

# The circledsteps package: circled numbers, circled steps and more

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## 1 Introduction

This package was born thanks to the discussion on [tex.stackexchange.com](https://tex.stackexchange.com), and with the help of the several authors that contributed to the answers. The base idea is to have a command that can create arbitrary “circled” text (numbers or letters) and that can work in normal text **and** in a node in a `tikzpicture` or derivative. That forbid to use `TikZ` itself for the circles — you can’t safely nest `tikzpictures`.

This package provides two things: the first one, macros to generate the circled text that use the original `pict2e` method, and then a (simple, to be taken as an example) set of macro to generate sequential circled numbers that can be referenced afterward.

## 2 Basic commands

The basic commands are:

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<code>\Circled{}</code>	circled text using the package colors, text on the baseline
<code>\CircledTop{}</code>	circled text using the package colors, circle on the baseline
<code>\CircledText{}</code>	circled text using the current color (may fail <sup>1</sup> across pages break in header or footers)

---

The parameters for the output are controlled using `pgfkeys`; you can change them with `\tikzset`; you can obviously limit the effect of change using normal  $\text{\LaTeX}$  scoping rules. The pseudo-color `none` means that the current color is used for both the text and the circle.

Parameter	Meaning	Default value
<code>/csteps/inner ysep</code>	vertical spacing	4pt
<code>/csteps/inner xsep</code>	horizontal spacing	4pt
<code>/csteps/inner color</code>	color of the text	none
<code>/csteps/outer color</code>	color of the circle	none

The working of the package is better explained with examples.

This is normal text: ① is on the baseline, ② is on top.  
This is more evident if you have descendents, like p:Ⓟ and Ⓟ.

<sup>1</sup>This is normal text: `\Circled{1}` is on the baseline, `\CircledTop{2}` is on top.

<sup>2</sup>

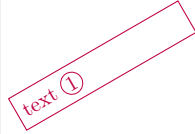
<sup>3</sup>This is more evident if you have descendents, like `p:\Circled{p}` and `\CircledTop{p}`.

<sup>1</sup>in the sense it can select the wrong color.

For big horizontal things the circle becomes oval: (200) or (199).

1 For big horizontal things the circle becomes oval: \Circled{200} or \CircledTop{199}.

Inside tikz they work ok:



```
1 Inside \texttt{tikz} they work ok:
2
3 \begin{tikzpicture}[scale=0.8, rotate=30,
4   text width=3cm, transform shape]
5   \node [draw,color=purple]{text \Circled{1}};
6 \end{tikzpicture}
```

If you like more breathing space: (1) (2) (p) (200) (199).

```
1 \tikzset{/csteps/inner ysep=10pt}
2 \tikzset{/csteps/inner xsep=10pt}
3 If you like more breathing space:
4 \Circled{1} \Circled{2} \Circled{p} \Circled{200} \Circled{199}.
5 \par\bigskip
```

If you want to change colors it's easy: (1) (2) (p) (200) (199).

```
1 \tikzset{/csteps/inner color=green}
2 \tikzset{/csteps/outer color=gray}
3 If you want to change colors it's easy:
4 \Circled{1} \Circled{2} \Circled{p} \Circled{200} \Circled{199}.
5 \par\bigskip
```

If you use the package option `redblue` or `legacy` you will have the same effect than

```
1 \tikzset{/csteps/inner color=red, /csteps/outer color=blue}
```

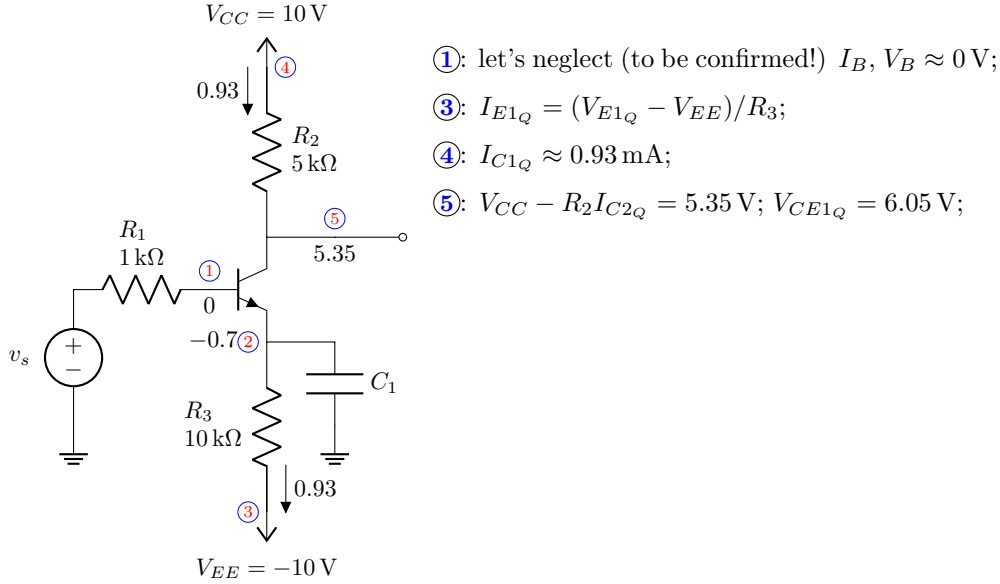
Or even you can have inline numbers like ① or exponents<sup>②</sup> and so on. **They follow the current color: ① and ② automatically**, as you can see: (1 + 1 ≈ 3). In-text circled numbers look better when a bit smaller, though, as you can see in ① for example.

```
1 Or even you can have inline numbers like \CircledText{1} or
2 exponents\textsuperscript{\CircledText{2}} and so on.
3 \textcolor{red}{They follow the current color: \CircledText{1} and \CircledText{2}
   automatically,} as you can see: \CircledText{$1+1\approx3$}. In-text circled
   numbers look better when a bit smaller, though, as you can see in {\small\
   CircledText{1}} for example.
```

No, you can't fill the circle/oval. Pull requests in that sense are welcome.

### 3 Automatically generated numbers

The command `\cstep` will generate a circled number, starting from 1, that can be referenced with the normal `\label` mechanism. You can reset the numbering with `\startcstep`. For example:



```

1 \tikzset{/csteps/inner color=red, /csteps/outer color=blue}
2 \newcommand{\circref}[1]{\CircledText{\small\textbf{\ref{#1}}}:}
3 \begin{circuitikz}[scale=0.9, baseline=(VCC), transform shape]
4   \draw (0,0) node[ground](GND){} to[V=$v_s$] ++(0,2)
5   to[R, l2_=$R_1$ and \SI{1}{k\ohm}, l2 valign=b] ++(2,0) coordinate(firstb);
6   \node [above] at(firstb) {\cstep\label{c:b1}};
7   \node [below] at(firstb) {0};
8   \draw (firstb) node[npn, anchor=B](Q1){};
9   \draw (Q1.E) node[left]{\num{-0.7}\cstep};
10  \draw (Q1.C) to[R, l2_=$R_2$ and \SI{5}{k\ohm}, f<=\num{0.93}] ++(0,2.5)
11    node[vcc](VCC){$V_{CC}=\SI{10}{V}$};
12  \draw (Q1.E) to[R, l2_=$R_3$ and \SI{10}{k\ohm},
13    f=\num{0.93}] ++(0,-2.5) node[vee](VEE){$V_{EE}=\SI{-10}{V}$};
14    node[left]{\cstep\label{c:ie1}};
15  \path (VCC) node[right]{\cstep\label{c:ic1}};
16  \draw (Q1.E) -- ++(1,0) coordinate(tmp) to[C=$C_1$] (tmp |- GND) node[ground]{};
17  \draw (Q1.C) -- ++(1,0) coordinate(g1) to[short, -o] ++(1,0);
18  \node [above] at(g1) {\cstep\label{c:g1}};
19  \node [below] at(g1) {\num{5.35}};
20 \end{circuitikz}\quad
21 \begin{minipage}[t]{0.5\linewidth}
22   %% minipage reset these..
23   \parindent=0pt\parskip=6pt plus 6pt minus 2pt\relax
24   \circref{c:b1} let's neglect (to be confirmed!) $I_B$, $V_B \approx \SI{0}{V}$;\par
25   \circref{c:ie1} $I_{E1Q}=(V_{E1Q}-V_{EE})/R_3$;\par
26   \circref{c:ic1} $I_{C1Q} \approx \SI{0.93}{mA}$;\par
27   \circref{c:g1} $V_{CC}-R_2I_{C2Q}=\SI{5.35}{V}$; $V_{CE1Q}=\SI{6.05}{V}$;\par
28 \end{minipage}

```

## 4 Personalize it!

The definition of `CircledText` is simply the following one; you can get idea and define your own easily (beware of spaces at the end of the lines, though!):

```
1 \newcommand{\CircledText}[1]{%
2   \begingroup
3   \tikzset{/csteps/inner color=none, /csteps/outer color=none,}
4   \Circled{#1}%
5   \endgroup
6 }
```

Also the implementation of the `\cstep` command and relatives is quite simple, and you can play a lot with it to change things (formats, colors, the type of numbering, and so on):

```
1 \newcounter{cstepcnt}
2 \newcommand{\startcstep}{\setcounter{cstepcnt}{0}}
3 \newcommand{\resetcstep}{\setcounter{cstepcnt}{0}}
4 \newcommand{\cstep}{%
5   \refstepcounter{cstepcnt}%
6   \Circled{\scriptsize\arabic{cstepcnt}}%
7 }
8 \renewcommand{\thecstepcnt}{\arabic{cstepcnt}}
```