Linear Division

The linear division is a mathematical formula to meet the user's requirement for composing the division of any long line in different sections. The linear division is displayed as a character string.

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1. Linear divisions with relative and absolute values

The linear division can be performed with relative or absolute values. **Absolute** values are defined by the specification of a dimension unit.

Example relative division:
1:1
=> The line is divided into two equally sized sections.

Example absolute division:
100mm:1
=> The first section has always a length of 100 mm whereas the second line is calculated from the total length.

Example for a reduction of the line:
1[100mm]:1
=> The line is divided in two sections. Both are nearly the same size. The first section has a length that is a multiple of 100 mm. The first section is smaller (or the same size) than the second section. With a total length of 480mm the calculation for a division is 200mm to 280mm.

Example for a repetition:
3*{1:2}:1
=> In this case the section between the {} is repeated three times. The resulting division is 1:2: 1:2: 1:2

2. Linear division with negative values

A linear division is usually defined by a position between two points. Points can also be defined beyond the 2 points. This type of linear division is for the definition of stretchable purchased parts and multiple parts.

Example:
Length of a part = 1000 mm
-200 mm : 1 > Position with: -200 mm
-200 mm : 1 : -200 mm > Position with:: -200 mm and 1200 mm

3. Special examples for a linear divisions

Problem
I want to apply a linear division for a dowel with a fixed distance from the front and back, the number of dowels relating to the width is determined and which are positioned in an equal distance.

Possible solutions

1. The distances between the dowels should be as close as possible to 100mm
   => 30mm(round((X-60)/100))*{1}:30mm

2. The distances between the dowels should be at least 100mm
   => 30mm(round((X-60)/100-0.5))*{1}:30mm

3. The distances between the dowels should only be maximum 100mm
   => 30mm(round((X-60)/100+0.5))*{1}:30mm

Problem
I want to set a line boring in 32 grid. There is a fixed distance of 45mm at the back and a minimum distance of 54mm in the front.
Possible solution
1+54mm:10000[32mm]:45mm

Problem
I need 11 same sized zones with a length of 150mm. At the end the rest zone remains.
Possible solution
11*{1000[150mm]}:1

Problem
I would like to allocate so many zones as possible with a length of 350mm along the total length. The last zone cannot be smaller than 350mm. And at least two zones have to be created.
Possible solution:
350mm:n*350mm:1+350mm

Problem
There is a distance of 100mm in the front and at the back and I want to allocate as many zones as possible with a size of at least 500mm.
Possible solution
X-200 is the total length minus the start- and end zone.
This length is divided by 500 and rounded off (therefore -0.5). This calculation shows the number of the intermediate zones.
100mm:(round((X-200)/500-0.5))*{1}:100mm

4. Linear division with algebraic expressions

Algebra formulas can be taken for defining a linear division. Therefore an X can be applied in the formula that represents the complete length in X-direction.
Example:
1:X-100mm
=> corresponds to the division „100mm:1“

Y can also be applied if two linear divisions for the X- and Y- direction are applied in imos. Y is the complete length in Y-direction.

5. Non linear divisions

In addition complex formulas can be applied to change a linear division into a non- linear division.
Example:
(X-(X*X-4*Y*(Y-350mm))^0.5)/2:1
Please note: ^0.5 is the same as the square root.
This formula has been applied in the outline geometry with two rectangular sides opposite each other.

6. N-Fold divisions

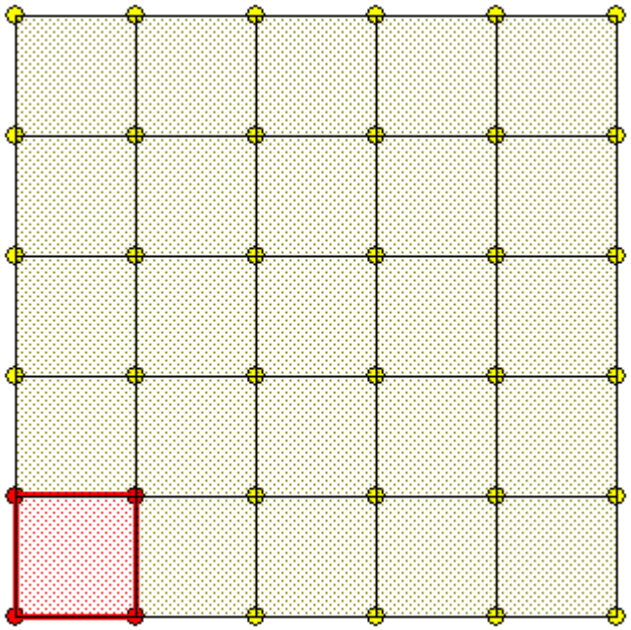
N-Fold divisions can be applied in multiple parts.
If element points are picked defined with the n-fold division in a definition, an automatic part duplication takes place.
The number of the duplications depends on the dimension of the part and the indicated division.

6.1 Definition of the N-Fold division

N-Fold divisions are defined by the following spelling: n*....
Then a numerical value follows or also a variable number:
n*350mm or n*$a
In this case the variable number cannot be deposited with a mathematical formula!

6.2 Examples

Example N- Fold division in X and Y direction

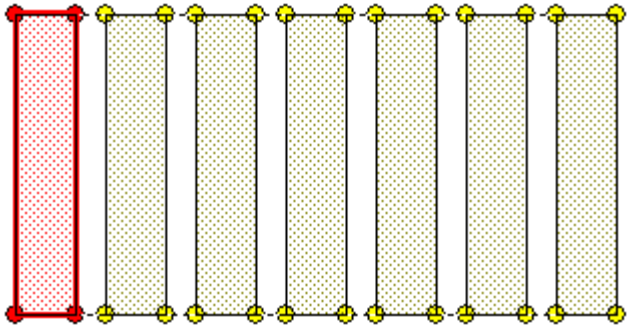


X: **0:n*400mm:0**
Y: **0:n*400mm:0**

The marked points have been picked in the selection!

Linear Division

Example N- Fold division in X direction

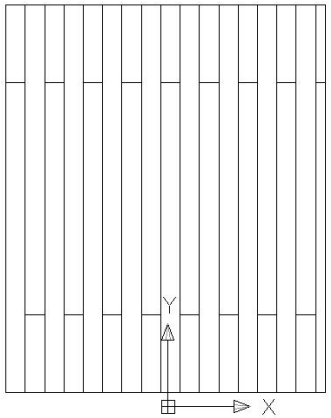


1. Linear division
X: **0:n*300mm:200mm**
Y: **0:1:0**

2. Linear division
X: **200mm:n*300mm:0**
Y: **0:1:0**

The marked points have been picked in the selection!

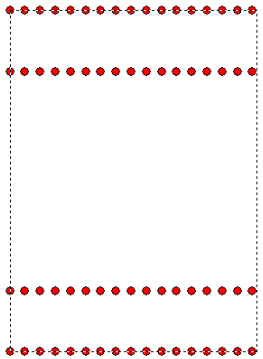
Problem:



A parquet pattern has to be designed so that it looks like it is displayed left.
Please note that “the remaining part” in a SPP has to be filled with an N-fold division. For doing this, it is necessary either to define a second linear division or to place the remaining part at the beginning of the linear division.

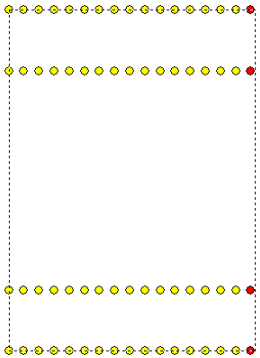
Possible solution:

In the first step the following linear division is defined:



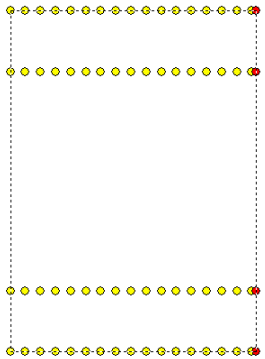
X: 0:n*100mm:1
Y: 0:400mm:1:400mm:0

Afterwards the auxiliary points in X are defined so that they have a minimum distance of 50mm to the outer edge.



X: 10000[50mm]:1
Y: 0:400mm:1:400mm:0

Finally, the outermost point is defined in X:



X: 1:0
Y: 0:400mm:1:400mm:0