Customizing the Prompt

Anatomy of a Prompt

- Our default prompt looks something like this:

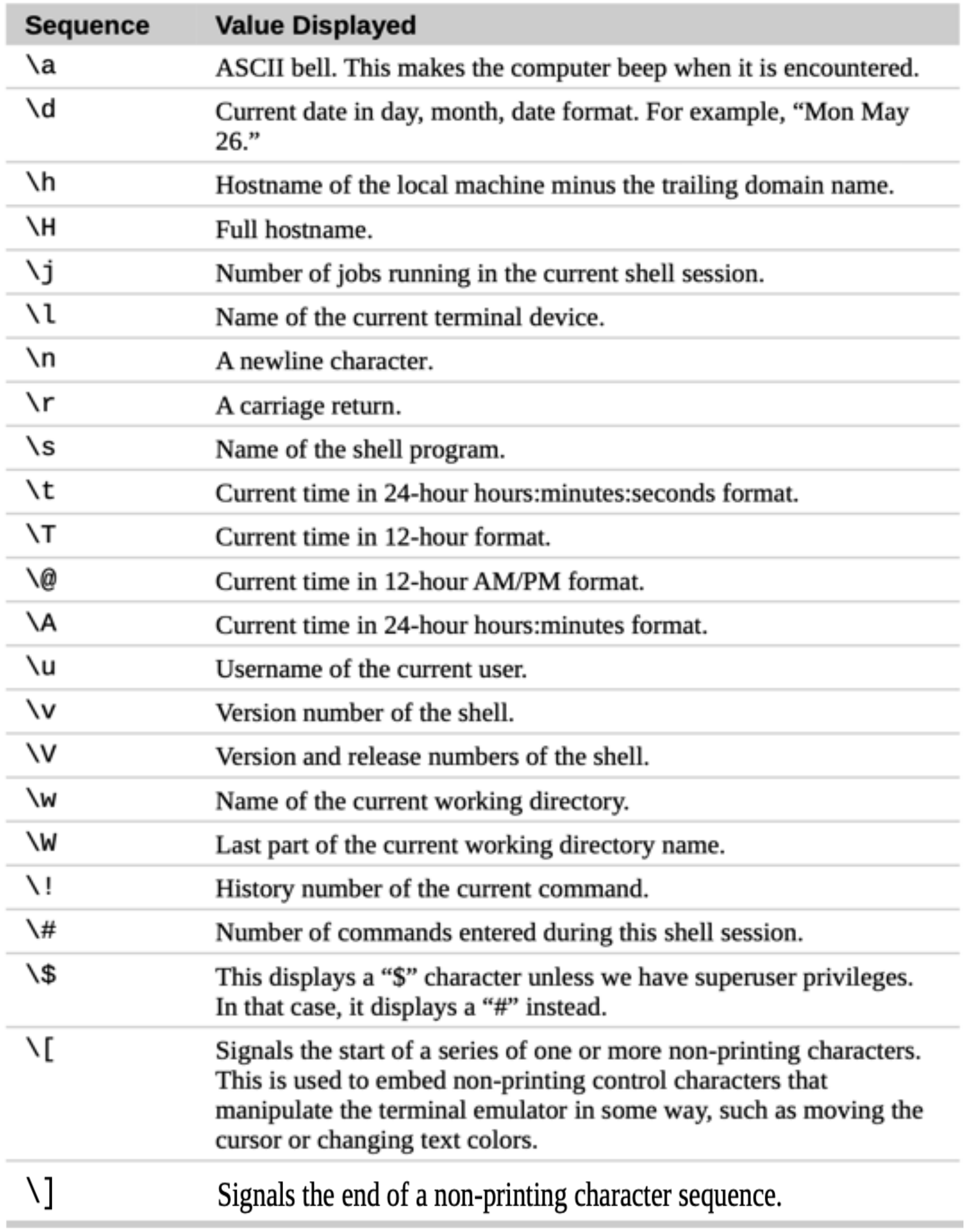
```
[me@linuxbox ~]$
```

- It contains our username, our hostname, and our current working directory.
- The prompt is defined by an environment variable named PS1 (short for “prompt string 1”).
- We can view the contents of PS1 with the echo command.

```
[me@linuxbox ~]$ echo $PS1
[\u@\h \W]\$
```

- Table 13-1 provides a partial list of the characters that the bash treats specially in the prompt string.

Table 13-1: Escape Codes Used in Shell Prompts



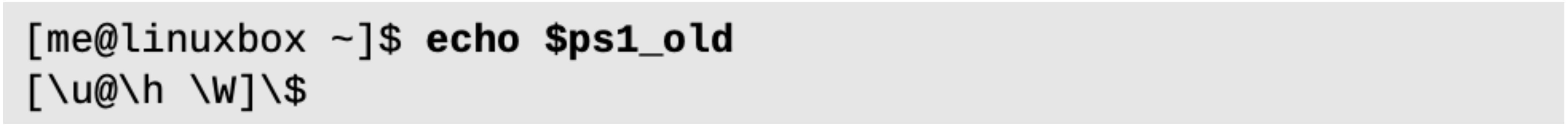
Sequence	Value Displayed
`\a`	ASCII bell. This makes the computer beep when it is encountered.
`\d`	Current date in day, month, date format. For example, "Mon May 26."
`\h`	Hostname of the local machine minus the trailing domain name.
`\H`	Full hostname.
`\j`	Number of jobs running in the current shell session.
`\l`	Name of the current terminal device.
`\n`	A newline character.
`\r`	A carriage return.
`\s`	Name of the shell program.
`\t`	Current time in 24-hour hours:minutes:seconds format.
`\T`	Current time in 12-hour format.
`\@`	Current time in 12-hour AM/PM format.
`\A`	Current time in 24-hour hours:minutes format.
`\u`	Username of the current user.
`\v`	Version number of the shell.
`\V`	Version and release numbers of the shell.
`\w`	Name of the current working directory.
`\W`	Last part of the current working directory name.
`\!`	History number of the current command.
`\#`	Number of commands entered during this shell session.
`\$`	This displays a "$" character unless we have superuser privileges. In that case, it displays a "#" instead.
`\[`	Signals the start of a series of one or more non-printing characters. This is used to embed non-printing control characters that manipulate the terminal emulator in some way, such as moving the cursor or changing text colors.
`\]`	Signals the end of a non-printing character sequence.

Trying Some Alternative Prompt Designs

- With this list of special characters, we can change the prompt to see the effect. First, we'll back up the existing prompt string so we can restore it later.
- To do this, we will copy the existing string into another shell variable that we create ourselves.

```
$ ps1_old="$PS1"
```

- We create a new variable called `ps1_old` and assign the value of `PS1` to it. We can verify that the string has been copied by using the echo command.



```
[me@linuxbox ~]$ echo $ps1_old
[\u@\h \W]\$
```

- We can restore the original prompt at any time during our terminal session by simply reversing the process.

```
[me@linuxbox ~]$ PS1="$ps1_old"
```

- Now that we are ready to proceed, let's see what happens if we have an empty prompt string.

```
[me@linuxbox ~]$ PS1=
```

- If we assign nothing to the prompt string, we get nothing. No prompt string at all! The prompt is still there, but displays nothing, just as we asked it to do. Since this is kind of disconcerting to look at, we'll replace it with a minimal prompt.

```
PS1="\$ "
```

- Let's add a bell to our prompt

```
$ PS1="\[\a\]\$ "
```

- Now we should hear a beep each time the prompt is displayed, though some systems disable this "feature." This could get annoying, but it might be useful if we needed notification when an especially long-running command has been executed. Note that we included the \[and \] sequences. Since the ASCII bell (\a) does not "print," that is, it does not move the cursor, we need to tell bash so it can correctly determine the length of the prompt.
- Next, let's try to make an informative prompt with some hostname and time-of-day information.

```
$ PS1="\A \h \$ "
17:33 linuxbox $
```

- Adding time-of-day to our prompt will be useful if we need to keep track of when we perform certain tasks. Finally, we'll make a new prompt that is similar to our original.

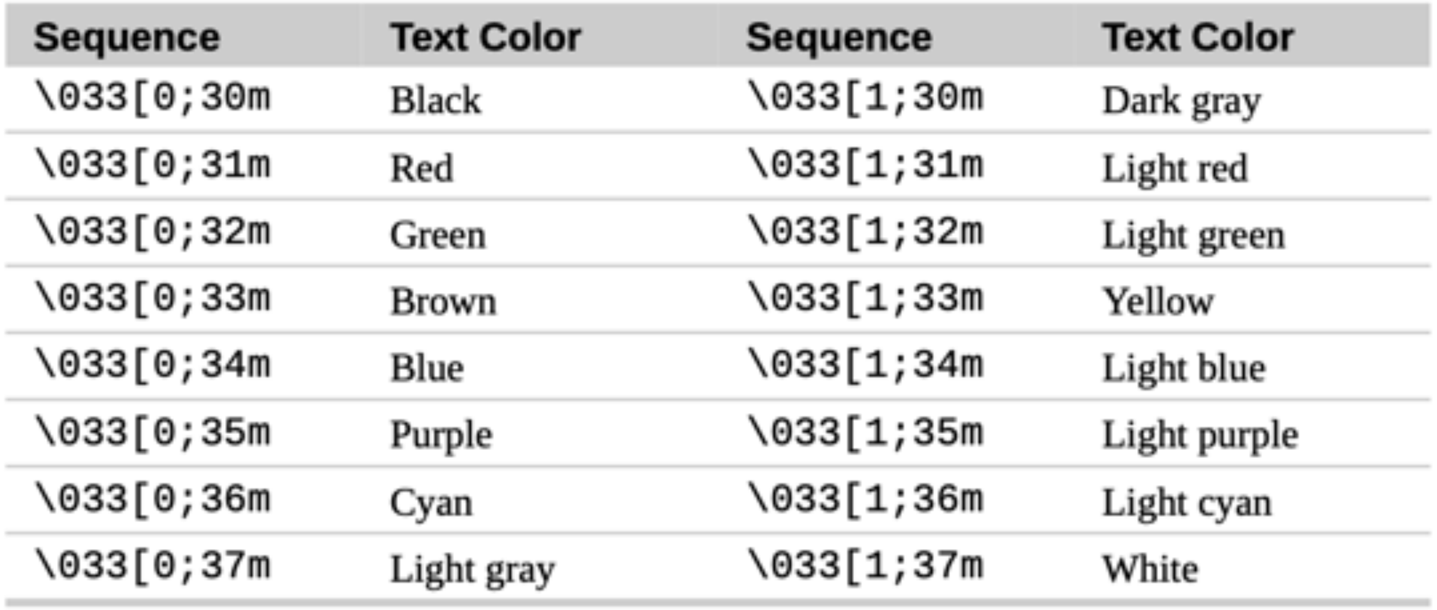
```
17:37 linuxbox $ PS1="<\u@\h \W>\$ "
<me@linuxbox ~>$
```

Adding Color

- Character color is controlled by sending the terminal emulator an ANSI escape code embedded in the stream of characters to be displayed.
- The control code does not “print out” on the display; rather, it is interpreted by the terminal as an instruction.
- An ANSI escape code begins with an octal 033 (the code generated by the Esc key), followed by an optional character attribute, followed by an instruction.
- For example, the code to set the text color to normal (attribute = 0), black text is as follows:

  ```
  \033[0;30m
  ```
- Table 13-2 lists the available text colors.

Table 13- 2: Escape Sequences Used to Set Text Colors



Sequence	Text Color	Sequence	Text Color
`\033[0;30m`	Black	`\033[1;30m`	Dark gray
`\033[0;31m`	Red	`\033[1;31m`	Light red
`\033[0;32m`	Green	`\033[1;32m`	Light green
`\033[0;33m`	Brown	`\033[1;33m`	Yellow
`\033[0;34m`	Blue	`\033[1;34m`	Light blue
`\033[0;35m`	Purple	`\033[1;35m`	Light purple
`\033[0;36m`	Cyan	`\033[1;36m`	Light cyan
`\033[0;37m`	Light gray	`\033[1;37m`	White

- Let's try to make a red prompt. We'll insert the escape code at the beginning.

```
<me@linuxbox ~>$ PS1="\[\033[0;31m\]<\u@\h \W>\$ "
<me@linuxbox ~>$
```

- That works, but notice that all the text that we type after the prompt will also display in red. To fix this, we will add another escape code to the end of the prompt that tells the terminal emulator to return to the previous color.

```
<me@linuxbox ~>$ PS1="\[\033[0;31m\]<\u@\h \W>\$\[\033[0m\] "
<me@linuxbox ~>$
```

- It's also possible to set the text background color using the codes listed Table 13-3. The background colors do not support the bold attribute.

Table 13-3: Escape Sequences Used to Set Background Color

Sequence	Background Color	Sequence	Background Color
`\033[0;40m`	Black	`\033[0;44m`	Blue
`\033[0;41m`	Red	`\033[0;45m`	Purple
`\033[0;42m`	Green	`\033[0;46m`	Cyan
`\033[0;43m`	Brown	`\033[0;47m`	Light gray

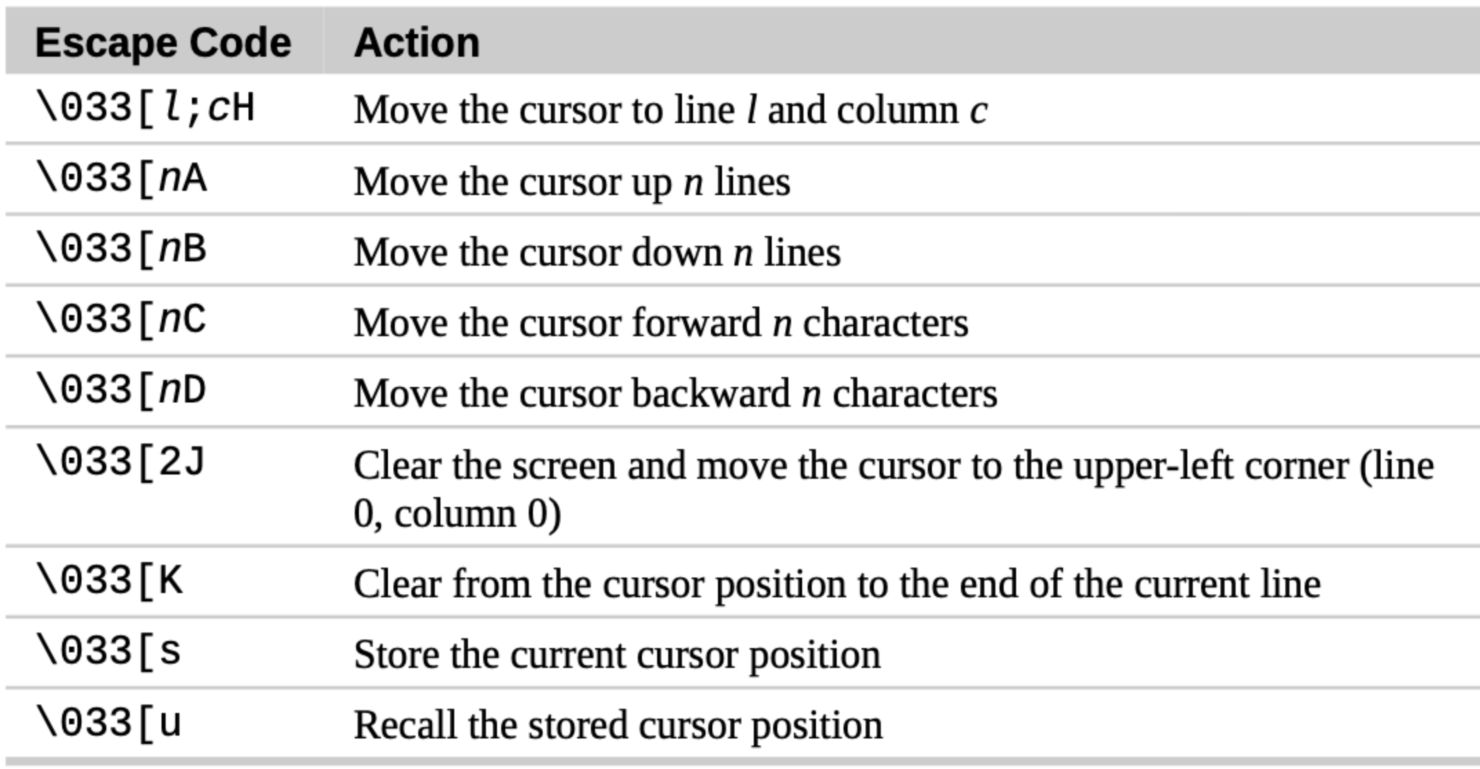
- We can create a prompt with a red background by applying a simple change to the first escape code.

```
<me@linuxbox ~>$ PS1="\[\033[0;41m\]<\u@\h \W>\$\[\033[0m\] "
<me@linuxbox ~>$
```

Moving the Cursor

- Escape codes can be used to position the cursor. This is commonly used to provide a clock or some other kind of information at a different location on the screen, such as in an upper corner each time the prompt is drawn. Table 13-4 lists the escape codes that position the cursor.

Table 13-4: Cursor Movement Escape Sequences



Escape Code	Action
`\033[`*l*`;`*c*`H`	Move the cursor to line *l* and column *c*
`\033[`*n*`A`	Move the cursor up *n* lines
`\033[`*n*`B`	Move the cursor down *n* lines
`\033[`*n*`C`	Move the cursor forward *n* characters
`\033[`*n*`D`	Move the cursor backward *n* characters
`\033[2J`	Clear the screen and move the cursor to the upper-left corner (line 0, column 0)
`\033[K`	Clear from the cursor position to the end of the current line
`\033[s`	Store the current cursor position
`\033[u`	Recall the stored cursor position

- Using the codes in Table 13-4, we'll construct a prompt that draws a red bar at the top of the screen containing a clock (rendered in yellow text) each time the prompt is displayed.
- The code for the prompt is this formidable-looking string:

```
PS1="\[\033[s\033[0;0H\033[0;41m\033[K\033[1;33m\t\033[0m\033[u\]
<\u@\h \W>\$ "
```

- Table 13-5 outlines what each part of the string does.

Table 13-5: Breakdown of Complex Prompt String

Sequence	Action
`\[`	Begin a non-printing character sequence. The purpose of this is to allow `bash` to properly calculate the size of the visible prompt. Without an accurate calculation, command line editing features cannot position the cursor correctly.
`\033[s`	Store the cursor position. This is needed to return to the prompt location after the bar and clock have been drawn at the top of the screen. *Be aware that some terminal emulators do not recognize this code.*
`\033[0;0H`	Move the cursor to the upper-left corner, which is line 0, column 0.
`\033[0;41m`	Set the background color to red.
`\033[K`	Clear from the current cursor location (the top-left corner) to the end of the line. Since the background color is now red, the line is cleared to that color, creating our bar. Note that clearing to the end of the line does not change the cursor position, which remains in the upper-left corner.
`\033[1;33m`	Set the text color to yellow.
`\t`	Display the current time. While this is a "printing" element, we still include it in the non-printing portion of the prompt since we don't want `bash` to include the clock when calculating the true size of the displayed prompt.
`\033[0m`	Turn off color. This affects both the text and the background.
`\033[u`	Restore the cursor position saved earlier.
`\]`	End the non-printing characters sequence.
`<\u@\h \W>\$`	Prompt string.

Saving the Prompt

- We don't want to be typing that monster all the time, so we'll want to store our prompt someplace.
- We can make the prompt permanent by adding it to our `.bashrc` file. To do so, add these two lines to the file:

```
PS1="\[\033[s\033[0;0H\033[0;41m\033[K\033[1;33m\t\033[0m\033[u\]
<\u@\h \W>\$ "

export PS1
```