

# LaTeX/Colors

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Adding colors to your text is supported by the `xcolor` (<http://www.ctan.org/pkg/xcolor>) package (supersedes package `color`). Using this package, you can set the font color, text background, or page background. You can choose from predefined colors or define your own colors using RGB, Hex, or CMYK. Mathematical formulas can also be colored.

## Adding the xcolor package

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To make use of these features, the `xcolor` package must be imported.

```
\usepackage{xcolor}
```

The package has some options to get more predefined colors, which should be added globally. `usenames` allows you to use names of the default colors, the same 16 base colors as used in HTML. The `dvipsnames` allows you access to more colors, another 64, and `svgnames` allows access to about 150 colors. The initialization of "table" allows colors to be added to tables by placing the color command just before the table.

If you need more colors, then you may also want to look at the `x11names` option. This offers more than 300 colors.

## Entering colored text

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The simplest way to type colored text is by:

```
\textcolor{declared-color}{text}
```

where `declared-color` is a color that was defined before by `\definecolor`.

Another possible way by

```
{\color{declared-color}some text}
```

that will switch the standard text color to the color you want. It will work until the end of the current TeX group. For example:

```
\emph{some black text,  
\color{red}followed by a  
red fragment}, going  
black again.
```

*some black text, followed by a red fragment, going black again.*

The difference between `\textcolor` and `\color` is the same as that between `\texttt` and `\ttfamily`, you can use the one you prefer. The `\color` environment allows the text to run over multiple lines and other text environments whereas the text in `\textcolor` must all be one paragraph and not contain other environments.

You can change the background color of the whole page by:

```
\pagecolor{declared-color}
```

## Entering colored background for the text

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```
\colorbox{declared-color}{text}
```

If the background color and the text color is changed, then:

```
\colorbox{declared-color1}{\color{declared-color2}text}
```

There is also `\fcolorbox` to make framed background color in yet another color:

```
\fcolorbox{declared-color-frame}{declared-color-background}{text}
```

## Predefined colors

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The predefined color names are

```
black, blue, brown, cyan, darkgray, gray, green, lightgray, lime, magenta, olive, orange, pink, purple, red, teal, violet, white, yellow.
```

There may be other pre-defined colors on your system, but these should be available on all systems.

If you would like a color not pre-defined, you can use one of the 68 dvips colors, or define your own. These options are discussed in the following sections

### The 68 standard colors known to dvips

Invoke the package with the `usenames` and `dvipsnames` option. If you are using `tikz` or `pstricks` package you must declare the `xcolor` package before that, otherwise it will not work.

```
\usepackage[dvipsnames]{xcolor}
```

```
i-----i
```

This above syntax may result in an error if you are using beamer with [tikz](#). To go around it, include usernames and dvipsnames options when defining the document class.

```
\documentclass[usernames,dvipsnames]{beamer}
```

Name	Color		Color	Name
Apricot				Aquamarine
Bittersweet				Black
Blue				BlueGreen
BlueViolet				BrickRed
Brown				BurntOrange
CadetBlue				CarnationPink
Cerulean				CornflowerBlue
Cyan				Dandelion
DarkOrchid				Emerald
ForestGreen				Fuchsia
Goldenrod				Gray
Green				GreenYellow
JungleGreen				Lavender
LimeGreen				Magenta
Mahogany				Maroon
Melon				MidnightBlue
Mulberry				NavyBlue
OliveGreen				Orange
OrangeRed				Orchid
Peach				Periwinkle
PineGreen				Plum
ProcessBlue				Purple
RawSienna				Red
RedOrange				RedViolet
Rhodamine				RoyalBlue
RoyalPurple				RubineRed
Salmon				SeaGreen
Sepia				SkyBlue
SpringGreen				Tan
TealBlue				Thistle
Turquoise				Violet
VioletRed				White
WildStrawberry				Yellow
YellowGreen				YellowOrange

# Defining new colors

If the predefined colors are not adequate, you may wish to define your own.

# Place

Define the colors in the *preamble* of your document. (Reason: do so in the preamble, so that you can already refer to them in the preamble, which is useful, for instance, in an argument of another package that supports colors as arguments, such as the listings package.)

# Method

You need to include the `xcolor` package in your preamble to define new colors. In the abstract, the colors are defined following this scheme:

```
\definecolor{name}{model}{color-spec}
```

where:

- *name* is the name of the color; you can call it as you like
- *model* is the way you *describe* the color, and is one of *gray*, *rgb*, *RGB*, *HTML*, and *cmyk*.
- *color-spec* is the description of the color

# Color Models

Among the models you can use to describe the color are the following (several more are described in the xcolor manual (<http://mirror.ctan.org/macros/latex/contrib/xcolor/xcolor.pdf>)):

Color Models			
Model	Description	Color Specification	Example
gray	Shades of gray (0-1)	Just one number between 0 (black) and 1 (white), so 0.95 will be very light gray, 0.30 will be dark gray.	<code>\definecolor{light-gray}{gray}{0.95}</code>
rgb	Red, Green, Blue (0-1)	Three numbers given in the form <i>red,green,blue</i> ; the quantity of each color is represented with a number between 0 and 1.	<code>\definecolor{orange}{rgb}{1,0.5,0}</code>
RGB	Red, Green, Blue (0-255)	Three numbers given in the form <i>red,green,blue</i> ; the quantity of each color is represented with a number between 0 and 255.	<code>\definecolor{orange}{RGB}{255,127,0}</code>
HTML	Red, Green, Blue (00-FF)	Six hexadecimal numbers given in the form <i>RRGGBB</i> ; similar to what is used in HTML.	<code>\definecolor{orange}{HTML}{FF7F00}</code>
cmyk	Cyan, Magenta, Yellow, Black (0-1)	Four numbers given in the form <i>cyan,magenta,yellow,black</i> ; the quantity of each color is represented with a number between 0 and 1.	<code>\definecolor{orange}{cmyk}{0,0.5,1,0}</code>

## Examples

To define a new color, follow the following example, which defines orange for you, by setting the red to the maximum, the green to one half (0.5), and the blue to the minimum:

```
\definecolor{orange}{rgb}{1,0.5,0}
```

The following code should give a similar results to the last code chunk.

```
\definecolor{orange}{RGB}{255,127,0}
```

If you loaded the `xcolor` package, you can define colors upon previously defined ones.

The first specifies 20 percent blue and 80 percent white; the second is a mixture of 20 percent blue and 80 percent black; and the last one is a mixture of (20\*0.3) percent blue, ((100-20)\*0.3) percent black and (100-30) percent green.

```
\color{blue!20}  
\color{blue!20!black}  
\color{blue!20!black!30!green}
```

`xcolor` also feature a handy command to define colors from color mixes:

```
\colorlet{notgreen}{blue!50!yellow}
```

## Using color specifications directly

Normally one would predeclare all the colors as above, but sometimes it is convenient to directly use a color without naming it first. To achieve this, `\color` and `\textcolor` have an alternative syntax specifying the model in square brackets, and the color specification in curly braces. For example:

```
{\color[rgb]{1,0,0} This text will appear red-colored}  
\textcolor[rgb]{0,1,0}{This text will appear green-colored}
```

## Creating / Capturing colors

You may want to use colors that appear on another document, web pages, pictures, etc. Alternatively, you may want to play around with `rgb` values to create your own custom colors.

Image processing suites like the free GIMP (<http://www.gimp.org/downloads/>) suite for Linux/Windows/Mac offer color picker facilities to capture any color on your screen or synthesize colors directly from their respective rgb / hsv / hexadecimal values.

Smaller, free utilities also exist:

- Linux/BSD: The gcolor2 (<http://gcolor2.sourceforge.net/>) tool (usually also available in repositories)
- Microsoft Windows: The open-source Color Selector (<http://colorselector.sourceforge.net/>) tool.
- Apple Macs: Hex Color Picker (<http://wafflesoftware.net/hexpicker/>) for creating custom colors and the built-in DigitalColor Meter (<http://www.apple.com/uk/osx/apps/all.html#colormeter>) for capturing colors on screen.
- Online utilities: See here for a Wikipedia article with several external links

## Spot colors

Spot colors are customary in printing. They usually refer to pre-mixed inks based on a swatchbook (like Pantone, TruMatch or Toyo). The package `colorspace` extends `xcolor` to provide real spot colors (CMYK and CIELAB). They are defined with, say:

```
\definespotcolor{mygreen}{PANTONE 7716 C}{.83, 0, .40, .11}
```

## Sources

- The xcolor manual (<http://mirror.ctan.org/macros/latex/contrib/xcolor/xcolor.pdf>)
- The color package documentation (<http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf>)

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