Typeset Code Listings and Emulate Console Screenshots with LaTeX Beautifully

https://github.com/xziyue/latex-beautiful-listings-screenshot

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Contents

1 Quick Start Guide

1. Download `customlisting.sty` and place it in your project folder.
2. Load the package with `\usepackage{customlisting}`.
3. If you are using pdfLaTeX, make sure to include `\usepackage[T1]{fontenc}` in the preamble. Otherwise, symbols like ~ may not be displayed correctly.

This package provides the following environments:

- `tcbconsole`, `tcbconsole*`
- `tcbcode`, `tcbcode*`
- `tcbverbatim`, `tcbverbatim*`

This package also provides the following commands:

- `tcbinputcode`, `tcbinputcode*`
- `tcbinputverbatim`, `tcbinputverbatim*`

The starred environments/commands offer *unbreakable* listing boxes; while normal ones are *breakable*.

2 Typeset Source Code Listings

- Typeset source code inside TeX files

```
\begin{tcbcode}{cpp}
#include <iostream>
using namespace std;

int main(){
    cout<<"Hello World\n";
    return 0;
}
\end{tcbcode}
```

Code

```cpp
#include <iostream>
using namespace std;

int main(){
    cout<<"Hello World\n";
    return 0;
}
```

- Typeset source code from external source files

```
\tcbinputcode*{cpp}{../res/example.cpp}
```

Code

```cpp
#include <iostream>
using namespace std;

int main(){
    cout<<"Hello World\n";
    return 0;
}
```

- Inline source code

```
\cinline|printf("%s", "some text");|
\pyinline|map(lambda x:x, [1, 2])|
\rawinline|raw value|
```

`printf("%s", "some text");` `map(lambda x:x, [1, 2])` `raw value`

- Declare inline macros for other languages

```
\newmintinline[rubyinline]{ruby}{frame=none, fontsize=\fontsize{10}{10}}
\rubyinline|puts 'Hello, world!'|
```

```ruby
puts 'Hello, world!'
```

3 Typeset Generic Verbatims

- Typeset generic verbatims inside TEX files

```
\begin{tcbverbatim}
 _____________________________  ___
\__    ___/\_   _____/\   \/  /
   |    |    |    __)_  \     /
   |    |    |        \ /     \
   |____|   /_______  //___/\  \
                    \/        \_/
\end{tcbverbatim}
```

Verbatim

```
 _____________________________  ___
\__    ___/\_   _____/\   \/  /
   |    |    |    __)_  \     /
   |    |    |        \ /     \
   |____|   /_______  //___/\  \
                    \/        \_/
```

- Typeset generic verbatims from external files

```
\tcbinputverbatim*{../res/wireshark.txt}
```

Verbatim

```
No.     Time           Source                Destination           Protocol Length Info
    118 0.159070602    2604:6000:1419:404a::6 2607:f8b0:4009:805::2004 TCP      86     42136> 443 [ACK] Seq=936 Ack=52751 Win=2933 Len=0 TSval=2838670553 TSecr=302725484
    119 0.177751097    192.168.0.1           192.168.0.100         DNS      140    Standard query response 0x829b A fonts.gstatic.com CNAME gstaticadssl.l.google.com A 172.217.1.35 OPT
    120 0.178038905    192.168.0.1           192.168.0.100         DNS      152    Standard query response 0x0ec8 AAAA fonts.gstatic.com CNAME gstaticadssl.l.google.com AAAA 2607:f8b0
        :4009:802::2003 OPT
    121 0.178444739    2604:6000:1419:404a::6 2607:f8b0:4009:802::2003 TCP      94     39596> 443 [SYN] Seq=0 Win=64800 Len=0 MSS=1440 SACK_PERM=1 TSval=4016727607 TSecr=0 WS=128
    122 0.180362133    2607:f8b0:4009:805::2004 2604:6000:1419:404a::6 TCP      86     443> 42188 [ACK] Seq=1883 Ack=1337 Win=68096 Len=0 TSval=319629076 TSecr=2838670536
    123 0.185824541    2607:f8b0:4009:806::2003 2604:6000:1419:404a::6 TCP      86     443> 53154 [ACK] Seq=1 Ack=591 Win=66816 Len=0 TSval=1161394810 TSecr=356743249
    124 0.187455681    2607:f8b0:4009:806::2003 2604:6000:1419:404a::6 TLSv1.3  298    Server Hello, Change Cipher Spec, Application Data
    125 0.187460441    2604:6000:1419:404a::6 2607:f8b0:4009:806::2003 TCP      86     53154> 443 [ACK] Seq=591 Ack=213 Win=64768 Len=0 TSval=356743285 TSecr=1161394811
    126 0.187881868    2604:6000:1419:404a::6 2607:f8b0:4009:806::2003 TLSv1.3  150    Change Cipher Spec, Application Data
    127 0.187975438    2604:6000:1419:404a::6 2607:f8b0:4009:806::2003 TLSv1.3  172    Application Data
    128 0.188000758    2604:6000:1419:404a::6 2607:f8b0:4009:806::2003 TLSv1.3  323    Application Data
    129 0.188267503    2604:6000:1419:404a::6 2607:f8b0:4009:806::2003 TLSv1.3  649    Application Data
    130 0.194787446    2607:f8b0:4009:805::2004 2604:6000:1419:404a::6 TCP      86     443> 42136 [ACK] Seq=52751 Ack=936 Win=609 Len=0 TSval=302725520 TSecr=2838670548
    131 0.211610817    2607:f8b0:4009:802::2003 2604:6000:1419:404a::6 TCP      94     443> 39596 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1360 SACK_PERM=1 TSval=3015134314 TSecr=4016727607
        WS=256
    132 0.211641489    2604:6000:1419:404a::6 2607:f8b0:4009:802::2003 TCP      86     39596> 443 [ACK] Seq=1 Ack=1 Win=64896 Len=0 TSval=4016727640 TSecr=3015134314
```

4 Typeset Console Screenshots

Typesetting console screenshots is a bit trickier. By far, it can be done most conveniently on Ubuntu 18.04+. The key is to convert ANSI color codes used by the console into HTML. As it is shown in Figure 1, on Ubuntu 18.04+, this can be done simply by selecting the desired region, right click and select "Copy as HTML". On other platforms, this should be also doable by dumping the terminal output to a file and using a conversion tool such as `ansi2html`.

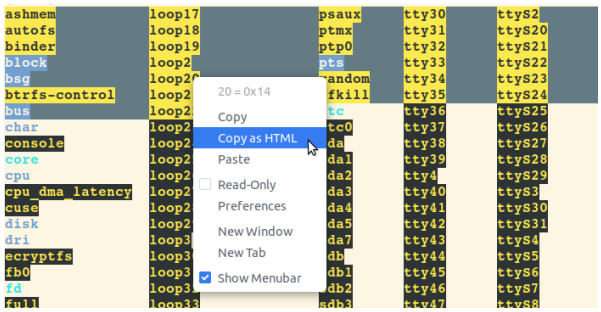

Figure 1: Converting terminal output to HTML on Ubuntu 18.04+.

Generally speaking, one needs to fulfill the following requirements:

1. Have a way of converting terminal output to HTML.
2. Be able to run the `html2latex` LaTeX Python script. Currently, the script is dependent on `wxPython`, `TexSoup`, colour and `PyLaTeX`. Please note that this software is very primitive and does not support many HTML features.

To typeset this screenshot in LaTeX, one needs to run `html2latex` and paste the HTML in the upper text box. By pressing the "Convert" button, the corresponding LaTeX code will appear in the lower text box, as it is shown in Figure 2. The result is shown as below.

```
1  \input{../res/console-dev.txt}
```

Terminal

```
ashmem    loop17    psaux    tty30    ttyS2
autofs    loop18    ptmx     tty31    ttyS20
binder    loop19    ptp0     tty32    ttyS21
block     loop2     pts      tty33    ttyS22
bsg       loop20    random   tty34    ttyS23
btrfs-control  loop21  rfkill  tty35  ttyS24
bus       loop22
```

Figure 2: Using `html2latex` to convert HTML to LaTeX.

Other classic command-line tools, such as `emacs`, are supported as well.

```
1  \input{../res/console-emacs.txt}
```

Terminal

```
File Edit Options Buffers Tools Help
Emacs tutorial.  See end for copying conditions.

Emacs commands generally involve the CONTROL key (sometimes labeled
CTRL or CTL) or the META key (sometimes labeled EDIT or ALT).  Rather than
write that in full each time, we'll use the following abbreviations:

 C-<chr>  means hold the CONTROL key while typing the character <chr>
          Thus, C-f would be: hold the CONTROL key and type f.
 M-<chr>  means hold the META or EDIT or ALT key down while typing <chr>.
          If there is no META, EDIT or ALT key, instead press and release the
          ESC key and then type <chr>.  We write <ESC> for the ESC key.

Important note: to end the Emacs session, type C-x C-c.  (Two characters.)
To quit a partially entered command, type C-g.
The characters ">>" at the left margin indicate directions for you to
```

```
try using a command.  For instance:

>> Now type C-v (View next screen) to move to the next screen.
  (go ahead, do it by holding down the CONTROL key while typing v).
       From now on, you should do this again whenever you finish
       reading the screen.
-UU-:----F1  TUTORIAL     Top L1     (Fundamental) --------------------------
```

4.1 Unicode Support

Very frequently, the terminal output contains Unicode characters. For TEXdistribution that supports Unicode input natively (e.g. XELATEX, LuaLATEX), this should not be a problem. Just remember to tick the "XeLaTeX" check box in `html2latex`.

As for the most commonly used pdfLATEX, special treatment is needed. The solution is to use the `\unichar` command provided by loading `\usepackage[utf8x]{inputenc}`. Therefore, if you are using pdfLATEXand there is Unicode character inside the terminal output, you should do the following:

1. Make sure to include `\usepackage[utf8x]{inputenc}` in your preamble.
2. Put `customlisting-unicode.sty` into your project folder and load it with `\usepackage{customlisting-unicode}`.
3. In `html2latex`, make sure "XeLaTeX" is unchecked.

A pdfLATEXexample is shown as below. However, keep in mind that `this Unicode support is extremely limited`: many characters are simply unavailable in pdfLATEX.

```
1 \input{../res/console-unicode.txt}
```

Terminal

```
(base) user@machine:~/latex_typeset_listings/res$ cat unicode-test.txt
Basic Latin
! " # $ % & ' ( ) * +
Latin-1 Supplement
  ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª
Latin Extended-A
Ā ā Ă ă Ć ć Ĉ ĉ Ċ
```

5 Add Captions

To support captions, one needs to load the `caption` package in the preamble and add some related definitions.

```
1 \usepackage{caption}
2
3 \newenvironment{mylisting}{\medskip\captionsetup{type=listing, labelsep=space}}{\medskip}
4 \DeclareCaptionType{lstcap}[Listing][List of Code Listings]
```

This allows one to add caption to code listings with the following code. The “List of Code Listings” can be generated with `\listoflstcaps`.

```
\begin{mylisting}
\begin{tcbcode*}{julia}
function quadratic2(a::Float64, b::Float64, c::Float64)
    # unlike other languages 2a is equivalent to 2*a
    # a^2 is used instead of a**2 or pow(a,2)
    sqr_term = sqrt(b^2-4a*c)
    r1 = quadratic(a, sqr_term, b)
    r2 = quadratic(a, -sqr_term, b)
    # multiple values can be returned from a function using tuples
    # if the return keyword is omitted, the last term is returned
    r1, r2
end
\end{tcbcode*}
\end{mylisting}
\listoflstcaps
```

Code

```julia
function quadratic2(a::Float64, b::Float64, c::Float64)
    # unlike other languages 2a is equivalent to 2*a
    # a^2 is used instead of a**2 or pow(a,2)
    sqr_term = sqrt(b^2-4a*c)
    r1 = quadratic(a, sqr_term, b)
    r2 = quadratic(a, -sqr_term, b)
    # multiple values can be returned from a function using tuples
    # if the return keyword is omitted, the last term is returned
    r1, r2
end
```

Listing 1: Some random Julia function.

List of Code Listings