Modul:Chart

Mobile View Problem: Bar charts behave unpredictably, causing problems with the axes and legend. Use Template:Graph:Chart instead. Pie charts aren't too bad. Module Chart exports two functions: bar chart and pie chart

Note - Template:Graph:Chart is an alternative template, that may be more suitable for your use case.

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Drawing Bar charts: "bar chart"

Parameters

parameter name	what it does
delimiter	string to delimit multiple values when given. default to colon (:). normally you do not want to touch this, it's provided for the off-chance you'll want to use colon as part of one of the parameters.
width	number. if provided, must be at least 200. default: 500
height	number. if provided, must be at least 200. default: 350
groupn	(where "n" is a number. use "group 1", "group 2" etc. for as many groups as there are in the graph) the values to be charted. see below.
tool	tooltip to be associated with specific bar. If no tooltip for a specific bar is defined, and this bar has a link, then this link will be used as tooltip. Otherwise, the tooltip will be

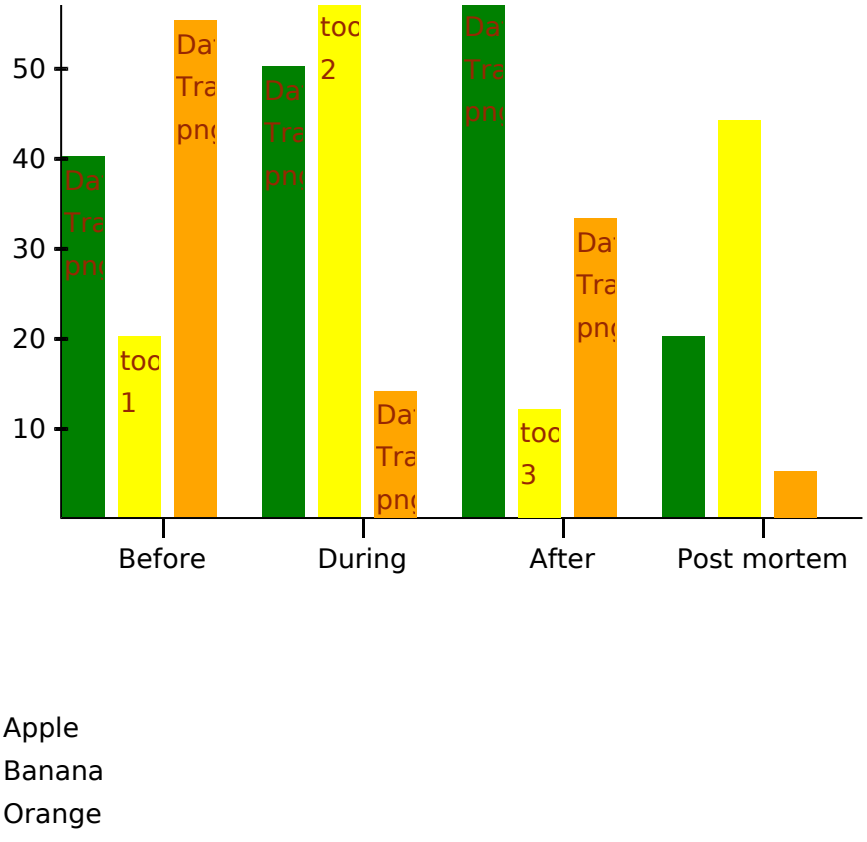
parameter name	what it does
tipn	combined from the group name and the value, optionally with "units prefix" and "units suffix".
links n	links to articles to be associated with specific bar
stack	whether to stack the different groups on top of each other. do not specify to show bars side by side. Any non-empty value means "yes". To say "no", simply do not supply this parameter at all, or leave the value blank.
Vorlage: Nowrap	useful only with stack: when set to true, tooltip will show accumulated value of all blocks up to current one
colors	the colors used to denote the various groups. should have exactly as many values as # of groups. can be given as standard html-recognized color names, or using #xxx or #xxxxxx notation.
x legends	The legends for the X values. Wikicode, such as internal links or templates can be used.
Vorlage: Nowrap	if set to true, group legends will not be shown below chart. Any non-empty value means "yes". To say "no", simply do not supply this parameter at all, or leave the value blank.
Vorlage: Nowrap	set to use separate Y- scale for each group. leave empty to use one scale for all groups. incompatible with "stack". Note that even if some of the scales are exactly the same, they will be drawn separately when this setting is on. Any non-empty value means "yes". To say "no", simply do not supply this parameter at all, or leave the value blank.
Vorlage: No	

parameter name	what it does
wrap	used in tooltip. e.g., $, so values will show as "$500" instead of "500" in the tooltip
Vorlage: Nowrap	ditto for units suffix. use, e.g. "Kg" so values will show as 88Kg instead of 88 in tooltip. underscore ("_") are replaced by spaces, to allow a space between the value and the suffix.
Vorlage: Nowrap	names of different groups
Vorlage: Nowrap	number of tick marks on the y axis. if the value is negative or omitted, the module will attempt to automatically calculate a sensible number of tick marks.

Examples

Basic

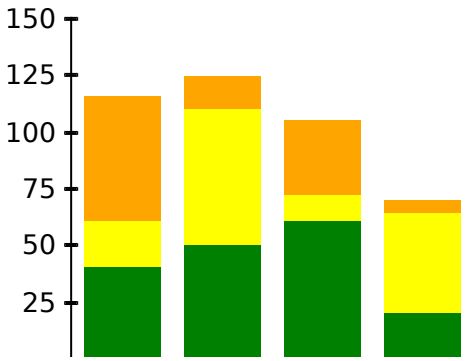
```
{{ #invoke:Chart | bar chart
| group 1 = 40 : 50 : 60 : 20
| group 2 = 20 : 60 : 12 : 44
| group 3 = 55 : 14 : 33 : 5
| links 1 = Apple : McCintosh : Golden delicious
| links 2 = Banana : Apricot : Peach
| links 3 = Orange : Pear : Bear
| tooltip 2 = tooltip 1 : tooltip 2 : tooltip 3 : tooltip 4
| colors = green : yellow : orange
| group names = Apple : Banana : Orange
| x legends = Before : During : After : Post mortem
}}
```

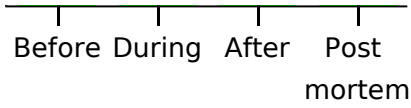


Stacked

Here is the same graph, with more modest height and width, using "stack", and adding "units suffix" for good measure:

```
{{ #invoke:Chart | bar chart
| height = 250
| width = 300
| stack = 1
| group 1 = 40 : 50 : 60 : 20
| group 2 = 20 : 60 : 12 : 44
| group 3 = 55 : 14 : 33 : 5
| colors = green : yellow : orange
| group names = Apple : Banana : Orange
| units suffix = Kg
| x legends = Before : During : After : Post mortem
}}
```

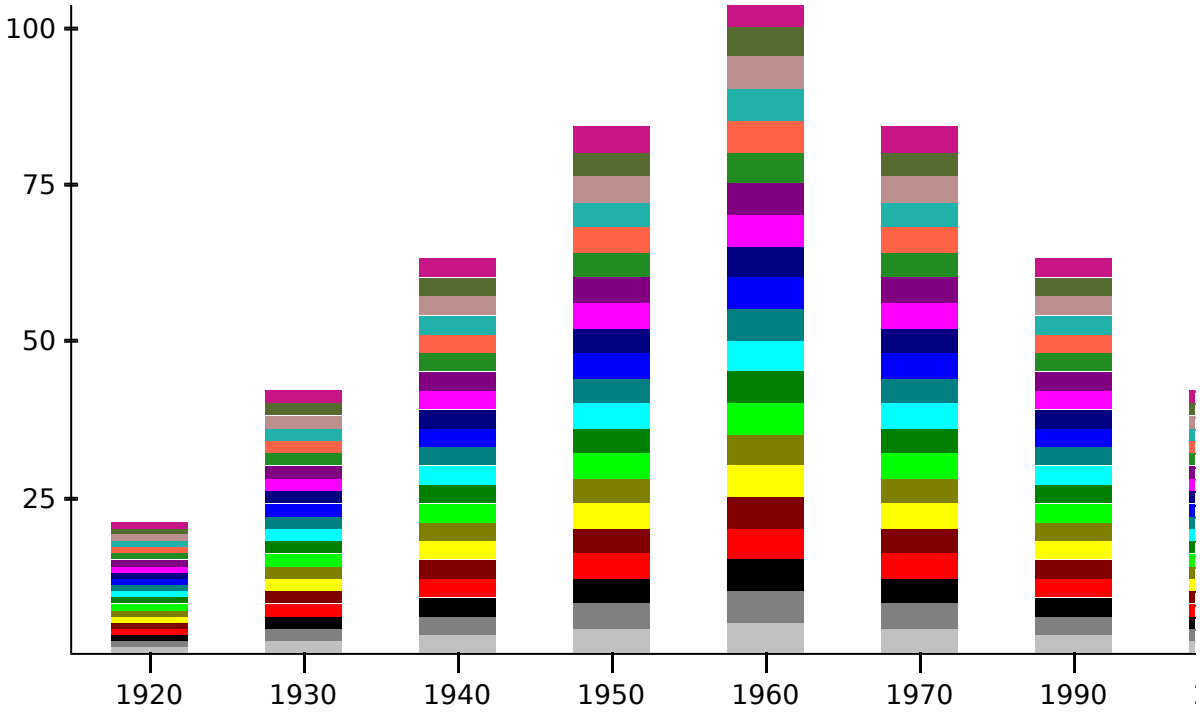




Scale per group

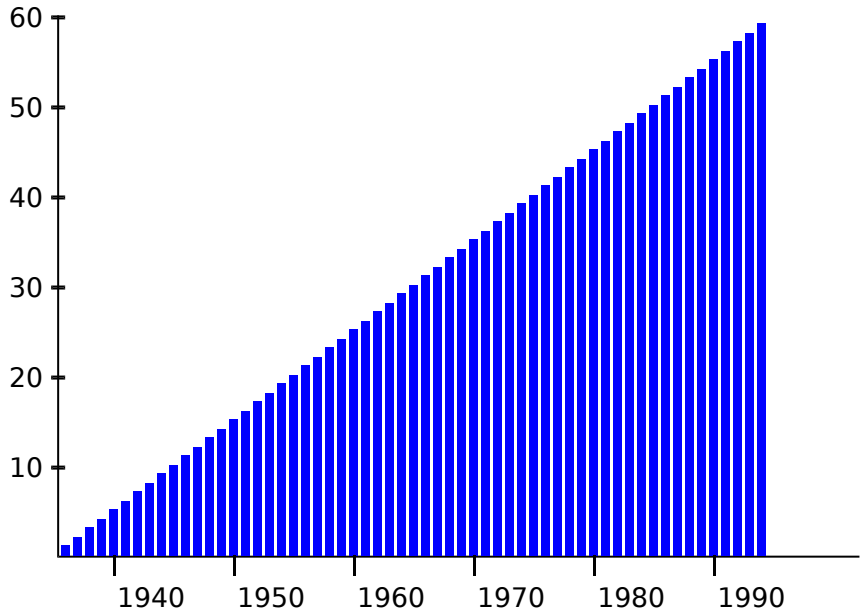
This option has been disabled. It was rarely used and broke in the last code update. Here is an example with large number of groups - mainly to test how it looks with large number of legends:

```
{{ #invoke:Chart | bar chart
| width = 800
| height = 550
| group 1 = 1:2:3:4:5:4:3:2:1
| group 2 = 1:2:3:4:5:4:3:2:1
| group 3 = 1:2:3:4:5:4:3:2:1
| group 4 = 1:2:3:4:5:4:3:2:1
| group 5 = 1:2:3:4:5:4:3:2:1
| group 6 = 1:2:3:4:5:4:3:2:1
| group 7 = 1:2:3:4:5:4:3:2:1
| group 8 = 1:2:3:4:5:4:3:2:1
| group 9 = 1:2:3:4:5:4:3:2:1
| group 10 = 1:2:3:4:5:4:3:2:1
| group 11 = 1:2:3:4:5:4:3:2:1
| group 12 = 1:2:3:4:5:4:3:2:1
| group 13 = 1:2:3:4:5:4:3:2:1
| group 14 = 1:2:3:4:5:4:3:2:1
| group 15 = 1:2:3:4:5:4:3:2:1
| group 16 = 1:2:3:4:5:4:3:2:1
| group 17 = 1:2:3:4:5:4:3:2:1
| group 18 = 1:2:3:4:5:4:3:2:1
| group 19 = 1:2:3:4:5:4:3:2:1
| group 20 = 1:2:3:4:5:4:3:2:1
| group 21 = 1:2:3:4:5:4:3:2:1
| colors = Silver:Gray:Black:Red:Maroon:Yellow:Olive:Lime:Green:Aqua:Teal:Blue:Na
| group names = Alabama:Alaska:Arizona:Arkansas:California:Colorado:Connecticut:D
| x legends = 1920 : 1930 : 1940: 1950 : 1960 : 1970 : 1990 : 2000 : 2010
| units prefix = $
| units suffix = _billion
| stack = 1
}}
```



If there are many values, x legends can be diluted by using delimiters with nothing in between:

```
{{ #invoke:Chart | bar chart
| group 1 = 1:2:3:4:5:6:7:8:9:10:11:12:13:14:15:16:17:18:19:20:21:22:23:24:25:26:
:31:32:33:34:35:36:37:38:39:40:41:42:43:44:45:46:47:48:49:50:51:52:53:54:55:56:57
| units suffix = _Things
| group names = Some
| x legends = ::::1940::::::::::1950::::::::::1960::::::::::1970::::::::::1980:::
}}
```



Vorlage:-

Drawing Pie charts: "pie chart"

Parameters

parametername	what it does
del	

parametername	what it does
limiter	string to delimit multiple values when given. default to colon (:). normally you do not want to touch this, it's provided for the off-chance you'll want to use colon as part of one of the parameters.
radius	number. The radius of the pie in pixels
slices	Tuples, in parenthesis. Use delimiter inside the tuple: `( Value1 : Name1 : Color1 : Link1 ) ( Value2 : Name2 : Color2 : Link2 ) ...` The values are numbers. The numbers can be integers or decimal fractions, or using the scientific notation: 7.24e6, 7,240,000, or 7240000.00 are all acceptable for 7 Million and 240 thousands. Names are strings. Colors are optional. you can use any Web colors, such as "red" or "#FF0000". Up to 26 default colors are defined, but if your pie has more than 26 slices, you must define the colors of slice #27 and up. Links can be external or internal links, including linking to internal anchors and paragraphs in the same article, like so: [[Article|Tooltip]] for internal link, [[#Paragraph name|Tooltip]] for linking to an anchor in same article, or [http://example.org Tooltip] for external link.
Vor	

parametername	what it does

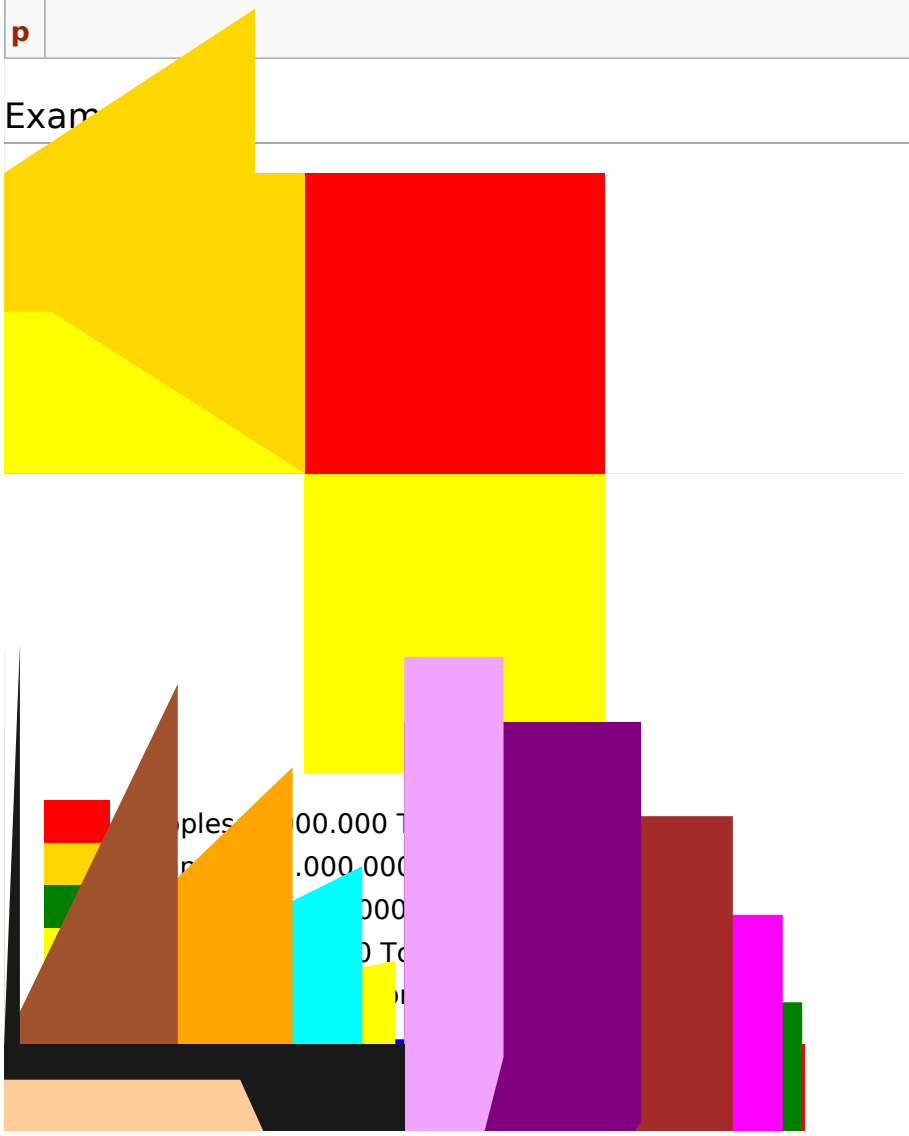
large:Nowrap	alternative syntax to "slices". n is the slice number, beginning with 1. make sure not to skip: if you define "slice 1", "slice 2", "slice 4", "slice 5"..., skipping slice 3, only the first two slices will be shown. this syntax is incompatible with "slices", i.e., they should not be used in conjunction in the same invocation. Using both "slices" and "slice n" in the same invocation will cause unpredictable results. The value is like a single "tuple" as explained above, but without the parenthesis:
	`| slice 1 = Value1 : Name1 : Color1 : Link1`
	`| slice 2 = Value2 : Name2 : Color2 : Link2`
	`| ...`
	This syntax allows you to use parenthesis in names, links, and colors.

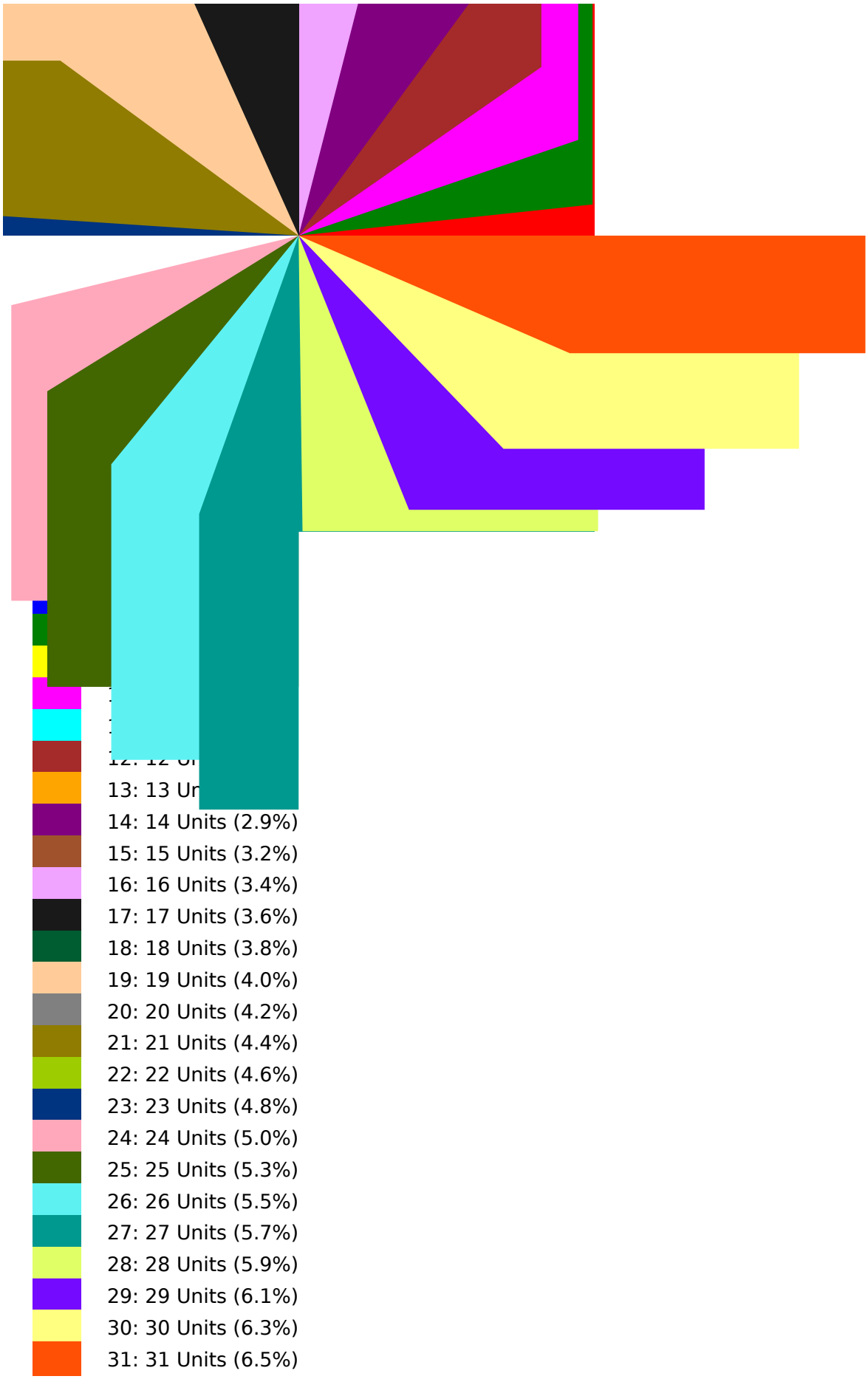
percent	if used, the percentage of each slice will be calculated and added to the legend: so if you have two slices, like so: (1 : Younglings) (3 : elders), and use define "percent", the legends will become "Younglings: 1 (25%)" and "Elders: 3 (75%)", instead of simply "Younglings: 1" and "Elders: 3". Any non-empty value means "yes". To say "no", simply do not supply this parameter at all, or leave the value blank.
Vorlage:	

parametername	what it does
Nowrap	used in the legend. e.g., defining "units prefix=$", values will show as "$500" instead of "500" in the legends
Vorlage:Nowrap	ditto for units suffix. use, e.g. "Kg" so values will show as 88Kg instead of 88 in legend. underscore ("_") are replaced by spaces, to allow a space between the value and the suffix.
Vorlage:	

parametername	what it does
Nowrap	Setting to true prevents displaying of the group legends under the chart. Any non-empty value means "yes". To say "no", simply do not supply this parameter at all, or leave the value blank.

Exam




13: 13 Ur
14: 14 Units (2.9%)
15: 15 Units (3.2%)
16: 16 Units (3.4%)
17: 17 Units (3.6%)
18: 18 Units (3.8%)
19: 19 Units (4.0%)
20: 20 Units (4.2%)
21: 21 Units (4.4%)
22: 22 Units (4.6%)
23: 23 Units (4.8%)
24: 24 Units (5.0%)
25: 25 Units (5.3%)
26: 26 Units (5.5%)
27: 27 Units (5.7%)
28: 28 Units (5.9%)
29: 29 Units (6.1%)
30: 30 Units (6.3%)
31: 31 Units (6.5%)

```
--[[
        keywords are used for languages: they are the names of the actual
        parameters of the template
]]

local keywords = {
        barChart = 'bar chart',
        pieChart = 'pie chart',
        width = 'width',
        height = 'height',
        stack = 'stack',
        colors = 'colors',
        group = 'group',
        xlegend = 'x legends',
        yticks = 'y tick marks',
        tooltip = 'tooltip',
        accumulateTooltip = 'tooltip value accumulation',
        links = 'links',
        defcolor = 'default color',
        scalePerGroup = 'scale per group',
        unitsPrefix = 'units prefix',
        unitsSuffix = 'units suffix',
        groupNames = 'group names',
        hideGroupLegends = 'hide group legends',
        slices = 'slices',
        slice = 'slice',
        radius = 'radius',
        percent = 'percent',

} -- here is what you want to translate

local defColors = mw.loadData("Module:Chart/Default colors")
local hideGroupLegends

local function nulOrWhitespace( s )
        return not s or mw.text.trim( s ) == ''
end

local function createGroupList( tab, legends, cols )
        if #legends > 1 and not hideGroupLegends then
                table.insert( tab, mw.text.tag( 'div' ) )
                local list = {}
                local spanStyle = "padding:0 1em;background-color:%s;border:1px s
                for gi = 1, #legends do
                        local span = mw.text.tag( 'span', { style = string.format
                        table.insert( list, mw.text.tag( 'li', {}, span ) )
                end
                table.insert( tab,
                        mw.text.tag( 'ul',
                                {style="width:100%;list-style:none;column-width:1
                                table.concat( list, '\n' )
                        )
                )
                table.insert( tab, '</div>' )
        end
end

local function pieChart( frame )
        local res, imslices, args = {}, {}, frame.args
        local radius
        local values, colors, names, legends, links = {}, {}, {}, {}, {}
        local delimiter = args.delimiter or ':'
        local lang = mw.getContentLanguage()
```

```
	local function getArg( s, def, subst, with )
		local result = args[keywords[s]] or def or ''
		if subst and with then result = string.gsub( result, subst, with
		return result
	end

	local function analyzeParams()
		local function addSlice( i, slice )
			local value, name, color, link = unpack( mw.text.split( s
			values[i] = tonumber( lang:parseFormattedNumber( value )
				or error( string.format( 'Slice %d: "%s", first i
			colors[i] = not nulOrWhitespace( color ) and color or def
			names[i] = name or ''
			links[i] = link
		end

		radius = getArg( 'radius', 150 )
		hideGroupLegends = not nulOrWhitespace( args[keywords.hideGroupLe
		local slicesStr = getArg( 'slices' )
		local prefix = getArg( 'unitsPrefix', '', '_', ' ' )
		local suffix = getArg( 'unitsSuffix', '', '_', ' ' )
		local percent = args[keywords.percent]
		local sum = 0
		local i = 0
		for slice in string.gmatch( slicesStr or '', "%b()" ) do
			i = i + 1
			addSlice( i, string.match( slice, '^%(%s*(.-)%s*%)$' ) )
		end

		for k, v in pairs(args) do
			local ind = string.match( k, '^' .. keywords.slice .. '%s
			if ind then addSlice( tonumber( ind ), v ) end
		end

		for _, val in ipairs( values ) do sum = sum + val end
		for i, value in ipairs( values ) do
			local addprec = percent and string.format( ' (%0.1f%%)',
			legends[i] = string.format( '%s: %s%s%s%s', names[i], pre
			links[i] = mw.text.trim( links[i] or string.format( '[[#r
		end
	end

	local function addRes( ... )
		for _, v in pairs( { ... } ) do
			table.insert( res, v )
		end
	end

	local function createImageMap()
		addRes( '{{#tag:imagemap|', 'Image:Circle frame.svg{{!}}' .. ( ra
		addRes( unpack( imslices ) )
		addRes( 'desc none', '}}' )
	end

	local function drawSlice( i, q, start )
		local color = colors[i]
		local angle = start * 2 * math.pi
		local sin, cos = math.abs( math.sin( angle ) ), math.abs( math.co
		local wsin, wcos = sin * radius, cos * radius
		local s1, s2, w1, w2, w3, w4, border
		if q == 1 then
			border = 'left'
			w1, w2, w3, w4 = 0, 0, wsin, wcos
```

```
                        s1, s2 = 'bottom', 'left'
                elseif q == 2 then
                        border = 'bottom'
                        w1, w2, w3, w4 = 0, wcos, wsin, 0
                        s1, s2 = 'bottom', 'right'
                elseif q == 3 then
                        border = 'right'
                        w1, w2, w3, w4 = wsin, wcos, 0, 0
                        s1, s2 = 'top', 'right'
                else
                        border = 'top'
                        w1, w2, w3, w4 = wsin, 0, 0, wcos
                        s1, s2 = 'top', 'left'
                end

                local style = string.format( 'border:solid transparent;position:a
                if start <= ( q - 1 ) * 0.25 then
                        style = string.format( '%s;border:0;background-color:%s',
                else
                        style = string.format( '%s;border-width:%spx %spx %spx %s
                end
                addRes( mw.text.tag( 'div', { style = style }, '' ) )
        end

        local function createSlices()
                local function coordsOfAngle( angle )
                        return ( 100 + math.floor( 100 * math.cos( angle ) ) ) .
                end

                local sum, start = 0, 0
                for _, value in ipairs( values ) do sum = sum + value end
                for i, value in ipairs(values) do
                        local poly = { 'poly 100 100' }
                        local startC, endC =  start / sum, ( start + value ) / su
                        local startQ, endQ = math.floor( startC * 4 + 1 ), math.f
                        for q = startQ, math.min( endQ, 4 ) do drawSlice( i, q, s
                        for angle = startC * 2 * math.pi, endC * 2 * math.pi, 0.0
                                table.insert( poly,  coordsOfAngle( angle ) )
                        end
                        table.insert( poly, coordsOfAngle( endC * 2 * math.pi ) )
                        table.insert( imslices, table.concat( poly, ' ' ) )
                        start = start + values[i]
                end
        end

        analyzeParams()
        if #values == 0 then error( "no slices found - can't draw pie chart" ) en
        addRes( mw.text.tag( 'div', { class = 'chart noresize', style = string.fo
        addRes( mw.text.tag( 'div', { style = string.format( 'position:relative;m
        createSlices()
        addRes( mw.text.tag( 'div', { style = string.format( 'position:absolute;m
        createImageMap()
        addRes( '</div>' ) -- close "position:relative" div that contains slices
        addRes( '</div>' ) -- close "position:relative" div that contains slices
        createGroupList( res, legends, colors ) -- legends
        addRes( '</div>' ) -- close containing div
        return frame:preprocess( table.concat( res, '\n' ) )
end


local function barChart( frame )
        local res = {}
        local args = frame.args -- can be changed to frame:getParent().args
        local values, xlegends, colors, tooltips, yscales = {}, {}, {}, {}, {}
```

```
	local groupNames, unitsSuffix, unitsPrefix, links = {}, {}, {}, {}
	local width, height, yticks, stack, delimiter = 500, 350, -1, false, args
	local chartWidth, chartHeight, defcolor, scalePerGroup, accumulateTooltip


	local numGroups, numValues
	local scaleWidth

	local function validate()
		local function asGroups( name, tab, toDuplicate, emptyOK )
			if #tab == 0 and not emptyOK then
				error( "must supply values for " .. keywords[name
			end
			if #tab == 1 and toDuplicate then
				for i = 2, numGroups do tab[i] = tab[1] end
			end
			if #tab > 0 and #tab ~= numGroups then
				error ( keywords[name] .. ' must contain the same
			end
		end

		-- do all sorts of validation here, so we can assume all params a
		-- among other things, replace numerical values with mw.language


		chartHeight = height - 80
		numGroups = #values
		numValues = #values[1]
		defcolor = defcolor or 'blue'
		colors[1] = colors[1] or defcolor
		scaleWidth = scalePerGroup and 80 * numGroups or 100
		chartWidth = width - scaleWidth
		asGroups( 'unitsPrefix', unitsPrefix, true, true )
		asGroups( 'unitsSuffix', unitsSuffix, true, true )
		asGroups( 'colors', colors, true, true )
		asGroups( 'groupNames', groupNames, false, false )
		if stack and scalePerGroup then
			error( string.format( 'Illegal settings: %s and %s are in
		end
		for gi = 2, numGroups do
			if #values[gi] ~= numValues then error( keywords.group .
		end
		if #xlegends ~= numValues then error( 'Illegal number of ' .. key
	end

	local function extractParams()
		local function testone( keyword, key, val, tab )
			local i = keyword == key and 0 or key:match( keyword .. '
			if not i then return end
			i = tonumber( i ) or error("Expect numerical index for ke
			if i > 0 then tab[i] = {} end
			for s in mw.text.gsplit( val, '%s*' .. delimiter .. '%s*'
				table.insert( i == 0 and tab or tab[i], s )
			end
			return true
		end

		for k, v in pairs( args ) do
			if k == keywords.width then
				width = tonumber( v )
				if not width or width < 200 then
					error( 'Illegal width value (must be a nu
				end
			elseif k == keywords.height then
```

```
                                height = tonumber( v )
                                if not height or height < 200 then
                                        error( 'Illegal height value (must be a r
                                end
                        elseif k == keywords.stack then stack = true
                        elseif k == keywords.yticks then yticks = tonumber(v) or
                        elseif k == keywords.scalePerGroup then scalePerGroup = t
                        elseif k == keywords.defcolor then defcolor = v
                        elseif k == keywords.accumulateTooltip then accumulateToo
                        elseif k == keywords.hideGroupLegends then hideGroupLeger
                        else
                                for keyword, tab in pairs( {
                                        group = values,
                                        xlegend = xlegends,
                                        colors = colors,
                                        tooltip = tooltips,
                                        unitsPrefix = unitsPrefix,
                                        unitsSuffix = unitsSuffix,
                                        groupNames = groupNames,
                                        links = links,
                                        } ) do
                                                if testone( keywords[keyword], k
                                                        then break
                                                end
                                end
                        end
                end
        end

        local function roundup( x ) -- returns the next round number: eg., for 30
                local ordermag = 10 ^ math.floor( math.log10( x ) )
                local normalized = x /  ordermag
                local top = normalized >= 1.5 and ( math.floor( normalized + 1 )
                return ordermag * top, top, ordermag
        end

        local function calcHeightLimits() -- if limits were passed by user, use t
                if stack then
                        local sums = {}
                        for _, group in pairs( values ) do
                                for i, val in ipairs( group ) do sums[i] = ( sums
                        end
                        local sum = math.max( unpack( sums ) )
                        for i = 1, #values do yscales[i] = sum end
                else
                        for i, group in ipairs( values ) do yscales[i] = math.max
                end
                for i, scale in ipairs( yscales ) do yscales[i] = roundup( scale
                if not scalePerGroup then for i = 1, #values do yscales[i] = math
        end

        local function tooltip( gi, i, val )
                if tooltips and tooltips[gi] and not nulOrWhitespace( tooltips[gi
                local groupName = mw.text.killMarkers(not nulOrWhitespace( groupN
                local prefix = unitsPrefix[gi] or unitsPrefix[1] or ''
                local suffix = unitsSuffix[gi] or unitsSuffix[1] or ''
                return string.gsub(groupName .. prefix .. mw.getContentLanguage()
        end

        local function calcHeights( gi, i, val )
                local barHeight = math.floor( val / yscales[gi] * chartHeight + 0
                local top, base = chartHeight - barHeight, 0
                if stack then
                        local rawbase = 0
```

```
                        for j = 1, gi - 1 do rawbase = rawbase + values[j][i] end
                        base = math.floor( chartHeight * rawbase / yscales[gi] )
                end
                if barHeight < 2 then
                        barHeight = 2 -- Otherwise the template would try to crea
                end
                return barHeight, top - base
        end

        local function groupBounds( i )
                local setWidth = math.floor( chartWidth / numValues )
                local setOffset = ( i - 1 ) * setWidth
                return setOffset, setWidth
        end

        local function calcx( gi, i )
                local setOffset, setWidth = groupBounds( i )
                if stack or numGroups == 1 then
                        local barWidth = math.min( 38, math.floor( 0.8 * setWidth
                        return setOffset + (setWidth - barWidth) / 2, barWidth
                end
                setWidth = 0.85 * setWidth
                local barWidth = math.floor( 0.75 * setWidth / numGroups )
                local left = setOffset + math.floor( ( gi - 1 ) / numGroups * set
                return left, barWidth
        end

        local function drawbar( gi, i, val, ttval )
                if val == '0' then return end -- do not show single line (borders

                local color, tooltip, custom = colors[gi] or defcolor or 'blue',
                local left, barWidth = calcx( gi, i )
                local barHeight, top = calcHeights( gi, i, val )

                -- borders so it shows up when printing
                local style = string.format("position:absolute;left:%spx;top:%spx
                                                    left, top, barHeight-1, barWidth
                local link = links[gi] and links[gi][i] or ''
                local img = not nulOrWhitespace( link ) and string.format( '[[Fil
                table.insert( res, mw.text.tag( 'div', { style = style, title = t
        end


        local function drawYScale()
                local function drawSingle( gi, color, width, yticks, single )
                        local yscale = yscales[gi]
                        local _, top, ordermag = roundup( yscale * 0.999 )
                        local numnotches = yticks >= 0 and yticks or
                                        (top <= 1.5 and top * 4
                                        or top < 4  and top * 2
                                        or top)
                        local valStyleStr =
                                single and 'position:absolute;height=20px;text-al
                                or 'position:absolute;height=20px;text-align:righ
                        local notchStyleStr = 'position:absolute;height=1px;min-v
                        for i = 1, numnotches do
                                local val = i / numnotches * yscale
                                local y = chartHeight - calcHeights( gi, 1, val )
                                local div = mw.text.tag( 'div', { style = string.
                                table.insert( res, div )
                                div = mw.text.tag( 'div', { style = string.format
                                table.insert( res, div )
                        end
                end
```

```
                if scalePerGroup then
                        local colWidth = 80
                        local colStyle = "position:absolute;height:%spx;min-width
                        for gi = 1, numGroups do
                                local left = ( gi - 1 ) * colWidth
                                local color = colors[gi] or defcolor
                                table.insert( res, mw.text.tag( 'div', { style =
                                drawSingle( gi, color, colWidth, yticks )
                                table.insert( res, '</div>' )
                        end
                else
                        drawSingle( 1, 'black', scaleWidth, yticks, true )
                end
        end

        local function drawXlegends()
                local setOffset, setWidth
                local legendDivStyleFormat = "position:absolute;left:%spx;top:10p
                local tickDivstyleFormat = "position:absolute;left:%spx;height:10
                for i = 1, numValues do
                        if not nulOrWhitespace( xlegends[i] ) then
                                setOffset, setWidth = groupBounds( i )
                                -- setWidth = 0.85 * setWidth
                                table.insert( res, mw.text.tag( 'div', { style =
                                table.insert( res, mw.text.tag( 'div', { style =
                        end
                end
        end

        local function drawChart()
                table.insert( res, mw.text.tag( 'div', { class = 'chart noresize'
                table.insert( res, mw.text.tag( 'div', { style = string.format("p

                table.insert( res, mw.text.tag( 'div', { style = string.format("t
                local acum = stack and accumulateTooltip and {}
                for gi, group in pairs( values ) do
                        for i, val in ipairs( group ) do
                                if acum then acum[i] = ( acum[i] or 0 ) + val end
                                drawbar( gi, i, val, acum and acum[i] )
                        end
                end
                table.insert( res, '</div>' )
                table.insert( res, mw.text.tag( 'div', { style = string.format("p
                drawYScale()
                table.insert( res, '</div>' )
                table.insert( res, mw.text.tag( 'div', { style = string.format( "
                drawXlegends()
                table.insert( res, '</div>' )
                table.insert( res, '</div>' )
                createGroupList( res, groupNames, colors )
                table.insert( res, '</div>' )
        end

        extractParams()
        validate()
        calcHeightLimits()
        drawChart()
        return table.concat( res, "\n" )
end
```

```
return {
        ['bar-chart'] = barChart,
        [keywords.barChart] = barChart,
        [keywords.pieChart] = pieChart,
}
```