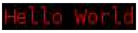
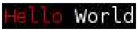
Colors and formatting (ANSI/VT100 Control sequences)

The **ANSI/VT100** terminals and terminal emulators are not just able to display black and white text ; they can display **colors** and formatted texts thanks to **escape sequences.** Those sequences are composed of the **Escape character** (often represented by "`^[`" or "`<Esc>`") followed by some other characters: "`<Esc>[`*FormatCode*`m`".

In Bash, the `<Esc>` character can be obtained with the following syntaxes:

- `\e`
- `\033`
- `\x1B`

Examples:

Code (Bash)	Preview
`echo -e "\e[31mHello World\e[0m"`	 Hello World
`echo -e "\033[31mHello\e[0m World"`	 Hello World

NOTE^1: The `-e` option of the `echo` command enable the parsing of the escape sequences.

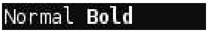
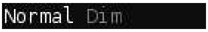
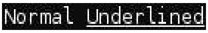
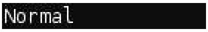
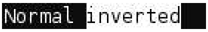
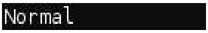
NOTE^2: The "`\e[0m`" sequence removes all attributes (formatting and colors). It can be a good idea to add it at the end of each colored text. ;)

NOTE^3: The examples in this page are in **Bash** but the **ANSI/VT100** escape sequences can be used in every programming languages.

Formatting

Here are the most commonly supported control sequences for formatting text. Their support depends on the used terminal (see the compatibility list).

Set

Code	Description	Example	Preview
1	Bold/Bright	`echo -e "Normal \e[1mBold"`	 Normal **Bold**
2	Dim	`echo -e "Normal \e[2mDim"`	 Normal Dim
4	Underlined	`echo -e "Normal \e[4mUnderlined"`	 Normal Underlined
5	Blink [1]	`echo -e "Normal \e[5mBlink"`	 Normal
7	Reverse (invert the foreground and background colors)	`echo -e "Normal \e[7minverted"`	 Normal inverted
8	Hidden (useful for passwords)	`echo -e "Normal \e[8mHidden"`	 Normal

Reset

Code	Description	Example	Preview
0	Reset all attributes	`echo -e "\e[0mNormal Text"`	Normal Text
21	Reset bold/bright	`echo -e "Normal \e[1mBold \e[21mNormal"`	Normal **Bold** Normal
22	Reset dim	`echo -e "Normal \e[2mDim \e[22mNormal"`	Normal Dim Normal
24	Reset underlined	`echo -e "Normal \e[4mUnderlined \e[24mNormal"`	Normal Underlined Normal
25	Reset blink	`echo -e "Normal \e[5mBlink \e[25mNormal"`	Normal Normal
27	Reset reverse	`echo -e "Normal \e[7minverted \e[27mNormal"`	Normal inverted Normal
28	Reset hidden	`echo -e "Normal \e[8mHidden \e[28mNormal"`	Normal Normal

8/16 Colors

The following colors works with most terminals and terminals emulators [2)], see the compatibility list for more informations.

NOTE: The colors can vary depending of the terminal configuration.

Foreground (text)

Code	Color	Example	Preview
39	Default foreground color	`echo -e "Default \e[39mDefault"`	Default Default
30	Black	`echo -e "Default \e[30mBlack"`	Default Black
31	Red	`echo -e "Default \e[31mRed"`	Default Red
32	Green	`echo -e "Default \e[32mGreen"`	Default Green
33	Yellow	`echo -e "Default \e[33mYellow"`	Default Yellow
34	Blue	`echo -e "Default \e[34mBlue"`	Default Blue
35	Magenta	`echo -e "Default \e[35mMagenta"`	Default Magenta
36	Cyan	`echo -e "Default \e[36mCyan"`	Default Cyan
37	Light gray	`echo -e "Default \e[37mLight gray"`	Default Light gray
90	Dark gray	`echo -e "Default \e[90mDark gray"`	Default Dark gray
91	Light red	`echo -e "Default \e[91mLight red"`	Default Light red
92	Light green	`echo -e "Default \e[92mLight green"`	Default Light green
93	Light yellow	`echo -e "Default \e[93mLight yellow"`	Default Light yellow
94	Light blue	`echo -e "Default \e[94mLight blue"`	Default Light blue
95	Light magenta	`echo -e "Default \e[95mLight magenta"`	Default Light magenta

Code	Color	Example	Preview
96	Light cyan	`echo -e "Default \e[96mLight cyan"`	Default Light cyan
97	White	`echo -e "Default \e[97mWhite"`	Default White

Background

Code	Color	Example	Preview
49	Default background color	`echo -e "Default \e[49mDefault"`	Default Default
40	Black	`echo -e "Default \e[40mBlack"`	Default Black
41	Red	`echo -e "Default \e[41mRed"`	Default Red
42	Green	`echo -e "Default \e[42mGreen"`	Default Green
43	Yellow	`echo -e "Default \e[43mYellow"`	Default Yellow
44	Blue	`echo -e "Default \e[44mBlue"`	Default Blue
45	Magenta	`echo -e "Default \e[45mMagenta"`	Default Magenta
46	Cyan	`echo -e "Default \e[46mCyan"`	Default Cyan
47	Light gray	`echo -e "Default \e[47mLight gray"`	Default Light gray
100	Dark gray	`echo -e "Default \e[100mDark gray"`	Default Dark gray
101	Light red	`echo -e "Default \e[101mLight red"`	Default Light red
102	Light green	`echo -e "Default \e[102mLight green"`	Default Light green
103	Light yellow	`echo -e "Default \e[103mLight yellow"`	Default Light yellow
104	Light blue	`echo -e "Default \e[104mLight blue"`	Default Light blue
105	Light magenta	`echo -e "Default \e[105mLight magenta"`	Default Light magenta
106	Light cyan	`echo -e "Default \e[106mLight cyan"`	Default Light cyan
107	White	`echo -e "Default \e[107mWhite"`	Default

88/256 Colors

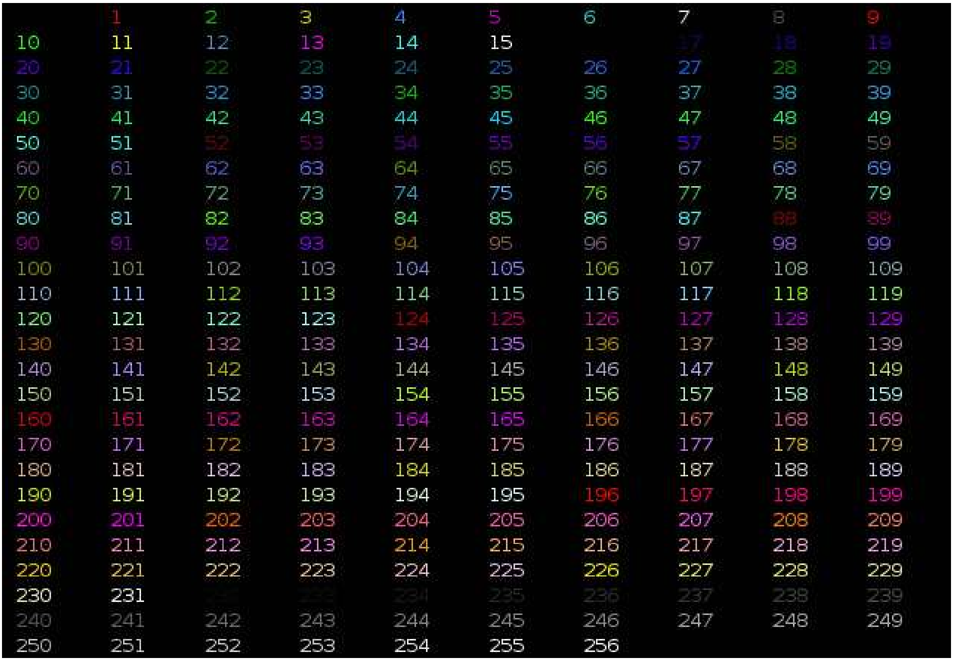
Some terminals (see the compatibility list) can support 88 or 256 colors. Here are the control sequences that permit you to use them.

NOTE¹: The colors number 256 is only supported by **vte** (GNOME Terminal, XFCE4 Terminal, Nautilus Terminal, Terminator,…).

NOTE²: The 88-colors terminals (like **rxvt**) does not have the same color map that the 256-colors terminals. For showing the 88-colors terminals color map, run the "256-colors.sh" script in a 88-colors terminal.

Foreground (text)

For using one of the 256 colors on the foreground (text color), the control sequence is "<Esc>[38;5;*ColorNumber*m" where ColorNumber is one of the following colors:



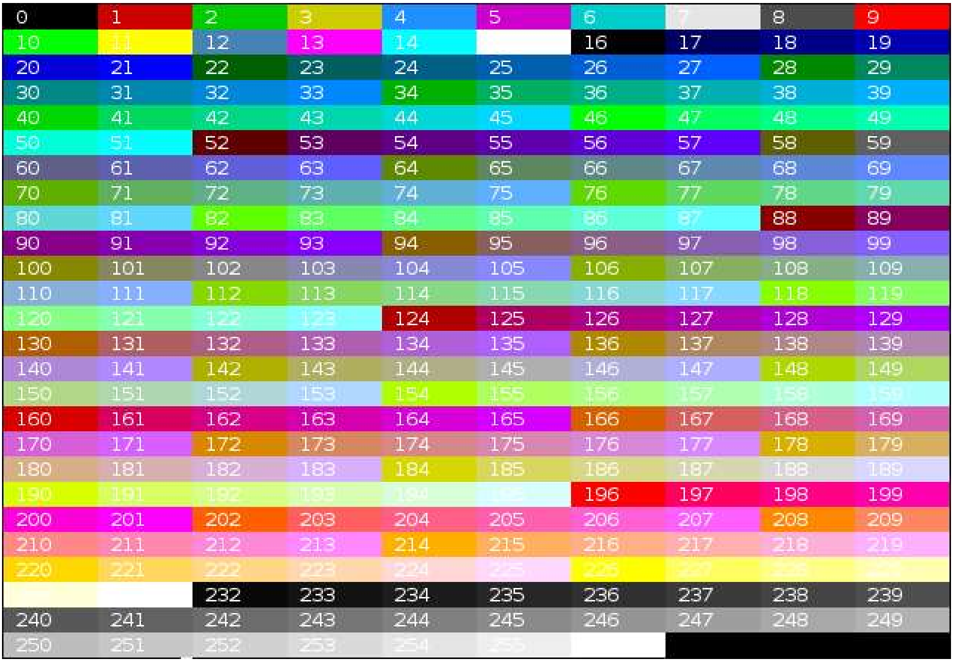
	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15		17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231		233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256			

<u>Examples:</u>

Code (Bash)	**Preview**
`echo -e "\e[38;5;82mHello \e[38;5;198mWorld"`	Hello World
`for i in {16..21} {21..16} ; do echo -en "\e[38;5;${i}m#\e[0m" ; done ; echo`	############

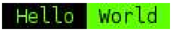
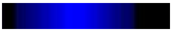
Background

For using one of the 256 colors on the background, the control sequence is "<Esc>[48;5;*ColorNumber*m" where ColorNumber is one of the following colors:



0	1	2	3	4	5	6	7	8	9
10	11	12	13	14		16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
		232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255				

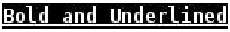
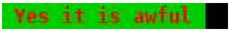
<u>Examples:</u>

Code (Bash)	**Preview**
`echo -e "\e[40;38;5;82m Hello \e[30;48;5;82m World \e[0m"`	 Hello World
`for i in {16..21} {21..16} ; do echo -en "\e[48;5;${i}m \e[0m" ; done ; echo`	

Attributes combination

Terminals allow attribute combinations. The attributes must be separated by a semicolon ("**;**").

<u>Examples:</u>

Description	**Code (Bash)**	**Preview**
Bold + Underlined	`echo -e "\e[1;4mBold and Underlined"`	 Bold and Underlined
Bold + Red forground + Green background	`echo -e "\e[1;31;42m Yes it is awful \e[0m"`	 Yes it is awful

Terminals compatibility

Terminal	**Formatting**						**Colors**				**Comment**
	Bold	**Dim**	**Underlined**	**Blink**	**invert**	**Hidden**	**8**	**16**	**88**	**256**	
aTerm	ok	-	ok	-	ok	-	ok	~	-	-	Lighter background instead of blink.

Terminal	Formatting						Colors				Comment
	Bold	Dim	Underlined	Blink	invert	Hidden	8	16	88	256	
Eterm	~	-	ok	-	ok	-	ok	~	-	ok	Lighter color instead of Bold. Lighter background instead of blink. Can overline a text with the "^[[6m" sequence.
GNOME Terminal	ok	ok	ok	ok	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.
Guake	ok	ok	ok	ok	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.
Konsole	ok	-	ok	ok	ok	-	ok	ok	-	ok	
Nautilus Terminal	ok	ok	ok	ok	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.
rxvt	ok	-	ok	~	ok	-	ok	ok	ok	-	If the background is not set to the default color, Blink make it lighter instead of blinking. Support of italic text with the "^[[3m" sequence.
Terminator	ok	ok	ok	-	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.
Tilda	ok	-	ok	ok	ok	-	ok	ok	-	-	Underline instead of Dim. Convert 256-colors in 16-colors.
XFCE4 Terminal	ok	ok	ok	ok	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.
XTerm	ok	-	ok	ok	ok	ok	ok	ok	-	ok	
xvt	ok	-	ok	-	ok	-	-	-	-	-	
Linux TTY	ok	-	-	-	ok	-	ok	~	-	-	Specials colors instead of Dim and Underlined. Lighter background instead of Blink, Bug with 88/256 colors.
VTE Terminal [3]	ok	ok	ok	ok	ok	ok	ok	ok	-	ok	Strikeout with the "^[[9m" sequence.

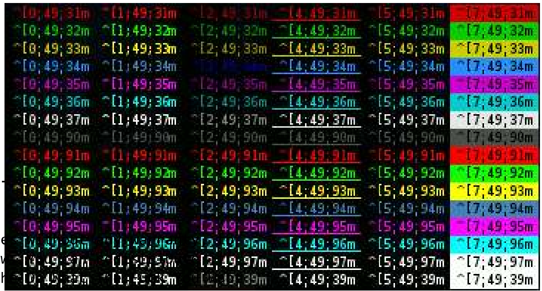
Notations used in the table:

- "ok": Supported by the terminal.
- "~": Supported in a special way by the terminal.
- "-": Not supported at all by the terminal.

Demonstration programs

Colors and formatting (16 colors)

The following shell script displays a lot of possible combination of the attributes (but not all, because it uses only one formatting attribute at a time).



```
^[0;49;31m  ^[1;49;31m  ^[2;49;31m  ^[4;49;31m  ^[5;49;31m  ^[7;49;31m
^[0;49;32m  ^[1;49;32m  ^[2;49;32m  ^[4;49;32m  ^[5;49;32m  ^[7;49;32m
^[0;49;33m  ^[1;49;33m  ^[2;49;33m  ^[4;49;33m  ^[5;49;33m  ^[7;49;33m
^[0;49;34m  ^[1;49;34m  ^[2;49;34m  ^[4;49;34m  ^[5;49;34m  ^[7;49;34m
^[0;49;35m  ^[1;49;35m  ^[2;49;35m  ^[4;49;35m  ^[5;49;35m  ^[7;49;35m
^[0;49;36m  ^[1;49;36m  ^[2;49;36m  ^[4;49;36m  ^[5;49;36m  ^[7;49;36m
^[0;49;37m  ^[1;49;37m  ^[2;49;37m  ^[4;49;37m  ^[5;49;37m  ^[7;49;37m
^[0;49;90m  ^[1;49;90m  ^[2;49;90m  ^[4;49;90m  ^[5;49;90m  ^[7;49;90m
^[0;49;91m  ^[1;49;91m  ^[2;49;91m  ^[4;49;91m  ^[5;49;91m  ^[7;49;91m
^[0;49;92m  ^[1;49;92m  ^[2;49;92m  ^[4;49;92m  ^[5;49;92m  ^[7;49;92m
^[0;49;93m  ^[1;49;93m  ^[2;49;93m  ^[4;49;93m  ^[5;49;93m  ^[7;49;93m
^[0;49;94m  ^[1;49;94m  ^[2;49;94m  ^[4;49;94m  ^[5;49;94m  ^[7;49;94m
^[0;49;95m  ^[1;49;95m  ^[2;49;95m  ^[4;49;95m  ^[5;49;95m  ^[7;49;95m
^[0;49;96m  ^[1;49;96m  ^[2;49;96m  ^[4;49;96m  ^[5;49;96m  ^[7;49;96m
^[0;49;97m  ^[1;49;97m  ^[2;49;97m  ^[4;49;97m  ^[5;49;97m  ^[7;49;97m
^[0;49;39m  ^[1;49;39m  ^[2;49;39m  ^[4;49;39m  ^[5;49;39m  ^[7;49;39m
```

colors_and_formatting.sh

```
#!/bin/bash

# This program is free software. It come
# the extent permitted by applicable la
# and/or modify it under the terms of th
# To Public License, Version 2, as published by Sam Hocevar. See
# http://sam.zoy.org/wtfpl/COPYING for more details.
```

```
#Background
for clbg in {40..47} {100..107} 49 ; do
        #Foreground
        for clfg in {30..37} {90..97} 39 ; do
                #Formatting
                for attr in 0 1 2 4 5 7 ; do
                        #Print the result
                        echo -en "\e[${attr};${clbg};${clfg}m ^[${attr};${clbg};${clfg}m \e[0m"
                done
                echo #Newline
        done
done

exit 0
```

256 colors

The following script display the 256 colors available on some terminals and terminals emulators like **XTerm** and **GNOME Terminal**.

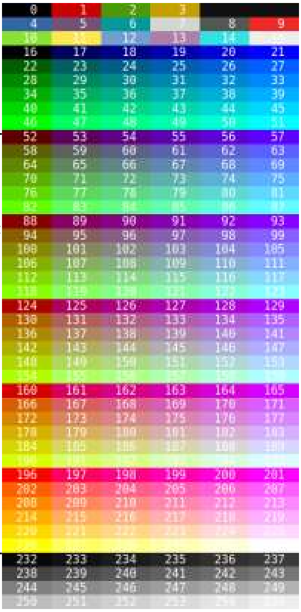
256-colors.sh

```
#!/bin/bash

# This program is free software. It comes without any warranty, to
# the extent permitted by applicable law. You can redistribute it
# and/or modify it under the terms of the Do What The Fuck You Want
# To Public License, Version 2, as published by Sam Hocevar. See
# http://sam.zoy.org/wtfpl/COPYING for more details.

for fgbg in 38 48 ; do # Foreground / Background
    for color in {0..255} ; do # Colors
        # Display the color
        printf "\e[${fgbg};5;%sm  %3s  \e[0m" $color $color
        # Display 6 colors per lines
        if [ $((($color + 1) % 6)) == 4 ] ; then
            echo # New line
        fi
    done
    echo # New line
done

exit 0
```



```
  0    1    2    3
  4    5    6    7    8    9
 10   11   12   13   14   15
 16   17   18   19   20   21
 22   23   24   25   26   27
 28   29   30   31   32   33
 34   35   36   37   38   39
 40   41   42   43   44   45
 46   47   48   49   50   51
 52   53   54   55   56   57
 58   59   60   61   62   63
 64   65   66   67   68   69
 70   71   72   73   74   75
 76   77   78   79   80   81
 82   83   84   85   86   87
 88   89   90   91   92   93
 94   95   96   97   98   99
100  101  102  103  104  105
106  107  108  109  110  111
112  113  114  115  116  117
118  119  120  121  122  123
124  125  126  127  128  129
130  131  132  133  134  135
136  137  138  139  140  141
142  143  144  145  146  147
148  149  150  151  152  153
154  155  156  157  158  159
160  161  162  163  164  165
166  167  168  169  170  171
172  173  174  175  176  177
178  179  180  181  182  183
184  185  186  187  188  189
190  191  192  193  194  195
196  197  198  199  200  201
202  203  204  205  206  207
208  209  210  211  212  213
214  215  216  217  218  219
220  221  222  223  224  225
226  227  228  229  230  231
232  233  234  235  236  237
238  239  240  241  242  243
244  245  246  247  248  249
250  251  252  253  254  255
```

Links

- Linux console codes manual ("man console_codes")
- XTerm Control Sequences
- Compilation of all escape sequences
- ANSI escape code (Wikipedia)

[1] Does not work with most of the terminal emulators, works in the tty and XTerm.

[2] Some terminals supports only the first 8 colors (30..37 and 40..47), and some others does not support any color at all.

[3] GTK Widget used in GNOME Terminal, Nautilus Terminal, XFCE4 Terminal…