

an asset for Unity 3d by Oliver Wuensch email: <u>support@wuenschonline.de</u>

the Nodecanvas Actions

What is Rangemapper?

Do you need to **convert input data** like the value of a slider to move an object in 3 d space?

Do you need to **calculate the rotation** of the hands of a clock? Rangemapper makes it easy to **convert floats**, **vector2 or vector3** from one space of numbers into another.

RangemapperCustom components can be used to create presets of Rangemappers stored in your scene so you you only need to pass the input to the correct RangeMapperCustom and you can reuse them whenever you need them in your scene.

Also you can **modify the output data by curves** which adds a convenient way to implement slow-in and slow out for animation or other animation purposes.

RangeMapperManager provides an easy way to **call Rangemappers by** a friendly **name**, if you have many RangeMappers in your scene.

RangeMapper comes with Nodes for Hutong NodeCanvas and Paradoxnotion Nodecanvas/ Flowcanvas visual programming environments.

NodeCanvas Actions installation

This document assumes that you are familiar with the NodeCanvas usage and interface and that you own NodeCanvas **and have it already installed in your project.**

NodeCanvas is an asset created by Paradoxnotion bringing visual programming with FSMs and Behavior Trees to Unity 3d. Paradoxnotion has also a fantastic Flow Programming asset calles FlowCanvas available, that compliments NodeCanvas perfectly.

(For **Flowcanvas** all you have to do is add the **namespace Wuensch** to Flowcanvas and it will **automatically create all RangeMapper functionality** in FlowCanvas Nodes for you, tested and works great).

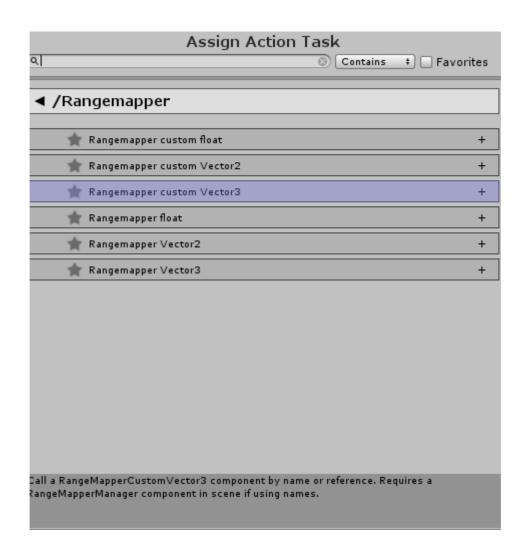
If you have NodeCanvas installed:

To use the NodeCanvas RangeMapper Nodes simply install the provided **NodeCanvasRangeMapper.unitypackage** found in Assets->3rdParty

by double clicking it in the Project manager of Unity3d.

Assets ► RangeMapper ► 3rdParty	
NodeCanvasRangeMapper	
🚭 PlaymakerRangeMapper	

After installation when you open a BehaviorTree or FSM NodeCanvas and create an action node you will find these new actions in the **NodeCanvas Action** manager in the category "Rangemapper":



Create a new FSM Owner or Behavior Tree Owner on a GameObject and add a new Action Node, then with the Node selected call up the Action Browser in NodeCanvas to find the Rangemapper Actions in the category RangeMapper to assign them to your action list.

ACTION				
Executes an action and returns Success or Failure. Returns Running until the action is finished.				
Tag		P		
RangeMapper Cube	e is Custom, sphe	re is directly mapped		
X V Action List	t	Œ		
	Assign Action Ta	sk		
Q		8		
≡ 🗹 💿 Rangen	napCustom \$inpı	itVector3 to \$0 🗙		
🗏 🗹 💽 Rangen	nap \$inputVecto	r3 to \$OutputV(🗙		
Actions Run In Sequ	ence	\$		
X ▼ Rangemap	per Vector3	Œ		
Convert a Vector3 fro modulo to cycle data		another.Includes		
Input	inputVecto	r3 🕴 💿		
Output	OutputVec	tor3Direct 🕴 💿		
From Min		0		
X 0	Y 0	Z 0		
From Max		0		
X 1	Y 1	Z 1		
To Min	1	0		
X -0.952	Y 0.15	Z 0		
To Max X 0.95	Y 0.456			
		ZO		
Clamp Min		0		
Clamp Max		0		
Cycle Modulo		0		
Use Curves		000000000000000000000000000000000000000		
Remap Curve X				
Remap Curve Y		0		
Remap Curve Z		0		

The nodes **Rangemapper** (for floats input), **RangemapperVector2** and **RangemapperVector3** (for Vector input) are used to directly rangemap inputdata into a different number space.

This means that you setup all releavant variables in the nodes.

The Nodes RangemapperCustomFloat, RangemapperCustomVector2, RangemapperCustomVector3

are meant to be used to access RangeMapperCustom components set up somewhere in your scene.

RangeMapperCustom components are **like presets that you configure** in your scene and can then reuse any time you want without configuring all variables again and again.

Read everything about RangeMapperCustom components in the RangeMapper_Manual.pdf that comes with this asset.

Also Check out the NodeCanvas version of the **demo files** to see how the Rangemapper actions can be used to drive animation.

I assume that you know how to use actions in NodeCanvas.

If you assign a Rangemapper action to an action node in NodeCanvas it will look like this:

🗙 🔻 Rangemapper fl	oat	(#		
Convert a float value from one range to any another.Includes modulo to cycle data for clocks or dials				
Input	0	0		
Output	0	0		
From Min	0	0		
From Max	1	0		
To Min	0	0		
To Max	360	0		
Clamp Min		0		
Clamp Max		0		
Cycle Modulo		0		
Use Curve		0		
Remap Curve		0		

The variables to use are the same as in the RangeMapperCustom components. You can read a detailed explanation in the RangeMapper_Manual.pdf .

Assign a variable for the output data in the Output field of the action like you normally do in any NodeCanvas action and configure your input data and you are ready to go .

Rangemapper action variables explained:

The parameters are:

FromMin and fromMax:

These are float numbers for the minimum and maximum of your **input number space**, **toMin** and **toMax** are the minimum and maximum of the corresponding **output space**.

Your minimum and maximum values **can be in the negative number ranges** if you need that. RangeMapper will take care that everything maps correctly.

For example if you set fromMin and toMin to a range of to 0f (0 float value) and 1f and your toMin/toMax to 0f and 360 you get a RangeMapper that will output 180 if you input 0.5.

This can be used to map input to a rotation for example (Check out the DemoClock scene in the demos folder for this).

If you do not clamp or use cycleModulo or curves the RangeMapper **will not limit the return value to the minimum and maximum**, you use these min max ranges basically to match the input and output ranges and the number spaces continue below and above.

ClampMin and clampMax:

To limit the input so that the min or max are never exceeded simply activate the **clampMin** and/or **clampMax** boolean switches. If you clamp both and your fromMin/ fromMax are 0f/1f an input of 2.4 will be clamped at the maximum of 1.0 and an input of -200.5f will be treated as if it were 0f.

CycleModulo:

For a clock for example if you input a counter that counts the passed seconds like you get in Unity from Time.time you would want the RangeMapper for the hand of your clocks rotation degrees to return 360 or 0 every 60 seconds, since this means that a minute has passed and the clock's hand has completed a turn.

Since the input counter like that of Time.time in Unity simply adds up furter and further the RangeMapper has to take care of that.

By activating the **cycleModulo** bool switch the rangeMapper **calculates how often the fromMin-fromMax number distance fits into the input and maps the resulting rest** (this is called a modulo) to the output number Range.

if the input range is 0 to 60, so whenever the input exceeds a multiple of 60 it will become 0 again.

This is mapped to a range of 0 to 360 (degrees) to get the rotation for the clock.

Edit:

To be correct with the clock I should have entered a fromMin/ fromMax of 0 to 59 and 1 to 360 as output for a correct result. I made a mistake when setting up the demo, sorry.Edit: To be correct with the clock I should have entered a fromMin/ fromMax of 0 to 59 and 1 to 360 as output for a correct result. I made a mistake when setting up the demo, sorry.

Remap Curve:

if you activate the **useCurve** bool switch and configure the **remapCurve** (simply click on the curve rectangle) this curve is used to manipulate the input values between fromMin and fromMax (by default a Unity AnimationCurve clamps input, no matter if the ClampMin/clampMax is being used).

You can use this to achieve nice curved output or slow-in/slow-out for animation purposes. For Vectors you can manipulate the separate axis with independent curves, resulting in a lot of flexibility.

One important thing to know when working with vectors and curves:

If you use only the curve for one vector axis- and do not configure the other curves only the value for the vector that has a valid curve is being used and clamped. **Empty** curves without any points are ignored and the input value is passed into RangeMapper unaltered.

If you do not want this behavior you either have to configure the other curves (with the linear preset for example) or clamp the input value with the clampMin/ clampMax switches.

Output (read only):

Assign a variable of the appropriate type (float, vector3, vector2) here to use your output data.

🗙 🖲 Rangemap	per Vector2	(#
Convert a Vector2 from modulo to cycle data	om one range to any another.Includes for clocks or dials	
Input		0
X 0	Y 0	
Output		0
X 0	Y 0	
From Min		_ O
X 0	Y 0	
From Max		_ 0
X 1	Y 1	
To Min		_ 0
X 0	Y 0	
To Max		_ 0
X 100	Y 100	
Clamp Min		0
Clamp Max		000
Cycle Modulo		0
Use Curves		0
Remap Curve X		0
Remap Curve Y		0

The actions for Vector2 and Vector3 use work similarly, only with Vector data as input and output..

RangeMapperCustom actions

These actions send input and receive output using custom Rangemappers created with the **RangeMapperCustom components** in your scene.

Think of RangeMapperCustom components as **presets** of RangeMappers with individual names that you can conveniently call if needed.

Read all about **RangeMapperCustom** components in the **RangeMapper_Manual.pdf** that comes with this asset.

If you have set up RangeMapperCustom components in your scene use these actions to access them either by name or by direct link.

For inserting a direct link the easiest way is to **select the GameObject** your RangeMapperCustom is on and the **lock the Unity Inspector** with the tiny padlock symbol on the right top, then **select your NodeCanvas Owner** and the **Actionlist** the action is on and **drop the RangeMapperCustom** from inspector into the slot in the action.

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	Free Aspect Scale	1×	Maximize On Play Mute Audio Stats O	Bizmos T	👕 🗹 RangeMapper			otatic 🕶
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tedBvRangeMapperCustom					Position	X 0 Y 0 X 0 Y 0		
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ACTION		Variables			You only need one Ran functions RangemapCo RangeMapCustomVect	istom or RangeMapCus	tomVector2 or	4
Executes an action and returns Success or Failure.		Add Variable			Log Range Mapper Mar		to can arry castorn	
Returns Running until the action is finished.	Name	Value			Range Mapper	Custom Vector 3 (Sc	ript)	a ,
RangeMapper Cube is Custom, sphere is directly mapped	sliderValue	0			Script	RangeMapperCu		0
	inputVector3	X 0	χ <u>ρ</u> Ζ ο		Custom Vector3 Ran	gemapper		
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Assign Action Task					Input	X 0 Y 0		
Q 0					From Min	X 0 Y 0 X 1 Y 1		
≡ 🗹 💿 RangemapCustom \$inputVector3 to \$0 🗙					From Max To Min		0.449 Z 0.46	6
Rangemap sinputVector3 to soutputV(X	2) - N(1) Repeat Forev	ver			To Max	X 1.196 Y 0		
					Clamp Min			
Actions Run In Sequence 1					Clamp Max			
X ▼ Rangemapper custom Vector3				_	Cycle Modulo			
Call a RangeMapperCustomVector3 component by name or				<u><u></u> =- € ★ ★</u>	Use Curves			
reference. Requires a RangeMapperManager component in scene	- t	† *		• *	Remap Curve X Remap Curve Y			
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al: Use Self (Transform)					Output	X 0 Y 0	Z O	_
s Range Mapper Custom Ve RangeMapper (Ranger 0	لسم							
Range Mapper Name						Add Component		
Output OutputVector3 : 0								
* \$sliderValue = Slider.get value			* Cube AnimatedByRangeMapp					
New Vector as \$inputVector3	RangemapCustom \$inputVector3 to \$0		Sphere_AnimatedByRangeMapper					
a check slider and make Vector	Rangemap \$inputVector3 to \$OutputVector3		t position					
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If a RangeMapperCustom has been assigned directly, the name in the RangeMapperName variable is NOT USED, but **the direct link is preferred**.

If no direct link is set up the name is used.

To call a RangeMapper by name you have to have the RangeMapperManager

component installed on one GameObject in you scene (see Manual for details). Only one Manager is necessary. The manager needs no configuration.

Once the components are prepared simply call them with the action that fits the input type (float, vector2 or vector3). All you have to do is setup the input and output (and enter the name or direct link of the RangeMapperCustom component).

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Call a RangeMapperCustom component by name or reference. Requires a RangeMapperManager component in scene if using names.					
👃 Use Self (Transform)				
Input	inHours 🕴 💿				
Range Mapper Custom	None (Range Mapper Cu 🛛 O 🔵				
Range Mapper Name	Hours				
Output	outHours 🕴 💿				
Output	outHours 🕴 🖲				

🔻 🕞 🗹 Range Mapper Custom (Script) 🛛 👔 🌣			
Script	RangeMapperCustom ○		
Custom Float Rangema	pper		
My Name	Hours		
Input	0		
From Min	0		
From Max	12		
To Min	0		
To Max	360		
Clamp Min			
Clamp Max			
Cycle Modulo			
Use Curve			
Remap Curve			
Output	0		

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X ▼ Rangemapper custom Vector2	(#				
Call a RangeMapperCustomVector2 component by name or reference. Requires a RangeMapperManager component in scene if using names.					
👃 Use Self (Transform)					
Input	0				
X 0 Y 0					
Range Mapper Custom Ve None (Range Mapper Cu	0 0				
Range Mapper Name	0				
Output X 0 Y 0					

X ▼ Rangemapper c	ustom Vector3)			
Call a RangeMapperCustomVector3 component by name or reference. Requires a RangeMapperManager component in scene if using names.					
🙏 Use Self (Transform)	C	כ			
Input	inputVector3 \$ (•			
Range Mapper Custom Ve	💽 RangeMapper (RangeN ☉ (0			
Range Mapper Name		0			
Output	OutputVector3 \$	۲			

If you have questions, input or need support email me at:

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Have fun remapping, Oliver Wuensch