bash: JP's Choice Recipes

PLUG North
2008-05-12

PLUG West
2008-06-16

HMS
2008-07-02

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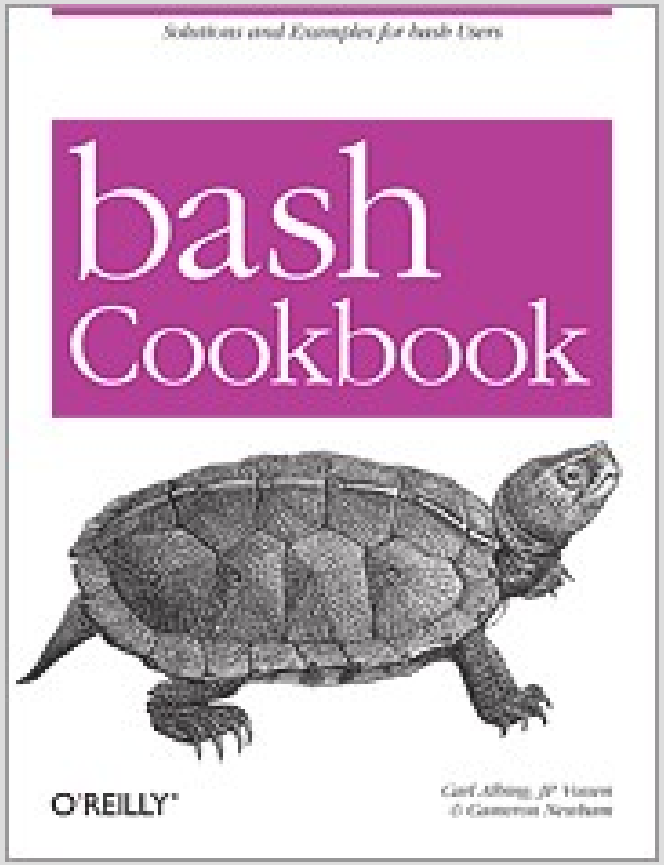
bashcookbook.com



Book Timeline (1 / 4)

- 2004-11-30 JP sends email to O'Reilly and proposes "How about a Bash cookbook?"
- 2005-03-24 Mike gets in touch
- 2005-04-01 Cameron (author of Learning the bash Shell) is added
- 2005-05-02 Submit second draft of ToC/outline
- 2005-0[89]* More drafts of the ToC/outline
- 2005-09-13 Carl is added
- 2005-10-01 Start learning/writing in OR wiki
- 2005-10* Submit first proposal, various revisions, contract discussion

Book Timeline (2 / 4)

- 2005-10-20 Get contract (600 pages, 12% of net revenue, split 3 ways more or less)
- Schedule:
  - 2005-11-30 3 chapters
  - 2006-01-31 1/2 chapters
  - 2006-05-31 First draft
- 2006-02-13 Got first advance check
- 2006-07-13 Move to OpenOffice.org Writer and deployed echidna (for SVN)
- 2006-12-18 Submit real first draft (for technical reviewers)

Book Timeline (3 / 4)

- 2007-01-15 Technical Reviews due, give or take
- 2007-01-12 Got second/third advance check
- 2007-02-01 Submit copyediting draft
- 2007-02* Copyediting
- 2007-02-15 Got last advance check
- 2007-03-14 Draft from copyeditor to production
- 2007-03-27 Get PDFs for QC1
- 2007-03-29 Get FedEx of QC1 hardcopy (printouts of the QC1 PDFs)

Book Timeline (4 / 4)

- 2007-04-10 QC1 due back to O'Reilly
- 2007-04-25 Index (post QC1, pre QC2)
- 2007-05-03 QC2 review (PDF)
- 2007-05-11 Book goes to the printer!!!

- Recap:
  - 2004-11-30 Email
  - 2005-10-20 Get contract
  - 2006-07-13 Move to OpenOffice.org
  - 2007-05-11 To the printer

Why my prompt looks like this [16.2]

- PS1='\n[\u@\h:T\l:L$SHLVL:C\!:J\j:\D{%Y-%m-%d_%H:%M:%S_%Z}]\n$PWD\$ '

- Huh?!?
  - \n = newline
  - \u = user, \h = host
  - \l = Pseudo terminal number
  - $SHLVL = Shell level (nesting)
  - \! = Command history number
  - \j = # of background jobs
  - \D = strftime specification (bash ???+)
  - $PWD = Current working directory
  - \$ = # for root, $ for user
- http://tldp.org/HOWTO/Bash-Prompt-HOWTO/

Using screen [17.4-6]

- What?
  - may need setuid root for tty manipulation
- Why?
- How?
- For training
  - Host
    - screen -S [session_name], e.g., *screen -S training*
    - *CTRL-a:multiuser on*
    - CTRL-a:addacl [user,user], e.g., *addacl alice,bob,eve*
  - Viewer
    - screen -x [user]/[session_name], e.g., *screen -x jp/training*
  - CTRL-aK to kill the window and end the session

How to show only dot files [1.5]

- What happens with *ls .**?
- Use ls -d
  - ls -d .*
  - ls -d .b*
  - ls -d .[!.]*
- Or construct your wildcard in such a way that . and .. don't match.
  - $ grep -l PATH ~/.[!.]*

Are you running interactively? [1.8]

```
#!/usr/bin/env bash
# cookbook filename: interactive

case "$-" in
    *i*)  # Code for interactive shell here
          ;;
    *)    # Code for non-interactive shell here
          ;;
esac
```

Skipping a header [2.12]

- tail -n+2

```
$ cat data.file
Header line
Line 1
Line 2
Line 3
Line 4

$ tail -n+2 data.file
Line 1
Line 2
Line 3
Line 4
```

Swapping STDOUT & STDERR [2.20]

- $ ./myscript 3>&1 1>stdout.logfile 2>&3- | tee -a stderr.logfile

- 3>&1 = FD3 gets FD1 (STDOUT)
- 2>&3- = FD2 (STDERR) gets 3, 3 closed

- Why would you do this?

Prompting for a password [3.8]

- read -s -p "password: " PASSWD ; printf "%b" "\n"

- Why is that bad?
- Why all on one line?
- Why is the old stty method bad?

Error message on failure [4.8]

- cmd || printf "%b" "cmd failed. You're on your own\n"
- cmd || {
  printf "%b" "cmd failed. You're Toast!\n"
  exit 10
  }
- set -e
  - Exit immediately if a command exits with a non-zero status

Running all scripts in a directory [4.10]

```
for SCRIPT in /path/to/scripts/dir/*
do
    if [ -f $SCRIPT -a -x $SCRIPT ]
    then
        $SCRIPT
    fi
done
```

- -f = is a file
- -a = logical ”and”
- -x = is executable

Embedded documentation [5.2]

- Use embedded POD (Perl's Plain Old Documentation)
- Seriously!

```
#!/usr/bin/env bash

echo 'Shell script code goes here'

# Use a : NOOP and here document to embed documentation,
: <<'END_OF_DOCS'

Any accurate documentation is better than none at all.

=head1 NAME
[ POD here ]
=cut

END_OF_DOCS
```

Testing using a regex [6.8]

- if [["$CDTRACK" =~ "([[:alpha:][:blank:]]*)-([[:digit:]]*) - (.*)$"]]

- Also, sort-of

```
case "$-" in
    *i*)  # Code for interactive shell here
          ;;
    *)    # Code for non-interactive shell here
          ;;
esac
```

A command line calculator [6.19]

```
# cookbook filename: func_calc

# Trivial command line calculator
function calc
{
    awk "BEGIN {print \"The answer is: \" $* }";
}
```

- How cool is that?

Sum a list of numbers [7.13]

- $ ls -l | awk '{sum += $5} END {print sum}'
- How cool is that, too?
  Especially the $5 part.

Sorting IP Addresses [8.3]

- $ sort -t . -k 1,1n -k 2,2n -k 3,3n -k 4,4n ipaddr.list

- -t = field separator
- -k = POSIX key definition
- -n = number

- Watch out for LOCALE for sorting in general

Removing duplicates [8.5]

- cat data.file | sort -u
- sort -u data.file
- sort data.file | uniq -c | sort -nr
- sort data.file | uniq -c | sort -nr | head

- What's the difference?
- Watch out for uniq = uniq [input] [OUTPUT]

less is more [8.15]

- export LESS="--LONG-PROMPT --LINE-NUMBERS --ignore-case –QUIET"

- Debian has a /usr/bin/lesspipe that can be eval'ed and also supports additional filters via a ~/.lessfilter file.
- Use Wolfgang Friebel's *lesspipe.sh*

Handling odd characters [9.2]

- Shell quoting
- $ find . -name '*.mp3' -print0 | xargs -i -0 mv '{}' ~/songs

- find -print0 = use NULL instead of white space for field separator
- xargs -0 = use NULL instead of white space for field separator

Dates and times [ch 11]

- date '+%Y-%m-%d'
- date '+%Y-%m-%d_%H:%M:%S %Z'
- date -d '+ 90 minutes' '+%R'
- date '+%s'
- date -d '2005-11-05 12:00:00 +0000' '+%s'
- date -d "1970-01-01 UTC $EPOCH seconds" +"%Y-%m-%d %T %z"
- date --utc --date "1970-01-01 $EPOCH seconds" +"%Y-%m-%d %T %z"

Handling white space [13.14,15]

- $ while read REPLY; do echo ~~"$REPLY"~~; done < whitespace
- $ while read; do echo "~~${REPLY## }~~"; done < whitespace
- $ while read; do echo "~~${REPLY%% }~~"; done < whitespace

- $ cat data_file | tr -s ' ' '\t'
- $ awk 'BEGIN { FS = " "; OFS = "\t" } { $1 = $1; gsub(/\t+/, "\t"); print }' data_file1

Fixed length or no line breaks [13.16,17]

- $ gawk ' BEGIN { FIELDWIDTHS = "18 32 16"; OFS = "\t" } { $1 = $1; gsub(/ +\t/, "\t"); gsub(/ +$/, ""); print }' fixed-length_file

- $ perl -ne 'print join("\t", unpack("A18 A32 A16", $_)) . "\n";' fixed-length_file

$RANDOM [14.11]

- This is one of my favorite bash features!
  - bash 2.0+
  - not in dash (buggers)
- echo $RANDOM$RANDOM$RANDOM
- How do *you* create secure temp files?

Script portability [15.1,3,4]

- #!/usr/bin/env bash
- Why not *#!/usr/bin/env bash -*

- *Don't use Linux*

- *http://www.pcbsd.org/?p=download#vmware*

Phases [15.16]

```
# cookbook filename: using_phases
# Main Loop
until [ "$phase" = "Finished." ]; do

    case $phase in

        phase0 )
...
            phase="Finished."
            ;;
    esac
    printf "%b" "\a"        # Ring the bell
done
```

Tweaking your Environment [16.7,8]

- set and shopt
  - shopt -q -s cdspell
  - shopt -q -s checkwinsize
  - set -o notify # (or set -b)
  - set -o ignoreeof
- ~/.inputrc or /etc/inputrc
  - set completion-ignore-case on
  - "\C-i": menu-complete
  - set show-all-if-ambiguous on

mcd [16.14]

- mcd () { mkdir "$1" && cd "$1"; }
- OR

```
# mkdir newdir then cd into it
# usage: mcd (<mode>) <dir>
function mcd {
    local newdir='_mcd_command_failed_'
    if [ -d "$1" ]; then         # Dir exists, mention that...
        echo "$1 exists..."
        newdir="$1"
    else
        if [ -n "$2" ]; then     # We've specified a mode
            command mkdir -p -m $1 "$2" && newdir="$2"
        else                     # Plain old mkdir
            command mkdir -p "$1" && newdir="$1"
        fi
    fi
    builtin cd "$newdir"         # No matter what, cd into it
} # end of mcd
```

bot [16.15]

- Getting to the bottom of things
- alias bot='cd $(dirname $(find . | tail -1))'

Programmable Completion [16.17]

- Ian Macdonald's set from http://freshmeat.net/projects/bashcompletion/
- Already included in Debian and Ubuntu, but not turned on by default. See ”# enable bash completion in interactive shells” in */etc/bash.bashrc*. and */etc/bash_completion*.

grep ps without grep [17.18]

- pgrep -l ssh
- ps auwwx | grep '[s]sh'

- But why does this work?

- Old, ugly:
  - ps auwwx | grep 'ssh' | grep -v grep

Adding a per-line prefix or postfix [17.20]

- $ last | while read i; do [[-n "$i"]] && printf "%b" "$HOSTNAME\t$i\n"; done
- $ last | grep -v '^$'| while read i; do printf "%b" "$i\t$HOSTNAME\n"; done

- $ last | awk "BEGIN { OFS=\"\t\" } ! /^\$/ { print \"$HOSTNAME\", \$0}"

- $ last | perl -ne "print qq($HOSTNAME\t\$_) if ! /^\s*$/;"
- $ last | sed "s/./$HOSTNAME□&/; /^$/d"

Numbering Lines [17.21]

- $ i=0; while IFS= read -r line; do ((i++)); echo "$i $line"; done < lines

- $ cat -n lines
- $ less -N lines
- $ nl lines
- $ nl -ba lines
- $ awk '{ print NR, $0 }' filename
- $ perl -ne 'print qq($.\t$_);' filename

Writing sequences [17.22]

- awk should always work
  - $ awk 'BEGIN { for (i=1; i <= 5; i+=.5) print i}' /dev/null
- Bash 2.04+ only, integer only
  - $ for ((i=1; i<=5; i++)); do echo "$i text"; done
- Bash 3.0+ only, integer or single character only
  - $ printf "%s text\n" {1..5}
  - $ printf "%s text\n" {a..e}
- man seq

Debugging [19.12]

- bash -n
  - Like perl -c, check basic syntax, but don't run
- set -x
  - debugging; show the final parsed command
- set -v
  - verbose; show the raw unparsed command

Questions?

- http://examples.oreilly.com/bashckbk/
- [N.N] = Recipe numbers
- bashcookbook.com
- PLUG Mailing list
- jp@jpsdomain.org