatableShape<Rectangle>, IDeepCopyableShape<Rectangle>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<Rectangle>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,

Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Enumerator:

The enumerator does not repeat any points.

Constructors

Rectangle(IntRect, bool)

Creates a Rectangle that takes up the region of the given IntRect.

```
public Rectangle(IntRect boundingRect, bool filled)
```

Parameters

`boundingRect` IntRect

See boundingRect.

`filled` bool

See filled.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; set; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

isSquare

Whether the Rectangle is a square.

```
public bool isSquare { get; }
```

Property Value

bool

Remarks

This is equivalent to its boundingRect being a square.

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public Rectangle DeepCopy()
```

Returns

Rectangle

Equals(Rectangle)

See operator ==(Rectangle, Rectangle).

```
public bool Equals(Rectangle other)
```

Parameters

`other` Rectangle

Returns

bool

Equals(object)

See Equals(Rectangle).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public Rectangle Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

Rectangle

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public Rectangle Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

Rectangle

See Also

operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public Rectangle Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

Rectangle

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, Rectangle)

Returns a deep copy of the Rectangle translated by the given vector.

```
public static Rectangle operator +(IntVector2 translation, Rectangle rectangle)
```

Parameters

`translation` IntVector2

`rectangle` Rectangle

Returns

Rectangle

See Also
Translate(IntVector2)

operator +(Rectangle, IntVector2)

Returns a deep copy of the Rectangle translated by the given vector.

```
public static Rectangle operator +(Rectangle rectangle, IntVector2 translation)
```

Parameters

`rectangle` Rectangle

`translation` IntVector2

Returns

Rectangle

See Also
Translate(IntVector2)

operator ==(Rectangle, Rectangle)

Whether the two Rectangles have the same shape, and the same value for filled.

```
public static bool operator ==(Rectangle a, Rectangle b)
```

Parameters

a Rectangle

b Rectangle

Returns

bool

operator !=(Rectangle, Rectangle)

See operator ==(Rectangle, Rectangle).

```
public static bool operator !=(Rectangle a, Rectangle b)
```

Parameters

a Rectangle

b Rectangle

Returns

bool

operator -(Rectangle, IntVector2)

Returns a deep copy of the Rectangle translated by the given vector.

```
public static Rectangle operator -(Rectangle rectangle, IntVector2 translation)
```

Parameters

`rectangle` Rectangle

`translation` IntVector2

Returns

Rectangle

See Also
Translate(IntVector2)

operator -(Rectangle)

Returns a deep copy of the Rectangle rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static Rectangle operator -(Rectangle rectangle)
```

Parameters

`rectangle` Rectangle

Returns

Rectangle

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Class RightTriangle

Namespace: PAC.Geometry.Shapes

A pixel art right-angled triangle shape. For example,

```
            # #
        # #   #
      #       #
  # #         #
#             #
# # # # # # # #
```

```
public class RightTriangle : I2DShape<RightTriangle>, IFillableShape,
ITransformableShape<RightTriangle, CardinalOrdinalAxis>,
ITranslatableShape<RightTriangle>, IFlippableShape<RightTriangle,
CardinalOrdinalAxis>, IRotatableShape<RightTriangle>,
IDeepCopyableShape<RightTriangle>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>,
IEnumerable, IEquatable<RightTriangle>
```

Inheritance

object ← RightTriangle

Implements

I2DShape<RightTriangle>, IFillableShape, ITransformableShape<RightTriangle, CardinalOrdinalAxis>, ITranslatableShape<RightTriangle>, IFlippableShape<RightTriangle, CardinalOrdinalAxis>, IRotatableShape<RightTriangle>, IDeepCopyableShape<RightTriangle>, IShape, IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable, IEquatable<RightTriangle>

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,

IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,

IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Shape:

The hypotenuse is drawn as a Line. We draw this Line starting from the longer side of the RightTriangle (or the horizontal side if both sides have the same length). This is done to ensure that rotating/reflecting the corners doesn't change the geometry (up to rotating/reflecting).

Except in some special cases, this Line is not drawn from the corners. Instead, the endpoints are inset by 1 from the corners. For example,

```
                        line end
                            v
                            # #
                          # #   #
                        #       #
                    # #         #
  line start > #                #
               # # # # # # # # #
```

This is done to make it look more aesthetic.

The special cases where the endpoints are not inset are:

- Width or height 1 - the RightTriangle looks like a straight line
- Width or height 2 - the RightTriangle looks like, for example,

```
  #
  #
# #
# #
# #
```

where, if the width is 2, the height of the shorter vertical block is `ceil(height of triangle / 2)`, and analogously for when the height is 2.

Enumerator:

The enumerator does not repeat any points.

Constructors

RightTriangle(IntRect, RightAngleLocation, bool)

Creates the largest RightTriangle that can fit in the given rect, and that has the right angle in the specified corner of the rect.

```
public RightTriangle(IntRect boundingRect, RightTriangle.RightAngleLocation
rightAngleLocation, bool filled)
```

Parameters

`boundingRect` IntRect

See boundingRect.

`rightAngleLocation` RightTriangle.RightAngleLocation

See rightAngleLocation.

`filled` bool

See filled.

RightTriangle(IntVector2, IntVector2, bool, bool)

Creates a RightTriangle with the two given non-right-angle corners.

```
public RightTriangle(IntVector2 corner, IntVector2 oppositeCorner, bool
horizontalEdgeIsBottomEdge, bool filled)
```

Parameters

`corner` IntVector2

One of the two non-right-angle corners of the RightTriangle.

`oppositeCorner` IntVector2

The non-right-angle corner opposite `corner`.

`horizontalEdgeIsBottomEdge` bool

Whether the horizontal edge of the RightTriangle is the bottom edge (as opposed to the top edge).

`filled` bool

See filled.

Properties

Count

Gets the number of elements in the collection.

```
public int Count { get; }
```

Property Value

int

The number of elements in the collection.

bottomCorner

The lower of the two corners that don't contain the right angle.

```
public IntVector2 bottomCorner { get; }
```

Property Value

IntVector2

Remarks

This will be different from topCorner, unless the RightTriangle is a single point.

See Also
topCorner, leftCorner, rightCorner, rightAngleCorner

boundingRect

The smallest rect containing the whole shape.

```
public IntRect boundingRect { get; set; }
```

Property Value

IntRect

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
public bool filled { get; set; }
```

Property Value

bool

isIsosceles

Whether the RightTriangle is an isosceles triangle.

```
public bool isIsosceles { get; }
```

Property Value

bool

Remarks

This is equivalent to its boundingRect being a square.

leftCorner

The left-most of the two corners that don't contain the right angle.

```
public IntVector2 leftCorner { get; }
```

Property Value

IntVector2

Remarks

This will be different from rightCorner, unless the RightTriangle is a single point.

See Also
bottomCorner, topCorner, rightCorner, rightAngleCorner

rightAngleCorner

The corner that contains the right angle.

```
public IntVector2 rightAngleCorner { get; }
```

Property Value

IntVector2

See Also
bottomCorner, topCorner, leftCorner, rightCorner

rightAngleLocation

Which corner of the boundingRect the right angle is in.

```
public RightTriangle.RightAngleLocation rightAngleLocation { get; set; }
```

Property Value

RightTriangle.RightAngleLocation

rightCorner

The right-most of the two corners that don't contain the right angle.

```
public IntVector2 rightCorner { get; }
```

Property Value

IntVector2

Remarks

This will be different from leftCorner, unless the RightTriangle is a single point.

See Also
bottomCorner, topCorner, leftCorner, rightAngleCorner

topCorner

The higher of the two corners that don't contain the right angle.

```
public IntVector2 topCorner { get; }
```

Property Value

IntVector2

Remarks

This will be different from bottomCorner, unless the RightTriangle is a single point.

See Also

bottomCorner, leftCorner, rightCorner, rightAngleCorner

Methods

Contains(IntVector2)

```
public bool Contains(IntVector2 point)
```

Parameters

`point` IntVector2

Returns

bool

DeepCopy()

Returns a deep copy of the shape.

```
public RightTriangle DeepCopy()
```

Returns

RightTriangle

Equals(RightTriangle)

See operator ==(RightTriangle, RightTriangle).

```
public bool Equals(RightTriangle other)
```

Parameters

`other` RightTriangle

Returns

bool

Equals(object)

See Equals(RightTriangle).

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

Flip(CardinalOrdinalAxis)

Returns a deep copy of the shape reflected across the given axis.

```
public RightTriangle Flip(CardinalOrdinalAxis axis)
```

Parameters

`axis` CardinalOrdinalAxis

Returns

RightTriangle

GetEnumerator()

Returns an enumerator that iterates through the collection.

```
public IEnumerator<IntVector2> GetEnumerator()
```

Returns

IEnumerator<IntVector2>

An enumerator that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
public RightTriangle Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

RightTriangle

See Also

operator -(IRotatableShape<T>)

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public RightTriangle Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

RightTriangle

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, RightTriangle)

Returns a deep copy of the RightTriangle translated by the given vector.

```
public static RightTriangle operator +(IntVector2 translation,
RightTriangle triangle)
```

Parameters

`translation` IntVector2

`triangle` RightTriangle

Returns

RightTriangle

See Also
Translate(IntVector2)

operator +(RightTriangle, IntVector2)

Returns a deep copy of the RightTriangle translated by the given vector.

```
public static RightTriangle operator +(RightTriangle triangle,
IntVector2 translation)
```

Parameters

`triangle` RightTriangle

`translation` IntVector2

Returns

RightTriangle

See Also
Translate(IntVector2)

operator ==(RightTriangle, RightTriangle)

Whether the two RightTriangles have the same shape, and the same rightAngleLocation.

```
public static bool operator ==(RightTriangle a, RightTriangle b)
```

Parameters

a RightTriangle

b RightTriangle

Returns

bool

operator !=(RightTriangle, RightTriangle)

See operator ==(RightTriangle, RightTriangle).

```
public static bool operator !=(RightTriangle a, RightTriangle b)
```

Parameters

a RightTriangle

b RightTriangle

Returns

bool

operator -(RightTriangle, IntVector2)

Returns a deep copy of the RightTriangle translated by the given vector.

```
public static RightTriangle operator -(RightTriangle triangle,
IntVector2 translation)
```

Parameters

triangle RightTriangle

`translation` IntVector2

Returns

RightTriangle

See Also
Translate(IntVector2)

operator -(RightTriangle)

Returns a deep copy of the RightTriangle rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static RightTriangle operator -(RightTriangle triangle)
```

Parameters

`triangle` RightTriangle

Returns

RightTriangle

See Also
Rotate(QuadrantalAngle), Flip(CardinalOrdinalAxis)

Enum RightTriangle.RightAngleLocation

Namespace: PAC.Geometry.Shapes

Which corner of the boundingRect the right angle is in.

```
public enum RightTriangle.RightAngleLocation
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`BottomLeft = 0`

`BottomRight = 1`

`TopLeft = 2`

`TopRight = 3`

Namespace PAC.Geometry.Shapes.Extensions

Classes

IShapeExtensions

Extension methods for IShape.

Class IShapeExtensions

Namespace: PAC.Geometry.Shapes.Extensions

Extension methods for IShape.

```
public static class IShapeExtensions
```

Inheritance

object ← IShapeExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ToTexture(IShape, Color)

Turns the pixels in the shape's bounding rect into a Unity Texture2D with the given colour.

```
public static Texture2D ToTexture(this IShape shape, Color colour)
```

Parameters

`shape` IShape

`colour` Color

Returns

Texture2D

ToTexture(IShape, Color, IntRect)

Turns the pixels in the given rect into a Unity Texture2D with the given colour, using any of the shape's points that lie within that rect.

```
public static Texture2D ToTexture(this IShape shape, Color colour,
IntRect textureRect)
```

Parameters

`shape` IShape

`colour` Color

`textureRect` IntRect

Returns

Texture2D

Namespace PAC.Geometry.Shapes.Interfaces

Interfaces

I1DShape<T>
A pixel art representation of a 1D shape (such as a straight line, or a curve).

I2DShape<T>
A pixel art representation of a 2D shape (such as a rectangle or a circle).

IDeepCopyableShape<T>
An IShape that can be deep-copied.

IFillableShape
An IShape that encloses a region that can be filled in.

IFlippableShape<T, A>
An IShape that can be flipped.

IIsometricShape<T>
A pixel art representation of the isometric projection of a shape.

IRotatableShape<T>
An IShape that can be rotated.

IShape
Defines a non-empty collection of integer points that make up a pixel art shape. The shape must be connected (including diagonally).

ITransformableShape<T, A>
An IShape that can be translated, flipped and rotated.

ITranslatableShape<T>
An IShape that can be translated.

Interface I1DShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

A pixel art representation of a 1D shape (such as a straight line, or a curve).

```
public interface I1DShape<out T> : ITransformableShape<T, CardinalOrdinalAxis>,
ITranslatableShape<T>, IFlippableShape<T, CardinalOrdinalAxis>,
IRotatableShape<T>, IDeepCopyableShape<T>, IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable where T
: IShape
```

Type Parameters

T

The type of shape obtained from transformations on the shape. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members
ITranslatableShape<T>.Translate(IntVector2) , IFlippableShape<T, CardinalOrdinalAxis>.Flip(CardinalOrdinalAxis) , IRotatableShape<T>.Rotate(QuadrantalAngle) , IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,

Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Interface I2DShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

A pixel art representation of a 2D shape (such as a rectangle or a circle).

```
public interface I2DShape<out T> : IFillableShape, ITransformableShape<T,
CardinalOrdinalAxis>, ITranslatableShape<T>, IFlippableShape<T,
CardinalOrdinalAxis>, IRotatableShape<T>, IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape
```

Type Parameters

`T`

The type of shape obtained from transformations on the shape. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members
IFillableShape.filled , ITranslatableShape<T>.Translate(IntVector2) , IFlippableShape<T, CardinalOrdinalAxis>.Flip(CardinalOrdinalAxis) , IRotatableShape<T>.Rotate(QuadrantalAngle) , IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,

Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Interface IDeepCopyableShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that can be deep-copied.

```
public interface IDeepCopyableShape<out T> : IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable where T
: IShape
```

Type Parameters

T

The type of shape obtained from the deep copy. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members
IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,

IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) , IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) , IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) , IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) , IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) , IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) , IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) , IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Methods

DeepCopy()

Returns a deep copy of the shape.

```
T DeepCopy()
```

Returns

T

Interface IFillableShape

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that encloses a region that can be filled in.

```
public interface IFillableShape : IShape, IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable
```

Inherited Members

IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,

IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>,
IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int)

Properties

filled

Whether the shape has its inside filled-in, or whether it's just the border.

```
bool filled { get; set; }
```

Property Value

bool

Interface IFlippableShape<T, A>

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that can be flipped.

```
public interface IFlippableShape<out T, in A> : IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape where A : CardinalOrdinalAxis
```

Type Parameters

T

The type of shape obtained from flipping. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

A

The axis/axes that the shape can be flipped over.

Inherited Members
IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,

Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Methods

Flip(A)

Returns a deep copy of the shape reflected across the given axis.

```
T Flip(A axis)
```

Parameters

axis A

Returns

T

Interface IIsometricShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

A pixel art representation of the isometric projection of a shape.

```
public interface IIsometricShape<out T> : IFillableShape, ITranslatableShape<T>,
IFlippableShape<T, VerticalAxis>, IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape
```

Type Parameters

T

The type of shape obtained from transformations on the shape. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members

IFillableShape.filled , ITranslatableShape<T>.Translate(IntVector2) , IFlippableShape<T, VerticalAxis>.Flip(VerticalAxis) , IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,

IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,

Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Interface IRotatableShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that can be rotated.

```
public interface IRotatableShape<out T> : IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape
```

Type Parameters

T

The type of shape obtained from rotating. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members
IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,

IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) , IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) , IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) , IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) , IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) , IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) , IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) , IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Methods

Rotate(QuadrantalAngle)

Returns a deep copy of the shape rotated by the given angle.

```
T Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Returns

T

See Also
operator -(IRotatableShape<T>)

Operators

operator -(IRotatableShape<T>)

Returns a deep copy of the shape rotated 180 degrees about the origin (equivalently, reflected through the origin).

```
public static T operator -(IRotatableShape<out T> shape)
```

Parameters

`shape` IRotatableShape<T>

Returns

T

See Also

Rotate(QuadrantalAngle)

Interface IShape

Namespace: PAC.Geometry.Shapes.Interfaces

Defines a non-empty collection of integer points that make up a pixel art shape. The shape must be connected (including diagonally).

```
public interface IShape : IReadOnlyContains<IntVector2>,
IReadOnlyCollection<IntVector2>, IEnumerable<IntVector2>, IEnumerable
```

Inherited Members

IReadOnlyContains<IntVector2>.Contains(IntVector2) ,
IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) ,
IShapeExtensions.ToTexture(IShape, Color, IntRect) ,
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) ,
ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>,
IEnumerable<T>) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>,
IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>,
Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>,
Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>,
params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,

IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
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Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>,
IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

Though uncommon among the shapes that implement this interface, points *can* be repeated in the collection. Whether this can happen or not should be documented for each implementing shape. Note that Count should include multiplicities.

Properties

boundingRect

The smallest rect containing the whole shape.

```
IntRect boundingRect { get; }
```

Property Value

IntRect

Interface ITransformableShape<T, A>

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that can be translated, flipped and rotated.

```
public interface ITransformableShape<out T, in A> : ITranslatableShape<T>,
IFlippableShape<T, A>, IRotatableShape<T>, IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape where A : CardinalOrdinalAxis
```

Type Parameters

T

The type of shape obtained from the transformations. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

A

The axis/axes that the shape can be flipped over.

Inherited Members

ITranslatableShape<T>.Translate(IntVector2) , IFlippableShape<T, A>.Flip(A) , IRotatableShape<T>.Rotate(QuadrantalAngle) , IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods

IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) ,

IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) ,
IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) ,
IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,
IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) ,
IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,

Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

See ITranslatableShape<T> for details of the design pattern regarding the generic type parameter.

Interface ITranslatableShape<T>

Namespace: PAC.Geometry.Shapes.Interfaces

An IShape that can be translated.

```
public interface ITranslatableShape<out T> : IDeepCopyableShape<T>, IShape,
IReadOnlyContains<IntVector2>, IReadOnlyCollection<IntVector2>,
IEnumerable<IntVector2>, IEnumerable where T : IShape
```

Type Parameters

T

The type of shape obtained from translating. When implementing this interface on a concrete type, this should be the same as the implementing type. See ITranslatableShape<T> for more detail on this design pattern.

Inherited Members
IDeepCopyableShape<T>.DeepCopy() , IShape.boundingRect , IReadOnlyContains<IntVector2>.Contains(IntVector2) , IReadOnlyCollection<IntVector2>.Count , IEnumerable<IntVector2>.GetEnumerator()

Extension Methods
IShapeExtensions.ToTexture(IShape, Color) , IShapeExtensions.ToTexture(IShape, Color, IntRect) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) ,

IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) , IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) , IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) , IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) , IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) , IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) , IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) , IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) , Combinatorics.Pairs<T>(IEnumerable<T>) , Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) , Combinatorics.Permutations<T>(IEnumerable<T>) , Combinatorics.Permutations<T>(IEnumerable<T>, int) , Combinatorics.Triples<T>(IEnumerable<T>) , Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) , Combinatorics.Tuples<T>(IEnumerable<T>, int)

Remarks

When implementing this interface on a concrete type, the type parameter `T` should be the same as the implementing type. For example,

```
class Point : ITranslatableShape<Point>
{
    public IntVector2 point;

    public Point(IntVector2 point)
    {
        this.point = point;
    }

    public Point Translate(IntVector2 translation) => new Point(point
+ translation);

    // Implementation of the rest of the interface...
}
```

This is done to ensure the specific return type of the Translate(IntVector2) method. Note though that `T` is covariant (see out), so you can abstract over any shape that is translatable. For example,

```
List<ITranslatableShape<IShape>>
```

This can store any shape that implements ITranslatableShape<T>. Note though that calling Translate(IntVector2) on an element of this list will return an IShape so cannot be translated again without downcasting. However you can do, say,

```
List<ITranslatableShape<ITranslatableShape<IShape>>>
```

This allows you to translate twice before you get an IShape returned.

Methods

Translate(IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
T Translate(IntVector2 translation)
```

Parameters

`translation` IntVector2

Returns

T

See Also
operator +(ITranslatableShape<T>, IntVector2),
operator +(IntVector2, ITranslatableShape<T>),
operator -(ITranslatableShape<T>, IntVector2)

Operators

operator +(IntVector2, ITranslatableShape<T>)

Returns a deep copy of the shape translated by the given vector.

```
public static T operator +(IntVector2 translation, ITranslatableShape<out T> shape)
```

Parameters

`translation` IntVector2

`shape` ITranslatableShape<T>

Returns

T

See Also
Translate(IntVector2)

operator +(ITranslatableShape<T>, IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public static T operator +(ITranslatableShape<out T> shape, IntVector2 translation)
```

Parameters

`shape` ITranslatableShape<T>

`translation` IntVector2

Returns

T

See Also
Translate(IntVector2)

operator -(ITranslatableShape<T>, IntVector2)

Returns a deep copy of the shape translated by the given vector.

```
public static T operator -(ITranslatableShape<out T> shape, IntVector2 translation)
```

Parameters

`shape` ITranslatableShape<T>

`translation` IntVector2

Returns

T

See Also
Translate(IntVector2)

Namespace PAC.Image

Classes

File

A class to represent a single Pixel Art Creator file.

File.JsonConverter

Class File

Namespace: PAC.Image

A class to represent a single Pixel Art Creator file.

```
public class File
```

Inheritance

object ← File

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

File(File)

Creates a deep copy of the File.

```
public File(File file)
```

Parameters

`file` File

File(string, int, int)

Creates a blank file.

```
public File(string name, int width, int height)
```

Parameters

`name` string

`width` int

`height` int

Properties

height

```
public int height { get; }
```

Property Value

int

keyFrameIndices

The frame indices at which some layer has a key frame.

```
public int[] keyFrameIndices { get; }
```

Property Value

int[]

layers

```
public List<Layer> layers { get; }
```

Property Value

List<Layer>

liveRender

```
public Texture2D liveRender { get; }
```

Property Value

Texture2D

mostRecentSavePath

```
public string mostRecentSavePath { get; }
```

Property Value

string

name

```
public string name { get; set; }
```

Property Value

string

numOfFrames

The number of frames the animation lasts for.

```
public int numOfFrames { get; set; }
```

Property Value

int

rect

```
public IntRect rect { get; }
```

Property Value

IntRect

savedSinceLastEdit

```
public bool savedSinceLastEdit { get; }
```

Property Value

bool

tiles

All the tile objects currently in the file.

```
public Tile[] tiles { get; }
```

Property Value

Tile[]

width

```
public int width { get; }
```

Property Value

int

Methods

AddLayer(Layer)

Adds the given layer on top of all existing layers.

```
public void AddLayer(Layer layer)
```

Parameters

`layer` Layer

AddLayer(Layer, int)

Adds the given layer at the given index. Throws an error if the layer is already in the file.

```
public void AddLayer(Layer layer, int index)
```

Parameters

`layer` Layer

`index` int

AddLayers(params Layer[])

Adds the layers on top of all existing layers, retaining the order they have in the array - i.e. first layer in the array is the one on top, etc.

```
public void AddLayers(params Layer[] layers)
```

Parameters

`layers` Layer[]

AddNormalLayer()

Adds a blank normal layer on top of all existing layers.

```
public void AddNormalLayer()
```

AddNormalLayer(int)

Adds a blank normal layer at the given index.

```
public void AddNormalLayer(int index)
```

Parameters

`index` int

AddNormalLayer(Texture2D, int)

Adds a normal layer at the given index with the given texture.

```
public void AddNormalLayer(Texture2D texture, int index = 0)
```

Parameters

`texture` Texture2D

`index` int

AddTile(File, IntVector2, int)

Adds the given file as a tile.

```
public void AddTile(File file, IntVector2 bottomLeft, int lowestLayer)
```

Parameters

`file` File

`bottomLeft` IntVector2

`lowestLayer` int

AddTile(Tile)

Adds the tile to the file.

```
public void AddTile(Tile tile)
```

Parameters

`tile` Tile

AddTileLayer()

Adds a blank tile layer on top of all existing layers.

```
public void AddTileLayer()
```

AddTileLayer(int)

Adds a blank tile layer at the given index.

```
public void AddTileLayer(int index)
```

Parameters

`index` int

ContainsTile(Tile)

```
public bool ContainsTile(Tile tile)
```

Parameters

`tile` Tile

Returns

bool

DeepCopy()

Creates a deep copy of the File.

```
public File DeepCopy()
```

Returns

File

ExportAnimation(string)

Exports each frame of the animation and puts them in a folder. The file path specifies the folder name and location, and the file extension to export each frame as.

```
public bool ExportAnimation(string filePath)
```

Parameters

`filePath` string

Returns

bool

ExportFrame(int, string)

Exports the frame to the file path, according to the file extension.

```
public bool ExportFrame(int frame, string filePath)
```

Parameters

`frame` int

`filePath` string

Returns

bool

Extend(int, int, int, int)

Extends the dimensions of the file in each direction by the given amounts.

```
public void Extend(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

Flip(CardinalAxis)

Flips the file.

```
public void Flip(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

ImportImage(string)

Adds the image at the file path as a new layer.

```
public void ImportImage(string filePath)
```

Parameters

`filePath` string

ImportLayers(params Layer[])

Adds deep copies of the layers on top of all existing layers, retaining the order they have in the array - i.e. first layer in the array is the one on top, etc.

```
public void ImportLayers(params Layer[] layers)
```

Parameters

`layers` Layer[]

IndexOfLayer(Layer)

Gets the index of the layer within the file.

```
public int IndexOfLayer(Layer layer)
```

Parameters

`layer` Layer

Returns

int

The index of the layer, or -1 if the layer is not in the file.

IsBlank()

Returns true if and only if all pixels on all layers are completely transparent.

```
public bool IsBlank()
```

Returns

bool

MoveLayer(Layer, int)

Moves the layer to indexToMoveTo. Throws an error if the layer is not in the file.

```
public void MoveLayer(Layer layerToMove, int indexToMoveTo)
```

Parameters

`layerToMove` Layer

`indexToMoveTo` int

MoveLayer(int, int)

Moves the layer at indexToMove to indexToMoveTo.

```
public void MoveLayer(int layerToMove, int indexToMoveTo)
```

Parameters

`layerToMove` int

`indexToMoveTo` int

OpenFile(string)

Opens the file according to its file extension.

```
public static File OpenFile(string filePath)
```

Parameters

`filePath` string

Returns

File

OpenImage(string)

Opens the file at the file path if it is an image file type, e.g. PNG or JPEG.

```
public static File OpenImage(string filePath)
```

Parameters

`filePath` string

Returns

File

OpenJPEG(string)

Opens the JPEG/JPG file. Throws an error if the file is not a JPEG/JPG file.

```
public static File OpenJPEG(string filePath)
```

Parameters

`filePath` string

Returns

File

OpenPAC(string)

Opens the PAC file. Throws an error if the file is not a PAC file.

```
public static File OpenPAC(string filePath)
```

Parameters

`filePath` string

Returns

File

OpenPNG(string)

Opens the PNG file. Throws an error if the file is not a PNG file.

```
public static File OpenPNG(string filePath)
```

Parameters

`filePath` string

Returns

File

RemoveAllLayers()

Removes all layers, then adds a blank normal layer.

```
public void RemoveAllLayers()
```

RemoveLayer(Layer)

Removes the layer from the file. Throws an error if the layer is not in the file.

```
public void RemoveLayer(Layer layer)
```

Parameters

`layer` Layer

RemoveLayer(int)

Removes the layer at the given index.

```
public void RemoveLayer(int layer)
```

Parameters

`layer` int

RemoveLayers(Layer[])

Removes the given layers from the file. Throws an error if a layer is not in the file.

```
public void RemoveLayers(Layer[] layers)
```

Parameters

`layers` Layer[]

RemoveLayers(int[])

Removes the layers at the given indices.

```
public void RemoveLayers(int[] layers)
```

Parameters

`layers` int[]

RemoveTile(Tile)

Removes the tile. Throws an error if the tile is not in the file.

```
public void RemoveTile(Tile tile)
```

Parameters

`tile` Tile

Render(int)

Renders all layers down to a Texture2D. Does not apply the texture.

```
public Texture2D Render(int frame)
```

Parameters

`frame` int

Returns

Texture2D

RenderLayers(IEnumerable<int>, int)

Renders the layers at the given layer indices down to a Texture2D. Does not apply the texture.

```
public Texture2D RenderLayers(IEnumerable<int> layerIndices, int frame)
```

Parameters

`layerIndices` IEnumerable<int>

The layer indices in the order you want them to be rendered, from highest layer (so lowest index) to lowest.

`frame` int

Returns

Texture2D

RenderLayers(int, int, int, bool)

Renders all the layers with index between lowestLayer and highestLayer (inclusive iff inclusive == true) down to a Texture2D. highestLayer and lowestLayer are automatically clamped to be in the valid range of layers. Does not apply the texture.

```
public Texture2D RenderLayers(int highestLayer, int lowestLayer, int frame, bool
inclusive = true)
```

Parameters

`highestLayer` int

The higher layer (so lower index).

`lowestLayer` int

The lower layer (so higher index).

`frame` int

`inclusive` bool

Returns

Texture2D

RenderLayersAbove(int, int, bool)

Renders all layers that appear above the given layer (includes the layer iff inclusive == true) down to a Texture2D. Returns a blank texture if there are none. Does not apply the texture.

```
public Texture2D RenderLayersAbove(int layer, int frame, bool inclusive = false)
```

Parameters

`layer` int

`frame` int

`inclusive` bool

Returns

Texture2D

RenderLayersBelow(int, int, bool)

Renders all layers that appear strictly beneath the given layer (includes the layer iff inclusive == true) down to a Texture2D. Returns a blank texture if there are none. Does not apply the texture.

```
public Texture2D RenderLayersBelow(int layer, int frame, bool inclusive = false)
```

Parameters

`layer` int

`frame` int

`inclusive` bool

Returns

Texture2D

RenderPixel(IntVector2, IEnumerable<int>, int)

Renders the colour of the pixel on the layers at the given layer indices. Throws an error if there are no layer indices.

```
public Color RenderPixel(IntVector2 pixel, IEnumerable<int> layerIndices, int frame)
```

Parameters

`pixel` IntVector2

`layerIndices` IEnumerable<int>

`frame` int

Returns

Color

RenderPixel(IntVector2, int)

Renders the colour of the given pixel.

```
public Color RenderPixel(IntVector2 pixel, int frame)
```

Parameters

`pixel` IntVector2

`frame` int

Returns

Color

RenderPixel(IntVector2, int, int, int, bool)

```
public Color RenderPixel(IntVector2 pixel, int highestLayer, int lowestLayer, int
```

```
frame, bool inclusive = true)
```

Parameters

`pixel` IntVector2

`highestLayer` int

`lowestLayer` int

`frame` int

`inclusive` bool

Returns

Color

RenderPixel(int, int, IEnumerable<int>, int)

Renders the colour of pixel (x, y) on the layers at the given layer indices. Throws an error if there are no layer indices.

```
public Color RenderPixel(int x, int y, IEnumerable<int> layerIndices, int frame)
```

Parameters

`x` int

`y` int

`layerIndices` IEnumerable<int>

`frame` int

Returns

Color

RenderPixel(int, int, int)

Renders the colour of the given pixel.

```
public Color RenderPixel(int x, int y, int frame)
```

Parameters

`x` int

`y` int

`frame` int

Returns

Color

RenderPixel(int, int, int, int, int, bool)

```
public Color RenderPixel(int x, int y, int highestLayer, int lowestLayer, int frame,
bool inclusive = true)
```

Parameters

`x` int

`y` int

`highestLayer` int

`lowestLayer` int

`frame` int

`inclusive` bool

Returns

Color

ReplaceLayer(Layer, Layer)

Replaces the layer with the given layer. Throws an error if the layer to replace is not in the file, or if the layer to replace with is already in the file.

```
public void ReplaceLayer(Layer layerToReplace, Layer layerToReplaceWith)
```

Parameters

`layerToReplace` Layer

`layerToReplaceWith` Layer

ReplaceLayer(int, Layer)

Replaces the layer at the given index with the given layer. Throws an error if the layer to replace with is already in the file.

```
public void ReplaceLayer(int layerToReplace, Layer layerToReplaceWith)
```

Parameters

`layerToReplace` int

`layerToReplaceWith` Layer

Rotate(QuadrantalAngle)

Rotates the file. Rotation is clockwise.

```
public void Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

SaveAsPAC(string)

Saves the file as a PAC file at the given file path. Throws an error if the file is not a PAC file.

```
public void SaveAsPAC(string filePath)
```

Parameters

`filePath` string

SavePAC()

Saves the file as a PAC file at the location it was most recently saved at. Throws an error if the file hasn't been saved before.

```
public void SavePAC()
```

Scale(int, int)

Resizes the file to the new width and height.

```
public void Scale(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

Scale(float)

Resizes the dimensions of the file by the scale factor.

```
public void Scale(float scaleFactor)
```

Parameters

`scaleFactor` float

Scale(float, float)

Resizes the dimensions of the file by the scale factors.

```
public void Scale(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

SetLiveRenderFrame(int)

Sets the frame that the live render will be for.

```
public void SetLiveRenderFrame(int frame)
```

Parameters

`frame` int

SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>, Layer[], int[]>)

Event invoked when some pixels have been changed on a layer. Passes the pixels, layers and frames that were affected.

```
public void SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>, Layer[],
int[]> call)
```

Parameters

`call` UnityAction<IEnumerable<IntVector2>, Layer[], int[]>

SubscribeToOnSavedSinceEditChanged(UnityAction)

Event invoked when the a change to file is made or when the file is saved.

```
public void SubscribeToOnSavedSinceEditChanged(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnTileAdded(UnityAction)

Event invoked when a tile is added to the file.

```
public void SubscribeToOnTileAdded(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnTileRemoved(UnityAction)

Event invoked when a tile is removed from the file.

```
public void SubscribeToOnTileRemoved(UnityAction call)
```

Parameters

`call` UnityAction

Class File.JsonConverter

Namespace: PAC.Image

```
public class File.JsonConverter : JsonConversion.JsonConverter<File,
JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<File, JsonData.Object> ← File.JsonConverter

Inherited Members

JsonConversion.JsonConverter<File, JsonData.Object>.ToJson(File) , JsonConversion.JsonConverter<File, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<File, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverter(SemanticVersion)

```
public JsonConverter(SemanticVersion fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override File FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

File

ToJson(File)

Attempts to convert the C# object into JSON data.

```
public override JsonData.Object ToJson(File file)
```

Parameters

`file` File

Returns

JsonData.Object

Namespace PAC.Image.Animation

Classes

AnimationKeyFrame

A class representing a single keyframe for a layer.

AnimationKeyFrame.JsonConverter

Class AnimationKeyFrame

Namespace: PAC.Image.Animation

A class representing a single keyframe for a layer.

```
public class AnimationKeyFrame
```

Inheritance

object ← AnimationKeyFrame

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

AnimationKeyFrame(AnimationKeyFrame)

Creates a deep copy of the AnimationKeyFrame.

```
public AnimationKeyFrame(AnimationKeyFrame animationKeyFrame)
```

Parameters

`animationKeyFrame` AnimationKeyFrame

AnimationKeyFrame(int, Texture2D)

```
public AnimationKeyFrame(int frame, Texture2D texture)
```

Parameters

`frame` int

`texture` Texture2D

Fields

frame

The number of the frame this keyframe is on.

```
public int frame
```

Field Value

int

texture

The texture displayed at this keyframe.

```
public Texture2D texture
```

Field Value

Texture2D

Methods

DeepCopy()

Creates a deep copy of the AnimationKeyFrame.

```
public AnimationKeyFrame DeepCopy()
```

Returns

AnimationKeyFrame

Class AnimationKeyFrame.JsonConverter

Namespace: PAC.Image.Animation

```
public class AnimationKeyFrame.JsonConverter :
JsonConversion.JsonConverter<AnimationKeyFrame, JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<AnimationKeyFrame, JsonData.Object> ← AnimationKeyFrame.JsonConverter

Inherited Members

JsonConversion.JsonConverter<AnimationKeyFrame, JsonData.Object>.ToJson(AnimationKeyFrame) , JsonConversion.JsonConverter<AnimationKeyFrame, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<AnimationKeyFrame, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverter(SemanticVersion)

```
public JsonConverter(SemanticVersion fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override AnimationKeyFrame FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

AnimationKeyFrame

ToJson(AnimationKeyFrame)

Attempts to convert the C# object into JSON data.

```
public override JsonData.Object ToJson(AnimationKeyFrame keyFrame)
```

Parameters

`keyFrame` AnimationKeyFrame

Returns

JsonData.Object

Namespace PAC.Image.Layers

Classes

Layer

An abstract class to define what each type of layer must have.

Layer.JsonConverter

NormalLayer

A class to represent a normal layer - one that can be drawn on as a regular image.

NormalLayer.JsonConverter

TileLayer

A class to represent a tile layer - one for placing and editing tileset tiles.

TileLayer.JsonConverter

Enums

AnimFrameRefMode

LayerType

Enum AnimFrameRefMode

Namespace: PAC.Image.Layers

```
public enum AnimFrameRefMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`MostRecentKeyFrame = 1`

`NewKeyFrame = 0`

Class Layer

Namespace: PAC.Image.Layers

An abstract class to define what each type of layer must have.

```
public abstract class Layer
```

Inheritance

object ← Layer

Derived

NormalLayer, TileLayer

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Layer(Layer)

```
public Layer(Layer layer)
```

Parameters

`layer` Layer

Layer(string, Texture2D)

```
public Layer(string name, Texture2D texture)
```

Parameters

`name` string

`texture` Texture2D

Fields

_blendMode

```
protected BlendMode _blendMode
```

Field Value

BlendMode

_visible

```
protected bool _visible
```

Field Value

bool

onPixelsChanged

Called when the SetPixel() or SetPixels() has been called. Passes the array of pixels changed and the frames it was called on.

```
protected UnityEvent<IEnumerable<IntVector2>, int[]> onPixelsChanged
```

Field Value

UnityEvent<IEnumerable<IntVector2>, int[]>

Properties

this[int]

Returns the texture of the most recent key frame before or at the frame index. Same as GetTexture(frame).

```
public AnimationKeyFrame this[int frame] { get; }
```

Parameters

`frame` int

Property Value

AnimationKeyFrame

blendMode

```
public BlendMode blendMode { get; set; }
```

Property Value

BlendMode

height

```
public int height { get; protected set; }
```

Property Value

int

keyFrameIndices

The frame indices of the key frames in the animation, in order.

```
public int[] keyFrameIndices { get; }
```

Property Value

int[]

keyFrameTextures

The textures of the key frames in the animation, in order.

```
public Texture2D[] keyFrameTextures { get; }
```

Property Value

Texture2D[]

keyFrames

The key frames of the animation, in order.

```
public List<AnimationKeyFrame> keyFrames { get; protected set; }
```

Property Value

List<AnimationKeyFrame>

layerType

```
public abstract LayerType layerType { get; }
```

Property Value

LayerType

locked

```
public bool locked { get; set; }
```

Property Value

bool

name

```
public string name { get; set; }
```

Property Value

string

opacity

```
public float opacity { get; set; }
```

Property Value

float

rect

```
public IntRect rect { get; }
```

Property Value

IntRect

visible

```
public bool visible { get; set; }
```

Property Value

bool

width

```
public int width { get; protected set; }
```

Property Value

int

Methods

AddKeyFrame(AnimationKeyFrame)

Adds the given key frame. Returns true if it replaces an existing key frame, and false otherwise.

```
protected bool AddKeyFrame(AnimationKeyFrame keyFrame)
```

Parameters

`keyFrame` AnimationKeyFrame

Returns

bool

AddKeyFrame(int)

Adds a key frame at frame frame. The texture will be that of the most recent key frame. Returns true if it replaces an existing key frame, and false otherwise.

```
protected bool AddKeyFrame(int frame)
```

Parameters

`frame` int

Returns

bool

AddKeyFrame(int, Texture2D)

Adds a key frame with the given texture at frame frame. Returns true if it replaces an existing key frame, and false otherwise.

```
protected bool AddKeyFrame(int frame, Texture2D texture)
```

Parameters

`frame` int

`texture` Texture2D

Returns

bool

ClearFrames()

Deletes all key frames.

```
public abstract void ClearFrames()
```

DeepCopy()

Creates a deep copy of the Layer.

```
public abstract Layer DeepCopy()
```

Returns

Layer

DeleteKeyFrame(AnimationKeyFrame)

Deletes the given key frame, if it's in the animation, in which case it returns true. Otherwise it returns false.

```
public bool DeleteKeyFrame(AnimationKeyFrame keyFrame)
```

Parameters

`keyFrame` AnimationKeyFrame

Returns

bool

DeleteKeyFrame(int)

```
public AnimationKeyFrame DeleteKeyFrame(int keyFrame)
```

Parameters

`keyFrame` int

Returns

AnimationKeyFrame

DeleteKeyFrameNoEvent(int)

Deletes the key frame at the given frame index, if there is one, in which case it returns that key frame. Otherwise it returns null.

```
protected abstract AnimationKeyFrame DeleteKeyFrameNoEvent(int keyframe)
```

Parameters

`keyframe` int

Returns

AnimationKeyFrame

DeleteMostRecentKeyFrame(int)

Deletes the most recent key frame before or at the given frame index and returns that key frame.

```
public AnimationKeyFrame DeleteMostRecentKeyFrame(int frame)
```

Parameters

`frame` int

Returns

AnimationKeyFrame

Extend(int, int, int, int)

Extends the dimensions of the layer in each direction by the given amounts.

```
public void Extend(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

ExtendNoEvent(int, int, int, int)

Extends the dimensions of the layer in each direction by the given amounts, but does not invoke the onPixelsChanged event.

```
protected abstract void ExtendNoEvent(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

Flip(CardinalAxis)

Flips the layer.

```
public void Flip(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

FlipNoEvent(CardinalAxis)

Flips the layer, but does not invoke the onPixelsChanged event.

```
protected abstract void FlipNoEvent(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

GetJsonConverterSet(SemanticVersion)

```
public static JsonConversion.JsonConverterSet GetJsonConverterSet(SemanticVersion
fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Returns

JsonConversion.JsonConverterSet

GetKeyFrame(int)

Returns the most recent key frame before or at the frame index - i.e. the key frame the animation will play at the frame index.

```
public AnimationKeyFrame GetKeyFrame(int frame)
```

Parameters

`frame` int

Returns

AnimationKeyFrame

GetPixel(IntVector2, int, bool)

Gets the colour of the pixel.

```
public abstract Color GetPixel(IntVector2 pixel, int frame, bool useLayerOpacity
= true)
```

Parameters

`pixel` IntVector2

`frame` int

`useLayerOpacity` bool

Returns

Color

GetPixel(int, int, int, bool)

Gets the colour of the pixel (x, y).

```
public Color GetPixel(int x, int y, int frame, bool useLayerOpacity = true)
```

Parameters

`x` int

`y` int

`frame` int

`useLayerOpacity` bool

Returns

Color

HasKeyFrameAt(int)

Returns whether or not there is a key frame at the given frame index.

```
public bool HasKeyFrameAt(int frame)
```

Parameters

`frame` int

Returns

bool

IsBlank()

Returns true if and only if all pixels are completely transparent.

```
public bool IsBlank()
```

Returns

bool

Rotate(QuadrantalAngle)

Rotates the layer. Rotation is clockwise.

```
public void Rotate(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

RotateNoEvent(QuadrantalAngle)

Rotates the layer, but does not invoke the onPixelsChanged event. Rotation is clockwise.

```
protected abstract void RotateNoEvent(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

Scale(int, int)

Resizes the dimensions of the file by the scale factor.

```
public void Scale(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

Scale(float)

Resizes the dimensions of the file by the scale factor.

```
public void Scale(float scaleFactor)
```

Parameters

`scaleFactor` float

Scale(float, float)

Resizes the dimensions of the file by the scale factors.

```
public void Scale(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

ScaleNoEvent(int, int)

Resizes the dimensions to the new width and height, but does not invoke the onPixelsChanged event.

```
protected abstract void ScaleNoEvent(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

ScaleNoEvent(float, float)

Resizes the dimensions of the file by the scale factors, but does not invoke the onPixelsChanged event.

```
protected abstract void ScaleNoEvent(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

SetPixel(IntVector2, int, Color, AnimFrameRefMode)

Sets the colour of the pixel. Throws an error if the pixel is outside the layer.

```
public IEnumerable<IntVector2> SetPixel(IntVector2 pixel, int frame, Color colour,
AnimFrameRefMode frameRefMode)
```

Parameters

`pixel` IntVector2

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

SetPixel(int, int, int, Color, AnimFrameRefMode)

Sets the colour of the pixel (x, y). Throws an error if the pixel is outside the layer.

```
public IEnumerable<IntVector2> SetPixel(int x, int y, int frame, Color colour,
AnimFrameRefMode frameRefMode)
```

Parameters

`x` int

`y` int

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

SetPixels(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode)

Sets the colour of the pixels. Throws an error if a pixel is outside the layer.

```
public IEnumerable<IntVector2> SetPixels(IEnumerable<IntVector2> pixels, int frame,
Color colour, AnimFrameRefMode frameRefMode)
```

Parameters

`pixels` IEnumerable<IntVector2>

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

SetPixelsNoEvent(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode)

Sets the colour of the pixels. You do not need to check the pixels are in the layer as this check is done in Layer.SetPixels(), which is the only way this method is called.

```
protected abstract IEnumerable<IntVector2> SetPixelsNoEvent(IEnumerable<IntVector2>
pixels, int frame, Color colour, AnimFrameRefMode frameRefMode)
```

Parameters

`pixels` IEnumerable<IntVector2>

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

SubscribeToOnBlendModeChanged(UnityAction)

```
public void SubscribeToOnBlendModeChanged(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnKeyFrameAdded(UnityAction<int>)

```
public void SubscribeToOnKeyFrameAdded(UnityAction<int> call)
```

Parameters

`call` UnityAction<int>

SubscribeToOnKeyFrameRemoved(UnityAction<int>)

```
public void SubscribeToOnKeyFrameRemoved(UnityAction<int> call)
```

Parameters

`call` UnityAction<int>

SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>, int[]>)

```
public void SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>,
int[]> call)
```

Parameters

`call` UnityAction<IEnumerable<IntVector2>, int[]>

SubscribeToOnVisibilityChanged(UnityAction)

```
public void SubscribeToOnVisibilityChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class Layer.JsonConverter

Namespace: PAC.Image.Layers

```
public class Layer.JsonConverter : JsonConversion.JsonConverter<Layer,
JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<Layer, JsonData.Object> ← Layer.JsonConverter

Inherited Members

JsonConversion.JsonConverter<Layer, JsonData.Object>.ToJson(Layer) , JsonConversion.JsonConverter<Layer, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<Layer, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverter(SemanticVersion)

```
public JsonConverter(SemanticVersion fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override Layer FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

Layer

ToJson(Layer)

This currently can't be used since JsonConversion.ToJson() only works on concrete types, but Layer is abstract so you cannot have an object without concrete type Layer.

```
public override JsonData.Object ToJson(Layer obj)
```

Parameters

`obj` Layer

Returns

JsonData.Object

Exceptions

NotImplementedException

Enum LayerType

Namespace: PAC.Image.Layers

```
public enum LayerType
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Normal = 0`

`Tile = 1`

Class NormalLayer

Namespace: PAC.Image.Layers

A class to represent a normal layer - one that can be drawn on as a regular image.

```
public class NormalLayer : Layer
```

Inheritance

object ← Layer ← NormalLayer

Inherited Members

Layer.name , Layer.width , Layer.height , Layer.rect , Layer._visible , Layer.visible , Layer.locked , Layer.opacity , Layer._blendMode , Layer.blendMode , Layer.keyFrames , Layer.keyFrameIndices , Layer.keyFrameTextures , Layer.onPixelsChanged , Layer.SetPixel(int, int, int, Color, AnimFrameRefMode) , Layer.SetPixel(IntVector2, int, Color, AnimFrameRefMode) , Layer.SetPixels(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode) , Layer.GetPixel(int, int, int, bool) , Layer.IsBlank() , Layer.Flip(CardinalAxis) , Layer.Rotate(QuadrantalAngle) , Layer.Extend(int, int, int, int) , Layer.Scale(float) , Layer.Scale(float, float) , Layer.Scale(int, int) , Layer.this[int] , Layer.GetKeyFrame(int) , Layer.HasKeyFrameAt(int) , Layer.AddKeyFrame(int) , Layer.AddKeyFrame(int, Texture2D) , Layer.AddKeyFrame(AnimationKeyFrame) , Layer.DeleteMostRecentKeyFrame(int) , Layer.DeleteKeyFrame(int) , Layer.DeleteKeyFrame(AnimationKeyFrame) , Layer.SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>, int[]>) , Layer.SubscribeToOnVisibilityChanged(UnityAction) , Layer.SubscribeToOnBlendModeChanged(UnityAction) , Layer.SubscribeToOnKeyFrameAdded(UnityAction<int>) , Layer.SubscribeToOnKeyFrameRemoved(UnityAction<int>) , Layer.GetJsonConverterSet(SemanticVersion) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

NormalLayer(NormalLayer)

Creates a deep copy of the NormalLayer.

```
public NormalLayer(NormalLayer layer)
```

Parameters

`layer` NormalLayer

NormalLayer(int, int)

```
public NormalLayer(int width, int height)
```

Parameters

`width` int

`height` int

NormalLayer(string, int, int)

```
public NormalLayer(string name, int width, int height)
```

Parameters

`name` string

`width` int

`height` int

NormalLayer(string, Texture2D)

```
public NormalLayer(string name, Texture2D texture)
```

Parameters

`name` string

`texture` Texture2D

NormalLayer(Texture2D)

```
public NormalLayer(Texture2D texture)
```

Parameters

`texture` Texture2D

Properties

layerType

```
public override LayerType layerType { get; }
```

Property Value

LayerType

Methods

ClearFrames()

Deletes all key frames.

```
public override void ClearFrames()
```

DeepCopy()

Creates a deep copy of the Layer.

```
public override Layer DeepCopy()
```

Returns

Layer

DeleteKeyFrameNoEvent(int)

Deletes the key frame at the given frame index, if there is one, in which case it returns that key frame. Otherwise it returns null.

```
protected override AnimationKeyFrame DeleteKeyFrameNoEvent(int keyframe)
```

Parameters

`keyframe` int

Returns

AnimationKeyFrame

ExtendNoEvent(int, int, int, int)

Extends the dimensions of the layer in each direction by the given amounts, but does not invoke the onPixelsChanged event.

```
protected override void ExtendNoEvent(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

Flip(int, CardinalAxis, AnimFrameRefMode)

Flips the given frame of the layer.

```
public void Flip(int frame, CardinalAxis axis, AnimFrameRefMode frameRefMode)
```

Parameters

`frame` int

`axis` CardinalAxis

`frameRefMode` AnimFrameRefMode

FlipNoEvent(CardinalAxis)

Flips the layer, but does not invoke the onPixelsChanged event.

```
protected override void FlipNoEvent(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

GetPixel(IntVector2, int, bool)

Gets the colour of the pixel.

```
public override Color GetPixel(IntVector2 pixel, int frame, bool useLayerOpacity
= true)
```

Parameters

`pixel` IntVector2

`frame` int

`useLayerOpacity` bool

Returns

Color

OverlayTexture(int, Texture2D, IntVector2, AnimFrameRefMode)

Overlays the texture onto the given frame, placing the bottom-left corner at the coordinates 'offset' (which don't have to be within the image). Uses Normal blend mode.

```
public void OverlayTexture(int frame, Texture2D overlayTex, IntVector2 offset,
AnimFrameRefMode frameRefMode)
```

Parameters

`frame` int

`overlayTex` Texture2D

`offset` IntVector2

`frameRefMode` AnimFrameRefMode

OverlayTexture(int, Texture2D, AnimFrameRefMode)

Overlays the texture onto the given frame. Uses Normal blend mode.

```
public void OverlayTexture(int frame, Texture2D overlayTex,
AnimFrameRefMode frameRefMode)
```

Parameters

`frame` int

`overlayTex` Texture2D

`frameRefMode` AnimFrameRefMode

OverlayTexture(Texture2D)

Overlays the texture onto every frame. Uses Normal blend mode.

```
public void OverlayTexture(Texture2D overlayTex)
```

Parameters

`overlayTex` Texture2D

OverlayTexture(Texture2D, IntVector2)

Overlays the texture onto every frame, placing the bottom-left corner at the coordinates 'offset' (which don't have to be within the image). Uses Normal blend mode.

```
public void OverlayTexture(Texture2D overlayTex, IntVector2 offset)
```

Parameters

`overlayTex` Texture2D

`offset` IntVector2

Rotate(int, QuadrantalAngle, AnimFrameRefMode)

Rotates the given frame of the layer. Rotation is clockwise.

```
public void Rotate(int frame, QuadrantalAngle angle, AnimFrameRefMode frameRefMode)
```

Parameters

`frame` int

`angle` QuadrantalAngle

`frameRefMode` AnimFrameRefMode

RotateNoEvent(QuadrantalAngle)

Rotates the layer, but does not invoke the onPixelsChanged event. Rotation is clockwise.

```
protected override void RotateNoEvent(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

ScaleNoEvent(int, int)

Resizes the dimensions to the new width and height, but does not invoke the onPixelsChanged event.

```
protected override void ScaleNoEvent(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

ScaleNoEvent(float, float)

Resizes the dimensions of the file by the scale factors, but does not invoke the onPixelsChanged event.

```
protected override void ScaleNoEvent(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

SetPixelsNoEvent(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode)

Sets the colour of the pixels. You do not need to check the pixels are in the layer as this check is done in Layer.SetPixels(), which is the only way this method is called.

```
protected override IEnumerable<IntVector2> SetPixelsNoEvent(IEnumerable<IntVector2>
pixels, int frame, Color colour, AnimFrameRefMode frameRefMode)
```

Parameters

`pixels` IEnumerable<IntVector2>

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

SetTexture(int, Texture2D, AnimFrameRefMode)

Sets the texture at the given frame.

```
public void SetTexture(int frame, Texture2D texture, AnimFrameRefMode frameRefMode)
```

Parameters

`frame` int

`texture` Texture2D

`frameRefMode` AnimFrameRefMode

Class NormalLayer.JsonConverter

Namespace: PAC.Image.Layers

```
public class NormalLayer.JsonConverter : JsonConversion.JsonConverter<NormalLayer,
JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<NormalLayer, JsonData.Object> ← NormalLayer.JsonConverter

Inherited Members

JsonConversion.JsonConverter<NormalLayer, JsonData.Object>.ToJson(NormalLayer) , JsonConversion.JsonConverter<NormalLayer, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<NormalLayer, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverter(SemanticVersion)

```
public JsonConverter(SemanticVersion fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override NormalLayer FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

NormalLayer

ToJson(NormalLayer)

Attempts to convert the C# object into JSON data.

```
public override JsonData.Object ToJson(NormalLayer layer)
```

Parameters

`layer` NormalLayer

Returns

JsonData.Object

Class TileLayer

Namespace: PAC.Image.Layers

A class to represent a tile layer - one for placing and editing tileset tiles.

```
public class TileLayer : Layer
```

Inheritance

object ← Layer ← TileLayer

Inherited Members

Layer.name , Layer.width , Layer.height , Layer.rect , Layer._visible , Layer.visible , Layer.locked , Layer.opacity , Layer._blendMode , Layer.blendMode , Layer.keyFrames , Layer.keyFrameIndices , Layer.keyFrameTextures , Layer.onPixelsChanged , Layer.SetPixel(int, int, int, Color, AnimFrameRefMode) , Layer.SetPixel(IntVector2, int, Color, AnimFrameRefMode) , Layer.SetPixels(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode) , Layer.GetPixel(int, int, int, bool) , Layer.IsBlank() , Layer.Flip(CardinalAxis) , Layer.Rotate(QuadrantalAngle) , Layer.Extend(int, int, int, int) , Layer.Scale(float) , Layer.Scale(float, float) , Layer.Scale(int, int) , Layer.this[int] , Layer.GetKeyFrame(int) , Layer.HasKeyFrameAt(int) , Layer.AddKeyFrame(int) , Layer.AddKeyFrame(int, Texture2D) , Layer.AddKeyFrame(AnimationKeyFrame) , Layer.DeleteMostRecentKeyFrame(int) , Layer.DeleteKeyFrame(int) , Layer.DeleteKeyFrame(AnimationKeyFrame) , Layer.SubscribeToOnPixelsChanged(UnityAction<IEnumerable<IntVector2>, int[]>) , Layer.SubscribeToOnVisibilityChanged(UnityAction) , Layer.SubscribeToOnBlendModeChanged(UnityAction) , Layer.SubscribeToOnKeyFrameAdded(UnityAction<int>) , Layer.SubscribeToOnKeyFrameRemoved(UnityAction<int>) , Layer.GetJsonConverterSet(SemanticVersion) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

TileLayer(TileLayer)

Creates a deep copy of the TileLayer.

```
public TileLayer(TileLayer layer)
```

Parameters

`layer` TileLayer

TileLayer(string, int, int)

```
public TileLayer(string name, int width, int height)
```

Parameters

`name` string

`width` int

`height` int

Properties

layerType

```
public override LayerType layerType { get; }
```

Property Value

LayerType

tiles

The tiles on this layer.

```
public List<Tile> tiles { get; }
```

Property Value

List<Tile>

Methods

AddTile(Tile)

Adds the tile to the layer.

```
public void AddTile(Tile tile)
```

Parameters

`tile` Tile

ClearFrames()

Deletes all key frames.

```
public override void ClearFrames()
```

ClearTiles()

Removes all tiles.

```
public void ClearTiles()
```

ContainsTile(Tile)

Returns true if the tile appears on this layer.

```
public bool ContainsTile(Tile tile)
```

Parameters

`tile` Tile

Returns

bool

DeepCopy()

Creates a deep copy of the Layer.

```
public override Layer DeepCopy()
```

Returns

Layer

DeleteKeyFrameNoEvent(int)

Deletes the key frame at the given frame index, if there is one, in which case it returns that key frame. Otherwise it returns null.

```
protected override AnimationKeyFrame DeleteKeyFrameNoEvent(int keyframe)
```

Parameters

`keyframe` int

Returns

AnimationKeyFrame

ExtendNoEvent(int, int, int, int)

Extends the dimensions of the layer in each direction by the given amounts, but does not invoke the onPixelsChanged event.

```
protected override void ExtendNoEvent(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

FlipNoEvent(CardinalAxis)

Flips the layer, but does not invoke the onPixelsChanged event.

```
protected override void FlipNoEvent(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

GetLinkedPixels(IntVector2)

Get the pixels that are linked to the given pixel due to multiple tiles having the same file - i.e. they point to the same pixel within the tiles' file.

```
public IEnumerable<IntVector2> GetLinkedPixels(IntVector2 pixel)
```

Parameters

`pixel` IntVector2

Returns

IEnumerable<IntVector2>

GetLinkedPixels(IEnumerable<IntVector2>)

Get the pixels that are linked to the given pixels due to multiple tiles having the same file - i.e. they point to the same pixels within the tiles' file.

```
public IEnumerable<IntVector2> GetLinkedPixels(IEnumerable<IntVector2> pixels)
```

Parameters

`pixels` IEnumerable<IntVector2>

Returns

IEnumerable<IntVector2>

GetPixel(IntVector2, int, bool)

Gets the colour of the pixel.

```
public override Color GetPixel(IntVector2 pixel, int frame, bool useLayerOpacity
= true)
```

Parameters

`pixel` IntVector2

`frame` int

`useLayerOpacity` bool

Returns

Color

PixelToTile(IntVector2)

Gets the tile that the pixel lands in, or null if there isn't one.

```
public Tile PixelToTile(IntVector2 pixel)
```

Parameters

`pixel` IntVector2

Returns

Tile

PixelToTile(int, int)

Gets the tile that the pixel (x, y) lands in, or null if there isn't one.

```
public Tile PixelToTile(int x, int y)
```

Parameters

`x` int

`y` int

Returns

Tile

RemoveTile(Tile)

Removes the tile from the layer. Throws an error if the tile is not in the layer.

```
public void RemoveTile(Tile tile)
```

Parameters

`tile` Tile

RerenderKeyFrame(int)

Rerenders the keyframe.

```
public void RerenderKeyFrame(int frame)
```

Parameters

`frame` int

RerenderKeyFrame(int, IntRect)

Rerenders the section of the keyframe within the given rect.

```
public void RerenderKeyFrame(int frame, IntRect rect)
```

Parameters

`frame` int

`rect` IntRect

RerenderKeyFrame(int, IEnumerable<IntVector2>)

Rerenders the given pixels of the keyframe.

```
public void RerenderKeyFrame(int frame, IEnumerable<IntVector2> pixels)
```

Parameters

`frame` int

`pixels` IEnumerable<IntVector2>

RerenderKeyFrames()

Rerenders all keyframes.

```
public void RerenderKeyFrames()
```

RerenderKeyFrames(IntRect)

Rerenders the section of every keyframe within the given rect.

```
public void RerenderKeyFrames(IntRect rect)
```

Parameters

`rect` IntRect

RerenderKeyFrames(IEnumerable<IntVector2>)

Rerenders the given pixels of every keyframe.

```
public void RerenderKeyFrames(IEnumerable<IntVector2> pixels)
```

Parameters

`pixels` IEnumerable<IntVector2>

RerenderKeyFrames(int[])

Rerenders the given keyframes.

```
public void RerenderKeyFrames(int[] keyFrames)
```

Parameters

`keyFrames` int[]

RerenderKeyFrames(int[], IntRect)

Rerenders the section of the given keyframes within the given rect.

```
public void RerenderKeyFrames(int[] keyFrames, IntRect rect)
```

Parameters

`keyFrames` int[]

`rect` IntRect

RerenderKeyFrames(int[], IEnumerable<IntVector2>)

Rerenders the given pixels of the given keyframes.

```
public void RerenderKeyFrames(int[] keyFrames, IEnumerable<IntVector2> pixels)
```

Parameters

`keyFrames` int[]

`pixels` IEnumerable<IntVector2>

RotateNoEvent(QuadrantalAngle)

Rotates the layer, but does not invoke the onPixelsChanged event. Rotation is clockwise.

```
protected override void RotateNoEvent(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

ScaleNoEvent(int, int)

Resizes the dimensions to the new width and height, but does not invoke the onPixelsChanged event.

```
protected override void ScaleNoEvent(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

ScaleNoEvent(float, float)

Resizes the dimensions of the file by the scale factors, but does not invoke the onPixelsChanged event.

```
protected override void ScaleNoEvent(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

SetPixelsNoEvent(IEnumerable<IntVector2>, int, Color, AnimFrameRefMode)

Sets the colour of the pixels. You do not need to check the pixels are in the layer as this check is done in Layer.SetPixels(), which is the only way this method is called.

```
protected override IEnumerable<IntVector2> SetPixelsNoEvent(IEnumerable<IntVector2>
pixels, int frame, Color colour, AnimFrameRefMode frameRefMode)
```

Parameters

`pixels` IEnumerable<IntVector2>

`frame` int

`colour` Color

`frameRefMode` AnimFrameRefMode

Returns

IEnumerable<IntVector2>

Class TileLayer.JsonConverter

Namespace: PAC.Image.Layers

```
public class TileLayer.JsonConverter : JsonConversion.JsonConverter<TileLayer,
JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<TileLayer, JsonData.Object> ← TileLayer.JsonConverter

Inherited Members

JsonConversion.JsonConverter<TileLayer, JsonData.Object>.ToJson(TileLayer) , JsonConversion.JsonConverter<TileLayer, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<TileLayer, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverter(SemanticVersion)

```
public JsonConverter(SemanticVersion fromJsonFileFormatVersion)
```

Parameters

`fromJsonFileFormatVersion` SemanticVersion

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override TileLayer FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

TileLayer

ToJson(TileLayer)

Attempts to convert the C# object into JSON data.

```
public override JsonData.Object ToJson(TileLayer layer)
```

Parameters

`layer` TileLayer

Returns

JsonData.Object

Namespace PAC.ImageEditing

Classes

FloodFill

Handles flood-filling pixel art images.

ImageEdit

Outline

Handles creating pixel art outlines.

Texture2DCreator

Provides methods to create Texture2Ds.

Structs

ImageEdit.ExtendCropOptions

Options for ExtendCrop(Texture2D, in ExtendCropOptions).

Outline.Options

Defines how the outline in DrawOutline(Texture2D, Color, in Options) will look.

Enums

Outline.Options.OutlineType

Class FloodFill

Namespace: PAC.ImageEditing

Handles flood-filling pixel art images.

```
public static class FloodFill
```

Inheritance

object ← FloodFill

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

GetPixelsToFill(Texture2D, IntVector2, bool, int)

Returns the largest connected (in terms of being adjacent) set containing `startPoint` where all pixels have the same colour.

```
public static IEnumerable<IntVector2> GetPixelsToFill(Texture2D texture, IntVector2
startPoint, bool includeDiagonallyAdjacent, int maxNumOfIterations = 1000000)
```

Parameters

`texture` Texture2D

`startPoint` IntVector2

`includeDiagonallyAdjacent` bool

Whether to flood-fill diagonally-adjacent pixels (as well as up/down/left/right-adjacent).

`maxNumOfIterations` int

After this many pixels have been enumerated, the method will stop. Useful to prevent huge frame drops when filling large areas.

Returns

IEnumerable<IntVector2>

Class ImageEdit

Namespace: PAC.ImageEditing

```
public static class ImageEdit
```

Inheritance

object ← ImageEdit

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

Blend(BlendMode, Color, Texture2D)

Blends `topColour` onto each pixel of a deep copy of `bottomTexture` using the given Blend Mode.

```
public static Texture2D Blend(this BlendMode blendMode, Color topColour,
Texture2D bottomTexture)
```

Parameters

`blendMode` BlendMode

`topColour` Color

`bottomTexture` Texture2D

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Blend(BlendMode, Texture2D, Texture2D)

Blends a deep copy of `topTexture` onto a deep copy of `bottomTexture` using the given Blend Mode, placing the bottom-left corner of `topTexture` on the bottom-left corner of `bottomTexture`.

```
public static Texture2D Blend(this BlendMode blendMode, Texture2D topTexture,
Texture2D bottomTexture)
```

Parameters

`blendMode` BlendMode

`topTexture` Texture2D

`bottomTexture` Texture2D

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Blend(BlendMode, Texture2D, Texture2D, IntVector2)

Blends a deep copy of `topTexture` onto a deep copy of `bottomTexture` using the given Blend Mode, placing the bottom-left corner of `topTexture` at the coordinates `topTextureOffset` on `bottomTexture`.

```
public static Texture2D Blend(this BlendMode blendMode, Texture2D topTexture,
Texture2D bottomTexture, IntVector2 topTextureOffset)
```

Parameters

`blendMode` BlendMode

`topTexture` Texture2D

`bottomTexture` Texture2D

`topTextureOffset` IntVector2

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

ExtendCrop(Texture2D, IntRect)

Creates a deep copy of the Texture2D with the dimensions changed to fit the given IntRect by adding/removing rows/columns of pixels from the sides of the Texture2D.

```
public static Texture2D ExtendCrop(this Texture2D texture, IntRect newRect)
```

Parameters

`texture` Texture2D

`newRect` IntRect

The coords of the new rect, relative to the coords of the old rect.

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

ExtendCrop(Texture2D, in ExtendCropOptions)

Creates a deep copy of the Texture2D with rows/columns of pixels added to / removed from the sides.

```
public static Texture2D ExtendCrop(this Texture2D texture, in
```

```
ImageEdit.ExtendCropOptions options)
```

Parameters

`texture` Texture2D

`options` ImageEdit.ExtendCropOptions

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentException

The resulting width is <= 0 or the resulting height is <= 0.

Flip(Texture2D, CardinalAxis)

Returns a deep copy of the Texture2D reflected across the given axis.

```
public static Texture2D Flip(this Texture2D texture, CardinalAxis axis)
```

Parameters

`texture` Texture2D

`axis` CardinalAxis

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentNullException

`axis` is null.

ReplaceColour(Texture2D, Color, Color, float)

Returns a deep copy of the Texture2D with all occurrences of the colour `toReplace` replaced with `replaceWith`.

```
public static Texture2D ReplaceColour(this Texture2D texture, Color toReplace, Color
replaceWith, float tolerance = 0)
```

Parameters

`texture` Texture2D

`toReplace` Color

`replaceWith` Color

`tolerance` float

How close a colour has to be to `toReplace` to be replaced.

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`tolerance` is negative.

Rotate(Texture2D, QuadrantalAngle)

Returns a deep copy of the Texture2D rotated by the given angle.

```
public static Texture2D Rotate(this Texture2D texture, QuadrantalAngle angle)
```

Parameters

`texture` Texture2D

`angle` QuadrantalAngle

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Scale(Texture2D, int, int)

Returns a deep copy of the Texture2D scaled to size `newWidth` x `newHeight` using the nearest-neighbour algorithm.

```
public static Texture2D Scale(this Texture2D texture, int newWidth, int newHeight)
```

Parameters

`texture` Texture2D

`newWidth` int

`newHeight` int

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`newWidth` is <= 0 or `newHeight` is <= 0.

Scale(Texture2D, float)

Calls Scale(Texture2D, float, float) with both scale factors equal to `scaleFactor`.

```
public static Texture2D Scale(this Texture2D texture, float scaleFactor)
```

Parameters

`texture` Texture2D

`scaleFactor` float

Returns

Texture2D

Exceptions

ArgumentOutOfRangeException

`scaleFactor` is <= 0.

Scale(Texture2D, float, float)

Returns a deep copy of the Texture2D with the width scaled by `xScaleFactor` and the height scaled by `yScaleFactor`, using the nearest-neighbour algorithm.

```
public static Texture2D Scale(this Texture2D texture, float xScaleFactor,
float yScaleFactor)
```

Parameters

`texture` Texture2D

`xScaleFactor` float

`yScaleFactor` float

Returns

Texture2D

Remarks

The width is multiplied by `xScaleFactor` then rounded. Similarly for the height.

Calls Texture2D.Apply() on the returned Texture2D.

Exceptions

ArgumentOutOfRangeException

`xScaleFactor` is <= 0 or `yScaleFactor` is <= 0.

ArgumentException

Rounding the scaled width results in a new width of 0 or rounding the scaled height results in a new height of 0.

Struct ImageEdit.ExtendCropOptions

Namespace: PAC.ImageEditing

Options for ExtendCrop(Texture2D, in ExtendCropOptions).

```
public struct ImageEdit.ExtendCropOptions
```

Inherited Members
ValueType.Equals(object) , ValueType.GetHashCode() , ValueType.ToString() , object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

bottom

How many rows of pixels to add to the bottom side of the texture.

```
public int bottom
```

Field Value

int

Remarks

Negative values will crop the texture.

left

How many columns of pixels to add to the left side of the texture.

```
public int left
```

Field Value

int

Remarks

Negative values will crop the texture.

right

How many columns of pixels to add to the right side of the texture.

```
public int right
```

Field Value

int

Remarks

Negative values will crop the texture.

top

How many rows of pixels to add to the top side of the texture.

```
public int top
```

Field Value

int

Remarks

Negative values will crop the texture.

Class Outline

Namespace: PAC.ImageEditing

Handles creating pixel art outlines.

```
public static class Outline
```

Inheritance

object ← Outline

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

DrawOutline(Texture2D, Color, in Options)

Returns a deep copy of the Texture2D with an outline around the non-transparent pixels.

```
public static Texture2D DrawOutline(Texture2D texture, Color outlineColour, in
Outline.Options outlineOptions)
```

Parameters

`texture` Texture2D

`outlineColour` Color

`outlineOptions` Outline.Options

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

Struct Outline.Options

Namespace: PAC.ImageEditing

Defines how the outline in DrawOutline(Texture2D, Color, in Options) will look.

```
public struct Outline.Options
```

Inherited Members
ValueType.Equals(object) , ValueType.GetHashCode() , ValueType.ToString() , object.Equals(object, object) , object.GetType() , object.ReferenceEquals(object, object)

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

includeBottomLeft

Whether to draw the outline on the bottom-left edges.

```
public bool includeBottomLeft
```

Field Value

bool

includeBottomMiddle

Whether to draw the outline on the bottom-middle edges.

```
public bool includeBottomMiddle
```

Field Value

bool

includeBottomRight

Whether to draw the outline on the bottom-right edges.

```
public bool includeBottomRight
```

Field Value

bool

includeMiddleLeft

Whether to draw the outline on the middle-left edges.

```
public bool includeMiddleLeft
```

Field Value

bool

includeMiddleRight

Whether to draw the outline on the middle-right edges.

```
public bool includeMiddleRight
```

Field Value

bool

includeTopLeft

Whether to draw the outline on the top-left edges.

```
public bool includeTopLeft
```

Field Value

bool

includeTopMiddle

Whether to draw the outline on the top-middle edges.

```
public bool includeTopMiddle
```

Field Value

bool

includeTopRight

Whether to draw the outline on the top-right edges.

```
public bool includeTopRight
```

Field Value

bool

outlineType

```
public Outline.Options.OutlineType outlineType
```

Field Value

Outline.Options.OutlineType

Methods

EnumerateDirectionsToInclude()

Iterates over the directions associated with includeTopLeft etc for those that are true.

```
public readonly IEnumerable<Direction8> EnumerateDirectionsToInclude()
```

Returns

IEnumerable<Direction8>

Enum Outline.Options.OutlineType

Namespace: PAC.ImageEditing

```
public enum Outline.Options.OutlineType
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Inside = 0`

The outline will be drawn on non-transparent pixels that are adjacent to transparent pixels.

`Outside = 1`

The outline will be drawn on transparent pixels that are adjacent to non-transparent pixels.

Class Texture2DCreator

Namespace: PAC.ImageEditing

Provides methods to create Texture2Ds.

```
public static class Texture2DCreator
```

Inheritance

object ← Texture2DCreator

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

HSLHueSaturationGrid(int, int)

Creates a Texture2D of size `width` x `height`, where the colour of a pixel is determined in HSL as follows:

- **Hue**: linearly interpolated based on the x coord, such that the left-most pixels have hue 0 and the texture goes through all hues exactly once.
- **Saturation**: linearly interpolated based on the y coord, such that the top-most pixels have saturation 1 and the bottom-most pixels have saturation 0.
- **Lightness**: 0.5.

```
public static Texture2D HSLHueSaturationGrid(int width, int height)
```

Parameters

`width` int

`height` int

Returns

Texture2D

Remarks

Calls Texture2D.Apply() on the returned Texture2D.

TransparentCheckerboardBackground(int, int)

Creates a checkerboard Texture2D to act as the background for transparent pixels for a `width` x `height` image.

```
public static Texture2D TransparentCheckerboardBackground(int width, int height)
```

Parameters

`width` int

`height` int

Returns

Texture2D

Remarks

The checkerboard texture will have dimensions 2 * `width` x 2 * `height`.

Calls Texture2D.Apply() on the returned Texture2D.

Namespace PAC.Input

Classes

InputSystem

InputTarget

Keyboard

KeyboardTarget

Mouse

MouseTarget

Enums

CursorState

MouseButton

MouseTargetDeselectMode

MouseTargetState

Enum CursorState

Namespace: PAC.Input

```
public enum CursorState
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

```
CrossArrows = 7

CurrentTool = -1

EyeDropper = 5

Grab = 12

Hover = 2

Invisible = 4

LeftRightArrow = 9

LinearGradient = 30

MagicWand = 11

MagnifyingGlass = 10

Normal = 1

Press = 3

RadialGradient = 31

SelectionEllipse = 101

SelectionRectangle = 100

Text = 6
```

```
Unspecified = 0

UpDownArrow = 8
```

Class InputSystem

Namespace: PAC.Input

```
public class InputSystem : MonoBehaviour
```

Inheritance

object ← InputSystem

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

timeBetweenKeySpam

```
public float timeBetweenKeySpam
```

Field Value

float

timeUntilKeySpam

```
public float timeUntilKeySpam
```

Field Value

float

Properties

globalInputTarget

```
public InputTarget globalInputTarget { get; }
```

Property Value

InputTarget

globalKeyboardTarget

```
public KeyboardTarget globalKeyboardTarget { get; }
```

Property Value

KeyboardTarget

globalMouseTarget

```
public MouseTarget globalMouseTarget { get; }
```

Property Value

MouseTarget

hasInputTarget

```
public bool hasInputTarget { get; }
```

Property Value

bool

inputTarget

```
public InputTarget inputTarget { get; }
```

Property Value

[InputTarget]

keyboard

```
public Keyboard keyboard { get; }
```

Property Value

[Keyboard]

mouse

```
public Mouse mouse { get; }
```

Property Value

[Mouse]

Methods

LockForAFrame()

```
public void LockForAFrame()
```

SubscribeToGlobalKeyboard(UnityAction)

```
public void SubscribeToGlobalKeyboard(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToGlobalLeftClick(UnityAction)

```
public void SubscribeToGlobalLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToGlobalMouseScroll(UnityAction)

```
public void SubscribeToGlobalMouseScroll(UnityAction call)
```

Parameters

`call` UnityAction

Target(InputTarget)

```
public bool Target(InputTarget newTarget)
```

Parameters

`newTarget` InputTarget

Returns

bool

Untarget()

```
public InputTarget Untarget()
```

Returns

[InputTarget]

Class InputTarget

Namespace: PAC.Input

```
public class InputTarget : MonoBehaviour
```

Inheritance

object ← InputTarget

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

allowHoldingKeySpam

```
public bool allowHoldingKeySpam
```

Field Value

bool

allowLeftClick

```
public bool allowLeftClick
```

Field Value

bool

allowMiddleClick

```
public bool allowMiddleClick
```

Field Value

bool

allowRightClick

```
public bool allowRightClick
```

Field Value

bool

allowScroll

```
public bool allowScroll
```

Field Value

bool

cursorHover

```
public CursorState cursorHover
```

Field Value

CursorState

cursorPress

```
public CursorState cursorPress
```

Field Value

CursorState

cursorSelected

```
public CursorState cursorSelected
```

Field Value

CursorState

disableMouseWhenSelected

```
public bool disableMouseWhenSelected
```

Field Value

bool

isHoverTrigger

```
public bool isHoverTrigger
```

Field Value

bool

keyboardInputEnabled

```
public bool keyboardInputEnabled
```

Field Value

bool

mouseDeselectMode

```
public MouseTargetDeselectMode mouseDeselectMode
```

Field Value

MouseTargetDeselectMode

mouseInputEnabled

```
public bool mouseInputEnabled
```

Field Value

bool

receiveAlreadyHeldKeys

```
public bool receiveAlreadyHeldKeys
```

Field Value

bool

uiElement

```
public UIElement uiElement
```

Field Value

UIElement

viewport

```
public UIViewport viewport
```

Field Value

UIViewport

Properties

collider

```
public Collider2D collider { get; }
```

Property Value

Collider2D

cursorScroll

```
public CursorState cursorScroll { get; set; }
```

Property Value

CursorState

keyboardTarget

```
public KeyboardTarget keyboardTarget { get; }
```

Property Value

KeyboardTarget

mouseTarget

```
public MouseTarget mouseTarget { get; }
```

Property Value

MouseTarget

targetName

```
public string targetName { get; }
```

Property Value

string

targetTag

```
public int targetTag { get; }
```

Property Value

int

Methods

GetUntargeted()

```
public void GetUntargeted()
```

SubscribeToTarget(UnityAction)

```
public void SubscribeToTarget(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUntarget(UnityAction)

```
public void SubscribeToUntarget(UnityAction call)
```

Parameters

`call` UnityAction

Target()

```
public void Target()
```

Untarget()

```
public void Untarget()
```

Class Keyboard

Namespace: PAC.Input

```
public class Keyboard : MonoBehaviour
```

Inheritance

object ← Keyboard

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

canInteract

```
public bool canInteract
```

Field Value

bool

Class KeyboardTarget

Namespace: PAC.Input

```
public class KeyboardTarget
```

Inheritance

object ← KeyboardTarget

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

KeyboardTarget()

```
public KeyboardTarget()
```

Fields

allowHoldingKeySpam

```
public bool allowHoldingKeySpam
```

Field Value

bool

receiveAlreadyHeldKeys

```
public bool receiveAlreadyHeldKeys
```

Field Value

bool

Properties

inputThisFrame

```
public bool inputThisFrame { get; }
```

Property Value

bool

keysHeld

The keys that are currently held down, in order of when they were pressed (most recent first).

```
public CustomKeyCode[] keysHeld { get; }
```

Property Value

CustomKeyCode[]

keysPressed

```
public CustomKeyCode[] keysPressed { get; }
```

Property Value

CustomKeyCode[]

Methods

IsHeld(CustomKeyCode)

Returns true if all the given key (and potentially some other keys) is held (and is a key detectable by KeyboardTarget).

```
public bool IsHeld(CustomKeyCode key)
```

Parameters

`key` CustomKeyCode

Returns

bool

IsHeld(params CustomKeyCode[])

Returns true if all the given keys (and potentially some other keys) are held (and are keys detectable by KeyboardTarget).

```
public bool IsHeld(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

Returns

bool

IsHeld(KeyboardShortcut)

Returns true if all the given key (and potentially some other keys) is held (and is a key detectable by KeyboardTarget).

```
public bool IsHeld(KeyboardShortcut shortcut)
```

Parameters

`shortcut` KeyboardShortcut

Returns

bool

IsHeldExactly(params CustomKeyCode[])

Returns true if all and only the given keys are held (and are keys detectable by KeyboardTarget).

```
public bool IsHeldExactly(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

Returns

bool

IsHeldExactly(KeyboardShortcut)

Returns true if all and only the given keys are held (and are keys detectable by KeyboardTarget).

```
public bool IsHeldExactly(KeyboardShortcut shortcut)
```

Parameters

`shortcut` KeyboardShortcut

Returns

bool

IsPressed(CustomKeyCode)

Returns true if all the given key (and potentially some other keys) has been pressed this frame (and is a key detectable by KeyboardTarget).

```
public bool IsPressed(CustomKeyCode key)
```

Parameters

`key` CustomKeyCode

Returns

bool

IsPressed(params CustomKeyCode[])

Returns true if all the given keys (and potentially some other keys) have been pressed this frame (and are keys detectable by KeyboardTarget).

```
public bool IsPressed(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

Returns

bool

IsPressed(KeyboardShortcut)

Returns true if all the given keys (and potentially some other keys) have been pressed this frame (and are keys detectable by KeyboardTarget).

```
public bool IsPressed(KeyboardShortcut shortcut)
```

Parameters

`shortcut` KeyboardShortcut

Returns

bool

KeyDown(CustomKeyCode)

Simulates the key being pressed, if it is a key detectable by KeyboardTarget.

```
public void KeyDown(CustomKeyCode key)
```

Parameters

`key` CustomKeyCode

KeyDownNoSpamReset(CustomKeyCode)

Simulates the key being pressed, if it is a key detectable by KeyboardTarget, without restting the timer until key spamming occurs.

```
public void KeyDownNoSpamReset(CustomKeyCode key)
```

Parameters

`key` CustomKeyCode

KeyUp(CustomKeyCode)

Simulates the key being unpressed.

```
public void KeyUp(CustomKeyCode key)
```

Parameters

`key` CustomKeyCode

KeysDown(params CustomKeyCode[])

Simulates the keys being pressed, if they are keys detectable by KeyboardTarget.

```
public void KeysDown(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

KeysDownNoSpamReset(params CustomKeyCode[])

Simulates the keys being pressed, if they are keys detectable by KeyboardTarget, without restting the timer until key spamming occurs.

```
public void KeysDownNoSpamReset(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

KeysUp(params CustomKeyCode[])

Simulates the keys being unpressed.

```
public void KeysUp(params CustomKeyCode[] keys)
```

Parameters

`keys` CustomKeyCode[]

ManualUpdate()

Only to be called in InputTarget's Update() method.

```
public void ManualUpdate()
```

OneIsHeld(IEnumerable<KeyboardShortcut>)

Returns true if all the given keys (and potentially some other keys) are held (and are keys detectable by KeyboardTarget) for one of the given keyboard shortcuts.

```
public bool OneIsHeld(IEnumerable<KeyboardShortcut> shortcuts)
```

Parameters

`shortcuts` IEnumerable<KeyboardShortcut>

Returns

bool

OneIsHeldExactly(IEnumerable<KeyboardShortcut>)

Returns true if all and only the given keys are held (and are keys detectable by KeyboardTarget) for one of the given keyboard shortcuts.

```
public bool OneIsHeldExactly(IEnumerable<KeyboardShortcut> shortcuts)
```

Parameters

`shortcuts` IEnumerable<KeyboardShortcut>

Returns

bool

OneIsPressed(IEnumerable<KeyboardShortcut>)

Returns true if all the given keys (and potentially some other keys) have been pressed this frame (and are keys detectable by KeyboardTarget) for one of the given keyboard shortcuts.

```
public bool OneIsPressed(IEnumerable<KeyboardShortcut> shortcuts)
```

Parameters

`shortcuts` IEnumerable<KeyboardShortcut>

Returns

bool

SubscribeToOnInput(UnityAction)

```
public void SubscribeToOnInput(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnKeyDown(UnityAction<CustomKeyCode>)

```
public void SubscribeToOnKeyDown(UnityAction<CustomKeyCode> call)
```

Parameters

`call` UnityAction<CustomKeyCode>

SubscribeToOnKeyUp(UnityAction<CustomKeyCode>)

```
public void SubscribeToOnKeyUp(UnityAction<CustomKeyCode> call)
```

Parameters

`call` UnityAction<CustomKeyCode>

SubscribeToUntarget(UnityAction)

```
public void SubscribeToUntarget(UnityAction call)
```

Parameters

`call` UnityAction

Untarget()

```
public void Untarget()
```

Class Mouse

Namespace: PAC.Input

```
public class Mouse : MonoBehaviour
```

Inheritance

object ← Mouse

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

canInteract

```
public bool canInteract
```

Field Value

bool

lockAllUIInteractions

```
public bool lockAllUIInteractions
```

Field Value

bool

Properties

click

```
public bool click { get; }
```

Property Value

bool

cursorState

```
public CursorState cursorState { get; }
```

Property Value

CursorState

hasHoverTrigger

```
public bool hasHoverTrigger { get; }
```

Property Value

bool

held

```
public bool held { get; }
```

Property Value

bool

hoverTarget

```
public InputTarget hoverTarget { get; }
```

Property Value

InputTarget

leftClick

```
public bool leftClick { get; }
```

Property Value

bool

leftHold

```
public bool leftHold { get; }
```

Property Value

bool

leftUnclick

```
public bool leftUnclick { get; }
```

Property Value

bool

middleClick

```
public bool middleClick { get; }
```

Property Value

bool

middleHold

```
public bool middleHold { get; }
```

Property Value

bool

middleUnclick

```
public bool middleUnclick { get; }
```

Property Value

bool

nothingClick

```
public bool nothingClick { get; }
```

Property Value

bool

nothingHeld

```
public bool nothingHeld { get; }
```

Property Value

bool

numButtonsHeld

```
public int numButtonsHeld { get; }
```

Property Value

int

rightClick

```
public bool rightClick { get; }
```

Property Value

bool

rightHold

```
public bool rightHold { get; }
```

Property Value

bool

rightUnclick

```
public bool rightUnclick { get; }
```

Property Value

bool

scrollCursorDisplayTime

```
public float scrollCursorDisplayTime { get; }
```

Property Value

float

scrollDelta

```
public float scrollDelta { get; }
```

Property Value

float

unclick

```
public bool unclick { get; }
```

Property Value

bool

worldPos

```
public Vector2 worldPos { get; }
```

Property Value

Vector2

Methods

IsClicked(MouseButton)

```
public bool IsClicked(MouseButton mouseButton)
```

Parameters

`mouseButton` MouseButton

Returns

bool

IsHeld(MouseButton)

```
public bool IsHeld(MouseButton mouseButton)
```

Parameters

`mouseButton` MouseButton

Returns

bool

IsUnclicked(MouseButton)

```
public bool IsUnclicked(MouseButton mouseButton)
```

Parameters

`mouseButton` MouseButton

Returns

bool

SetCursorSprite(CursorState)

```
public void SetCursorSprite(CursorState cursorState)
```

Parameters

`cursorState` CursorState

SetCursorState(CursorState)

```
public void SetCursorState(CursorState cursorState)
```

Parameters

`cursorState` CursorState

SubscribeToClick(UnityAction)

```
public void SubscribeToClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftClick(UnityAction)

```
public void SubscribeToLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftUnclick(UnityAction)

```
public void SubscribeToLeftUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToMiddleClick(UnityAction)

```
public void SubscribeToMiddleClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToMiddleUnclick(UnityAction)

```
public void SubscribeToMiddleUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightClick(UnityAction)

```
public void SubscribeToRightClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightUnclick(UnityAction)

```
public void SubscribeToRightUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToScroll(UnityAction)

```
public void SubscribeToScroll(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUnclick(UnityAction)

```
public void SubscribeToUnclick(UnityAction call)
```

Parameters

`call` UnityAction

Enum MouseButton

Namespace: PAC.Input

```
public enum MouseButton
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Left = 0`

`Middle = 2`

`Right = 1`

Class MouseTarget

Namespace: PAC.Input

```
public class MouseTarget
```

Inheritance

object ← MouseTarget

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

allowLeftClick

```
public bool allowLeftClick
```

Field Value

bool

allowMiddleClick

```
public bool allowMiddleClick
```

Field Value

bool

allowRightClick

```
public bool allowRightClick
```

Field Value

bool

allowScroll

```
public bool allowScroll
```

Field Value

bool

buttonTargetedWith

```
public MouseButton buttonTargetedWith
```

Field Value

MouseButton

cursorHover

```
public CursorState cursorHover
```

Field Value

CursorState

cursorPress

```
public CursorState cursorPress
```

Field Value

CursorState

cursorScroll

```
public CursorState cursorScroll
```

Field Value

CursorState

cursorSelected

```
public CursorState cursorSelected
```

Field Value

CursorState

deselectMode

```
public MouseTargetDeselectMode deselectMode
```

Field Value

MouseTargetDeselectMode

isHoverTrigger

```
public bool isHoverTrigger
```

Field Value

bool

Properties

selected

```
public bool selected { get; }
```

Property Value

bool

state

```
public MouseTargetState state { get; }
```

Property Value

MouseTargetState

timeHovered

```
public float timeHovered { get; }
```

Property Value

float

Methods

Deselect()

```
public void Deselect()
```

Hover()

```
public void Hover()
```

Idle()

```
public void Idle()
```

Press()

```
public void Press()
```

Scroll()

```
public void Scroll()
```

Select()

```
public void Select()
```

SubscribeToClick(UnityAction)

```
public void SubscribeToClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToDeselect(UnityAction)

```
public void SubscribeToDeselect(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToHover(UnityAction)

```
public void SubscribeToHover(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToIdle(UnityAction)

```
public void SubscribeToIdle(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftClick(UnityAction)

```
public void SubscribeToLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftUnclick(UnityAction)

```
public void SubscribeToLeftUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToMiddleClick(UnityAction)

```
public void SubscribeToMiddleClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToMiddleUnclick(UnityAction)

```
public void SubscribeToMiddleUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToPress(UnityAction)

```
public void SubscribeToPress(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightClick(UnityAction)

```
public void SubscribeToRightClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightUnclick(UnityAction)

```
public void SubscribeToRightUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToScroll(UnityAction)

```
public void SubscribeToScroll(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToSelect(UnityAction)

```
public void SubscribeToSelect(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToStateChange(UnityAction)

```
public void SubscribeToStateChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUnclick(UnityAction)

```
public void SubscribeToUnclick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUntarget(UnityAction)

```
public void SubscribeToUntarget(UnityAction call)
```

Parameters

`call` UnityAction

Untarget()

```
public void Untarget()
```

Enum MouseTargetDeselectMode

Namespace: PAC.Input

```
public enum MouseTargetDeselectMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`ClickAgain = 1`

`Manual = 100`

`Unclick = 0`

Enum MouseTargetState

Namespace: PAC.Input

```
public enum MouseTargetState
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Hover = 1`

`Idle = 0`

`Pressed = 2`

Namespace PAC.Interfaces

Interfaces

IReadOnlyContains<T>

Adds Contains(T) to IReadOnlyCollection<T>.

ISetComparable<T>

Defines how to determine whether two sets are equal / one is a subset of the other.

Interface IReadOnlyContains<T>

Namespace: PAC.Interfaces

Adds Contains(T) to IReadOnlyCollection<T>.

```
public interface IReadOnlyContains<T> : IReadOnlyCollection<T>,
IEnumerable<T>, IEnumerable
```

Type Parameters

T

Inherited Members
IReadOnlyCollection<T>.Count , IEnumerable<T>.GetEnumerator()

Extension Methods
IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAll<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsAny<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNone<T>(IReadOnlyContains<T>, params T[]) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>) , IReadOnlyContainsExtensions.ContainsNotAll<T>(IReadOnlyContains<T>, params T[]) , ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) ,

IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>,
IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int)

Methods

Contains(T)

```
bool Contains(T item)
```

Parameters

item T

Returns

bool

Interface ISetComparable<T>

Namespace: PAC.Interfaces

Defines how to determine whether two sets are equal / one is a subset of the other.

```
public interface ISetComparable<T>
```

Type Parameters

`T`

The type to define set comparison against.

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, it is up to implementers to ensure the logical symmetries of the methods. See the documentation of each method for more detail on these symmetries.

Methods

IsSubsetOf(T)

Whether this as a set is a subset of `other` as a set.

```
bool IsSubsetOf(T other)
```

Parameters

`other` T

Returns

bool

Remarks

Recall that 'this is subset of `other`' means that every element of this is an element of `other`, ignoring order and duplicate elements.

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, then `T1.IsSubsetOf(T2)` should be logically equivalent to `T2.IsSupersetOf(T1)`.

See Also
IsSupersetOf(T)

IsSupersetOf(T)

Whether this as a set is a superset of `other` as a set.

```
bool IsSupersetOf(T other)
```

Parameters

`other` T

Returns

bool

Remarks

Recall that 'this is superset of `other`' means that every element of `other` is an element of this, ignoring order and duplicate elements.

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, then `T1.IsSupersetOf(T2)` should be logically equivalent to `T2.IsSubsetOf(T1)`.

See Also
IsSubsetOf(T)

SetEquals(T)

Whether this as a set is equal to `other` as a set.

```
bool SetEquals(T other)
```

Parameters

`other` T

Returns

bool

Remarks

Recall that set equality means they have precisely the same elements, ignoring order and duplicate elements.

If `T1` implements `ISetComparable<T2>` and `T2` implements `ISetComparable<T1>`, then `T1.SetEquals(T2)` should be logically equivalent to `T2.SetEquals(T1)`.

Namespace PAC.Interfaces.Extensions

Classes

IReadOnlyContainsExtensions

ISetComparableExtensions

Extension methods for ISetComparable<T>.

Class IReadOnlyContainsExtensions

Namespace: PAC.Interfaces.Extensions

```
public static class IReadOnlyContainsExtensions
```

Inheritance

object ← IReadOnlyContainsExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ContainsAll<T>(IReadOnlyContains<T>, IEnumerable<T>)

Whether all the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsAll<T>(this IReadOnlyContains<T> iReadOnlyContains,
IEnumerable<T> elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` IEnumerable <T>

Returns

bool

Type Parameters

`T`

ContainsAll<T>(IReadOnlyContains<T>, params T[])

Whether all the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsAll<T>(this IReadOnlyContains<T> iReadOnlyContains,
params T[] elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

ContainsAny<T>(IReadOnlyContains<T>, IEnumerable<T>)

Whether any of the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsAny<T>(this IReadOnlyContains<T> iReadOnlyContains,
IEnumerable<T> elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsAny<T>(IReadOnlyContains<T>, params T[])

Whether any of the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsAny<T>(this IReadOnlyContains<T> iReadOnlyContains,
params T[] elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

ContainsNone<T>(IReadOnlyContains<T>, IEnumerable<T>)

Whether none of the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsNone<T>(this IReadOnlyContains<T> iReadOnlyContains,
IEnumerable<T> elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

T

ContainsNone<T>(IReadOnlyContains<T>, params T[])

Whether none of the given elements are in the IReadOnlyContains<T>.

```
public static bool ContainsNone<T>(this IReadOnlyContains<T> iReadOnlyContains,
params T[] elements)
```

Parameters

iReadOnlyContains IReadOnlyContains<T>

elements T[]

Returns

bool

Type Parameters

T

ContainsNotAll<T>(IReadOnlyContains<T>, IEnumerable<T>)

Whether at least one of the given elements is not in the IReadOnlyContains<T>.

```
public static bool ContainsNotAll<T>(this IReadOnlyContains<T> iReadOnlyContains,
IEnumerable<T> elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` IEnumerable<T>

Returns

bool

Type Parameters

`T`

ContainsNotAll<T>(IReadOnlyContains<T>, params T[])

Whether at least one of the given elements is not in the IReadOnlyContains<T>.

```
public static bool ContainsNotAll<T>(this IReadOnlyContains<T> iReadOnlyContains,
params T[] elements)
```

Parameters

`iReadOnlyContains` IReadOnlyContains<T>

`elements` T[]

Returns

bool

Type Parameters

`T`

Class ISetComparableExtensions

Namespace: PAC.Interfaces.Extensions

Extension methods for ISetComparable<T>.

```
public static class ISetComparableExtensions
```

Inheritance

object ← ISetComparableExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

IsProperSubsetOf<T1, T2>(T1, T2)

Whether `set` as a set is a proper subset of `other` as a set.

```
public static bool IsProperSubsetOf<T1, T2>(this T1 set, T2 other) where T1
: ISetComparable<T2>
```

Parameters

`set` T1

`other` T2

Returns

bool

Type Parameters

`T1`

`T2`

Remarks

Recall that '`set` is proper subset of `other`' means that `set` is a subset of `other`, but is not set-equal to `other`. In more detail, every element of `set` is an element of `other`, ignoring order and duplicate elements, but there is at least one element of `other` that is not in `set`.

See Also
IsProperSupersetOf<T1, T2>(T1, T2), IsSubsetOf(T), SetEquals(T)

IsProperSupersetOf<T1, T2>(T1, T2)

Whether `set` as a set is a proper superset of `other` as a set.

```
public static bool IsProperSupersetOf<T1, T2>(this T1 set, T2 other) where T1
: ISetComparable<T2>
```

Parameters

`set` T1

`other` T2

Returns

bool

Type Parameters

`T1`

`T2`

Remarks

Recall that '`set` is proper superset of `other`' means that `set` is a superset of `other`, but is not set-equal to `other`. In more detail, every element of `other` is an element of `set`, ignoring order and duplicate elements, but there is at least one element of `set` that is not in `other`.

See Also

IsProperSupersetOf<T1, T2>(T1, T2), IsSubsetOf(T), SetEquals(T)

Namespace PAC.Json

Classes

JsonConversion

JsonConversion.JsonConverterSet

Represents a set of JsonConverter objects, making sure there's at most one custom converter for each type. For example, a class MyClass cannot have two JSON converters defined for it in the list.

JsonConversion.JsonConverter<T, JsonDataType>

An interface that custom JSON converters must implement.

NOTE: Has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

JsonData.Bool

Represents a bool in JSON data.

JsonData.Float

Represents a float in JSON data.

JsonData.Int

Represents an int in JSON data.

JsonData.List

Represents a non-null list/array in JSON data.

JsonData.Null

Represents a null value in JSON data.

JsonData.Object

Represents a non-null object in JSON data.

JsonData.String

Represents a non-null string in JSON data.

Interfaces

JsonData

Represents a piece of JSON data.

Class JsonConversion

Namespace: PAC.Json

```
public static class JsonConversion
```

Inheritance

object ← JsonConversion

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

FromJson<T>(JsonData, JsonConverterSet, bool)

Attempts to convert the JSON data into a C# object of the given type.

```
public static T FromJson<T>(JsonData jsonData, JsonConversion.JsonConverterSet
customConverters, bool allowUndefinedConversions = false)
```

Parameters

`jsonData` JsonData

The JSON data to convert.

`customConverters` JsonConversion.JsonConverterSet

A collection of JsonConverter objects that defined custom conversions for certain data types.

`allowUndefinedConversions` bool

If false, an exception will be thrown if the code encounters a type that can not be converted using conversions for primitive JSON types and/or custom converters.

Returns

T

Type Parameters

`T`

The type to convert the JSON into.

FromJson<T>(JsonData, JsonConverterSet, bool, HashSet<JsonData>)

Attempts to convert the JSON data into a C# object of the given type.

```
public static T FromJson<T>(JsonData jsonData, JsonConversion.JsonConverterSet
customConverters, bool allowUndefinedConversions, HashSet<JsonData>
dataAlreadyTryingToConvert)
```

Parameters

`jsonData` JsonData

The JSON data to convert.

`customConverters` JsonConversion.JsonConverterSet

A collection of JsonConverter objects that defined custom conversions for certain data types.

`allowUndefinedConversions` bool

If false, an exception will be thrown if the code encounters a type that can not be converted using conversions for primitive JSON types and/or custom converters.

`dataAlreadyTryingToConvert` HashSet<JsonData>

The JSON data objects trying to be converted in the current function call stack. Used to prevent infinite loops when converting objects with circular references.

Returns

T

Type Parameters

`T`

The type to convert the JSON into.

FromJson<T>(JsonData, bool)

Attempts to convert the JSON data into a C# object of the given type.

```
public static T FromJson<T>(JsonData jsonData, bool allowUndefinedConversions
= false)
```

Parameters

`jsonData` JsonData

The JSON data to convert.

`allowUndefinedConversions` bool

If false, an exception will be thrown if the code encounters a type that can not be converted using conversions for primitive JSON types and/or custom converters.

Returns

T

Type Parameters

`T`

The type to convert the JSON into.

ToJson(object, JsonConverterSet, bool)

Attempts to convert the C# object into JSON data.

NOTE: When converting an enum value which has more than one name, one of those names will be chosen, but not necessarily the one originally used to assign that value. E.g. for an enum with values Value1 = 0, Value2 = 0, Value3 = 1, converting Value1 into JSON may end up as "Value2".

```
public static JsonData ToJson(object obj, JsonConversion.JsonConverterSet
customConverters, bool allowUndefinedConversions = false)
```

Parameters

`obj` object

The object to convert into JSON.

`customConverters` JsonConversion.JsonConverterSet

A collection of JsonConverter objects that defined custom conversions for certain data types.

`allowUndefinedConversions` bool

If false, an exception will be thrown if the code encounters a type that can not be converted using conversions for primitive JSON types and/or custom converters.

Returns

JsonData

ToJson(object, bool)

Attempts to convert the C# object into JSON data.

NOTE: When converting an enum value which has more than one name, one of those names will be chosen, but not necessarily the one originally used to assign that value. E.g. for an enum with values Value1 = 0, Value2 = 0, Value3 = 1, converting Value1 into JSON may end up as "Value2".

```
public static JsonData ToJson(object obj, bool allowUndefinedConversions = false)
```

Parameters

`obj` object

The object to convert into JSON.

`allowUndefinedConversions` bool

If false, an exception will be thrown if the code encounters a type that can not be converted using conversions for primitive JSON types and/or custom converters.

Returns

JsonData

Class JsonConversion.JsonConverterSet

Namespace: PAC.Json

Represents a set of JsonConverter objects, making sure there's at most one custom converter for each type. For example, a class MyClass cannot have two JSON converters defined for it in the list.

```
public class JsonConversion.JsonConverterSet : IEnumerable
```

Inheritance

object ← JsonConversion.JsonConverterSet

Implements

IEnumerable

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

JsonConverterSet()

Creates an empty JsonConverterSet.

```
public JsonConverterSet()
```

JsonConverterSet(IEnumerable)

```
public JsonConverterSet(IEnumerable converters)
```

Parameters

`converters` IEnumerable

JsonConverterSet(params object[])

Creates a JsonConverterSet with the given converters. Throws an error if an object is not a type that implements JsonConverter, or if the set already contains a converter for the type a converter converts.

```
public JsonConverterSet(params object[] converters)
```

Parameters

`converters` object[]

Methods

Add(object)

Adds the converter to the set. Throws an error if it is not a type that implements JsonConverter, or if the set already contains a converter for the type the converter converts.

```
public void Add(object converter)
```

Parameters

`converter` object

ContainsConverterFor(Type)

Returns whether the set contains a converter that converts the given type.

```
public bool ContainsConverterFor(Type converterType)
```

Parameters

`converterType` Type

Returns

bool

true if the set has a converter for the given type.

Remarks

If there is no converter for `converterType`, this method will work its way up the inheritance tree to try and find a converter for a supertype.

GetConverterFor(Type)

If the set contains a converter that converts the given type, this will return it.

```
public object GetConverterFor(Type converterType)
```

Parameters

`converterType` Type

Returns

object

The converter for the given type, if there is one, otherwise null.

Remarks

If there is no converter for `converterType`, this method will work its way up the inheritance tree to try and find a converter for a supertype.

GetEnumerator()

Returns an enumerator that iterates through a collection.

```
public IEnumerator GetEnumerator()
```

Returns

IEnumerator

An IEnumerator object that can be used to iterate through the collection.

RemoveConverterFor(Type)

If the set contains a converter that converts the given type, this will remove it.

```
public bool RemoveConverterFor(Type converterType)
```

Parameters

`converterType` Type

Returns

bool

true if a converter was removed.

Class JsonConversion.JsonConverter<T, JsonDataType>

Namespace: PAC.Json

An interface that custom JSON converters must implement.

NOTE: Has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public abstract class JsonConversion.JsonConverter<T, JsonDataType> where
JsonDataType : JsonData
```

Type Parameters

`T`

The type the converter will convert to/from JSON.

`JsonDataType`

The type of JSON data the converter will convert to/from.

Inheritance

object ← JsonConversion.JsonConverter<T, JsonDataType>

Derived

BlendMode.JsonConverter, SemanticVersion.JsonConverter, AnimationKeyFrame.JsonConverter, File.JsonConverter, Layer.JsonConverter, NormalLayer.JsonConverter, TileLayer.JsonConverter, JsonConverters.ColorJsonConverter, JsonConverters.Texture2DJsonConverter, JsonConverters.Vector2JsonConverter, JsonConverters.Vector3JsonConverter, CustomKeyCode.JsonConverter, KeyboardShortcut.JsonConverter

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(JsonData)

Attempts to convert the JSON data into a C# object of the given type. Ensures the JSON data is the correct type before calling the FromJson() overload for the specific type of JSON data.

```
public T FromJson(JsonData jsonData)
```

Parameters

`jsonData` JsonData

Returns

T

FromJson(JsonDataType)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public abstract T FromJson(JsonDataType jsonData)
```

Parameters

`jsonData` JsonDataType

Returns

T

ToJson(T)

Attempts to convert the C# object into JSON data.

```
public abstract JsonDataType ToJson(T obj)
```

Parameters

`obj` T

Returns

JsonDataType

Interface JsonData

Namespace: PAC.Json

Represents a piece of JSON data.

```
public interface JsonData
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

HaveSameData(JsonData, JsonData, float)

Returns whether the two pieces of JSON data are equal by value rather than whether they point to the same JsonData object.

```
public static bool HaveSameData(JsonData jsonData1, JsonData jsonData2, float
floatTolerance = 0)
```

Parameters

`jsonData1` JsonData

`jsonData2` JsonData

`floatTolerance` float

A tolerance (inclusive) to allow close floats to be considered equal.

Returns

bool

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as JsonData. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData

Parse(string)

Attempts to parse the string as JsonData.

```
public static JsonData Parse(string str)
```

Parameters

`str` string

Returns

JsonData

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as JsonData. If successful, the index will be moved to the last character of the data.

```
public static JsonData Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData

ParseNumber(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.Int or JsonData.Float. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData ParseNumber(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData

ParseNumber(string)

Attempts to parse the string into a JsonData.Int or JsonData.Float.

```
public static JsonData ParseNumber(string str)
```

Parameters

`str` string

Returns

JsonData

ParseNumber(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.Int or JsonData.Float. If successful, the index will be moved to the last digit of the number.

```
public static JsonData ParseNumber(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData

ToJsonString(bool)

Converts it into a string in JSON format.

```
string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Class JsonData.Bool

Namespace: PAC.Json

Represents a bool in JSON data.

```
public class JsonData.Bool : JsonData
```

Inheritance

object ← JsonData.Bool

Implements

JsonData

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Bool(bool)

```
public Bool(bool value)
```

Parameters

`value` bool

Properties

value

```
public bool value { get; set; }
```

Property Value

bool

Methods

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.Bool. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.Bool Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.Bool

Parse(string)

Attempts to parse the string into a JsonData.Bool.

```
public static JsonData.Bool Parse(string str)
```

Parameters

`str` string

Returns

JsonData.Bool

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as JsonData.Bool. If successful, the index will be moved to the last character of the null.

```
public static JsonData.Bool Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.Bool

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Operators

implicit operator bool(Bool)

```
public static implicit operator bool(JsonData.Bool jsonBool)
```

Parameters

`jsonBool` JsonData.Bool

Returns

bool

implicit operator Bool(bool)

```
public static implicit operator JsonData.Bool(bool value)
```

Parameters

`value` bool

Returns

JsonData.Bool

Class JsonData.Float

Namespace: PAC.Json

Represents a float in JSON data.

```
public class JsonData.Float : JsonData
```

Inheritance

object ← JsonData.Float

Implements

JsonData

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Float(float)

```
public Float(float value)
```

Parameters

`value` float

Properties

value

```
public float value { get; set; }
```

Property Value

float

Methods

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.Float. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.Float Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.Float

Parse(string)

Attempts to parse the string into a JsonData.Float.

```
public static JsonData.Float Parse(string str)
```

Parameters

`str` string

Returns

JsonData.Float

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.Float. If successful, the index will be moved to the last digit of the float.

```
public static JsonData.Float Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.Float

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Operators

explicit operator int(Float)

```
public static explicit operator int(JsonData.Float jsonfloat)
```

Parameters

`jsonfloat` JsonData.Float

Returns

int

implicit operator float(Float)

```
public static implicit operator float(JsonData.Float jsonfloat)
```

Parameters

`jsonfloat` JsonData.Float

Returns

float

implicit operator Float(int)

```
public static implicit operator JsonData.Float(int value)
```

Parameters

`value` int

Returns

implicit operator Float(float)

```
public static implicit operator JsonData.Float(float value)
```

Parameters

`value` float

Returns

JsonData.Float

Class JsonData.Int

Namespace: PAC.Json

Represents an int in JSON data.

```
public class JsonData.Int : JsonData
```

Inheritance

object ← JsonData.Int

Implements

JsonData

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Int(int)

```
public Int(int value)
```

Parameters

`value` int

Properties

value

```
public int value { get; set; }
```

Property Value

int

Methods

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.Int. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.Int Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.Int

Parse(string)

Attempts to parse the string into a JsonData.Int.

```
public static JsonData.Int Parse(string str)
```

Parameters

`str` string

Returns

JsonData.Int

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.Int. If successful, the index will be moved to the last digit of the int.

```
public static JsonData.Int Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.Int

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Operators

explicit operator Int(float)

```
public static explicit operator JsonData.Int(float value)
```

Parameters

`value` float

Returns

JsonData.Int

implicit operator int(Int)

```
public static implicit operator int(JsonData.Int jsonInt)
```

Parameters

`jsonInt` JsonData.Int

Returns

int

implicit operator float(Int)

```
public static implicit operator float(JsonData.Int jsonInt)
```

Parameters

`jsonInt` JsonData.Int

Returns

float

implicit operator Int(int)

```
public static implicit operator JsonData.Int(int value)
```

Parameters

`value` int

Returns

JsonData.Int

Class JsonData.List

Namespace: PAC.Json

Represents a non-null list/array in JSON data.

```
public class JsonData.List : List<JsonData>, IList<JsonData>, ICollection<JsonData>,
IReadOnlyList<JsonData>, IReadOnlyCollection<JsonData>, IEnumerable<JsonData>,
IList, ICollection, IEnumerable, JsonData
```

Inheritance

object ← List<JsonData> ← JsonData.List

Implements

IList<JsonData>, ICollection<JsonData>, IReadOnlyList<JsonData>, IReadOnlyCollection<JsonData>, IEnumerable<JsonData>, IList, ICollection, IEnumerable, JsonData

Inherited Members

List<JsonData>.Add(JsonData) , List<JsonData>.AddRange(IEnumerable<JsonData>) , List<JsonData>.AsReadOnly() , List<JsonData>.BinarySearch(int, int, JsonData, IComparer<JsonData>) , List<JsonData>.BinarySearch(JsonData) , List<JsonData>.BinarySearch(JsonData, IComparer<JsonData>) , List<JsonData>.Clear() , List<JsonData>.Contains(JsonData) , List<JsonData>.ConvertAll<TOutput>(Converter<JsonData, TOutput>) , List<JsonData>.CopyTo(int, JsonData[], int, int) , List<JsonData>.CopyTo(JsonData[]) , List<JsonData>.CopyTo(JsonData[], int) , List<JsonData>.EnsureCapacity(int) , List<JsonData>.Exists(Predicate<JsonData>) , List<JsonData>.Find(Predicate<JsonData>) , List<JsonData>.FindAll(Predicate<JsonData>) , List<JsonData>.FindIndex(int, int, Predicate<JsonData>) , List<JsonData>.FindIndex(int, Predicate<JsonData>) , List<JsonData>.FindIndex(Predicate<JsonData>) , List<JsonData>.FindLast(Predicate<JsonData>) , List<JsonData>.FindLastIndex(int, int, Predicate<JsonData>) , List<JsonData>.FindLastIndex(int, Predicate<JsonData>) , List<JsonData>.FindLastIndex(Predicate<JsonData>) , List<JsonData>.ForEach(Action<JsonData>) , List<JsonData>.GetEnumerator() , List<JsonData>.GetRange(int, int) , List<JsonData>.IndexOf(JsonData) ,

List<JsonData>.IndexOf(JsonData, int) , List<JsonData>.IndexOf(JsonData, int, int) , List<JsonData>.Insert(int, JsonData) , List<JsonData>.InsertRange(int, IEnumerable<JsonData>) , List<JsonData>.LastIndexOf(JsonData) , List<JsonData>.LastIndexOf(JsonData, int) , List<JsonData>.LastIndexOf(JsonData, int, int) , List<JsonData>.Remove(JsonData) , List<JsonData>.RemoveAll(Predicate<JsonData>) , List<JsonData>.RemoveAt(int) , List<JsonData>.RemoveRange(int, int) , List<JsonData>.Reverse() , List<JsonData>.Reverse(int, int) , List<JsonData>.Slice(int, int) , List<JsonData>.Sort() , List<JsonData>.Sort(IComparer<JsonData>) , List<JsonData>.Sort(Comparison<JsonData>) , List<JsonData>.Sort(int, int, IComparer<JsonData>) , List<JsonData>.ToArray() , List<JsonData>.TrimExcess() , List<JsonData>.TrueForAll(Predicate<JsonData>) , List<JsonData>.Capacity , List<JsonData>.Count , List<JsonData>.this[int] , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , ICollectionExtensions.ContainsAll<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsAll<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsAny<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsAny<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsNone<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsNone<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsNotAll<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsNotAll<T>(ICollection<T>, IEnumerable<T>) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) ,

IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) ,
IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) ,
IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) ,
IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) ,
IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>) ,
IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,
IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>,
IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int) ,
IntRangeExtensions.GetRange<T>(IReadOnlyList<T>, IntRange) ,
IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, int, int) ,
IReadOnlyListExtensions.GetRange<T>(IReadOnlyList<T>, Range)

Constructors

List(params Bool[])

```
public List(params JsonData.Bool[] jsonData)
```

Parameters

`jsonData` Bool[]

List(params Float[])

```
public List(params JsonData.Float[] jsonData)
```

Parameters

`jsonData` Float[]

List(params Int[])

```
public List(params JsonData.Int[] jsonData)
```

Parameters

`jsonData` Int[]

List(params List[])

```
public List(params JsonData.List[] jsonData)
```

Parameters

`jsonData` List[]

List(params Null[])

```
public List(params JsonData.Null[] jsonData)
```

Parameters

`jsonData` Null[]

List(params Object[])

```
public List(params JsonData.Object[] jsonData)
```

Parameters

`jsonData` Object[]

List(params String[])

```
public List(params JsonData.String[] jsonData)
```

Parameters

`jsonData` String[]

List(params JsonData[])

```
public List(params JsonData[] jsonData)
```

Parameters

`jsonData` JsonData[]

List(bool)

```
public List(bool separateLinesInPrettyString = true)
```

Parameters

`separateLinesInPrettyString` bool

List(params bool[])

```
public List(params bool[] jsonData)
```

Parameters

`jsonData` bool[]

List(IEnumerable<Bool>)

```
public List(IEnumerable<JsonData.Bool> collection)
```

Parameters

`collection` IEnumerable<JsonData.Bool>

List(IEnumerable<Float>)

```
public List(IEnumerable<JsonData.Float> collection)
```

Parameters

`collection` IEnumerable<JsonData.Float>

List(IEnumerable<Int>)

```
public List(IEnumerable<JsonData.Int> collection)
```

Parameters

`collection` IEnumerable<JsonData.Int>

List(IEnumerable<List>)

```
public List(IEnumerable<JsonData.List> collection)
```

Parameters

`collection` IEnumerable<JsonData.List>

List(IEnumerable<Null>)

```
public List(IEnumerable<JsonData.Null> collection)
```

Parameters

`collection` IEnumerable<JsonData.Null>

List(IEnumerable<Object>)

```
public List(IEnumerable<JsonData.Object> collection)
```

Parameters

`collection` IEnumerable<JsonData.Object>

List(IEnumerable<String>)

```
public List(IEnumerable<JsonData.String> collection)
```

Parameters

`collection` IEnumerable<JsonData.String>

List(IEnumerable<JsonData>)

```
public List(IEnumerable<JsonData> collection)
```

Parameters

`collection` IEnumerable<JsonData>

List(IEnumerable<bool>)

```
public List(IEnumerable<bool> collection)
```

Parameters

`collection` IEnumerable<bool>

List(IEnumerable<int>)

```
public List(IEnumerable<int> collection)
```

Parameters

`collection` IEnumerable<int>

List(IEnumerable<float>)

```
public List(IEnumerable<float> collection)
```

Parameters

`collection` IEnumerable<float>

List(IEnumerable<string>)

```
public List(IEnumerable<string> collection)
```

Parameters

`collection` IEnumerable<string>

List(int)

```
public List(int capacity)
```

Parameters

`capacity` int

List(params int[])

```
public List(params int[] jsonData)
```

Parameters

`jsonData` int[]

List(params float[])

```
public List(params float[] jsonData)
```

Parameters

`jsonData` float[]

List(params string[])

```
public List(params string[] jsonData)
```

Parameters

`jsonData` string[]

Properties

separateLinesInPrettyString

```
public bool separateLinesInPrettyString { get; set; }
```

Property Value

bool

Methods

Add(Bool)

```
public void Add(JsonData.Bool jsonData)
```

Parameters

`jsonData` JsonData.Bool

Add(Float)

```
public void Add(JsonData.Float jsonData)
```

Parameters

`jsonData` JsonData.Float

Add(Int)

```
public void Add(JsonData.Int jsonData)
```

Parameters

`jsonData` JsonData.Int

Add(List)

```
public void Add(JsonData.List jsonData)
```

Parameters

`jsonData` JsonData.List

Add(Null)

```
public void Add(JsonData.Null jsonData)
```

Parameters

`jsonData` JsonData.Null

Add(Object)

```
public void Add(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Add(String)

```
public void Add(JsonData.String jsonData)
```

Parameters

`jsonData` JsonData.String

Add(bool)

```
public void Add(bool jsonData)
```

Parameters

`jsonData` bool

Add(int)

```
public void Add(int jsonData)
```

Parameters

`jsonData` int

Add(float)

```
public void Add(float jsonData)
```

Parameters

`jsonData` float

Add(string)

```
public void Add(string jsonData)
```

Parameters

`jsonData` string

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.List. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.List Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.List

Parse(string)

Attempts to parse the string into a JsonData.List.

```
public static JsonData.List Parse(string str)
```

Parameters

`str` string

Returns

JsonData.List

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.List. If successful, the index will be moved to the closing square bracket.

```
public static JsonData.List Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.List

ParseMaybeNull(string)

Attempts to parse the string into a JSON list, with the potential to parse it into JsonData.Null.

```
public static JsonData ParseMaybeNull(string str)
```

Parameters

`str` string

Returns

JsonData

ParseMaybeNull(string, ref int)

Attempts to parse the string into a JSON list, with the potential to parse it into JsonData.Null. If successful, moves the index to the last parsed character.

```
public static JsonData ParseMaybeNull(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Class JsonData.Null

Namespace: PAC.Json

Represents a null value in JSON data.

```
public class JsonData.Null : JsonData
```

Inheritance

object ← JsonData.Null

Implements

JsonData

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Null()

```
public Null()
```

Methods

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as JsonData.Null. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.Null Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.Null

Parse(string)

Attempts to parse the string as JsonData.Null.

```
public static JsonData.Null Parse(string str)
```

Parameters

`str` string

Returns

JsonData.Null

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as JsonData.Null. If successful, the index will be moved to the last character of the null.

```
public static JsonData.Null Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.Null

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Operators

implicit operator List(Null)

```
public static implicit operator JsonData.List(JsonData.Null jsonNull)
```

Parameters

`jsonNull` JsonData.Null

Returns

JsonData.List

implicit operator Object(Null)

```
public static implicit operator JsonData.Object(JsonData.Null jsonNull)
```

Parameters

`jsonNull` JsonData.Null

Returns

JsonData.Object

implicit operator string(Null)

```
public static implicit operator string(JsonData.Null jsonNull)
```

Parameters

`jsonNull` JsonData.Null

Returns

string

Class JsonData.Object

Namespace: PAC.Json

Represents a non-null object in JSON data.

```
public class JsonData.Object : Dictionary<string, JsonData>, IDictionary<string,
JsonData>, ICollection<KeyValuePair<string, JsonData>>, IReadOnlyDictionary<string,
JsonData>, IReadOnlyCollection<KeyValuePair<string, JsonData>>,
IEnumerable<KeyValuePair<string, JsonData>>, IDictionary, ICollection, IEnumerable,
IDeserializationCallback, ISerializable, JsonData
```

Inheritance

object ← Dictionary<string, JsonData> ← JsonData.Object

Implements

IDictionary<string, JsonData>, ICollection<KeyValuePair<string, JsonData>>, IReadOnlyDictionary<string, JsonData>, IReadOnlyCollection<KeyValuePair<string, JsonData>>, IEnumerable<KeyValuePair<string, JsonData>>, IDictionary, ICollection, IEnumerable, IDeserializationCallback, ISerializable, JsonData

Inherited Members

Dictionary<string, JsonData>.Add(string, JsonData) ,
Dictionary<string, JsonData>.Clear() ,
Dictionary<string, JsonData>.ContainsKey(string) ,
Dictionary<string, JsonData>.ContainsValue(JsonData) ,
Dictionary<string, JsonData>.EnsureCapacity(int) ,
Dictionary<string, JsonData>.GetEnumerator() ,
Dictionary<string, JsonData>.OnDeserialization(object) ,
Dictionary<string, JsonData>.Remove(string) ,
Dictionary<string, JsonData>.Remove(string, out JsonData) ,
Dictionary<string, JsonData>.TrimExcess() ,
Dictionary<string, JsonData>.TrimExcess(int) ,
Dictionary<string, JsonData>.TryAdd(string, JsonData) ,
Dictionary<string, JsonData>.TryGetValue(string, out JsonData) ,
Dictionary<string, JsonData>.Comparer , Dictionary<string, JsonData>.Count ,
Dictionary<string, JsonData>.this[string] , Dictionary<string, JsonData>.Keys ,
Dictionary<string, JsonData>.Values , object.Equals(object) ,

object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , ICollectionExtensions.ContainsAll<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsAll<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsAny<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsAny<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsNone<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsNone<T>(ICollection<T>, params T[]) , ICollectionExtensions.ContainsNotAll<T>(ICollection<T>, IEnumerable<T>) , ICollectionExtensions.ContainsNotAll<T>(ICollection<T>, params T[]) , IDictionaryExtensions.GetOrAdd<TKey, TValue>(IDictionary<TKey, TValue>, TKey, TValue) , IEnumerableExtensions.AreAllDistinct<T>(IEnumerable<T>) , IEnumerableExtensions.ArgMax<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.ArgMin<TElement, TCompare>(IEnumerable<TElement>, Func<TElement, TCompare>) , IEnumerableExtensions.Concat<T>(IEnumerable<T>, IEnumerable<T>, IEnumerable<T>, params IEnumerable<T>[]) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsAny<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNone<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.ContainsNotAll<T>(IEnumerable<T>, params T[]) , IEnumerableExtensions.CountIsAtLeast<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsAtMost<T>(IEnumerable<T>, int) , IEnumerableExtensions.CountIsExactly<T>(IEnumerable<T>, int) , IEnumerableExtensions.EnumerateOccurrences<T>(IEnumerable<T>) , IEnumerableExtensions.Enumerate<T>(IEnumerable<T>) , IEnumerableExtensions.IsSubsequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.IsSupersequenceOf<T>(IEnumerable<T>, IEnumerable<T>) , IEnumerableExtensions.MinAndMax<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>) , IEnumerableExtensions.None<T>(IEnumerable<T>, Func<T, bool>) , IEnumerableExtensions.NotAll<T>(IEnumerable<T>, Func<T, bool>) ,

IEnumerableExtensions.Replace<T>(IEnumerable<T>, T, T) ,
IEnumerableExtensions.SkipIndex<T>(IEnumerable<T>, int) ,
IEnumerableExtensions.ToPrettyString<T>(IEnumerable<T>) ,
IEnumerableExtensions.ZipCurrentAndNext<T>(IEnumerable<T>) ,
IEnumerableExtensions.Zip<T1, T2>(IEnumerable<T1>, IEnumerable<T2>) ,
Combinatorics.Pairs<T>(IEnumerable<T>) ,
Combinatorics.Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>) ,
Combinatorics.Permutations<T>(IEnumerable<T>) ,
Combinatorics.Permutations<T>(IEnumerable<T>, int) ,
Combinatorics.Triples<T>(IEnumerable<T>) ,
Combinatorics.Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>) ,
Combinatorics.Tuples<T>(IEnumerable<T>, int)

Constructors

Object()

```
public Object()
```

Object(IDictionary<string, JsonData>)

```
public Object(IDictionary<string, JsonData> collection)
```

Parameters

`collection` IDictionary<string, JsonData>

Object(IEnumerable<KeyValuePair<string, JsonData>>)

```
public Object(IEnumerable<KeyValuePair<string, JsonData>> collection)
```

Parameters

`collection` IEnumerable<KeyValuePair<string, JsonData>>

Object(int)

```
public Object(int capacity)
```

Parameters

capacity int

Methods

Add(string, Bool)

```
public void Add(string key, JsonData.Bool value)
```

Parameters

key string

value JsonData.Bool

Add(string, Float)

```
public void Add(string key, JsonData.Float value)
```

Parameters

key string

value JsonData.Float

Add(string, Int)

```
public void Add(string key, JsonData.Int value)
```

Parameters

`key` string

`value` JsonData.Int

Add(string, List)

```
public void Add(string key, JsonData.List value)
```

Parameters

`key` string

`value` JsonData.List

Add(string, Null)

```
public void Add(string key, JsonData.Null value)
```

Parameters

`key` string

`value` JsonData.Null

Add(string, Object)

```
public void Add(string key, JsonData.Object value)
```

Parameters

`key` string

`value` JsonData.Object

Add(string, String)

```
public void Add(string key, JsonData.String value)
```

Parameters

`key` string

`value` JsonData.String

Add(string, bool)

```
public void Add(string key, bool value)
```

Parameters

`key` string

`value` bool

Add(string, int)

```
public void Add(string key, int value)
```

Parameters

`key` string

`value` int

Add(string, float)

```
public void Add(string key, float value)
```

Parameters

`key` string

`value` float

Add(string, string)

```
public void Add(string key, string value)
```

Parameters

`key` string

`value` string

Append(params Object[])

Returns a JSON object with this object's entries, followed by the first objects's entries, then the second objects's entries, etc.

```
public JsonData.Object Append(params JsonData.Object[] jsonObjs)
```

Parameters

`jsonObjs` Object[]

Returns

JsonData.Object

Append(IEnumerable<Object>)

Returns a JSON object with this object's entries, followed by the first objects's entries, then the second objects's entries, etc.

```
public JsonData.Object Append(IEnumerable<JsonData.Object> jsonObjs)
```

Parameters

`jsonObjs` IEnumerable<JsonData.Object>

Returns

JsonData.Object

Concat(params Object[])

Combines the JSON objects into one by putting the first object's entries first, then the second object's entries, etc. Returns an empty object if no JSON objects are given.

```
public static JsonData.Object Concat(params JsonData.Object[] jsonObjs)
```

Parameters

`jsonObjs` Object[]

Returns

JsonData.Object

Concat(IEnumerable<Object>)

Combines the JSON objects into one by putting the first object's entries first, then the second object's entries, etc. Returns an empty object if no JSON objects are given.

```
public static JsonData.Object Concat(IEnumerable<JsonData.Object> jsonObjs)
```

Parameters

`jsonObjs` IEnumerable<JsonData.Object>

Returns

JsonData.Object

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.Object. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.Object Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.Object

Parse(string)

Attempts to parse the string into a JsonData.Object.

```
public static JsonData.Object Parse(string str)
```

Parameters

`str` string

Returns

JsonData.Object

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.Object. If successful, the index will be moved to the closing curly bracket.

```
public static JsonData.Object Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.Object

ParseMaybeNull(string)

Attempts to parse the string into a JSON object, with the potential to parse it into JsonData.Null.

```
public static JsonData ParseMaybeNull(string str)
```

Parameters

`str` string

Returns

JsonData

ParseMaybeNull(string, ref int)

Attempts to parse the string into a JSON object, with the potential to parse it into JsonData.Null. If successful, moves the index to the last parsed character.

```
public static JsonData ParseMaybeNull(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData

Prepend(params Object[])

Returns a JSON object with the first objects's entries, then the second objects's entries, etc., then this object's entries.

```
public JsonData.Object Prepend(params JsonData.Object[] jsonObjs)
```

Parameters

`jsonObjs` Object[]

Returns

JsonData.Object

Prepend(IEnumerable<Object>)

Returns a JSON object with the first objects's entries, then the second objects's entries, etc., then this object's entries.

```
public JsonData.Object Prepend(IEnumerable<JsonData.Object> jsonObjs)
```

Parameters

`jsonObjs` IEnumerable<JsonData.Object>

Returns

JsonData.Object

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Class JsonData.String

Namespace: PAC.Json

Represents a non-null string in JSON data.

```
public class JsonData.String : JsonData
```

Inheritance

object ← JsonData.String

Implements

JsonData

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

String(string)

```
public String(string value)
```

Parameters

`value` string

Properties

value

```
public string value { get; set; }
```

Property Value

string

Methods

MaybeNull(string)

Creates a new JsonData.String with the given value, unless value is null in which case it returns JsonData.Null. Useful since JsonData.String cannot hold null strings.

```
public static JsonData MaybeNull(string value)
```

Parameters

`value` string

Returns

JsonData

Parse(TextReader, bool)

Reads the TextReader, starting at the given index, and attempts to parse it as a JsonData.String. If successful, the last read character will be the last character of the parsed JSON.

```
public static JsonData.String Parse(TextReader reader, bool mustReadAll)
```

Parameters

`reader` TextReader

`mustReadAll` bool

If true, it will check that all the data in the reader was used when parsing. Setting this to false is useful for parsing JSON data inside a list or object.

Returns

JsonData.String

Parse(string)

Attempts to parse the string into a JsonData.String.

```
public static JsonData.String Parse(string str)
```

Parameters

`str` string

Returns

JsonData.String

Parse(string, ref int)

Reads the string, starting at the given index, and attempts to parse the string as a JsonData.String. If successful, the index will be moved to the closing quotation mark.

```
public static JsonData.String Parse(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData.String

ParseMaybeNull(string)

Attempts to parse the string into a JSON string, with the potential to parse it into JsonData.Null.

```
public static JsonData ParseMaybeNull(string str)
```

Parameters

`str` string

Returns

JsonData

ParseMaybeNull(string, ref int)

Attempts to parse the string into a JSON string, with the potential to parse it into JsonData.Null. If successful, moves the index to the last parsed character.

```
public static JsonData ParseMaybeNull(string str, ref int index)
```

Parameters

`str` string

`index` int

Returns

JsonData

ToJsonString(bool)

Converts it into a string in JSON format.

```
public string ToJsonString(bool pretty)
```

Parameters

`pretty` bool

If true, puts the string into pretty form - e.g. with indentations.

Returns

string

Operators

implicit operator string(String)

```
public static implicit operator string(JsonData.String jsonString)
```

Parameters

`jsonString` JsonData.String

Returns

string

implicit operator String(string)

```
public static implicit operator JsonData.String(string value)
```

Parameters

`value` string

Returns

JsonData.String

Namespace PAC.Json.JsonConverters

Classes

JsonConverters

JsonConverters.ColorJsonConverter
Custom JSON converter for Color.

JsonConverters.Texture2DJsonConverter
Custom JSON converter for Texture2D.

JsonConverters.Vector2JsonConverter
Custom JSON converter for Vector2.

JsonConverters.Vector3JsonConverter
Custom JSON converter for Vector3.

Class JsonConverters

Namespace: PAC.Json.JsonConverters

```
public static class JsonConverters
```

Inheritance

object ← JsonConverters

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

allConverters

All the custom JSON converters define in this class.

```
public static readonly JsonConversion.JsonConverterSet allConverters
```

Field Value

JsonConversion.JsonConverterSet

Class JsonConverters.ColorJsonConverter

Namespace: PAC.Json.JsonConverters

Custom JSON converter for Color.

```
public class JsonConverters.ColorJsonConverter : JsonConversion.JsonConverter<Color,
JsonData.List>
```

Inheritance

object ← JsonConversion.JsonConverter<Color, JsonData.List> ← JsonConverters.ColorJsonConverter

Inherited Members

JsonConversion.JsonConverter<Color, JsonData.List>.ToJson(Color) , JsonConversion.JsonConverter<Color, JsonData.List>.FromJson(JsonData.List) , JsonConversion.JsonConverter<Color, JsonData.List>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(List)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override Color FromJson(JsonData.List jsonData)
```

Parameters

`jsonData` JsonData.List

Returns

Color

ToJson(Color)

Attempts to convert the C# object into JSON data.

```
public override JsonData.List ToJson(Color color)
```

Parameters

`color` Color

Returns

JsonData.List

Class JsonConverters.Texture2DJsonConverter

Namespace: PAC.Json.JsonConverters

Custom JSON converter for Texture2D.

```
public class JsonConverters.Texture2DJsonConverter :
JsonConversion.JsonConverter<Texture2D, JsonData.Object>
```

Inheritance

object ← JsonConversion.JsonConverter<Texture2D, JsonData.Object> ← JsonConverters.Texture2DJsonConverter

Inherited Members

JsonConversion.JsonConverter<Texture2D, JsonData.Object>.ToJson(Texture2D) , JsonConversion.JsonConverter<Texture2D, JsonData.Object>.FromJson(JsonData.Object) , JsonConversion.JsonConverter<Texture2D, JsonData.Object>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(Object)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override Texture2D FromJson(JsonData.Object jsonData)
```

Parameters

`jsonData` JsonData.Object

Returns

Texture2D

ToJson(Texture2D)

Attempts to convert the C# object into JSON data.

```
public override JsonData.Object ToJson(Texture2D tex)
```

Parameters

`tex` Texture2D

Returns

JsonData.Object

Class JsonConverters.Vector2JsonConverter

Namespace: PAC.Json.JsonConverters

Custom JSON converter for Vector2.

```
public class JsonConverters.Vector2JsonConverter :
JsonConversion.JsonConverter<Vector2, JsonData.List>
```

Inheritance

object ← JsonConversion.JsonConverter<Vector2, JsonData.List> ← JsonConverters.Vector2JsonConverter

Inherited Members

JsonConversion.JsonConverter<Vector2, JsonData.List>.ToJson(Vector2) , JsonConversion.JsonConverter<Vector2, JsonData.List>.FromJson(JsonData.List) , JsonConversion.JsonConverter<Vector2, JsonData.List>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(List)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override Vector2 FromJson(JsonData.List jsonData)
```

Parameters

`jsonData` JsonData.List

Returns

Vector2

ToJson(Vector2)

Attempts to convert the C# object into JSON data.

```
public override JsonData.List ToJson(Vector2 vec)
```

Parameters

`vec` Vector2

Returns

JsonData.List

Class JsonConverters.Vector3JsonConverter

Namespace: PAC.Json.JsonConverters

Custom JSON converter for Vector3.

```
public class JsonConverters.Vector3JsonConverter :
JsonConversion.JsonConverter<Vector3, JsonData.List>
```

Inheritance

object ← JsonConversion.JsonConverter<Vector3, JsonData.List> ← JsonConverters.Vector3JsonConverter

Inherited Members

JsonConversion.JsonConverter<Vector3, JsonData.List>.ToJson(Vector3) , JsonConversion.JsonConverter<Vector3, JsonData.List>.FromJson(JsonData.List) , JsonConversion.JsonConverter<Vector3, JsonData.List>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(List)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override Vector3 FromJson(JsonData.List jsonData)
```

Parameters

`jsonData` JsonData.List

Returns

Vector3

ToJson(Vector3)

Attempts to convert the C# object into JSON data.

```
public override JsonData.List ToJson(Vector3 vec)
```

Parameters

`vec` Vector3

Returns

JsonData.List

Namespace PAC.KeyboardShortcuts

Classes

CustomKeyCode

A class to supersede Unity's KeyCode enum to allow keycodes to refer to multiple keys - e.g. Shift instead of separated into LeftShift and RightShift.

CustomKeyCode.JsonConverter

Custom JSON converter for CustomKeyCode.

KeyboardShortcut

A class to represent a single keyboard shortcut.

KeyboardShortcut.JsonConverter

Custom JSON converter for KeyboardShortcut.

KeyboardShortcuts

A class for storing, loading and accessing keyboard shortcuts for defined actions.

Class CustomKeyCode

Namespace: PAC.KeyboardShortcuts

A class to supersede Unity's KeyCode enum to allow keycodes to refer to multiple keys - e.g. Shift instead of separated into LeftShift and RightShift.

```
public class CustomKeyCode : IEnumerable
```

Inheritance

object ← CustomKeyCode

Implements

IEnumerable

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

Alt

```
public static readonly CustomKeyCode Alt
```

Field Value

CustomKeyCode

Ctrl

```
public static readonly CustomKeyCode Ctrl
```

Field Value

CustomKeyCode

GreaterThan

```
public static readonly CustomKeyCode GreaterThan
```

Field Value

CustomKeyCode

LessThan

```
public static readonly CustomKeyCode LessThan
```

Field Value

CustomKeyCode

Minus

```
public static readonly CustomKeyCode Minus
```

Field Value

CustomKeyCode

Plus

```
public static readonly CustomKeyCode Plus
```

Field Value

CustomKeyCode

Shift

```
public static readonly CustomKeyCode Shift
```

Field Value

CustomKeyCode

_0

The keycode for 0.

```
public static readonly CustomKeyCode _0
```

Field Value

CustomKeyCode

_1

The keycode for 1.

```
public static readonly CustomKeyCode _1
```

Field Value

CustomKeyCode

_2

The keycode for 2.

```
public static readonly CustomKeyCode _2
```

Field Value

CustomKeyCode

_3

The keycode for 3.

```
public static readonly CustomKeyCode _3
```

Field Value

CustomKeyCode

_4

The keycode for 4.

```
public static readonly CustomKeyCode _4
```

Field Value

CustomKeyCode

_5

The keycode for 5.

```
public static readonly CustomKeyCode _5
```

Field Value

CustomKeyCode

_6

The keycode for 6.

```
public static readonly CustomKeyCode _6
```

Field Value

CustomKeyCode

_7

The keycode for 7.

```
public static readonly CustomKeyCode _7
```

Field Value

CustomKeyCode

_8

The keycode for 8.

```
public static readonly CustomKeyCode _8
```

Field Value

CustomKeyCode

_9

The keycode for 9.

```
public static readonly CustomKeyCode _9
```

Field Value

CustomKeyCode

allKeyCodes

All Unity KeyCodes and all combined keycodes.

```
public static readonly CustomKeyCode[] allKeyCodes
```

Field Value

CustomKeyCode[]

alphabet

The keycodes A-Z.

```
public static readonly CustomKeyCode[] alphabet
```

Field Value

CustomKeyCode[]

combinedKeyCodes

All the defined keycodes that combine multiple Unity KeyCodes.

```
public static readonly CustomKeyCode[] combinedKeyCodes
```

Field Value

CustomKeyCode[]

digits

The keycodes 0-9.

```
public static readonly CustomKeyCode[] digits
```

Field Value

CustomKeyCode[]

Properties

displayName

What will be returned from ToString().

```
public string displayName { get; }
```

Property Value

string

keyCodes

The Unity KeyCodes comprising this keycode.

```
public List<KeyCode> keyCodes { get; }
```

Property Value

List<KeyCode>

Methods

Contains(KeyCode)

Returns true if the Unity KeyCode forms part of this CustomKeyCode.

```
public bool Contains(KeyCode keyCode)
```

Parameters

`keyCode` KeyCode

Returns

bool

Equals(object)

Determines whether the specified object is equal to the current object.

```
public override bool Equals(object obj)
```

Parameters

`obj` object

The object to compare with the current object.

Returns

bool

true if the specified object is equal to the current object; otherwise, false.

FromString(string)

Converts a string into the keycode with that display name. Returns null if there isn't one.

```
public static CustomKeyCode FromString(string displayName)
```

Parameters

`displayName` string

Returns

CustomKeyCode

GetEnumerator()

Returns an enumerator that iterates through a collection.

```
public IEnumerator GetEnumerator()
```

Returns

IEnumerator

An IEnumerator object that can be used to iterate through the collection.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

GetKey()

Returns true while this key is being held down.

```
public bool GetKey()
```

Returns

bool

GetKeyDown()

Returns true the frame this key is pressed.

```
public bool GetKeyDown()
```

Returns

bool

GetKeyUp()

Returns true the frame this key is released.

```
public bool GetKeyUp()
```

Returns

bool

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Operators

operator ==(CustomKeyCode, CustomKeyCode)

```
public static bool operator ==(CustomKeyCode keyCode1, CustomKeyCode keyCode2)
```

Parameters

`keyCode1` CustomKeyCode

`keyCode2` CustomKeyCode

Returns

bool

implicit operator CustomKeyCode(KeyCode)

```
public static implicit operator CustomKeyCode(KeyCode keyCode)
```

Parameters

`keyCode` KeyCode

Returns

CustomKeyCode

operator !=(CustomKeyCode, CustomKeyCode)

```
public static bool operator !=(CustomKeyCode keyCode1, CustomKeyCode keyCode2)
```

Parameters

`keyCode1` CustomKeyCode

`keyCode2` CustomKeyCode

Returns

bool

Class CustomKeyCode.JsonConverter

Namespace: PAC.KeyboardShortcuts

Custom JSON converter for CustomKeyCode.

```
public class CustomKeyCode.JsonConverter :
JsonConversion.JsonConverter<CustomKeyCode, JsonData.String>
```

Inheritance

object ← JsonConversion.JsonConverter<CustomKeyCode, JsonData.String> ← CustomKeyCode.JsonConverter

Inherited Members

JsonConversion.JsonConverter<CustomKeyCode, JsonData.String>.ToJson(CustomKeyCode) , JsonConversion.JsonConverter<CustomKeyCode, JsonData.String>.FromJson(JsonData.String) , JsonConversion.JsonConverter<CustomKeyCode, JsonData.String>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(String)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override CustomKeyCode FromJson(JsonData.String jsonData)
```

Parameters

`jsonData` JsonData.String

Returns

CustomKeyCode

ToJson(CustomKeyCode)

Attempts to convert the C# object into JSON data.

```
public override JsonData.String ToJson(CustomKeyCode keyCode)
```

Parameters

`keyCode` CustomKeyCode

Returns

JsonData.String

Class KeyboardShortcut

Namespace: PAC.KeyboardShortcuts

A class to represent a single keyboard shortcut.

```
public class KeyboardShortcut
```

Inheritance

object ← KeyboardShortcut

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

KeyboardShortcut(params CustomKeyCode[])

Creates a shortcut from the given keycodes. Sorts the keycodes into the order they would be read.

```
public KeyboardShortcut(params CustomKeyCode[] keyCodes)
```

Parameters

`keyCodes` CustomKeyCode[]

Properties

None

The empty keyboard shortcut - i.e. no keycodes.

```
public static KeyboardShortcut None { get; }
```

Property Value

KeyboardShortcut

keyCodes

The keycodes in this shortcut, kept in the order they would be read.

```
public List<CustomKeyCode> keyCodes { get; }
```

Property Value

List<CustomKeyCode>

Methods

Add(CustomKeyCode)

Adds the keycode to the shortcut. Returns false if it was already in the shortcut; otherwise returns true.

```
public bool Add(CustomKeyCode keyCode)
```

Parameters

`keyCode` CustomKeyCode

Returns

bool

Contains(CustomKeyCode)

Returns true if the keycode is in the shortcut.

```
public bool Contains(CustomKeyCode keyCode)
```

Parameters

`keyCode` CustomKeyCode

Returns

bool

Equals(object)

Determines whether the specified object is equal to the current object.

```
public override bool Equals(object obj)
```

Parameters

`obj` object

The object to compare with the current object.

Returns

bool

true if the specified object is equal to the current object; otherwise, false.

GetHashCode()

Serves as the default hash function.

```
public override int GetHashCode()
```

Returns

int

A hash code for the current object.

GetKeys()

Returns true while all keys are being held down.

```
public bool GetKeys()
```

Returns

bool

GetKeysDown()

Returns true the frame the final key is pressed.

```
public bool GetKeysDown()
```

Returns

bool

GetKeysUp()

Returns true the frame (any key of) this shortcut is released.

```
public bool GetKeysUp()
```

Returns

bool

Remove(CustomKeyCode)

Removes the keycode from the shortcut. Returns false if the keycode already wasn't in the shortcut; otherwise returns true.

```
public bool Remove(CustomKeyCode keyCode)
```

Parameters

`keyCode` CustomKeyCode

Returns

bool

ToArray()

Returns an array of the keycodes in this shortcut, in the order they would be read.

```
public CustomKeyCode[] ToArray()
```

Returns

CustomKeyCode[]

ToString()

Returns a string that represents the current object.

```
public override string ToString()
```

Returns

string

A string that represents the current object.

Operators

operator ==(KeyboardShortcut, KeyboardShortcut)

Checks if the shortcuts have the same set of keycodes.

```
public static bool operator ==(KeyboardShortcut shortcut1,
KeyboardShortcut shortcut2)
```

Parameters

`shortcut1` KeyboardShortcut

`shortcut2` KeyboardShortcut

Returns

bool

operator !=(KeyboardShortcut, KeyboardShortcut)

Checks if the shortcuts do not have the same set of keycodes.

```
public static bool operator !=(KeyboardShortcut shortcut1,
KeyboardShortcut shortcut2)
```

Parameters

`shortcut1` KeyboardShortcut

`shortcut2` KeyboardShortcut

Returns

bool

Class KeyboardShortcut.JsonConverter

Namespace: PAC.KeyboardShortcuts

Custom JSON converter for KeyboardShortcut.

```
public class KeyboardShortcut.JsonConverter :
JsonConversion.JsonConverter<KeyboardShortcut, JsonData.List>
```

Inheritance

object ← JsonConversion.JsonConverter<KeyboardShortcut, JsonData.List> ← KeyboardShortcut.JsonConverter

Inherited Members

JsonConversion.JsonConverter<KeyboardShortcut, JsonData.List>.ToJson(KeyboardShortcut) , JsonConversion.JsonConverter<KeyboardShortcut, JsonData.List>.FromJson(JsonData.List) , JsonConversion.JsonConverter<KeyboardShortcut, JsonData.List>.FromJson(JsonData) , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

FromJson(List)

Attempts to convert the JSON data into a C# object of the given type.

NOTE: JsonConverter has a default implementation for an overload FromJson(JsonData jsonData) that ensures it is of type JsonDataType before calling the specific overload FromJSON(JsonDataType jsonData).

```
public override KeyboardShortcut FromJson(JsonData.List jsonData)
```

Parameters

`jsonData` JsonData.List

Returns

KeyboardShortcut

ToJson(KeyboardShortcut)

Attempts to convert the C# object into JSON data.

```
public override JsonData.List ToJson(KeyboardShortcut keyboardShortcut)
```

Parameters

`keyboardShortcut` KeyboardShortcut

Returns

JsonData.List

Class KeyboardShortcuts

Namespace: PAC.KeyboardShortcuts

A class for storing, loading and accessing keyboard shortcuts for defined actions.

```
public class KeyboardShortcuts : MonoBehaviour
```

Inheritance

object ← KeyboardShortcuts

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

shortcuts

A key is an action name. A value is a list of the keyboard shortcuts for that action.

```
public static Dictionary<string, List<KeyboardShortcut>> shortcuts { get; }
```

Property Value

Dictionary<string, List<KeyboardShortcut>>

Methods

AddShortcut(string, params CustomKeyCode[])

Combines the given keycodes into a single shortcut and adds it for the given action.

```
public static void AddShortcut(string actionName, params CustomKeyCode[] keyCodes)
```

Parameters

`actionName` string

`keyCodes` CustomKeyCode[]

AddShortcut(string, KeyboardShortcut)

Adds the given shortcut for the given action.

```
public static void AddShortcut(string actionName, KeyboardShortcut shortcut)
```

Parameters

`actionName` string

`shortcut` KeyboardShortcut

ClearShortcutsFor(string)

Removes all shortcuts for the action.

```
public static void ClearShortcutsFor(string actionName)
```

Parameters

`actionName` string

ContainsKey(string)

Returns true if the action is defined for having keyboard shortcuts.

```
public static bool ContainsKey(string actionName)
```

Parameters

`actionName` string

Returns

bool

ContainsShortcutFor(string)

Returns true if the action has a shortcut.

```
public static bool ContainsShortcutFor(string actionName)
```

Parameters

`actionName` string

Returns

bool

GetShortcutsFor(string)

Returns all shortcuts for the action.

```
public static List<KeyboardShortcut> GetShortcutsFor(string actionName)
```

Parameters

`actionName` string

Returns

List<KeyboardShortcut>

LoadShortcuts()

Loads saved shortcuts from the disk.

```
public static void LoadShortcuts()
```

SaveShortcuts()

Saves the current assignment of each shortcut to the disk.

```
public static void SaveShortcuts()
```

SetShortcut(string, KeyboardShortcut)

Removes any existing shortcuts for the action then adds the given shortcut.

```
public static void SetShortcut(string actionName, KeyboardShortcut shortcut)
```

Parameters

`actionName` string

`shortcut` KeyboardShortcut

Namespace PAC.Managers

Classes

AnimationManager

Handles the animation timeline and playback of animations. The animation system is still a work in progress.

Clipboard

A class to handle copy/paste functionality. Not yet properly implemented.

DialogBoxManager

DrawingArea

FileManager

FileTabsManager

Finder

GridManager

Handles drawing a grid over the image when the grid is enabled.

ImageEditManager

KeyboardShortcutOptionsManager

Handles the window where you can view / change keyboard shortcuts.

LayerManager

ThemeManager

TileOutlineManager

TilesetManager

Toolbar

Handles selecting tools, brush size, etc.

UIManager

UITabManager

UndoRedoManager

Enums

BrushShape

GradientMode

SelectionMode

Shape

Class AnimationManager

Namespace: PAC.Managers

Handles the animation timeline and playback of animations. The animation system is still a work in progress.

```
public class AnimationManager : MonoBehaviour
```

Inheritance

object ← AnimationManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

framerate

```
public int framerate
```

Field Value

int

onionSkinColour

```
public Color onionSkinColour
```

Field Value

Color

showOnionSkin

```
public bool showOnionSkin
```

Field Value

bool

Properties

currentFrameIndex

The number of the frame currently being displayed.

```
public int currentFrameIndex { get; set; }
```

Property Value

int

Methods

AddKeyFrame()

Extends the length of the animation by adding one frame to the end.

```
public void AddKeyFrame()
```

DebugLogKeyFrames()

For debugging purposes. Prints the current frame number and the frame numbers of each keyframe.

```
public void DebugLogKeyFrames()
```

DeleteSelectedKeyFrame()

Deletes the selected key frame.

```
public void DeleteSelectedKeyFrame()
```

Pause()

Pauses the animation playback.

```
public void Pause()
```

Play()

Starts/resumes the animation playback.

```
public void Play()
```

RemoveKeyFrame()

Reduces the length of the animation by removing the final frame.

```
public void RemoveKeyFrame()
```

Stop()

Stops the animation playback and resets the current frame number back to the start.

```
public void Stop()
```

SubscribeToOnCurrentFrameIndexChange(UnityAction)

Event is invoked when the current frame number changes.

```
public void SubscribeToOnCurrentFrameIndexChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnKeyFrameAdded(UnityAction)

Event is invoked when a keyframe is added.

```
public void SubscribeToOnKeyFrameAdded(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnKeyFrameDeleted(UnityAction)

Event is invoked when a keyframe is deleted.

```
public void SubscribeToOnKeyFrameDeleted(UnityAction call)
```

Parameters

`call` UnityAction

Enum BrushShape

Namespace: PAC.Managers

```
public enum BrushShape
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Circle = 0`

`Custom = -1`

`Diamond = 2`

`Square = 1`

Class Clipboard

Namespace: PAC.Managers

A class to handle copy/paste functionality. Not yet properly implemented.

```
public class Clipboard : MonoBehaviour
```

Inheritance

object ← Clipboard

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

Copy()

```
public void Copy()
```

Cut()

```
public void Cut()
```

Paste()

```
public void Paste()
```

Class DialogBoxManager

Namespace: PAC.Managers

```
public class DialogBoxManager : MonoBehaviour
```

Inheritance

object ← DialogBoxManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

CloseBrushSettingsWindow()

```
public void CloseBrushSettingsWindow()
```

CloseDialogBox(GameObject)

```
public void CloseDialogBox(GameObject dialogBox)
```

Parameters

`dialogBox` GameObject

CloseDialogBox(GameObject, Action)

```
public void CloseDialogBox(GameObject dialogBox, Action onComplete)
```

Parameters

`dialogBox` GameObject

`onComplete` Action

CloseExtendCropWindow()

```
public void CloseExtendCropWindow()
```

CloseFloodFillSettingsWindow()

```
public void CloseFloodFillSettingsWindow()
```

CloseGridWindow()

```
public void CloseGridWindow()
```

CloseImportPACWindow()

```
public void CloseImportPACWindow()
```

CloseKeyboardShortcutsWindow()

```
public void CloseKeyboardShortcutsWindow()
```

CloseLayerPropertiesWindow()

```
public void CloseLayerPropertiesWindow()
```

CloseModalWindow(UIModalWindow)

```
public void CloseModalWindow(UIModalWindow modalWindow)
```

Parameters

`modalWindow` UIModalWindow

CloseNewFileWindow()

```
public void CloseNewFileWindow()
```

CloseOutlineWindow()

```
public void CloseOutlineWindow()
```

CloseReplaceColourWindow()

```
public void CloseReplaceColourWindow()
```

CloseScaleWindow()

```
public void CloseScaleWindow()
```

ConfirmExtendCropWindow()

```
public void ConfirmExtendCropWindow()
```

ConfirmGridWindow()

```
public void ConfirmGridWindow()
```

ConfirmImportPACWindow()

```
public void ConfirmImportPACWindow()
```

ConfirmNewFileWindow()

```
public void ConfirmNewFileWindow()
```

ConfirmOutlineWindow()

```
public void ConfirmOutlineWindow()
```

ConfirmReplaceColourWindow()

```
public void ConfirmReplaceColourWindow()
```

ConfirmScaleWindow()

```
public void ConfirmScaleWindow()
```

OpenBrushSettingsWindow()

```
public void OpenBrushSettingsWindow()
```

OpenDialogBox(GameObject)

```
public void OpenDialogBox(GameObject dialogBox)
```

Parameters

`dialogBox` GameObject

OpenExtendCropWindow()

```
public void OpenExtendCropWindow()
```

OpenFloodFillSettingsWindow()

```
public void OpenFloodFillSettingsWindow()
```

OpenGridWindow()

```
public void OpenGridWindow()
```

OpenImportPACWindow(File)

```
public void OpenImportPACWindow(File file)
```

Parameters

`file` File

OpenKeyboardShortcutsWindow()

```
public void OpenKeyboardShortcutsWindow()
```

OpenLayerPropertiesWindow(int)

```
public void OpenLayerPropertiesWindow(int layerIndex)
```

Parameters

`layerIndex` int

OpenModalWindow()

```
public UIModalWindow OpenModalWindow()
```

Returns

UIModalWindow

OpenModalWindow(string, string)

```
public UIModalWindow OpenModalWindow(string title, string message)
```

Parameters

`title` string

`message` string

Returns

UIModalWindow

OpenModalWindow(string, string, string[], UnityAction[])

```
public UIModalWindow OpenModalWindow(string title, string message, string[]
buttonTexts, UnityAction[] buttonOnClicks)
```

Parameters

`title` string

`message` string

`buttonTexts` string[]

`buttonOnClicks` UnityAction[]

Returns

UIModalWindow

OpenNewFileWindow()

```
public void OpenNewFileWindow()
```

OpenOutlineWindow()

```
public void OpenOutlineWindow()
```

OpenReplaceColourWindow()

```
public void OpenReplaceColourWindow()
```

OpenScaleWindow()

```
public void OpenScaleWindow()
```

OpenUnsavedChangesWindow(int)

```
public void OpenUnsavedChangesWindow(int fileIndex)
```

Parameters

`fileIndex` int

SetNewFileHeight(int)

```
public void SetNewFileHeight(int height)
```

Parameters

`height` int

SetNewFileWidth(int)

```
public void SetNewFileWidth(int width)
```

Parameters

`width` int

UnsavedChangesNo()

```
public void UnsavedChangesNo()
```

UnsavedChangesYes()

```
public void UnsavedChangesYes()
```

UpdateBrushSettingsShape()

```
public void UpdateBrushSettingsShape()
```

UpdateFloodFillSettingsShape()

```
public void UpdateFloodFillSettingsShape()
```

UpdateImportPACPreview()

```
public void UpdateImportPACPreview()
```

Class DrawingArea

Namespace: PAC.Managers

```
public class DrawingArea : MonoBehaviour
```

Inheritance

object ← DrawingArea

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

file

```
public File file { get; }
```

Property Value

File

hasSelection

```
public bool hasSelection { get; }
```

Property Value

bool

pixelsPerUnit

```
public float pixelsPerUnit { get; }
```

Property Value

float

scrollSpeed

```
public float scrollSpeed { get; }
```

Property Value

float

selectionMask

```
public Texture2D selectionMask { get; }
```

Property Value

Texture2D

selectionRect

```
public IntRect selectionRect { get; }
```

Property Value

IntRect

zoomScrollSpeed

```
public float zoomScrollSpeed { get; }
```

Property Value

float

Methods

DeleteSelection()

```
public void DeleteSelection()
```

PixelsToWorldPos(IntVector2)

Turns the pixel coordinate in the drawing into a world coordinate (the resulting coord is the centre of the pixel in the world).

```
public Vector2 PixelsToWorldPos(IntVector2 pixel)
```

Parameters

`pixel` IntVector2

Returns

Vector2

PixelsToWorldPos(int, int)

Turns the pixel coordinate in the drawing into a world coordinate (the resulting coord is the centre of the pixel in the world).

```
public Vector2 PixelsToWorldPos(int x, int y)
```

Parameters

`x` int

`y` int

Returns

Vector2

PixelsToWorldPos(float, float)

Turns the pixel coordinate in the drawing into a world coordinate.

```
public Vector2 PixelsToWorldPos(float x, float y)
```

Parameters

`x` float

`y` float

Returns

Vector2

PixelsToWorldPos(Vector2)

Turns the pixel coordinate in the drawing into a world coordinate.

```
public Vector2 PixelsToWorldPos(Vector2 pixel)
```

Parameters

`pixel` Vector2

Returns

Vector2

UpdateDrawing()

Makes any changes to the file visible on the drawing area.

```
public void UpdateDrawing()
```

WorldPosToPixel(Vector2)

Turns the world coord into a pixel coord in the drawing.

```
public IntVector2 WorldPosToPixel(Vector2 worldPos)
```

Parameters

`worldPos` Vector2

Returns

IntVector2

WorldPosToPixels(float, float)

Turns the world coord into a pixel coord in the drawing.

```
public IntVector2 WorldPosToPixels(float x, float y)
```

Parameters

`x` float

`y` float

Returns

IntVector2

Class FileManager

Namespace: PAC.Managers

```
public class FileManager : MonoBehaviour
```

Inheritance

object ← FileManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

defaultFileName

```
public const string defaultFileName = "Untitled Image"
```

Field Value

string

previousFile

```
public File previousFile
```

Field Value

File

Properties

currentFile

```
public File currentFile { get; }
```

Property Value

File

currentFileIndex

```
public int currentFileIndex { get; }
```

Property Value

int

files

```
public List<File> files { get; }
```

Property Value

List<File>

Methods

AddFile(File)

```
public bool AddFile(File file)
```

Parameters

`file` File

Returns

bool

CloseFile(File)

Closes the file, with no checks for unsaved changes.

```
public bool CloseFile(File file)
```

Parameters

`file` File

Returns

bool

CloseFile(int)

Closes the file, with no checks for unsaved changes.

```
public File CloseFile(int fileIndex)
```

Parameters

`fileIndex` int

Returns

File

ExportAnimation(int, string)

```
public bool ExportAnimation(int fileIndex, string filePath)
```

Parameters

`fileIndex` int

`filePath` string

Returns

bool

ExportCurrentAnimation(string)

```
public bool ExportCurrentAnimation(string filePath)
```

Parameters

`filePath` string

Returns

bool

ExportCurrentAnimationDialog()

```
public void ExportCurrentAnimationDialog()
```

ExportCurrentFrame(int, string)

```
public bool ExportCurrentFrame(int frameIndex, string filePath)
```

Parameters

`frameIndex` int

`filePath` string

Returns

bool

ExportCurrentFrameDialog()

```
public void ExportCurrentFrameDialog()
```

ExportFrame(int, int, string)

```
public bool ExportFrame(int frameIndex, int fileIndex, string filePath)
```

Parameters

`frameIndex` int

`fileIndex` int

`filePath` string

Returns

bool

ImportDialog()

```
public void ImportDialog()
```

NewFile(int, int)

```
public void NewFile(int width, int height)
```

Parameters

`width` int

`height` int

OpenFile(File)

```
public bool OpenFile(File file)
```

Parameters

`file` File

Returns

bool

OpenFile(string)

```
public bool OpenFile(string filePath)
```

Parameters

`filePath` string

Returns

bool

OpenFileDialog()

```
public void OpenFileDialog()
```

ReloadFile()

```
public void ReloadFile()
```

SaveAsCurrentFile(string)

```
public void SaveAsCurrentFile(string filePath)
```

Parameters

`filePath` string

SaveAsCurrentFileDialog()

```
public void SaveAsCurrentFileDialog()
```

SaveAsFile(File, string)

```
public void SaveAsFile(File file, string filePath)
```

Parameters

`file` File

`filePath` string

SaveAsFile(int, string)

```
public void SaveAsFile(int fileIndex, string filePath)
```

Parameters

`fileIndex` int

`filePath` string

SaveAsFileDialog(File)

```
public void SaveAsFileDialog(File file)
```

Parameters

`file` File

SaveCurrentFileDialog()

```
public void SaveCurrentFileDialog()
```

SaveFileDialog(File)

```
public void SaveFileDialog(File file)
```

Parameters

`file` File

SubscribeToFileSwitched(UnityAction)

```
public void SubscribeToFileSwitched(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToFilesChanged(UnityAction)

```
public void SubscribeToFilesChanged(UnityAction call)
```

Parameters

`call` UnityAction

SwitchToFile(int)

```
public void SwitchToFile(int fileIndex)
```

Parameters

`fileIndex` int

TryCloseFile(File)

Will close the file if there are no unsaved changes. Otherwise it will open a dialog box asking if you want to save.

```
public bool TryCloseFile(File file)
```

Parameters

`file` File

Returns

bool

TryCloseFile(int)

Will close the file if there are no unsaved changes. Otherwise it will open a dialog box asking if you want to save.

```
public bool TryCloseFile(int fileIndex)
```

Parameters

`fileIndex` int

Returns

bool

Class FileTabsManager

Namespace: PAC.Managers

```
public class FileTabsManager : MonoBehaviour
```

Inheritance

object ← FileTabsManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

selectedFile

```
public File selectedFile { get; }
```

Property Value

File

selectedFileIndex

```
public int selectedFileIndex { get; }
```

Property Value

int

Methods

CloseFile()

```
public void CloseFile()
```

OnFilesChanged()

```
public void OnFilesChanged()
```

SelectFile()

```
public void SelectFile()
```

SubscribeToOnFilesChanged(UnityAction)

```
public void SubscribeToOnFilesChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class Finder

Namespace: PAC.Managers

```
public class Finder
```

Inheritance

object ← Finder

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

animationManager

```
public static AnimationManager animationManager { get; }
```

Property Value

AnimationManager

clipboard

```
public static Clipboard clipboard { get; }
```

Property Value

Clipboard

colourPicker

```
public static GlobalColourPicker colourPicker { get; }
```

Property Value

GlobalColourPicker

dialogBoxManager

```
public static DialogBoxManager dialogBoxManager { get; }
```

Property Value

DialogBoxManager

drawingArea

```
public static DrawingArea drawingArea { get; }
```

Property Value

DrawingArea

fileManager

```
public static FileManager fileManager { get; }
```

Property Value

FileManager

fileTabsManager

```
public static FileTabsManager fileTabsManager { get; }
```

Property Value

FileTabsManager

gridManager

```
public static GridManager gridManager { get; }
```

Property Value

GridManager

imageEditManager

```
public static ImageEditManager imageEditManager { get; }
```

Property Value

ImageEditManager

inputSystem

```
public static InputSystem inputSystem { get; }
```

Property Value

InputSystem

keyboard

```
public static Keyboard keyboard { get; }
```

Property Value

Keyboard

layerManager

```
public static LayerManager layerManager { get; }
```

Property Value

LayerManager

mouse

```
public static Mouse mouse { get; }
```

Property Value

Mouse

themeManager

```
public static ThemeManager themeManager { get; }
```

Property Value

ThemeManager

tileOutlineManager

```
public static TileOutlineManager tileOutlineManager { get; }
```

Property Value

TileOutlineManager

tilesetManager

```
public static TilesetManager tilesetManager { get; }
```

Property Value

TilesetManager

toolbar

```
public static Toolbar toolbar { get; }
```

Property Value

Toolbar

uiManager

```
public static UIManager uiManager { get; }
```

Property Value

UIManager

undoRedoManager

```
public static UndoRedoManager undoRedoManager { get; }
```

Property Value

UndoRedoManager

Enum GradientMode

Namespace: PAC.Managers

```
public enum GradientMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Linear = 0`

`Radial = 1`

Class GridManager

Namespace: PAC.Managers

Handles drawing a grid over the image when the grid is enabled.

```
public class GridManager : MonoBehaviour
```

Inheritance

object ← GridManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

lineThickness

```
public float lineThickness
```

Field Value

float

Properties

height

```
public int height { get; }
```

Property Value

int

on

```
public bool on { get; }
```

Property Value

bool

width

```
public int width { get; }
```

Property Value

int

xOffset

```
public int xOffset { get; }
```

Property Value

int

yOffset

```
public int yOffset { get; }
```

Property Value

int

Methods

SetGrid(int, int, int, int)

```
public void SetGrid(int width, int height, int xOffset, int yOffset)
```

Parameters

`width` int

`height` int

`xOffset` int

`yOffset` int

SetOnOff(bool)

```
public void SetOnOff(bool on)
```

Parameters

`on` bool

SetOnOffNoDisplayUpdate(bool)

```
public void SetOnOffNoDisplayUpdate(bool on)
```

Parameters

`on` bool

Class ImageEditManager

Namespace: PAC.Managers

```
public class ImageEditManager : MonoBehaviour
```

Inheritance

object ← ImageEditManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ExtendFile(int, int, int, int)

```
public void ExtendFile(int left, int right, int up, int down)
```

Parameters

`left` int

`right` int

`up` int

`down` int

ExtendFileDown(int)

```
public void ExtendFileDown(int amount)
```

Parameters

`amount` int

ExtendFileLeft(int)

```
public void ExtendFileLeft(int amount)
```

Parameters

`amount` int

ExtendFileRight(int)

```
public void ExtendFileRight(int amount)
```

Parameters

`amount` int

ExtendFileUp(int)

```
public void ExtendFileUp(int amount)
```

Parameters

`amount` int

FlipFile(CardinalAxis)

```
public void FlipFile(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

FlipFileX()

```
public void FlipFileX()
```

FlipFileY()

```
public void FlipFileY()
```

FlipSelectedLayers(CardinalAxis)

```
public void FlipSelectedLayers(CardinalAxis axis)
```

Parameters

`axis` CardinalAxis

FlipSelectedLayersX()

```
public void FlipSelectedLayersX()
```

FlipSelectedLayersY()

```
public void FlipSelectedLayersY()
```

RotateFile(QuadrantalAngle)

```
public void RotateFile(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

RotateSelectedLayers(QuadrantalAngle)

```
public void RotateSelectedLayers(QuadrantalAngle angle)
```

Parameters

`angle` QuadrantalAngle

RotateSelectedLayers180()

```
public void RotateSelectedLayers180()
```

RotateSelectedLayers90()

```
public void RotateSelectedLayers90()
```

RotateSelectedLayersMinus90()

```
public void RotateSelectedLayersMinus90()
```

ScaleFile(int, int)

```
public void ScaleFile(int newWidth, int newHeight)
```

Parameters

`newWidth` int

`newHeight` int

ScaleFile(float)

```
public void ScaleFile(float scaleFactor)
```

Parameters

`scaleFactor` float

ScaleFile(float, float)

```
public void ScaleFile(float xScaleFactor, float yScaleFactor)
```

Parameters

`xScaleFactor` float

`yScaleFactor` float

SubscribeToEdit(UnityAction)

```
public void SubscribeToEdit(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToImageSizeChanged(UnityAction)

```
public void SubscribeToImageSizeChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class KeyboardShortcutOptionsManager

Namespace: PAC.Managers

Handles the window where you can view / change keyboard shortcuts.

```
public class KeyboardShortcutOptionsManager : MonoBehaviour
```

Inheritance

object ← KeyboardShortcutOptionsManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Class LayerManager

Namespace: PAC.Managers

```
public class LayerManager : MonoBehaviour
```

Inheritance

object ← LayerManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

layerTypeSprite

```
public Sprite layerTypeSprite
```

Field Value

Sprite

tileLayerTypeSprite

```
public Sprite tileLayerTypeSprite
```

Field Value

Sprite

Properties

selectedLayer

The last layer that was selected.

```
public Layer selectedLayer { get; }
```

Property Value

Layer

selectedLayerIndex

The index of the last layer that was selected.

```
public int selectedLayerIndex { get; }
```

Property Value

int

selectedLayerIndices

The indices of all selected layers, in increasing order.

```
public int[] selectedLayerIndices { get; }
```

Property Value

int[]

selectedLayers

The selected layers, in order (highest layer first etc).

```
public Layer[] selectedLayers { get; }
```

Property Value

Layer[]

Methods

AddLayer()

```
public void AddLayer()
```

AddLayer(Texture2D)

```
public void AddLayer(Texture2D texture)
```

Parameters

`texture` Texture2D

AddTileLayer()

```
public void AddTileLayer()
```

DuplicateSelectedLayers()

```
public void DuplicateSelectedLayers()
```

FlattenSelectedLayers()

```
public void FlattenSelectedLayers()
```

HideAllBut(Layer)

```
public void HideAllBut(Layer layer)
```

Parameters

`layer` Layer

MoveSelectedLayersDown()

```
public void MoveSelectedLayersDown()
```

MoveSelectedLayersUp()

```
public void MoveSelectedLayersUp()
```

OnFileSwitched()

```
public void OnFileSwitched()
```

OnLayersChanged()

```
public void OnLayersChanged()
```

RemoveSelectedLayers()

```
public void RemoveSelectedLayers()
```

SetLayerBlendMode(int, BlendMode)

```
public void SetLayerBlendMode(int layerIndex, BlendMode blendMode)
```

Parameters

`layerIndex` int

`blendMode` BlendMode

SetLayerName(int, string)

```
public void SetLayerName(int layerIndex, string layerName)
```

Parameters

`layerIndex` int

`layerName` string

SetLayerOpacity(int, float)

```
public void SetLayerOpacity(int layerIndex, float opacity)
```

Parameters

`layerIndex` int

`opacity` float

SubscribeToLayerChange(UnityAction)

```
public void SubscribeToLayerChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToVisibilityChange(UnityAction)

```
public void SubscribeToVisibilityChange(UnityAction call)
```

Parameters

`call` UnityAction

WorldYCoordOfLayerTile(int)

```
public float WorldYCoordOfLayerTile(int layerTileIndex)
```

Parameters

`layerTileIndex` int

Returns

float

Enum SelectionMode

Namespace: PAC.Managers

```
public enum SelectionMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Draw = 0`

`Ellipse = 11`

`MagicWand = 1`

`Rectangle = 10`

Enum Shape

Namespace: PAC.Managers

```
public enum Shape
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Diamond = 3`

`Ellipse = 1`

`Rectangle = 0`

`RightTriangle = 2`

Class ThemeManager

Namespace: PAC.Managers

```
public class ThemeManager : MonoBehaviour
```

Inheritance

object ← ThemeManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

currentTheme

```
public Theme currentTheme { get; }
```

Property Value

Theme

themes

```
public List<Theme> themes { get; }
```

Property Value

List<Theme>

Methods

SetTheme(Theme)

```
public void SetTheme(Theme theme)
```

Parameters

`theme` Theme

SetTheme(string)

```
public void SetTheme(string themeName)
```

Parameters

`themeName` string

SubscribeToThemeChanged(UnityAction)

```
public void SubscribeToThemeChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class TileOutlineManager

Namespace: PAC.Managers

```
public class TileOutlineManager : MonoBehaviour
```

Inheritance

object ← TileOutlineManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

HideShowTileOutline(Tile, bool)

```
public void HideShowTileOutline(Tile tile, bool show)
```

Parameters

`tile` Tile

`show` bool

HideTileOutline(Tile)

```
public void HideTileOutline(Tile tile)
```

Parameters

`tile` Tile

RefreshTileOutlines()

```
public void RefreshTileOutlines()
```

ShowTileOutline(Tile)

```
public void ShowTileOutline(Tile tile)
```

Parameters

`tile` Tile

Class TilesetManager

Namespace: PAC.Managers

```
public class TilesetManager : MonoBehaviour
```

Inheritance

object ← TilesetManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

SubscribeToOnTileIconSelected(UnityAction<File>)

```
public void SubscribeToOnTileIconSelected(UnityAction<File> call)
```

Parameters

`call` UnityAction<File>

Class Toolbar

Namespace: PAC.Managers

Handles selecting tools, brush size, etc.

```
public class Toolbar : MonoBehaviour
```

Inheritance

object ← Toolbar

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

floodFillDiagonallyAdjacent

```
public bool floodFillDiagonallyAdjacent
```

Field Value

bool

Properties

brushPixels

The pixels, given relative to the position of the mouse, that will be affected by the current brush.

```
public IntVector2[] brushPixels { get; }
```

Property Value

IntVector2[]

brushPixelsHeight

```
public int brushPixelsHeight { get; }
```

Property Value

int

brushPixelsIsEmpty

```
public bool brushPixelsIsEmpty { get; }
```

Property Value

bool

brushPixelsIsSingleCentralPixel

```
public bool brushPixelsIsSingleCentralPixel { get; }
```

Property Value

bool

brushPixelsWidth

```
public int brushPixelsWidth { get; }
```

Property Value

int

brushShape

```
public BrushShape brushShape { get; set; }
```

Property Value

BrushShape

brushSize

```
public int brushSize { get; }
```

Property Value

int

brushTexture

```
public Texture2D brushTexture { get; }
```

Property Value

Texture2D

gradientMode

```
public GradientMode gradientMode { get; }
```

Property Value

GradientMode

lineSmoothingTime

The amount of time you have to draw a new pixel in for an old one to be potentially smoothed.

```
public float lineSmoothingTime { get; }
```

Property Value

float

previousTool

```
public Tool previousTool { get; }
```

Property Value

Tool

selectedTool

```
public Tool selectedTool { get; }
```

Property Value

Tool

selectionMode

```
public SelectionMode selectionMode { get; }
```

Property Value

SelectionMode

shapeToolShape

```
public Shape shapeToolShape { get; }
```

Property Value

Shape

Methods

DeselectGlobalEyeDropper()

```
public void DeselectGlobalEyeDropper()
```

LoadCustomBrush(Texture2D)

Turns the given texture into a brush shape by taking any pixels with non-zero alpha.

```
public void LoadCustomBrush(Texture2D brushShape)
```

Parameters

`brushShape` Texture2D

SelectGlobalEyeDropper()

```
public void SelectGlobalEyeDropper()
```

SetBrushSize(int)

```
public bool SetBrushSize(int brushSize)
```

Parameters

`brushSize` int

Returns

bool

SubscribeToOnBrushPixelsChanged(UnityAction)

Event invoked when brush pixels change.

```
public void SubscribeToOnBrushPixelsChanged(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnBrushSizeChanged(UnityAction)

Event invoked when brush size changes.

```
public void SubscribeToOnBrushSizeChanged(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnToolChanged(UnityAction)

Event invoked when selected tool changes.

```
public void SubscribeToOnToolChanged(UnityAction call)
```

Parameters

```
call UnityAction
```

Class UIManager

Namespace: PAC.Managers

```
public class UIManager : MonoBehaviour
```

Inheritance

object ← UIManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

selectedUIElement

```
public UIElement selectedUIElement { get; }
```

Property Value

UIElement

Methods

CanTargetInputTarget(InputTarget)

```
public bool CanTargetInputTarget(InputTarget inputTarget)
```

Parameters

`inputTarget` InputTarget

Returns

bool

TryTarget(UIElement)

```
public bool TryTarget(UIElement uiElement)
```

Parameters

`uiElement` UIElement

Returns

bool

TryUntarget(UIElement)

```
public bool TryUntarget(UIElement uiElement)
```

Parameters

`uiElement` UIElement

Returns

bool

Class UITabManager

Namespace: PAC.Managers

```
public class UITabManager : MonoBehaviour
```

Inheritance

object ← UITabManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

AddTab(GameObject)

```
public void AddTab(GameObject tab)
```

Parameters

`tab` GameObject

SelectTab(int)

```
public void SelectTab(int tabIndex)
```

Parameters

`tabIndex` int

SelectTabEditor(int)

```
public void SelectTabEditor(int tabIndex)
```

Parameters

`tabIndex` int

Class UndoRedoManager

Namespace: PAC.Managers

```
public class UndoRedoManager : MonoBehaviour
```

Inheritance

object ← UndoRedoManager

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

AddUndoState(UndoRedoState, int)

```
public void AddUndoState(UndoRedoState undoState, int fileIndex)
```

Parameters

`undoState` UndoRedoState

`fileIndex` int

SubscribeToRedo(UnityAction)

```
public void SubscribeToRedo(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUndo(UnityAction)

```
public void SubscribeToUndo(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToUndoOrRedo(UnityAction)

```
public void SubscribeToUndoOrRedo(UnityAction call)
```

Parameters

`call` UnityAction

Namespace PAC.Maths

Classes

Combinatorics

A collection of common combinatorial functions, such as computing factorials or generating all permutations of a set.

MathExtensions

Defines some mathematical functions.

Class Combinatorics

Namespace: PAC.Maths

A collection of common combinatorial functions, such as computing factorials or generating all permutations of a set.

```
public static class Combinatorics
```

Inheritance

object ← Combinatorics

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

BinomialCoefficient(int, int)

The coefficient of `x^k` in `(x + 1)^n`. An alias for Choose(int, int).

```
public static int BinomialCoefficient(int n, int k)
```

Parameters

`n` int

`k` int

Returns

int

See Also

Choose(int, int)

Choose(int, int)

The choose function. An alias for BinomialCoefficient(int, int).

```
public static int Choose(int n, int k)
```

Parameters

`n` int

`k` int

Returns

int

See Also
BinomialCoefficient(int, int)

Factorial(int)

Computes `n * (n - 1) * ... * 2 * 1`. Returns 1 if `n` is 0.

```
public static int Factorial(int n)
```

Parameters

`n` int

Returns

int

FallingFactorial(int, int)

Computes `n * (n - 1) * ... * (n - (k - 1))`. Returns 1 if `k` is 0.

```
public static int FallingFactorial(int n, int k)
```

Parameters

`n` int

`k` int

Returns

int

MultiChoose(int, int)

```
public static int MultiChoose(int n, int k)
```

Parameters

`n` int

`k` int

Returns

int

NumberOfCombinations(int)

```
public static int NumberOfCombinations(int sizeOfSet)
```

Parameters

`sizeOfSet` int

Returns

int

NumberOfCombinations(int, int)

```
public static int NumberOfCombinations(int numElementsToChooseFrom,
int lengthOfCombination)
```

Parameters

`numElementsToChooseFrom` int

`lengthOfCombination` int

Returns

int

NumberOfMultisets(int)

```
public static int NumberOfMultisets(int sizeOfSet)
```

Parameters

`sizeOfSet` int

Returns

int

NumberOfMultisets(int, int)

```
public static int NumberOfMultisets(int numElementsToChooseFrom, int sizeOfMultiset)
```

Parameters

`numElementsToChooseFrom` int

`sizeOfMultiset` int

Returns

int

NumberOfPermutations(int)

The number of possible permutations of a set of the given size. (Permutations do not allow repeated elements.)

```
public static int NumberOfPermutations(int sizeOfSet)
```

Parameters

`sizeOfSet` int

Returns

int

NumberOfPermutations(int, int)

The number of possible permutations of the given length with elements in a set of the given size. (Permutations do not allow repeated elements.)

```
public static int NumberOfPermutations(int numElementsToChooseFrom,
int lengthOfPermutation)
```

Parameters

`numElementsToChooseFrom` int

`lengthOfPermutation` int

Returns

int

NumberOfTuples(int, int)

The number of possible tuples of the given length with elements in a set of the given size. (Tuples allow repeated elements.)

```
public static int NumberOfTuples(int numElementsToChooseFrom, int lengthOfTuple)
```

Parameters

`numElementsToChooseFrom` int

`lengthOfTuple` int

Returns

int

Pairs<T>(IEnumerable<T>)

Lazily generates all possible pairs `(x, y)` with `x` and `y` in the given IEnumerable<T>. `x` and `y` don't have to be distinct.

```
public static IEnumerable<(T first, T second)> Pairs<T>(this IEnumerable<T> set)
```

Parameters

`set` IEnumerable<T>

Returns

IEnumerable<(T current, T next)>

Type Parameters

`T`

Remarks

If the given IEnumerable<T> has duplicate elements, those elements will be treated as though they were distinct.

For a description of the order in which the pairs are yielded, see Tuples<T> (IEnumerable<T>, int).

Pairs<TFirst, TSecond>(IEnumerable<TFirst>, IEnumerable<TSecond>)

Lazily generates all possible pairs `(x, y)` with `x` in `first` and `y` in `second`.

```
public static IEnumerable<(TFirst first, TSecond second)> Pairs<TFirst, TSecond>
(this IEnumerable<TFirst> first, IEnumerable<TSecond> second)
```

Parameters

`first` IEnumerable<TFirst>

`second` IEnumerable<TSecond>

Returns

IEnumerable<(TFirst first, TSecond second)>

Type Parameters

`TFirst`

`TSecond`

Remarks

If a given IEnumerable<T> has duplicate elements, those elements will be treated as though they were distinct.

For a description of the order in which the pairs are yielded, see Tuples<T> (IEnumerable<T>, int).

Permutations<T>(IEnumerable<T>)

Lazily generates all possible permutations of the elements in the given IEnumerable<T>. (Permutations do not allow repeated elements.)

```
public static IEnumerable<IEnumerable<T>> Permutations<T>(this
IEnumerable<T> elements)
```

Parameters

`elements` IEnumerable<T>

Returns

IEnumerable<IEnumerable<T>>

Type Parameters

`T`

Remarks

If the given IEnumerable<T> has duplicate elements, they will be treated as though they were distinct.

Permutations<T>(IEnumerable<T>, int)

Lazily generates all possible permutations of the given length with elements in the given IEnumerable<T>. (Permutations do not allow repeated elements.)

```
public static IEnumerable<IEnumerable<T>> Permutations<T>(this IEnumerable<T>
elements, int length)
```

Parameters

`elements` IEnumerable<T>

`length` int

Returns

IEnumerable<IEnumerable<T>>

Type Parameters

`T`

Remarks

If the given IEnumerable<T> has duplicate elements, they will be treated as though they were distinct.

RisingFactorial(int, int)

Computes `n * (n + 1) * ... * (n + (k - 1))`. Returns 1 if `k` is 0.

```
public static int RisingFactorial(int n, int k)
```

Parameters

`n` int

`k` int

Returns

int

Triples<T>(IEnumerable<T>)

Lazily generates all possible triples `(x, y, z)` with `x`, `y` and `z` in the given IEnumerable<T> . `x`, `y` and `z` don't have to all be distinct.

```
public static IEnumerable<(T first, T second, T third)> Triples<T>(this
IEnumerable<T> set)
```

Parameters

`set` IEnumerable<T>

Returns

IEnumerable<(T first, T second, T third)>

Type Parameters

`T`

Remarks

If the given IEnumerable<T> has duplicate elements, those elements will be treated as though they were distinct.

For a description of the order in which the triples are yielded, see Tuples<T> (IEnumerable<T>, int).

Triples<TFirst, TSecond, TThird>(IEnumerable<TFirst>, IEnumerable<TSecond>, IEnumerable<TThird>)

Lazily generates all possible triples `(x, y, z)` with `x` in `first`, `y` in `second` and `z` in `third`.

```
public static IEnumerable<(TFirst first, TSecond second, TThird third)>
Triples<TFirst, TSecond, TThird>(this IEnumerable<TFirst> first,
IEnumerable<TSecond> second, IEnumerable<TThird> third)
```

Parameters

`first` IEnumerable<TFirst>

`second` IEnumerable<TSecond>

`third` IEnumerable<TThird>

Returns

IEnumerable<(TFirst first, TSecond second, TThird third)>

Type Parameters

`TFirst`

`TSecond`

`TThird`

Remarks

If a given IEnumerable<T> has duplicate elements, those elements will be treated as though they were distinct.

For a description of the order in which the triples are yielded, see Tuples<T> (IEnumerable<T>, int).

Tuples<T>(IEnumerable<T>, int)

Lazily generates all possible tuples of the given length with elements in the given IEnumerable<T>. (Tuples allow repeated elements.)

```
public static IEnumerable<IEnumerable<T>> Tuples<T>(this IEnumerable<T> elements,
int length)
```

Parameters

`elements` IEnumerable<T>

`length` int

Returns

IEnumerable<IEnumerable<T>>

Type Parameters

`T`

Remarks

If the given IEnumerable<T> has duplicate elements, they will be treated as though they were distinct.

The order of the tuples will be lexicographic based on the order in which the elements appear in the input, with the left-most coordinate being the most significant. This is equivalent to using nested foreach loops, with a loop being less nested corresponding to a further-left coordinate.

For example, the tuples of length 2 with elements in `{ 0, 1 }` will be in the order `{ { 0, 0 }, { 0, 1 }, { 1, 0 }, { 1, 1 } }`. This is equivalent to

```
foreach (int element1 in set)
{
    foreach (int element2 in set)
    {
        yield return new int[] { element1, element2 };
    }
}
```

Class MathExtensions

Namespace: PAC.Maths

Defines some mathematical functions.

```
public static class MathExtensions
```

Inheritance

object ← MathExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

CeilToMultipleOf(float, int)

Returns the least multiple of `multipleOf` that is >= `toRound`.

```
public static int CeilToMultipleOf(this float toRound, int multipleOf)
```

Parameters

`toRound` float

`multipleOf` int

Returns

int

Exceptions

ArgumentException

`multipleOf` is 0.

CeilToMultipleOf(float, float)

Returns the least multiple of `multipleOf` that is >= `toRound`.

```
public static float CeilToMultipleOf(this float toRound, float multipleOf)
```

Parameters

`toRound` float

`multipleOf` float

Returns

float

Exceptions

ArgumentException

`multipleOf` is 0.

ClampNonNegative(int)

Clamps the value so it's non-negative.

```
public static int ClampNonNegative(this int x)
```

Parameters

`x` int

Returns

int

- `x` if `x` >= 0
- 0 if `x` < 0

ClampNonNegative(long)

Clamps the value so it's non-negative.

```
public static long ClampNonNegative(this long x)
```

Parameters

x long

Returns

long

- x if x >= 0
- 0 if x < 0

ClampNonNegative(float)

Clamps the value so it's non-negative.

```
public static float ClampNonNegative(this float x)
```

Parameters

x float

Returns

float

- x if x >= 0
- 0 if x < 0

ClampNonPositive(int)

Clamps the value so it's non-positive.

```
public static int ClampNonPositive(this int x)
```

Parameters

x int

Returns

int

- x if x <= 0
- 0 if x > 0

ClampNonPositive(float)

Clamps the value so it's non-positive.

```
public static float ClampNonPositive(this float x)
```

Parameters

x float

Returns

float

- x if x <= 0
- 0 if x > 0

FloorToMultipleOf(float, int)

Returns the greatest multiple of `multipleOf` that is <= `toRound`.

```
public static int FloorToMultipleOf(this float toRound, int multipleOf)
```

Parameters

`toRound` float

`multipleOf` int

Returns

int

Exceptions

ArgumentException

`multipleOf` is 0.

FloorToMultipleOf(float, float)

Returns the greatest multiple of `multipleOf` that is <= `toRound`.

```
public static float FloorToMultipleOf(this float toRound, float multipleOf)
```

Parameters

`toRound` float

`multipleOf` float

Returns

float

Exceptions

ArgumentException

`multipleOf` is 0.

Gcd(int, int)

Computes the greatest non-negative common divisor of `a` and `b`.

```
public static int Gcd(this int a, int b)
```

Parameters

a int

b int

Returns

int

Exceptions

ArgumentOutOfRangeException

a or b are MinValue.

Gcd(long, long)

Computes the greatest non-negative common divisor of a and b.

```
public static long Gcd(this long a, long b)
```

Parameters

a long

b long

Returns

long

Exceptions

ArgumentOutOfRangeException

a or b are MinValue.

Max(params int[])

Returns the maximum element.

```
public static int Max(params int[] elements)
```

Parameters

`elements` int[]

Returns

int

Exceptions

ArgumentException

`elements` is empty.

Min(params int[])

Returns the minimum element.

```
public static int Min(params int[] elements)
```

Parameters

`elements` int[]

Returns

int

Exceptions

ArgumentException

`elements` is empty.

Mod(int, int)

Returns `a mod b`, giving a result in the range `[0, abs(b))`.

```
public static int Mod(this int a, int b)
```

Parameters

a int

b int

Returns

int

Exceptions

DivideByZeroException

`b` is 0.

Mod(long, long)

Returns `a mod b`, giving a result in the range `[0, abs(b))`.

```
public static long Mod(this long a, long b)
```

Parameters

a long

b long

Returns

long

Exceptions

DivideByZeroException

`b` is 0.

Mod(float, float)

Returns `a mod b`, giving a result in the range `[0, abs(b))`.

```
public static float Mod(this float a, float b)
```

Parameters

`a` float

`b` float

Returns

float

Exceptions

DivideByZeroException

`b` is 0.

Pow(int, int)

Computes `n ^ exponent` (`n` raised to the `exponent`).

```
public static int Pow(this int n, int exponent)
```

Parameters

`n` int

`exponent` int

Returns

int

Remarks

0^0 is defined to be 1.

Exceptions

ArgumentOutOfRangeException

`exponent` is negative.

Round(float, int)

Rounds `toRound` to `decimalPlaces` decimal places.

```
public static float Round(this float toRound, int decimalPlaces)
```

Parameters

`toRound` float

`decimalPlaces` int

Returns

float

Exceptions

ArgumentOutOfRangeException

`decimalPlaces` is negative.

RoundAwayFrom(float, int)

Rounds `toRound` to an integer, choosing to round up or down so that it becomes further (or unchanged) away from `awayFrom`.

```
public static float RoundAwayFrom(this float toRound, int awayFrom)
```

Parameters

`toRound` float

`awayFrom` int

Returns

float

- `ceil(toRound)` if `toRound` >= `awayFrom`
- `floor(toRound)` if `toRound` < `awayFrom`

RoundToIntAwayFrom(float, int)

Rounds `toRound` to an integer, choosing to round up or down so that it becomes further (or unchanged) away from `awayFrom`.

```
public static int RoundToIntAwayFrom(this float toRound, int awayFrom)
```

Parameters

`toRound` float

`awayFrom` int

Returns

int

- `ceil(toRound)` if `toRound` >= `awayFrom`
- `floor(toRound)` if `toRound` < `awayFrom`

RoundToIntTowards(float, int)

Rounds `toRound` to an integer, choosing to round up or down so that it becomes closer (or unchanged) to `towards`.

```
public static int RoundToIntTowards(this float toRound, int towards)
```

Parameters

`toRound` float

`towards` int

Returns

int

- `floor(toRound)` if `toRound` >= `towards`
- `ceil(toRound)` if `toRound` < `towards`

RoundToMultipleOf(float, int)

Returns the multiple of `multipleOf` that is closest to `toRound`.

```
public static int RoundToMultipleOf(this float toRound, int multipleOf)
```

Parameters

`toRound` float

`multipleOf` int

Returns

int

Exceptions

ArgumentException

`multipleOf` is 0.

RoundToMultipleOf(float, float)

Returns the multiple of `multipleOf` that is closest to `toRound`.

```
public static float RoundToMultipleOf(this float toRound, float multipleOf)
```

Parameters

`toRound` float

`multipleOf` float

Returns

float

Exceptions

ArgumentException

`multipleOf` is 0.

RoundTowards(float, int)

Rounds `toRound` to an integer, choosing to round up or down so that it becomes closer (or unchanged) to `towards`.

```
public static float RoundTowards(this float toRound, int towards)
```

Parameters

`toRound` float

`towards` int

Returns

float

- `floor(toRound)` if `toRound` >= `towards`
- `ceil(toRound)` if `toRound` < `towards`

Sign(float)

Returns the sign of the given value.

```
public static float Sign(this float x)
```

Parameters

x float

Returns

float

- 1 if x > 0
- 0 if x = 0
- -1 if x < 0

Remarks

This is different from Unity's Mathf.Sign(float) since this method defines the sign of 0 to be 0, whereas Mathf.Sign(float) defines it to be 1.

Square(int)

Computes `n * n`.

```
public static float Square(this int n)
```

Parameters

n int

Returns

float

Square(float)

Computes `n * n`.

```
public static float Square(this float n)
```

Parameters

`n` float

Returns

float

Namespace PAC.Patterns

Classes

Checkerboard<T>

A repeating pattern of two values where horizontally/vertically adjacent points do not have the same value (unless the two values of the checkerboard are the same).

For example, with r = red, b = blue:

```
            .
            .
            .
        r b r b r
        b r b r b
  . . . r b r b r . . .
        b r b r b
        r b r b r
            .
            .
            .
```

Gradient

Provides a collection of gradient patterns.

Gradient.Linear

A gradient that linearly interpolates from the colour of start to the colour of end based on how far a point is in the direction of the vector between these two endpoints.

https://en.wikipedia.org/wiki/Color_gradient#Axial_gradients

Gradient.Radial

A gradient that linearly interpolates from the colour of centre to the colour of onCircumference based on the distance of a point from the centre.

https://en.wikipedia.org/wiki/Color_gradient#Radial_gradients

Interfaces

IPattern2D<T>

Represents an algorithm to assign a value to each point in the 2D plane.

Class Checkerboard<T>

Namespace: PAC.Patterns

A repeating pattern of two values where horizontally/vertically adjacent points do not have the same value (unless the two values of the checkerboard are the same).

For example, with r = red, b = blue:

```
            .
            .
            .
        r b r b r
        b r b r b
  . . . r b r b r . . .
        b r b r b
        r b r b r
            .
            .
            .
```

```
public record Checkerboard<T> : IPattern2D<T>, IEquatable<Checkerboard<T>>
```

Type Parameters

T

Inheritance

object ← Checkerboard<T>

Implements

IPattern2D<T>, IEquatable<Checkerboard<T>>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Checkerboard(T, T)

```
public Checkerboard(T valueOfOrigin, T otherValue)
```

Parameters

`valueOfOrigin` T

The value of (0, 0) in the checkerboard.

`otherValue` T

The value of (1, 0) in the checkerboard.

Properties

this[IntVector2]

Gets the value of the pattern at the given point.

```
public T this[IntVector2 point] { get; }
```

Parameters

`point` IntVector2

Property Value

T

Remarks

This value should be completely determined by the state of the object, and computing it should not change the state in a way that will affect any subsequent computations. See IPattern2D<T> for more details.

Class Gradient

Namespace: PAC.Patterns

Provides a collection of gradient patterns.

```
public static class Gradient
```

Inheritance

object ← Gradient

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Class Gradient.Linear

Namespace: PAC.Patterns

A gradient that linearly interpolates from the colour of start to the colour of end based on how far a point is in the direction of the vector between these two endpoints.

https://en.wikipedia.org/wiki/Color_gradient#Axial_gradients

```
public record Gradient.Linear : IPattern2D<Color>, IEquatable<Gradient.Linear>
```

Inheritance

object ← Gradient.Linear

Implements

IPattern2D<Color>, IEquatable<Gradient.Linear>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IPattern2DExtensions.ToTexture(IPattern2D<Color>, IntRect)

Remarks

In More Detail:

We imagine a (real) line through start and end. Given a point, we project it perpendicularly onto the line. The colour is then the linear interpolation from the start colour to the end colour using the proportion `distance of projected point from start / distance of end from start`.

Points that project to outside the segment of the line between start and end will be given the colour of the closer endpoint. In other words, the colour is clamped between the start colour and end colour.

If the coord of start is the same as the coord of end, then the pattern will be the start colour everywhere.

Constructors

Linear((IntVector2 coord, Color colour), (IntVector2 coord, Color colour))

See Gradient.Linear for details.

```
public Linear((IntVector2 coord, Color colour) start, (IntVector2 coord, Color colour) end)
```

Parameters

`start` (IntVector2 coord, Color colour)

The position and colour of the start of the gradient.

`end` (IntVector2 coord, Color colour)

The position and colour of the end of the gradient.

Properties

this[IntVector2]

Gets the value of the pattern at the given point.

```
public Color this[IntVector2 point] { get; }
```

Parameters

`point` IntVector2

Property Value

Color

Remarks

This value should be completely determined by the state of the object, and computing it should not change the state in a way that will affect any subsequent computations. See

IPattern2D<T> for more details.

end

The position and colour of the end of the gradient.

```
public (IntVector2 coord, Color colour) end { get; init; }
```

Property Value

(IntVector2 coord, Color colour)

See Also
start

start

The position and colour of the start of the gradient.

```
public (IntVector2 coord, Color colour) start { get; init; }
```

Property Value

(IntVector2 coord, Color colour)

See Also
end

Class Gradient.Radial

Namespace: PAC.Patterns

A gradient that linearly interpolates from the colour of centre to the colour of onCircumference based on the distance of a point from the centre.

https://en.wikipedia.org/wiki/Color_gradient#Radial_gradients

```
public record Gradient.Radial : IPattern2D<Color>, IEquatable<Gradient.Radial>
```

Inheritance

object ← Gradient.Radial

Implements

IPattern2D<Color>, IEquatable<Gradient.Radial>

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2) , IPattern2DExtensions.ToTexture(IPattern2D<Color>, IntRect)

Remarks

In More Detail:

Let `r = distance(centre, onCircumference)`, and for a given point let `d = distance(centre, point)`.

- If `d = 0`, the point's colour will be the colour of centre.
- If `d >= r`, the point's colour will be the colour of onCircumference.
- If `0 < d < r`, the point's colour will be linearly interpolated from the colour of centre to the colour of onCircumference, using the proportion `d / r`.

Design Note:

If centre and onCircumference have the same coord, the centre will still have its assigned colour and all other points will have the colour of onCircumference. This definition was chosen because I think it feels natural for a user of the gradient tool to always see the centre have its assigned colour.

Constructors

Radial((IntVector2 coord, Color colour), (IntVector2 coord, Color colour))

See Gradient.Radial for details.

```
public Radial((IntVector2 coord, Color colour) centre, (IntVector2 coord, Color colour) onCircumference)
```

Parameters

`centre` (IntVector2 coord, Color colour)

The position and colour of the centre of the circle.

`onCircumference` (IntVector2 coord, Color colour)

The position and colour of some point on the circumference of the circle.

Properties

this[IntVector2]

Gets the value of the pattern at the given point.

```
public Color this[IntVector2 point] { get; }
```

Parameters

`point` IntVector2

Property Value

Color

Remarks

This value should be completely determined by the state of the object, and computing it should not change the state in a way that will affect any subsequent computations. See IPattern2D<T> for more details.

centre

The position and colour of the centre of the circle.

```
public (IntVector2 coord, Color colour) centre { get; init; }
```

Property Value

(IntVector2 coord, Color colour)

See Also
onCircumference

onCircumference

The position and colour of some point on the circumference of the circle.

```
public (IntVector2 coord, Color colour) onCircumference { get; init; }
```

Property Value

(IntVector2 coord, Color colour)

See Also
centre

Interface IPattern2D<T>

Namespace: PAC.Patterns

Represents an algorithm to assign a value to each point in the 2D plane.

```
public interface IPattern2D<out T>
```

Type Parameters

T

The type of the values assigned to points in the 2D plane.

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

This value should be completely determined by the state of the object, and computing it should not change the state in a way that will affect any subsequent computations. This is so the value is invariant across multiple calls, but allows 'settings' of the pattern to be changed.

Intended Usage:

```
class Pattern : IPattern2D<int>
{
    public int valueOfZero;

    public Pattern(int valueOfZero)
    {
        this.valueOfZero = valueOfZero;
    }

    // Assigns valueOfZero to (0, 0) and assigns 0 to every other point
    public int this[IntVector2 point] => point == IntVector2.zero ? valueOfZero : 0;
}
```

Here the value of a point is completely determined by `valueOfZero` and computing a value does not change anything about the object. The user is allowed to change `valueOfZero`, which acts as a 'setting' for the pattern.

Not Intended Usage:

```
class Pattern : IPattern2D<int>
{
    private int value = 0;

    public int this[IntVector2 point]
    {
        value += 1; // Changes the object's state
        return value;
    }
}
```

This is not intended usage because computing a value modifies the state of the object so that computing the value of, say, `(0, 0)` twice will give two different values without having changed any 'settings' of the pattern.
Note:

Changes to state that don't affect the values are allowed. So, for example, caching values to avoid recomputing them is allowed.

Properties

this[IntVector2]

Gets the value of the pattern at the given point.

```
T this[IntVector2 point] { get; }
```

Parameters

`point` IntVector2

Property Value

T

Remarks

This value should be completely determined by the state of the object, and computing it should not change the state in a way that will affect any subsequent computations. See IPattern2D<T> for more details.

Namespace PAC.Patterns.Extensions

Classes

IPattern2DExtensions

Extension methods for IPattern2D<T>.

Class IPattern2DExtensions

Namespace: PAC.Patterns.Extensions

Extension methods for IPattern2D<T>.

```
public static class IPattern2DExtensions
```

Inheritance

object ← IPattern2DExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

ToTexture(IPattern2D<Color32>, IntRect)

Turns the section of the pattern in the given rect into a Unity Texture2D.

```
public static Texture2D ToTexture(this IPattern2D<Color32> pattern,
IntRect textureRect)
```

Parameters

`pattern` IPattern2D<Color32>

`textureRect` IntRect

Returns

Texture2D

Remarks

Uses Texture2D.SetPixels32(Color32[]), so should be faster than ToTexture(IPattern2D<Color>, IntRect) which uses Texture2D.SetPixels(Color[]).

ToTexture(IPattern2D<Color>, IntRect)

Turns the section of the pattern in the given rect into a Unity Texture2D.

```
public static Texture2D ToTexture(this IPattern2D<Color> pattern,
IntRect textureRect)
```

Parameters

`pattern` IPattern2D<Color>

`textureRect` IntRect

Returns

Texture2D

Remarks

Uses Texture2D.SetPixels(Color[]), so won't be as fast as ToTexture(IPattern2D<Color32>, IntRect) which uses Texture2D.SetPixels32(Color32[]).

Namespace PAC.Screen

Classes

MaximiseWindow

ScreenInfo

Class MaximiseWindow

Namespace: PAC.Screen

```
public class MaximiseWindow : MonoBehaviour
```

Inheritance

object ← MaximiseWindow

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

ShowWindowAsync(int, int)

```
public static extern bool ShowWindowAsync(int hWnd, int nCmdShow)
```

Parameters

`hWnd` int

`nCmdShow` int

Returns

bool

Class ScreenInfo

Namespace: PAC.Screen

```
public static class ScreenInfo
```

Inheritance

object ← ScreenInfo

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Properties

screenWorldHeight

Returns the height of the screen in world coords.

```
public static float screenWorldHeight { get; }
```

Property Value

float

screenWorldWidth

Returns the width of the screen in world coords.

```
public static float screenWorldWidth { get; }
```

Property Value

float

Methods

GetScreenPixelColour(IntVector2)

Returns the colour of the screen pixel at the given coords. Best results when called after end of frame, using 'yield return new WaitForEndOfFrame()'.

```
public static Color GetScreenPixelColour(IntVector2 coords)
```

Parameters

`coords` IntVector2

Returns

Color

GetScreenPixelColour(int, int)

Returns the colour of the screen pixel at coords (x, y). Best results when called after end of frame, using 'yield return new WaitForEndOfFrame()'.

```
public static Color GetScreenPixelColour(int x, int y)
```

Parameters

`x` int

`y` int

Returns

Color

Namespace PAC.Shaders

Classes

HueSaturationBoxShader

LightnessSliderShader

Outline

RainbowOutline

Class HueSaturationBoxShader

Namespace: PAC.Shaders

```
public class HueSaturationBoxShader : MonoBehaviour
```

Inheritance

object ← HueSaturationBoxShader

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

hueSaturationBoxMaterial

```
public Material hueSaturationBoxMaterial
```

Field Value

Material

Class LightnessSliderShader

Namespace: PAC.Shaders

```
public class LightnessSliderShader : MonoBehaviour
```

Inheritance

object ← LightnessSliderShader

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

lightnessSliderMaterial

```
public Material lightnessSliderMaterial
```

Field Value

Material

Class Outline

Namespace: PAC.Shaders

```
public class Outline : MonoBehaviour
```

Inheritance

object ← Outline

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

outlineMaterial

```
public Material outlineMaterial
```

Field Value

Material

Properties

colour

```
public Color colour { get; set; }
```

Property Value

Color

keepExistingTexture

```
public bool keepExistingTexture { get; set; }
```

Property Value

bool

outlineEnabled

```
public bool outlineEnabled { get; set; }
```

Property Value

bool

thickness

```
public float thickness { get; set; }
```

Property Value

float

Class RainbowOutline

Namespace: PAC.Shaders

```
public class RainbowOutline : MonoBehaviour
```

Inheritance

object ← RainbowOutline

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

rainbowOutlineMaterial

```
public Material rainbowOutlineMaterial
```

Field Value

Material

Properties

keepExistingTexture

```
public bool keepExistingTexture { get; set; }
```

Property Value

bool

outlineEnabled

```
public bool outlineEnabled { get; set; }
```

Property Value

bool

thickness

```
public float thickness { get; set; }
```

Property Value

float

Namespace PAC.Tilesets

Classes

Tile

Tileset

Class Tile

Namespace: PAC.Tilesets

```
public class Tile
```

Inheritance

object ← Tile

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Tile(File, IntVector2, TileLayer[])

```
public Tile(File file, IntVector2 bottomLeft, TileLayer[] linkedTileLayers)
```

Parameters

`file` File

`bottomLeft` IntVector2

`linkedTileLayers` TileLayer[]

The tile layers that the tile is on that are associated with each of the layers in the tile's file. Given in the same order as the layers in the tile's file.

Properties

bottomLeft

```
public IntVector2 bottomLeft { get; set; }
```

Property Value

IntVector2

bottomRight

```
public IntVector2 bottomRight { get; set; }
```

Property Value

IntVector2

centre

```
public Vector2 centre { get; }
```

Property Value

Vector2

file

```
public File file { get; }
```

Property Value

File

height

```
public int height { get; }
```

Property Value

int

rect

```
public IntRect rect { get; }
```

Property Value

IntRect

tileLayersAppearsOn

```
public TileLayer[] tileLayersAppearsOn { get; }
```

Property Value

TileLayer[]

topLeft

```
public IntVector2 topLeft { get; set; }
```

Property Value

IntVector2

topRight

```
public IntVector2 topRight { get; set; }
```

Property Value

IntVector2

width

```
public int width { get; }
```

Property Value

int

Methods

LayerInTileToTileLayer(Layer)

Takes in the layer (that must be in the tile's file) and returns the tile layer (that the tile is on) that the layer is associated with.

```
public TileLayer LayerInTileToTileLayer(Layer layer)
```

Parameters

`layer` Layer

Returns

TileLayer

SubscribeToOnMoved(UnityAction<IntRect>)

```
public void SubscribeToOnMoved(UnityAction<IntRect> call)
```

Parameters

`call` UnityAction<IntRect>

TileLayerToLayerInTile(TileLayer)

Takes in the tile layer (that this tile must be on) and returns the layer it is associated with in the tile's file.

```
public Layer TileLayerToLayerInTile(TileLayer tileLayer)
```

Parameters

`tileLayer` TileLayer

Returns

Layer

Class Tileset

Namespace: PAC.Tilesets

```
public class Tileset
```

Inheritance

object ← Tileset

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

Tileset(string)

```
public Tileset(string name)
```

Parameters

`name` string

Tileset(string, List<File>)

```
public Tileset(string name, List<File> tiles)
```

Parameters

`name` string

`tiles` List<File>

Properties

Count

```
public int Count { get; }
```

Property Value

int

tilesetName

```
public string tilesetName { get; }
```

Property Value

string

Methods

AddTile(File)

```
public void AddTile(File tile)
```

Parameters

`tile` File

RemoveTile(File)

```
public bool RemoveTile(File tile)
```

Parameters

`tile` File

Returns

bool

Namespace PAC.Tools

Classes

CoordSnapping

Provides methods to snap coordinates so they fit certain properties, such as forming a square.

Tool

Defines the tools available to use and their properties.

Tools

Defines how different tools act. I may rework this to be more like the BlendMode class where each Tool instance defines how it acts. Then to use a tool you would just do tool.Use(pixel) or similar.

Class CoordSnapping

Namespace: PAC.Tools

Provides methods to snap coordinates so they fit certain properties, such as forming a square.

```
public static class CoordSnapping
```

Inheritance

object ← CoordSnapping

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

SnapToPerfectLine(IntVector2, IntVector2, int)

Returns the closest (in l1 distance) point to `movablePoint` that forms a perfect Line to `fixedPoint`.

```
public static IntVector2 SnapToPerfectLine(IntVector2 fixedPoint, IntVector2
movablePoint, int maxDistance = 100)
```

Parameters

`fixedPoint` IntVector2

`movablePoint` IntVector2

`maxDistance` int

The largest l1 distance from `movablePoint` to search for a point to snap to.

Returns

IntVector2

Remarks

Note such a point may not be unique. This method breaks ties in such a way that applying an isometry to `fixedPoint` and `movablePoint` (the same one to both) applies the isometry to the snapped point.

Exceptions

ArgumentOutOfRangeException

`maxDistance` is negative.

InvalidOperationException

There is no point to snap to within `maxDistance` of `movablePoint`.

SnapToSquare(IntVector2, IntVector2)

Either changes `movablePoint`'s x coord *or* changes its y coord so that the rectangle it forms with `fixedPoint` is a square.

```
public static IntVector2 SnapToSquare(IntVector2 fixedPoint,
IntVector2 movablePoint)
```

Parameters

`fixedPoint` IntVector2

`movablePoint` IntVector2

Returns

IntVector2

Remarks

Chooses the largest such square that preserves the sign of each component of `movablePoint - fixedPoint`. If `fixedPoint` and `movablePoint` have the same x coord (but different y), the square will be made by increasing the x coord; if `fixedPoint` and `movablePoint` have the same y coord (but different x), the square will be made by increasing the y coord.

Class Tool

Namespace: PAC.Tools

Defines the tools available to use and their properties.

```
public class Tool
```

Inheritance

object ← Tool

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

Brush

```
public static Tool Brush
```

Field Value

Tool

EyeDropper

```
public static Tool EyeDropper
```

Field Value

Tool

Fill

```
public static Tool Fill
```

Field Value

Tool

GlobalEyeDropper

```
public static Tool GlobalEyeDropper
```

Field Value

Tool

Gradient

```
public static Tool Gradient
```

Field Value

Tool

IsoBox

```
public static Tool IsoBox
```

Field Value

Tool

Line

```
public static Tool Line
```

Field Value

Tool

Move

```
public static Tool Move
```

Field Value

Tool

None

```
public static Tool None
```

Field Value

Tool

Pencil

```
public static Tool Pencil
```

Field Value

Tool

Rubber

```
public static Tool Rubber
```

Field Value

Tool

Selection

```
public static Tool Selection
```

Field Value

Tool

Shape

```
public static Tool Shape
```

Field Value

Tool

canBeCancelled

```
public bool canBeCancelled
```

Field Value

bool

tools

All implemented tools.

```
public static readonly Tool[] tools
```

Field Value

Tool[]

Properties

finishMode

What action causes a use of the tool to be ended.

```
public MouseTargetDeselectMode finishMode { get; }
```

Property Value

MouseTargetDeselectMode

name

```
public string name { get; }
```

Property Value

string

showBrushBorder

Whether the outline of the brush shape should be shown.

```
public bool showBrushBorder { get; }
```

Property Value

bool

useMovementInterpolation

When the mouse position jumps between frames: true - the tool should be applied to each coord the mouse moved through; false - just applied to the ending coord.

```
public bool useMovementInterpolation { get; }
```

Property Value

bool

Methods

StringToTool(string)

Gets the tool with that name.

```
public static Tool StringToTool(string toolName)
```

Parameters

`toolName` string

Returns

Tool

Class Tools

Namespace: PAC.Tools

Defines how different tools act. I may rework this to be more like the BlendMode class where each Tool instance defines how it acts. Then to use a tool you would just do tool.Use(pixel) or similar.

```
public static class Tools
```

Inheritance

object ← Tools

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

PencilLineSmoothing(Line, Line, bool)

Smooth the meeting point of the two lines (given as coords) so it is pixel-perfect - i.e. no hard 90-degree corner.

```
public static bool PencilLineSmoothing(Line line, Line previousLine,
bool previousLineWasSmoothed)
```

Parameters

`line` Line

`previousLine` Line

`previousLineWasSmoothed` bool

Returns

bool

UseBrush(File, int, int, IntVector2, IntVector2[], Color)

```
public static void UseBrush(File file, int layer, int frame, IntVector2 pixel,
IntVector2[] brushBorderMaskPixels, Color colour)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

`brushBorderMaskPixels` IntVector2[]

`colour` Color

UseBrush(File, int, int, int, int, IntVector2[], Color)

```
public static void UseBrush(File file, int layer, int frame, int x, int y,
IntVector2[] brushBorderMaskPixels, Color colour)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

`brushBorderMaskPixels` IntVector2[]

`colour` Color

UseEyeDropper(File, int, int, IntVector2)

```
public static Color UseEyeDropper(File file, int layer, int frame, IntVector2 pixel)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

Returns

Color

UseEyeDropper(File, int, int, int, int)

```
public static Color UseEyeDropper(File file, int layer, int frame, int x, int y)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

Returns

Color

UseFill(File, int, int, IntVector2, Color, bool, int)

```
public static void UseFill(File file, int layer, int frame, IntVector2 pixel, Color
colour, bool includeDiagonallyAdjacent, int maxNumOfIterations = 1000000)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

`colour` Color

`includeDiagonallyAdjacent` bool

`maxNumOfIterations` int

UseFill(File, int, int, int, int, Color, bool, int)

```
public static void UseFill(File file, int layer, int frame, int x, int y, Color
colour, bool includeDiagonallyAdjacent, int maxNumOfIterations = 1000000)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

`colour` Color

`includeDiagonallyAdjacent` bool

`maxNumOfIterations` int

UsePattern(File, int, int, IPattern2D<Color32>)

```
public static void UsePattern(File file, int layer, int frame,
IPattern2D<Color32> pattern)
```

Parameters

`file` File

`layer` int

`frame` int

`pattern` IPattern2D<Color32>

UsePattern(File, int, int, IPattern2D<Color>)

```
public static void UsePattern(File file, int layer, int frame,
IPattern2D<Color> pattern)
```

Parameters

`file` File

`layer` int

`frame` int

`pattern` IPattern2D<Color>

UsePencil(File, int, int, IntVector2, Color)

```
public static void UsePencil(File file, int layer, int frame, IntVector2 pixel,
Color colour)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

`colour` Color

UsePencil(File, int, int, int, int, Color)

```
public static void UsePencil(File file, int layer, int frame, int x, int y,
Color colour)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

`colour` Color

UseRubber(File, int, int, IntVector2)

```
public static void UseRubber(File file, int layer, int frame, IntVector2 pixel)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

UseRubber(File, int, int, IntVector2, IntVector2[])

```
public static void UseRubber(File file, int layer, int frame, IntVector2 pixel,
IntVector2[] brushBorderMaskPixels)
```

Parameters

`file` File

`layer` int

`frame` int

`pixel` IntVector2

`brushBorderMaskPixels` IntVector2[]

UseRubber(File, int, int, int, int)

```
public static void UseRubber(File file, int layer, int frame, int x, int y)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

UseRubber(File, int, int, int, int, IntVector2[])

```
public static void UseRubber(File file, int layer, int frame, int x, int y,
IntVector2[] brushBorderMaskPixels)
```

Parameters

`file` File

`layer` int

`frame` int

`x` int

`y` int

`brushBorderMaskPixels` IntVector2[]

UseShape(File, int, int, IShape, Color)

```
public static void UseShape(File file, int layer, int frame, IShape shape,
Color colour)
```

Parameters

`file` File

`layer` int

`frame` int

`shape` IShape

`colour` Color

Namespace PAC.UI.Components

Classes

UIElement

Enums

UIElementDeselectMode

UIElementSelectMode

Class UIElement

Namespace: PAC.UI.Components

```
public class UIElement : MonoBehaviour
```

Inheritance

object ← UIElement

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

viewport

```
public UIViewport viewport
```

Field Value

UIViewport

Properties

elementName

```
public string elementName { get; }
```

Property Value

string

Enum UIElementDeselectMode

Namespace: PAC.UI.Components

```
public enum UIElementDeselectMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Manual = 0`

`OnInputTargetUntargeted = 1`

Enum UIElementSelectMode

Namespace: PAC.UI.Components

```
public enum UIElementSelectMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Manual = 0`

`OnInputTargetTargeted = 1`

Namespace PAC.UI.Components.Effect Panels

Classes

BlurPanel

A panel that blurs the view behind it.

EffectPanel

A class to represent a type of panel that applies an effect to the view behind it - e.g. a blur panel or a pixellate panel.

PixellatePanel

A panel that pixellates the view behind it.

Class BlurPanel

Namespace: PAC.UI.Components.EffectPanels

A panel that blurs the view behind it.

```
public class BlurPanel : MonoBehaviour
```

Inheritance

object ← BlurPanel

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

blurEnabled

```
public bool blurEnabled { get; }
```

Property Value

bool

Methods

EnableDisable(bool)

```
public void EnableDisable(bool enabled)
```

Parameters

`enabled` bool

Class EffectPanel

Namespace: PAC.UI.Components.EffectPanels

A class to represent a type of panel that applies an effect to the view behind it - e.g. a blur panel or a pixellate panel.

```
public class EffectPanel : MonoBehaviour
```

Inheritance

object ← EffectPanel

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

EnableDisable(bool)

```
public void EnableDisable(bool enabled)
```

Parameters

`enabled` bool

Class PixellatePanel

Namespace: PAC.UI.Components.EffectPanels

A panel that pixellates the view behind it.

```
public class PixellatePanel : MonoBehaviour
```

Inheritance

object ← PixellatePanel

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

pixellateOn

```
public bool pixellateOn { get; }
```

Property Value

bool

Namespace PAC.UI.Components.General

Classes

UIButton

UICollapser

UIDropdown

UIDropdownChoice

UIGridPacker

UIModalWindow

UINumberField

UIScale

UIScrollbar

UITextbox

UIToggleButton

UIToggleGroup

UIViewport

Enums

CollapsedState

DropdownCloseMode

DropdownDirection

GridAlignment

ScrollDirection

UITextboxAnchorPoint

ViewportSide

Enum CollapsedState

Namespace: PAC.UI.Components.General

```
public enum CollapsedState
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Collapsed = 1`

`Uncollapsed = 0`

Enum DropdownCloseMode

Namespace: PAC.UI.Components.General

```
public enum DropdownCloseMode
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`ClickOff = 0`

`MouseOff = 1`

Enum DropdownDirection

Namespace: PAC.UI.Components.General

```
public enum DropdownDirection
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`down = -1`

`up = 1`

Enum GridAlignment

Namespace: PAC.UI.Components.General

```
public enum GridAlignment
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Centre = 0`

`Left = -1`

`Right = 1`

Enum ScrollDirection

Namespace: PAC.UI.Components.General

```
public enum ScrollDirection
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Horizontal = 1`

`Vertical = 0`

Class UIButton

Namespace: PAC.UI.Components.General

```
public class UIButton : MonoBehaviour
```

Inheritance

object ← UIButton

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

backgroundColour

```
public Color backgroundColour
```

Field Value

Color

backgroundHoverColour

```
public Color backgroundHoverColour
```

Field Value

Color

backgroundPressedColour

```
public Color backgroundPressedColour
```

Field Value

Color

Properties

height

```
public float height { get; set; }
```

Property Value

float

hoverImage

```
public Sprite hoverImage { get; }
```

Property Value

Sprite

image

```
public Sprite image { get; }
```

Property Value

Sprite

isPressed

```
public bool isPressed { get; }
```

Property Value

bool

pressedImage

```
public Sprite pressedImage { get; }
```

Property Value

Sprite

width

```
public float width { get; set; }
```

Property Value

float

Methods

Press()

```
public void Press()
```

RightClick()

```
public void RightClick()
```

SetImages(Sprite, Sprite, Sprite)

```
public void SetImages(Sprite image, Sprite hoverImage, Sprite pressedImage)
```

Parameters

`image` Sprite

`hoverImage` Sprite

`pressedImage` Sprite

SetSortingLayer(string)

```
public void SetSortingLayer(string sortingLayer)
```

Parameters

`sortingLayer` string

SetSortingLayer(string, int)

```
public void SetSortingLayer(string sortingLayer, int sortingOrder)
```

Parameters

`sortingLayer` string

`sortingOrder` int

SetSortingOrder(int)

```
public void SetSortingOrder(int sortingOrder)
```

Parameters

`sortingOrder` int

SetText(string)

```
public void SetText(string text)
```

Parameters

`text` string

SubscribeToClick(UnityAction)

```
public void SubscribeToClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToHover(UnityAction)

```
public void SubscribeToHover(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToIdle(UnityAction)

```
public void SubscribeToIdle(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftClick(UnityAction)

```
public void SubscribeToLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightClick(UnityAction)

```
public void SubscribeToRightClick(UnityAction call)
```

Parameters

`call` UnityAction

UpdateDisplay()

```
public void UpdateDisplay()
```

Class UICollapser

Namespace: PAC.UI.Components.General

```
public class UICollapser : MonoBehaviour
```

Inheritance

object ← UICollapser

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

Collapse()

```
public void Collapse()
```

SetCollapsed(CollapsedState)

```
public void SetCollapsed(CollapsedState collapsedState)
```

Parameters

`collapsedState` CollapsedState

Uncollapse()

```
public void Uncollapse()
```

Class UIDropdown

Namespace: PAC.UI.Components.General

```
public class UIDropdown : MonoBehaviour
```

Inheritance

object ← UIDropdown

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

openingButton

```
public GameObject openingButton
```

Field Value

GameObject

parentDropdown

```
public UIDropdown parentDropdown
```

Field Value

UIDropdown

Properties

isRootDropdown

```
public bool isRootDropdown { get; }
```

Property Value

bool

open

```
public bool open { get; }
```

Property Value

bool

rootDropdown

```
public UIDropdown rootDropdown { get; }
```

Property Value

UIDropdown

Methods

Close()

```
public void Close()
```

CloseRoot()

Closes the highest-level dropdown containing this one.

```
public void CloseRoot()
```

FullyOpen()

Opens this dropdown and all child dropdowns, and all their child dropdowns, etc.

```
public void FullyOpen()
```

Initialise()

```
public void Initialise()
```

MouseOff()

```
public bool MouseOff()
```

Returns

bool

Open()

```
public void Open()
```

SetOpen(bool)

```
public void SetOpen(bool open)
```

Parameters

`open` bool

SetOpenEditor(bool)

```
public void SetOpenEditor(bool open)
```

Parameters

`open` bool

ToggleOpen()

```
public void ToggleOpen()
```

Class UIDropdownChoice

Namespace: PAC.UI.Components.General

```
public class UIDropdownChoice : MonoBehaviour
```

Inheritance

object ← UIDropdownChoice

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

direction

```
public DropdownDirection direction
```

Field Value

DropdownDirection

options

```
public List<string> options
```

Field Value

List<string>

selectedOptionIndex

```
public int selectedOptionIndex
```

Field Value

int

Properties

selectedOption

```
public string selectedOption { get; }
```

Property Value

string

Methods

Select(string)

```
public bool Select(string option)
```

Parameters

`option` string

Returns

bool

SetUpDropdown()

```
public void SetUpDropdown()
```

SubscribeToOptionChanged(UnityAction)

```
public void SubscribeToOptionChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class UIGridPacker

Namespace: PAC.UI.Components.General

```
public class UIGridPacker : MonoBehaviour
```

Inheritance

object ← UIGridPacker

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

Repack()

```
public void Repack()
```

Class UIModalWindow

Namespace: PAC.UI.Components.General

```
public class UIModalWindow : MonoBehaviour
```

Inheritance

object ← UIModalWindow

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Methods

AddButton(string, UnityAction)

```
public UIModalWindow AddButton(string text, UnityAction onClick)
```

Parameters

`text` string

`onClick` UnityAction

Returns

UIModalWindow

AddCloseButton(string)

```
public UIModalWindow AddCloseButton(string text)
```

Parameters

`text` string

Returns

UIModalWindow

Close()

```
public void Close()
```

SetMessage(string)

```
public UIModalWindow SetMessage(string message)
```

Parameters

`message` string

Returns

UIModalWindow

SetTitle(string)

```
public UIModalWindow SetTitle(string title)
```

Parameters

`title` string

Returns

UIModalWindow

Class UINumberField

Namespace: PAC.UI.Components.General

```
public class UINumberField : MonoBehaviour
```

Inheritance

object ← UINumberField

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

max

```
public float max { get; set; }
```

Property Value

float

min

```
public float min { get; set; }
```

Property Value

float

value

```
public float value { get; set; }
```

Property Value

float

Methods

AddNumOfIncrements(int)

```
public void AddNumOfIncrements(int numOfIncrements)
```

Parameters

`numOfIncrements` int

Decrement()

```
public void Decrement()
```

Increment()

```
public void Increment()
```

SubscribeToValueChanged(UnityAction)

```
public void SubscribeToValueChanged(UnityAction call)
```

Parameters

`call` UnityAction

Class UIScale

Namespace: PAC.UI.Components.General

```
public class UIScale : MonoBehaviour
```

Inheritance

object ← UIScale

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

backgroundColour

```
public Color backgroundColour
```

Field Value

Color

backgroundHoverColour

```
public Color backgroundHoverColour
```

Field Value

Color

backgroundPressedColour

```
public Color backgroundPressedColour
```

Field Value

Color

height

```
public float height
```

Field Value

float

width

```
public float width
```

Field Value

float

Properties

decimalPlaces

```
public int decimalPlaces { get; }
```

Property Value

int

value

```
public float value { get; }
```

Property Value

float

Methods

SetValue(float)

```
public bool SetValue(float value)
```

Parameters

`value` float

Returns

bool

SetValueNoNotify(float)

```
public bool SetValueNoNotify(float value)
```

Parameters

`value` float

Returns

bool

SubscribeToValueChange(UnityAction)

```
public void SubscribeToValueChange(UnityAction call)
```

Parameters

call UnityAction

UpdateDisplay()

```
public void UpdateDisplay()
```

Class UIScrollbar

Namespace: PAC.UI.Components.General

```
public class UIScrollbar : MonoBehaviour
```

Inheritance

object ← UIScrollbar

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

backgroundColour

```
public Color backgroundColour
```

Field Value

Color

backgroundHoverColour

```
public Color backgroundHoverColour
```

Field Value

Color

backgroundPressedColour

```
public Color backgroundPressedColour
```

Field Value

Color

handleColour

```
public Color handleColour
```

Field Value

Color

handleHoverColour

```
public Color handleHoverColour
```

Field Value

Color

handlePressedColour

```
public Color handlePressedColour
```

Field Value

Color

height

```
public float height
```

Field Value

float

width

```
public float width
```

Field Value

float

Properties

scrollAmount

```
public float scrollAmount { get; set; }
```

Property Value

float

Methods

GetScrollAmount()

```
public float GetScrollAmount()
```

Returns

float

SetScrollAmount(float)

```
public void SetScrollAmount(float scrollAmount)
```

Parameters

`scrollAmount` float

UpdateDisplay()

```
public void UpdateDisplay()
```

Class UITextbox

Namespace: PAC.UI.Components.General

```
public class UITextbox : MonoBehaviour
```

Inheritance

object ← UITextbox

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

allowLetters

```
public bool allowLetters
```

Field Value

bool

allowNumbers

```
public bool allowNumbers
```

Field Value

bool

allowPunctuation

```
public bool allowPunctuation
```

Field Value

bool

allowSpaces

```
public bool allowSpaces
```

Field Value

bool

anchorPoint

```
public UITextboxAnchorPoint anchorPoint
```

Field Value

UITextboxAnchorPoint

backgroundColour

```
public Color backgroundColour
```

Field Value

Color

backgroundHoverColour

```
public Color backgroundHoverColour
```

Field Value

Color

backgroundPressedColour

```
public Color backgroundPressedColour
```

Field Value

Color

backgroundSelectedColour

```
public Color backgroundSelectedColour
```

Field Value

Color

height

```
public float height
```

Field Value

float

width

```
public float width
```

Field Value

float

Properties

prefix

```
public string prefix { get; }
```

Property Value

string

suffix

```
public string suffix { get; }
```

Property Value

string

text

```
public string text { get; }
```

Property Value

string

Methods

SetPrefix(string)

```
public void SetPrefix(string prefix)
```

Parameters

`prefix` string

SetSuffix(string)

```
public void SetSuffix(string suffix)
```

Parameters

`suffix` string

SetText(string)

```
public void SetText(string text)
```

Parameters

`text` string

SubscribeToFinishEvent(UnityAction)

```
public void SubscribeToFinishEvent(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToInputEvent(UnityAction)

```
public void SubscribeToInputEvent(UnityAction call)
```

Parameters

`call` UnityAction

UpdateAnchor()

```
public void UpdateAnchor()
```

UpdateDisplay()

```
public void UpdateDisplay()
```

Enum UITextboxAnchorPoint

Namespace: PAC.UI.Components.General

```
public enum UITextboxAnchorPoint
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Centre = 4`

`Left = 3`

`Right = 5`

Class UIToggleButton

Namespace: PAC.UI.Components.General

```
public class UIToggleButton : MonoBehaviour
```

Inheritance

object ← UIToggleButton

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

height

```
public float height
```

Field Value

float

hoverBackgroundTint

```
public Color hoverBackgroundTint
```

Field Value

Color

width

```
public float width
```

Field Value

float

Properties

hoverImage

```
public Sprite hoverImage { get; }
```

Property Value

Sprite

inToggleGroup

```
public bool inToggleGroup { get; }
```

Property Value

bool

offBackgroundColour

```
public Color offBackgroundColour { get; set; }
```

Property Value

Color

offImage

```
public Sprite offImage { get; }
```

Property Value

Sprite

on

```
public bool on { get; }
```

Property Value

bool

onBackgroundColour

```
public Color onBackgroundColour { get; set; }
```

Property Value

Color

onImage

```
public Sprite onImage { get; }
```

Property Value

Sprite

pressedBackgroundColour

```
public Color pressedBackgroundColour { get; set; }
```

Property Value

Color

pressedImage

```
public Sprite pressedImage { get; }
```

Property Value

Sprite

toggleGroup

```
public UIToggleGroup toggleGroup { get; }
```

Property Value

UIToggleGroup

toggleName

```
public string toggleName { get; set; }
```

Property Value

string

Methods

JoinToggleGroup(UIToggleGroup)

```
public void JoinToggleGroup(UIToggleGroup toggleGroup)
```

Parameters

`toggleGroup` UIToggleGroup

LeaveToggleGroup()

```
public void LeaveToggleGroup()
```

Press()

```
public void Press()
```

RightClick()

```
public void RightClick()
```

SetImages(Sprite, Sprite, Sprite, Sprite)

```
public void SetImages(Sprite offImage, Sprite onImage, Sprite hoverImage,
Sprite pressedImage)
```

Parameters

`offImage` Sprite

`onImage` Sprite

`hoverImage` Sprite

`pressedImage` Sprite

SetOnOff(bool)

```
public void SetOnOff(bool on)
```

Parameters

`on` bool

SetText(string)

```
public void SetText(string text)
```

Parameters

`text` string

SetTextAlignment(TextAnchor)

```
public void SetTextAlignment(TextAnchor textAlignment)
```

Parameters

`textAlignment` TextAnchor

SubscribeToHover(UnityAction)

```
public void SubscribeToHover(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToLeftClick(UnityAction)

```
public void SubscribeToLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightClick(UnityAction)

```
public void SubscribeToRightClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToTurnOff(UnityAction)

```
public void SubscribeToTurnOff(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToTurnOn(UnityAction)

```
public void SubscribeToTurnOn(UnityAction call)
```

Parameters

`call` UnityAction

UpdateDisplay()

```
public void UpdateDisplay()
```

Class UIToggleGroup

Namespace: PAC.UI.Components.General

```
public class UIToggleGroup : MonoBehaviour
```

Inheritance

object ← UIToggleGroup

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

Count

```
public int Count { get; }
```

Property Value

int

canSelectMultiple

```
public bool canSelectMultiple { get; }
```

Property Value

bool

canSelectNone

```
public bool canSelectNone { get; }
```

Property Value

bool

currentToggle

```
public UIToggleButton currentToggle { get; }
```

Property Value

UIToggleButton

currentToggleIndex

```
public int currentToggleIndex { get; }
```

Property Value

int

hasSelectedToggle

```
public bool hasSelectedToggle { get; }
```

Property Value

bool

selectedIndices

```
public int[] selectedIndices { get; }
```

Property Value

int[]

selectedToggles

```
public UIToggleButton[] selectedToggles { get; }
```

Property Value

UIToggleButton[]

swapClickAndCtrlClick

```
public bool swapClickAndCtrlClick { get; }
```

Property Value

bool

toggles

```
public List<UIToggleButton> toggles { get; }
```

Property Value

List<UIToggleButton>

Methods

Add(UIToggleButton)

```
public bool Add(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

Clear()

```
public void Clear()
```

Contains(UIToggleButton)

```
public bool Contains(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

CtrlPress(UIToggleButton)

```
public bool CtrlPress(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

CtrlPress(int)

```
public bool CtrlPress(int index)
```

Parameters

`index` int

Returns

bool

DestroyToggles()

```
public void DestroyToggles()
```

Press(UIToggleButton)

```
public bool Press(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

Press(int)

```
public bool Press(int index)
```

Parameters

`index` int

Returns

bool

PressForceEvent(UIToggleButton)

```
public bool PressForceEvent(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

PressForceEvent(int)

```
public bool PressForceEvent(int index)
```

Parameters

`index` int

Returns

bool

PressOrCtrlPress(UIToggleButton, bool)

```
public bool PressOrCtrlPress(UIToggleButton toggle, bool ctrlClick)
```

Parameters

`toggle` UIToggleButton

`ctrlClick` bool

Returns

bool

Remove(UIToggleButton)

```
public bool Remove(UIToggleButton toggle)
```

Parameters

`toggle` UIToggleButton

Returns

bool

SubscribeToSelectedToggleChange(UnityAction)

```
public void SubscribeToSelectedToggleChange(UnityAction call)
```

Parameters

`call` UnityAction

Class UIViewport

Namespace: PAC.UI.Components.General

```
public class UIViewport : MonoBehaviour
```

Inheritance

object ← UIViewport

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

boundScrollToContents

```
public bool boundScrollToContents
```

Field Value

bool

maxScrollAmount

```
public float maxScrollAmount
```

Field Value

float

maxScrollEnabled

```
public bool maxScrollEnabled
```

Field Value

bool

minScrollAmount

```
public float minScrollAmount
```

Field Value

float

minScrollEnabled

```
public bool minScrollEnabled
```

Field Value

bool

scrollDirection

```
public ScrollDirection scrollDirection
```

Field Value

ScrollDirection

Properties

collider

```
public BoxCollider2D collider { get; }
```

Property Value

BoxCollider2D

defaultScrollSide

```
public ViewportSide defaultScrollSide { get; }
```

Property Value

ViewportSide

rectTransform

```
public RectTransform rectTransform { get; }
```

Property Value

RectTransform

scrollAmount

```
public float scrollAmount { get; }
```

Property Value

float

scrollingArea

```
public Transform scrollingArea { get; }
```

Property Value

Methods

AddScrollAmount(float)

```
public void AddScrollAmount(float scrollAmount)
```

Parameters

`scrollAmount` float

GetScrollMinMaxX()

Get the min and max x value of the space that the objects in this viewport's scroll area occupy. (Scaled to the scale of the viewport object.)

```
public Vector2 GetScrollMinMaxX()
```

Returns

Vector2

(min x, max x)

GetScrollMinMaxY()

Get the min and max y value of the space that the objects in this viewport's scroll area occupy. (Scaled to the scale of the viewport object.)

```
public Vector2 GetScrollMinMaxY()
```

Returns

Vector2

(min y, max y)

RefreshViewport()

```
public void RefreshViewport()
```

SetScrollAmount(float)

```
public void SetScrollAmount(float scrollAmount)
```

Parameters

`scrollAmount` float

SubscribeToRefresh(UnityAction)

```
public void SubscribeToRefresh(UnityAction call)
```

Parameters

`call` UnityAction

Enum ViewportSide

Namespace: PAC.UI.Components.General

```
public enum ViewportSide
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Centre = 0`

`Negative = -1`

`Positive = 1`

Namespace PAC.UI.Components.General.Tooltip

Classes

Tooltip

UITooltip

Class Tooltip

Namespace: PAC.UI.Components.General.Tooltip

```
public class Tooltip : MonoBehaviour
```

Inheritance

object ← Tooltip

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

hoverTimeUntilTooltip

```
public float hoverTimeUntilTooltip
```

Field Value

float

padding

```
public Vector2 padding
```

Field Value

Vector2

Properties

text

```
public string text { get; set; }
```

Property Value

string

tooltipVisible

```
public bool tooltipVisible { get; }
```

Property Value

bool

Methods

HideTooltip()

```
public void HideTooltip()
```

ShowTooltip(Vector2)

```
public void ShowTooltip(Vector2 worldCoords)
```

Parameters

`worldCoords` Vector2

Class UITooltip

Namespace: PAC.UI.Components.General.Tooltip

```
public class UITooltip : MonoBehaviour
```

Inheritance

object ← UITooltip

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

padding

```
public Vector2 padding
```

Field Value

Vector2

Properties

globalHeight

```
public float globalHeight { get; }
```

Property Value

float

globalWidth

```
public float globalWidth { get; }
```

Property Value

float

localHeight

```
public float localHeight { get; }
```

Property Value

float

localWidth

```
public float localWidth { get; }
```

Property Value

float

text

```
public string text { get; set; }
```

Property Value

string

Methods

Awake()

```
public void Awake()
```

GoesOffBottomOfScreen()

```
public bool GoesOffBottomOfScreen()
```

Returns

bool

GoesOffLeftOfScreen()

```
public bool GoesOffLeftOfScreen()
```

Returns

bool

GoesOffRightOfScreen()

```
public bool GoesOffRightOfScreen()
```

Returns

bool

GoesOffScreen()

```
public bool GoesOffScreen()
```

Returns

bool

GoesOffTopOfScreen()

```
public bool GoesOffTopOfScreen()
```

Returns

bool

SetText(string)

```
public void SetText(string text)
```

Parameters

`text` string

Namespace PAC.UI.Components.Specialised

Classes

FileTab

LayerTile

UIKeyboardShortcut

UITileIcon

UIToolButton

Class FileTab

Namespace: PAC.UI.Components.Specialised

```
public class FileTab : MonoBehaviour
```

Inheritance

object ← FileTab

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

closed

```
public bool closed { get; set; }
```

Property Value

bool

file

```
public File file { get; }
```

Property Value

File

selected

```
public bool selected { get; }
```

Property Value

bool

tileToggle

```
public UIToggleButton tileToggle { get; }
```

Property Value

UIToggleButton

Methods

SetFile(File)

```
public void SetFile(File file)
```

Parameters

`file` File

SubscribeToClose(UnityAction)

```
public void SubscribeToClose(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToNameChange(UnityAction)

```
public void SubscribeToNameChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToSelect(UnityAction)

```
public void SubscribeToSelect(UnityAction call)
```

Parameters

`call` UnityAction

Class LayerTile

Namespace: PAC.UI.Components.Specialised

```
public class LayerTile : MonoBehaviour
```

Inheritance

object ← LayerTile

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

layer

```
public Layer layer { get; }
```

Property Value

Layer

selected

```
public bool selected { get; }
```

Property Value

bool

tileToggle

```
public UIToggleButton tileToggle { get; }
```

Property Value

UIToggleButton

Methods

SetLayer(Layer)

```
public void SetLayer(Layer layer)
```

Parameters

`layer` Layer

SubscribeToLockChange(UnityAction)

```
public void SubscribeToLockChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToNameChange(UnityAction)

```
public void SubscribeToNameChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToRightClick(UnityAction)

```
public void SubscribeToRightClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToVisibilityChange(UnityAction)

```
public void SubscribeToVisibilityChange(UnityAction call)
```

Parameters

`call` UnityAction

Class UIKeyboardShortcut

Namespace: PAC.UI.Components.Specialised

```
public class UIKeyboardShortcut : MonoBehaviour
```

Inheritance

object ← UIKeyboardShortcut

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

actionName

```
public string actionName
```

Field Value

string

Properties

shortcut

```
public KeyboardShortcut shortcut { get; set; }
```

Property Value

KeyboardShortcut

Methods

SubscribeToOnShortcutSet(UnityAction<KeyboardShortcut>)

```
public void SubscribeToOnShortcutSet(UnityAction<KeyboardShortcut> call)
```

Parameters

`call` UnityAction<KeyboardShortcut>

Class UITileIcon

Namespace: PAC.UI.Components.Specialised

```
public class UITileIcon : MonoBehaviour
```

Inheritance

object ← UITileIcon

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

file

```
public File file { get; }
```

Property Value

File

height

```
public float height { get; }
```

Property Value

float

width

```
public float width { get; }
```

Property Value

float

Methods

SetFile(File)

```
public void SetFile(File file)
```

Parameters

`file` File

SubscribeToOnClick(UnityAction)

```
public void SubscribeToOnClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnLeftClick(UnityAction)

```
public void SubscribeToOnLeftClick(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnRightClick(UnityAction)

```
public void SubscribeToOnRightClick(UnityAction call)
```

Parameters

`call` UnityAction

Class UIToolButton

Namespace: PAC.UI.Components.Specialised

```
public class UIToolButton : MonoBehaviour
```

Inheritance

object ← UIToolButton

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

buttons

```
public UIButton[] buttons { get; }
```

Property Value

UIButton[]

currentButton

```
public UIButton currentButton { get; }
```

Property Value

UIButton

Namespace PAC.UI.Components.Specialised.Animation

Classes

FrameNotch

A class for the frame number markers on the animation timeline.

KeyFrameIcon

Stores the data about a keyframe icon on the animation timeline.

Class FrameNotch

Namespace: PAC.UI.Components.Specialised.Animation

A class for the frame number markers on the animation timeline.

```
public class FrameNotch : MonoBehaviour
```

Inheritance

object ← FrameNotch

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

frameNum

```
public int frameNum { get; set; }
```

Property Value

int

Methods

SetFrameNumber(int)

```
public void SetFrameNumber(int num)
```

Parameters

num int

Class KeyFrameIcon

Namespace: PAC.UI.Components.Specialised.Animation

Stores the data about a keyframe icon on the animation timeline.

```
public class KeyFrameIcon : MonoBehaviour
```

Inheritance

object ← KeyFrameIcon

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

frameIndex

The frame number this keyframe is on.

```
public int frameIndex
```

Field Value

int

layerIndex

The layer index this keyframe is on.

```
public int layerIndex
```

Field Value

int

Namespace PAC.UI.Components.Specialised.ColourField

Classes

UIColourField

UIColourFieldGroup

Class UIColourField

Namespace: PAC.UI.Components.Specialised.ColourField

```
public class UIColourField : MonoBehaviour
```

Inheritance

object ← UIColourField

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

colour

```
public Color colour { get; }
```

Property Value

Color

colourPickerOpen

```
public bool colourPickerOpen { get; }
```

Property Value

bool

outlineThickness

```
public float outlineThickness { get; }
```

Property Value

float

Methods

CloseColourPicker()

```
public void CloseColourPicker()
```

OpenColourPicker()

```
public void OpenColourPicker()
```

SetColour(Color)

```
public void SetColour(Color colour)
```

Parameters

`colour` Color

SubscribeToColourChange(UnityAction)

```
public void SubscribeToColourChange(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToColourPickerClose(UnityAction)

```
public void SubscribeToColourPickerClose(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToColourPickerOpen(UnityAction)

```
public void SubscribeToColourPickerOpen(UnityAction call)
```

Parameters

`call` UnityAction

Class UIColourFieldGroup

Namespace: PAC.UI.Components.Specialised.ColourField

```
public class UIColourFieldGroup : MonoBehaviour
```

Inheritance

object ← UIColourFieldGroup

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

Count

```
public int Count { get; }
```

Property Value

int

colourFields

```
public List<UIColourField> colourFields { get; }
```

Property Value

List<UIColourField>

currentOpenColourField

```
public UIColourField currentOpenColourField { get; }
```

Property Value

UIColourField

Methods

Add(UIColourField)

```
public bool Add(UIColourField colourField)
```

Parameters

`colourField` UIColourField

Returns

bool

Clear()

```
public void Clear()
```

Contains(UIColourField)

```
public bool Contains(UIColourField colourField)
```

Parameters

`colourField` UIColourField

Returns

bool

DestroyColourFields()

```
public void DestroyColourFields()
```

Opened(UIColourField)

```
public void Opened(UIColourField openedColourField)
```

Parameters

`openedColourField` UIColourField

Remove(UIColourField)

```
public bool Remove(UIColourField colourField)
```

Parameters

`colourField` UIColourField

Returns

bool

SubscribeToColourFieldOpen(UnityAction)

```
public void SubscribeToColourFieldOpen(UnityAction call)
```

Parameters

`call` UnityAction

Namespace PAC.UI.Components.Specialised.ColourPicker

Classes

ColourPreview

A class to represent colour previews - the boxes on colour pickers that show what colours you have selected.

GlobalColourPicker

A class for the main colour picker in the program - the one that appears in the main view.

HSLColourPicker

A class for the HSL colour picker.

HSLHueSaturationBox

A class for the hue/saturation box of the HSL colour picker.

HSLLightnessSlider

A class for the lightness slider of the HSL colour picker.

UIColourPicker

Class ColourPreview

Namespace: PAC.UI.Components.Specialised.ColourPicker

A class to represent colour previews - the boxes on colour pickers that show what colours you have selected.

```
public class ColourPreview : MonoBehaviour
```

Inheritance

object ← ColourPreview

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

colour

The colour displayed in the colour preview.

```
public Color colour { get; }
```

Property Value

Color

outlineThickness

```
public float outlineThickness { get; }
```

Property Value

float

Methods

SetColour(Color)

```
public void SetColour(Color colour)
```

Parameters

`colour` Color

SubscribeToOnDeselect(UnityAction)

Event invoked when colour preview is deselected.

```
public void SubscribeToOnDeselect(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnSelect(UnityAction)

Event invoked when colour preview is selected.

```
public void SubscribeToOnSelect(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToOnToggle(UnityAction)

Event invoked when colour preview is selected or deselected.

```
public void SubscribeToOnToggle(UnityAction call)
```

Parameters

`call` UnityAction

Class GlobalColourPicker

Namespace: PAC.UI.Components.Specialised.ColourPicker

A class for the main colour picker in the program - the one that appears in the main view.

```
public class GlobalColourPicker : MonoBehaviour
```

Inheritance

object ← GlobalColourPicker

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

colour

The currenty-selected colour.

```
public Color colour { get; }
```

Property Value

Color

numOfColourPreviews

```
public int numOfColourPreviews { get; }
```

Property Value

int

primaryColour

The current primary colour.

```
public Color primaryColour { get; }
```

Property Value

Color

secondaryColour

The current secondary colour.

```
public Color secondaryColour { get; }
```

Property Value

Color

Methods

GetColour(int)

Gets the chosen colour at the given index: 0 - primary; 1 - secondary.

```
public Color GetColour(int colourPreviewIndex)
```

Parameters

`colourPreviewIndex` int

Returns

Color

SetColour(Color)

Sets the current colour.

```
public void SetColour(Color colour)
```

Parameters

`colour` Color

SubscribeToOnColourChange(UnityAction)

Event is invoked when the selected colour changes.

```
public void SubscribeToOnColourChange(UnityAction call)
```

Parameters

`call` UnityAction

Class HSLColourPicker

Namespace: PAC.UI.Components.Specialised.ColourPicker

A class for the HSL colour picker.

```
public class HSLColourPicker : MonoBehaviour
```

Inheritance

object ← HSLColourPicker

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Remarks

The picker gets the hue as the x coord on the HSLHueSaturationBox (in the range `[0, 1]`), the saturation as the y coord on the HSLHueSaturationBox (in the range `[0, 1]`), and the lightness as the y coord on the HSLLightnessSlider (in the range `[0, 1]`).

For the display, the shader treats the HSL as being in gamma space. Hence, for the picked colour to match the colour on the display, the picked colour should be treated as in gamma space.

Properties

alpha

```
public float alpha { get; }
```

Property Value

float

color

```
public Color color { get; }
```

Property Value

Color

hsl

```
public HSLA hsl { get; }
```

Property Value

HSLA

hue

```
public float hue { get; }
```

Property Value

float

lightness

```
public float lightness { get; }
```

Property Value

float

mouseSensitivity

```
public float mouseSensitivity { get; }
```

Property Value

float

saturation

```
public float saturation { get; }
```

Property Value

float

slowSensitivityScalar

The sensitivity of the mouse when holding the modifier keyboard shortcut to reduce the sensitivity.

```
public float slowSensitivityScalar { get; }
```

Property Value

float

Methods

SetColour(Color)

```
public void SetColour(Color colour)
```

Parameters

`colour` Color

SubscribeToOnColourChange(UnityAction)

Event invoked when the selected colour changes.

```
public void SubscribeToOnColourChange(UnityAction call)
```

Parameters

`call` UnityAction

UpdateColour()

```
public void UpdateColour()
```

Class HSLHueSaturationBox

Namespace: PAC.UI.Components.Specialised.ColourPicker

A class for the hue/saturation box of the HSL colour picker.

```
public class HSLHueSaturationBox : MonoBehaviour
```

Inheritance

object ← HSLHueSaturationBox

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

hue

```
public float hue { get; }
```

Property Value

float

saturation

```
public float saturation { get; }
```

Property Value

float

Methods

SetHue(float)

```
public void SetHue(float hue)
```

Parameters

`hue` float

SetSaturation(float)

```
public void SetSaturation(float saturation)
```

Parameters

`saturation` float

Class HSLLightnessSlider

Namespace: PAC.UI.Components.Specialised.ColourPicker

A class for the lightness slider of the HSL colour picker.

```
public class HSLLightnessSlider : MonoBehaviour
```

Inheritance

object ← HSLLightnessSlider

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Properties

lightness

```
public float lightness { get; }
```

Property Value

float

Methods

SetDisplayHueSaturation(float, float)

Sets the hue/saturation to use for displaying the lightness gradient.

```
public void SetDisplayHueSaturation(float hue, float saturation)
```

Parameters

hue float

`saturation` float

SetLightness(float)

```
public void SetLightness(float lightness)
```

Parameters

`lightness` float

Class UIColourPicker

Namespace: PAC.UI.Components.Specialised.ColourPicker

```
public class UIColourPicker : MonoBehaviour
```

Inheritance

object ← UIColourPicker

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

colourPreview

```
public ColourPreview colourPreview
```

Field Value

ColourPreview

Properties

colour

```
public Color colour { get; }
```

Property Value

Color

Methods

Close()

```
public void Close()
```

SelectDeselectEyeDropper()

```
public void SelectDeselectEyeDropper()
```

SetColour(Color)

```
public void SetColour(Color colour)
```

Parameters

`colour` Color

SubscribeToClose(UnityAction)

```
public void SubscribeToClose(UnityAction call)
```

Parameters

`call` UnityAction

SubscribeToColourChange(UnityAction)

```
public void SubscribeToColourChange(UnityAction call)
```

Parameters

`call` UnityAction

UpdateColour(Color)

```
public void UpdateColour(Color colour)
```

Parameters

`colour` Color

Namespace PAC.UI.Themes

Classes

Theme

UITheme

Enums

ThemeObjectType

Class Theme

Namespace: PAC.UI.Themes

```
public class Theme : ScriptableObject
```

Inheritance

object ← Theme

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

backgroundColour

```
public Color backgroundColour
```

Field Value

Color

buttonColour

```
public Color buttonColour
```

Field Value

Color

buttonHoverColour

```
public Color buttonHoverColour
```

Field Value

Color

buttonPressedColour

```
public Color buttonPressedColour
```

Field Value

Color

layerTileHoverTint

```
public Color layerTileHoverTint
```

Field Value

Color

layerTileOffColour

```
public Color layerTileOffColour
```

Field Value

Color

layerTileOnColour

```
public Color layerTileOnColour
```

Field Value

Color

layerTilePressedColour

```
public Color layerTilePressedColour
```

Field Value

Color

panelColour

```
public Color panelColour
```

Field Value

Color

scaleColour

```
public Color scaleColour
```

Field Value

Color

scaleHoverColour

```
public Color scaleHoverColour
```

Field Value

Color

scalePressedColour

```
public Color scalePressedColour
```

Field Value

Color

scrollbarBackgroundColour

```
public Color scrollbarBackgroundColour
```

Field Value

Color

scrollbarBackgroundHoverColour

```
public Color scrollbarBackgroundHoverColour
```

Field Value

Color

scrollbarBackgroundPressedColour

```
public Color scrollbarBackgroundPressedColour
```

Field Value

Color

scrollbarHandleColour

```
public Color scrollbarHandleColour
```

Field Value

Color

scrollbarHandleHoverColour

```
public Color scrollbarHandleHoverColour
```

Field Value

Color

scrollbarHandlePressedColour

```
public Color scrollbarHandlePressedColour
```

Field Value

Color

shadowColour

```
public Color shadowColour
```

Field Value

Color

subPanelColour

```
public Color subPanelColour
```

Field Value

Color

textboxColour

```
public Color textboxColour
```

Field Value

Color

textboxHoverColour

```
public Color textboxHoverColour
```

Field Value

Color

textboxPressedColour

```
public Color textboxPressedColour
```

Field Value

Color

textboxSelectedColour

```
public Color textboxSelectedColour
```

Field Value

Color

themeName

```
public string themeName
```

Field Value

string

toggleButtonHoverTint

```
public Color toggleButtonHoverTint
```

Field Value

Color

toggleButtonOffColour

```
public Color toggleButtonOffColour
```

Field Value

Color

toggleButtonOnColour

```
public Color toggleButtonOnColour
```

Field Value

Color

toggleButtonPressedColour

```
public Color toggleButtonPressedColour
```

Field Value

Color

Methods

SubscribeToOnChanged(UnityAction)

```
public void SubscribeToOnChanged(UnityAction call)
```

Parameters

`call` UnityAction

Enum ThemeObjectType

Namespace: PAC.UI.Themes

```
public enum ThemeObjectType
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Background = 1`

`None = 0`

`Panel = 2`

`RadioButton = 5`

`Shadow = 4`

`SubPanel = 3`

Class UITheme

Namespace: PAC.UI.Themes

```
public class UITheme : MonoBehaviour
```

Inheritance

object ← UITheme

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Namespace PAC.UndoRedo

Classes

UndoRedoState

Enums

UndoRedoAction

Enum UndoRedoAction

Namespace: PAC.UndoRedo

```
public enum UndoRedoAction
```

Extension Methods
ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Fields

`Draw = 1`

`None = -1`

`ReorderLayers = 2`

`Undefined = 0`

Class UndoRedoState

Namespace: PAC.UndoRedo

```
public class UndoRedoState
```

Inheritance

object ← UndoRedoState

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)

Constructors

UndoRedoState(UndoRedoAction, Layer, int)

```
public UndoRedoState(UndoRedoAction action, Layer layer, int layerIndex)
```

Parameters

`action` UndoRedoAction

`layer` Layer

`layerIndex` int

UndoRedoState(UndoRedoAction, Layer[], int[])

```
public UndoRedoState(UndoRedoAction action, Layer[] affectedLayers,
int[] affectedLayersIndices)
```

Parameters

`action` UndoRedoAction

`affectedLayers` Layer[]

`affectedLayersIndices` int[]

Properties

action

```
public UndoRedoAction action { get; }
```

Property Value

UndoRedoAction

affectedLayers

```
public Layer[] affectedLayers { get; }
```

Property Value

Layer[]

affectedLayersIndices

```
public int[] affectedLayersIndices { get; }
```

Property Value

int[]

Namespace System.Runtime.Compiler Services

Classes

IsExternalInit

Class IsExternalInit

Namespace: System.Runtime.CompilerServices

```
public class IsExternalInit
```

Inheritance

object ← IsExternalInit

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Extension Methods

ISetComparableExtensions.IsProperSubsetOf<T1, T2>(T1, T2) , ISetComparableExtensions.IsProperSupersetOf<T1, T2>(T1, T2)