

pascaltriangle 宏包 \Rightarrow English Version

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^{*}<https://github.com/registor/pascaltriangle>
[†]https://gitee.com/nwafu_nan/pascaltriangle

1 引言

`pascaltriangle` 是一个基于 TikZ 用 `expl3` 开发的 Pascal 三角形 (杨辉三角形) 生成宏包, 它提供了一个唯一的绘图命令 `\pascal`, 并可以通过不同命令的命令选项或 `\pascalset` 命令设置生成不同外观的等腰或直角 Pascal 三角形。

2 用户接口

2.1 `\pascal` 绘图命令

<code>\pascal</code>	<code>\pascal</code> [<code><外观选项></code>] { <code><层数></code> }
----------------------	--

用于绘制一个 Pascal 三角形。

该命令仅有一个必选参数 {`<层数>`}, 用于指定 Pascal 三角形的层数。

在 [`<外观选项>`] 中可以通过 key-value 方式设置三角形形状、大小等外观。

三角形的外观也可以通过 `\pascalset` 命令的逗号分隔 key-value 列表进行设置

2.2 `\pascalset`

<code>\pascalset</code>	<code>\pascalset</code> { <code><外观选项></code> }
-------------------------	---

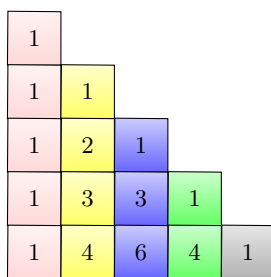
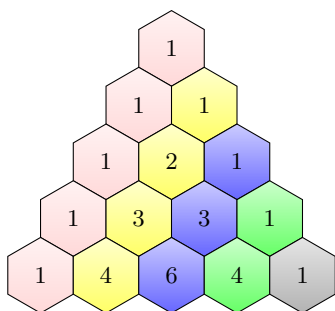
用于设置一个 Pascal 三角形的外观。

在 {`<外观选项>`} 中可以通过 key-value 方式设置三角形形状、大小等外观。

3 外观选项

`shape` = `<形状>` (initially iso)

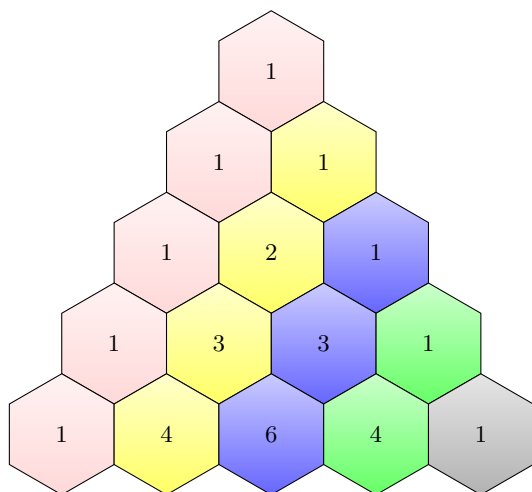
设置 Pascal 三角形的形状, 目前支持 `iso`—等腰三角形和 `rt`—直角三角形。



```
1 \centering
2 \pascal{5}\qqquad
3 \pascal[shape=rt]{5}
```

`radius` = `<半径>` (initially 0.5cm)

设置三角形每个单元外接圆半径, 注意需要带有单位。

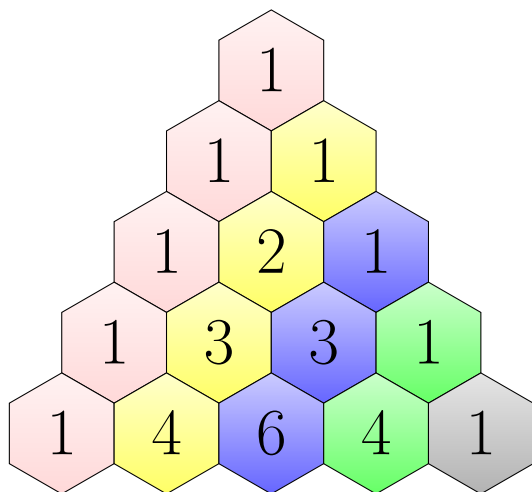


```

1 \centering
2 \pascal[radius=0.8cm]{5}

```

fontsize = \langle 字号命令 \rangle (initially \small)
 设置三角形每个单元中数字文本大小。

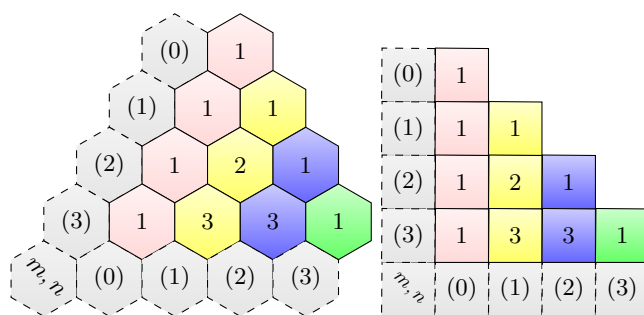


```

1 \centering
2 \pascal[radius=0.8cm,
3   fontsize=\Huge]{5}

```

withnum = \langle 布尔值 \rangle (initially false)
 设置是否显示 Pascal 三角形的行列编号。

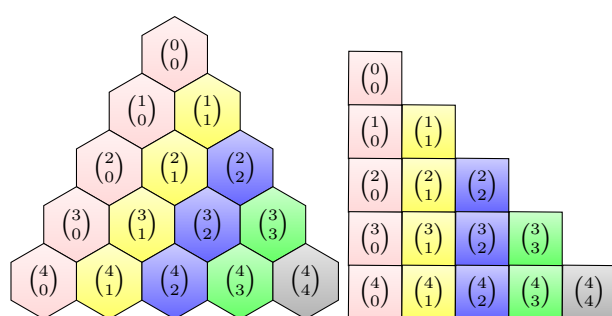


```

1 \centering
2 \pascal[withnum]{4}
3 \pascal[withnum,shape=rt]{4}

```

binom = \langle 布尔值 \rangle (initially false)
 设置是否显示用二项式表达式显示各元素值。



```

1 \centering
2 \pascal[binom]{5}
3 \pascal[binom,shape=rt]{5}

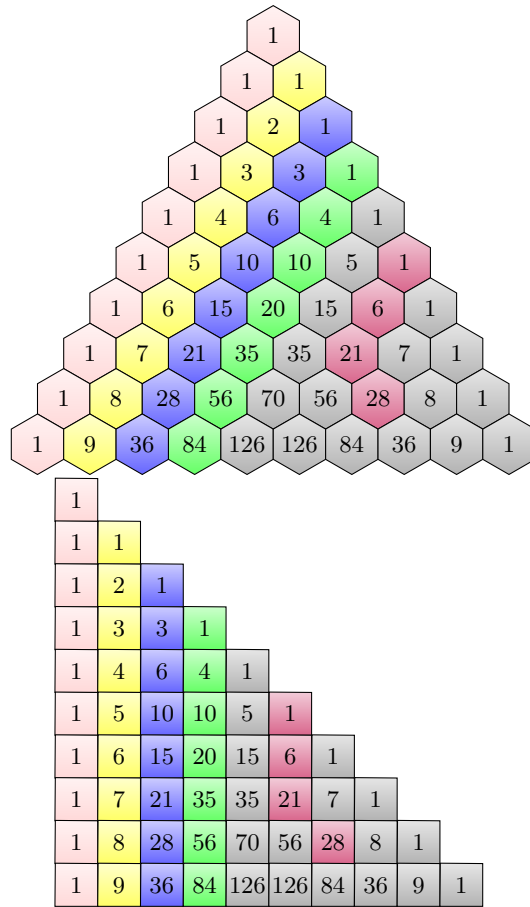
```

`fillr` = 〈整数〉 (initially 1)

设置需要表示前列累加的单元格行号，注意行号是当前列自顶向下从 0 开始计数。

`fillc` = 〈整数〉 (initially 1)

设置需要表示前列累加的单元格列号，注意列号是自左向右从 0 开始计数。



```

1 \centering
2 \pascalset{fillr=2,fillc=6,
3     radius=0.4cm}
4 \pascal{10}\\
5 \pascal[shape=rt]{10}

```

Package `pascaltriangle`

⇒ 中文版本

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January 7, 2022 v1.0.0 *†

4 Introduction

`pascaltriangle` is a Pascal triangle(Yanghui triangle) generation package based on TikZ developed in expl3, which provides a unique drawing command `\pascal`, and can be set by different options or `\pascalset` macro to generates isosceles or right-angle Pascal triangles with different appearances.

5 Interfaces

5.1 `\pascal` macro

<code>\pascal</code>	<code>\pascal</code> [<i>options</i>] { <i>order</i> }
----------------------	--

Used to draw a Pascal triangle.

This macro has only one mandatory parameter {*order*}, which specifies the number of layers of the Pascal triangle.

In [*options*] you can set the appearance of the triangle shape, size, etc. by key-value method.

The appearance of the triangle can also be set via the comma-separated key-value list of the `\pascalset` macro

5.2 `\pascalset` macro

<code>\pascalset</code>	<code>\pascalset</code> { <i>options</i> }
-------------------------	--

Used to set the appearance of Pascal triangle.

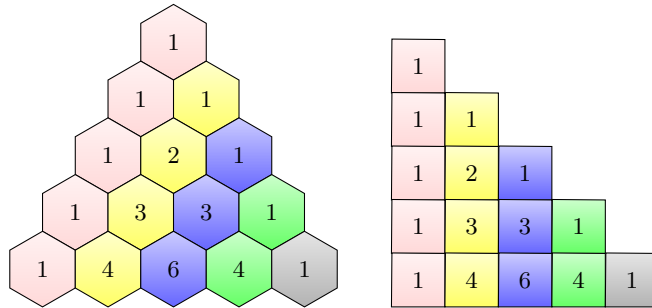
In [*options*] you can set the appearance of the triangle shape, size, etc. by key-value method.

*<https://github.com/registor/pascaltriangle>
†https://gitee.com/nwafu_nan/pascaltriangle
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†https://gitee.com/nwafu_nan/pascaltriangle

6 options

shape = $\langle shape \rangle$ (initially iso)

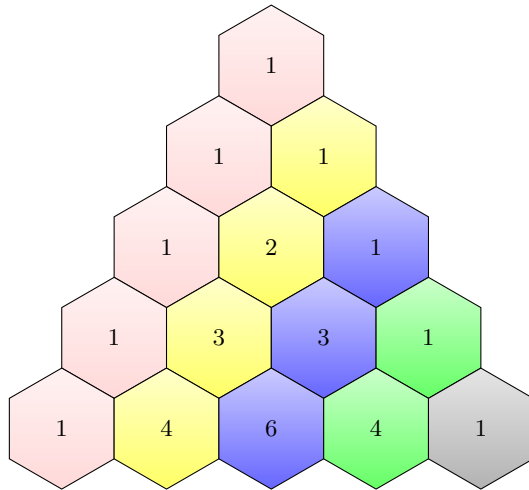
Sets the shape of Pascal triangle currently supporting **iso**—isosceles triangles and **rt**—right-angle triangles.



```
1 \centering
2 \pascal{5}\qqquad
3 \pascal[shape=rt]{5}
```

radius = $\langle radius \rangle$ (initially 0.5cm)

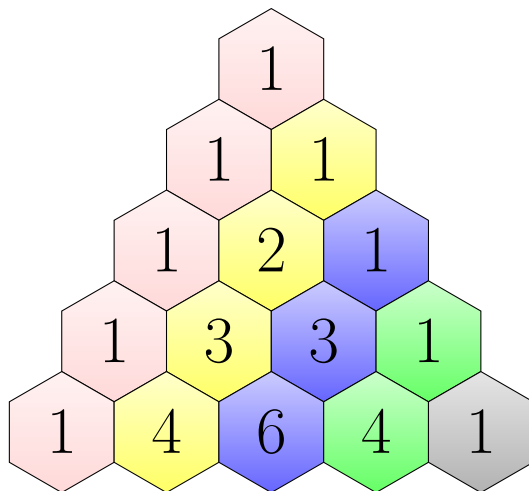
Set the radius of the outer circle of each cell of the triangle, note that it needs to have units.



```
1 \centering
2 \pascal[radius=0.8cm]{5}
```

fontsize = $\langle fontsize \rangle$ (initially \small)

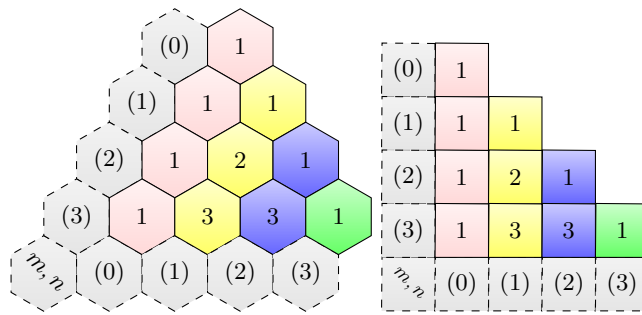
Sets the fontsize of each cell of the triangle.



```
1 \centering
2 \pascal[radius=0.8cm,
3   fontsize=\Huge]{5}
```

withnum = $\langle bool \rangle$ (initially false)

Sets whether to show the Pascal triangle row/col numbers or not.



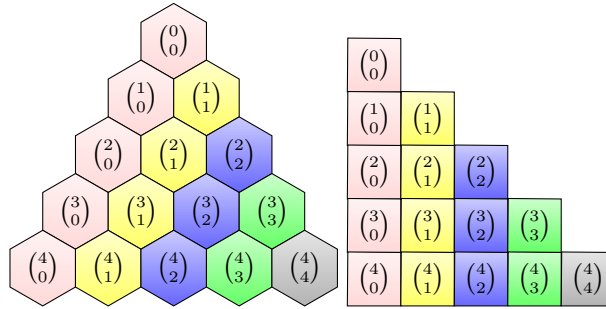
```

1 \centering
2 \pascal[withnum]{4}
3 \pascal[withnum,shape=rt]{4}

```

binom = $\langle \text{bool} \rangle$ (initially false)

Sets whether to show each element value with binomial expressions or not.



```

1 \centering
2 \pascal[binom]{5}
3 \pascal[binom,shape=rt]{5}

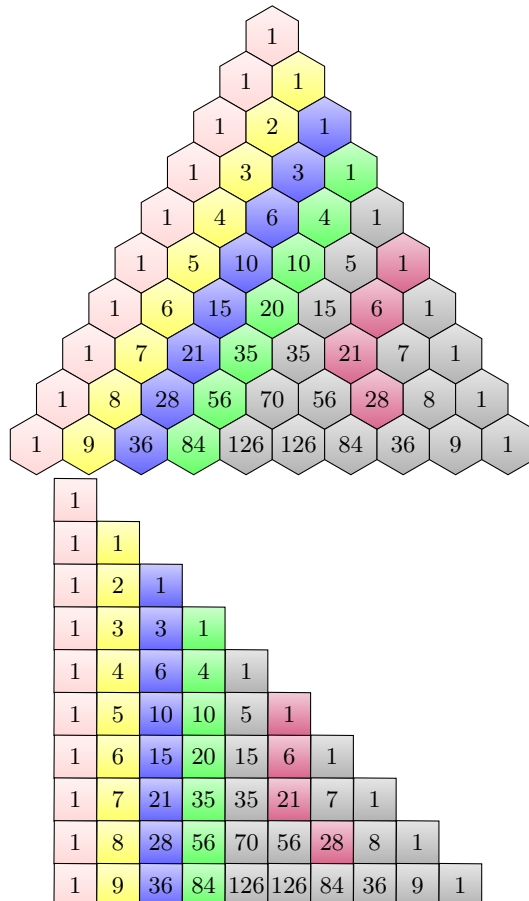
```

fillr = $\langle \text{integer} \rangle$ (initially 1)

Set the row number of the cell that needs to indicate the sum of the pre-column, note that the row number is in the current column counted from the top down based 0.

fillc = $\langle \text{integer} \rangle$ (initially 1)

Set the col number of the cell that needs to indicate the sum of the pre-column, note that the col number is counted from the left to right based 0.



```

1 \centering
2 \pascalset{fillr=2,fillc=6,
3           radius=0.4cm}
4 \pascal{10}\\
5 \pascal[shape=rt]{10}

```

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The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.

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