

Bash 4 - a rough overview

The Bash Hackers Wiki

This wiki is intended to hold documentation of any kind about GNU Bash. The main motivation was to provide *human-readable documentation* and information so users aren't forced to read every bit of the Bash manpage - which can be difficult to understand. However, the docs here are **not** meant as a newbie tutorial.

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What would YOU like to see here? (outdated and locked, please use the discussions)

Stranger! Feel free to register (<http://wiki.bash-hackers.org/start&do=register>) and comment or edit the contents. There is a Bash Hackers Wiki needs love page that lists some things to do. The registration is only there to prevent SPAM.

Scripting and general information

- Bash v4 - a rough overview (unmaintained, since Bash 4 is more or less standard)
- Scripting with style – an assorted collection of style and optic hints
- The basics of shell scripting
- Beginner Mistakes
- Bash's behaviour
- Handling positional parameters
- Bash and the process tree
- Obsolete and deprecated syntax
- Portability talk
- Debugging a script
- Terminal codes (ANSI/VT100) introduction

- [tutoriallist](#)

Code snippets

There is a section that holds small code snippets.
See also some Bash source code excerpts.

How to....

Doing specific tasks: concepts, methods, ideas:

- [Simple locking \(against parallel run\)](#)
- [Rudimentary config files for your scripts](#)
- [Editing files with ed\(1\)](#)
- [Collapsing Functions](#)
- [Illustrated Redirection Tutorial](#)
- [Calculate with dc\(1\)](#)
- [Introduction to pax - the POSIX archiver](#)
- [Small getopts tutorial \(*under construction!*\)](#)
- [Dissect a bad oneliner](#) An example of a bad oneliner, breakdown and fix (by [kojoro](#))
- [Write tests for ./your-script.sh by using bashtest util](#)

Bash syntax and operations

- [Bash features overview by version](#)
- [Basic grammar rules](#)
- [Quoting and character escaping](#)
- [Parsing and execution](#)
- [Some words about words...](#)
- [Patterns and pattern matching](#)
- [Arithmetic expressions](#)
- [List of shell options](#)
- [Redirection](#)
- [Special parameters and shell variables](#)
- [Arrays](#)

Compound commands

Compound commands overview

Grouping

<code>{ ...; }</code>	command grouping
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Expansions and substitutions

Introduction to expansions and substitutions

<code>{A, B, C}</code> <code>{A..C}</code>	Brace expansion
<code>~/</code> <code>~root/</code>	Tilde expansion

Compound commands overview

Grouping

<code>(...)</code>	command grouping in a subshell
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Conditionals

<code>[[...]]</code>	conditional expression
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<code>if ...; then ...; fi</code>	conditional branching
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<code>case ... esac</code>	pattern-based branching
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Loops

<code>for word in ...; do ...; done</code>	classic for-loop
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<code>for ((x=1; x<=10; x++)); do ...; done</code>	C-style for-loop
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<code>while ...; do ...; done</code>	while loop
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<code>until ...; do ...; done</code>	until loop
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Misc

<code>((...))</code>	arithmetic evaluation
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<code>select word in ...; do ...; done</code>	user selections
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Introduction to expansions and substitutions

<code>\$FOO</code> <code>\${BAR%.mp3}</code>	Parameter expansion
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<code>`command`</code> <code>\$(command)</code>	Command substitution
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<code><(command) ></code> <code>(command)</code>	Process substitution
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<code>\$((1 + 2 + 3))</code> <code>\$(4 + 5 + 6)</code>	Arithmetic expansion
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<code>Hello <---></code> <code>Word!</code>	Word splitting
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<code>/data/*-</code> <code>av/*.mp?</code>	Pathname expansion
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Builtin Commands

This is a selection of builtin commands and command-like keywords, loosely arranged by their common uses. These are provided directly by the shell, rather than invoked as standalone external commands.

Declaration commands				Control flow and data processing			
Commands that set and query attributes/types, and manipulate simple datastructures.				Commands that operate on data and/or affect control flow.		Alt	Type
		Alt	T	colon	"true" null command.	true	special builtin
declare	Display or set shell variables or functions along with attributes.	typeset	builtin	dot	Source external files.	source	special builtin
				false	Fail at doing nothing.	-	builtin
export	Display or set shell variables, also giving them the export attribute.	typeset -x	special builtin	continue / break	continue with or break out of loops.	-	special builtin
				let	Arithmetic evaluation simple command.	-	builtin
eval	Evaluate arguments as shell code.	-	special builtin	return	Return from a function with a specified exit status.	-	special builtin
local	Declare variables as having function local scope.	-	builtin	[The classic test simple command.	test	builtin
readonly	Mark variables or functions as read-only.	typeset -r	special builtin	Process and Job control		Alt	Type
				Commands related to jobs, signals, process groups, subshells.			
unset	Unset variables and functions.	-	special builtin	exec	Replace the current shell process or set redirections.	-	special builtin
shift	Shift positional parameters	-	special builtin	exit	Exit the shell.	-	special builtin
I/O		Alt	T	kill	Send a signal to specified process(es)	-	builtin
Commands for reading/parsing input, or producing/formatting output of standard streams.							

coproc	Co-processes: Run a command in the background with pipes for reading / writing its standard streams.	-	key	<div>Control flow and data processing</div> <div>Commands that operate on data and/or affect control flow.</div> <div>AltType</div>			
				trap	Set signal handlers or output the current handlers.	-	special builtin
echo	Create output from arguments.	-	bu	times	Display process times.	-	special builtin
mapfile	Read lines of input into an array.	readarray	bu	wait	Wait for background jobs and asynchronous lists.	-	builtin
printf	"advanced echo ."	-	bu	<div>AltType</div>			
read	Read input into variables or arrays, or split strings into fields using delimiters.	-	bu	<div>Configuration and Debugging</div> <div>Commands that modify shell behavior, change special options, assist in debugging.</div> <div>AltT</div>			
caller	Identify/print execution frames.	-	bu				
set	Set the positional parameters and/or set options that affect shell behaviour.	-	sp bu				

shopt set/get - b|
 some bash-
 specific
 shell
 options.



Dictionary

A list of expressions, words, and their meanings is here.

Links

Official Bash links

- Chet Ramey's Bash page (<http://tiswww.case.edu/php/chet/bash/bashtop.html>) and its FAQ (<http://tiswww.case.edu/php/chet/bash/FAQ>).
- GNU Bash software page (<http://www.gnu.org/software/bash/>)
- Official Bash mailing lists:
 - **Bug reports:** bug-bash@gnu.org (<mailto:bug-bash@gnu.org>) (archives (<http://mail.gnu.org/pipermail/bug-bash>))
 - **General questions:** help-bash@gnu.org (<mailto:help-bash@gnu.org>) (archives (<http://mail.gnu.org/pipermail/help-bash>))
- Official Bash git repository:
 - **Browse:** [cg](http://git.savannah.gnu.org/cgit/bash.git) (<http://git.savannah.gnu.org/cgit/bash.git>)
 - **Clone:** *git:* <ssh://git.sv.gnu.org/srv/git/bash.git> • *ssh:* <ssh://git.sv.gnu.org/srv/git/bash.git> • *http:* <http://git.savannah.gnu.org/r/bash.git>

Recommended Shell resources

- Greg's wiki (<http://mywiki.woledge.org/>) - Greg Woledge's (aka "greycat") wiki – with **MASSIVE** information about Bash and UNIX® in general.
 - BashFAQ (<http://mywiki.woledge.org/BashFAQ>) • BashGuide (<http://mywiki.woledge.org/BashGuide>) • BashPitfalls (<http://mywiki.woledge.org/BashPitfalls>) • BashSheet (<http://mywiki.woledge.org/BashSheet>)
- Sven Mascheck's pages (<http://www.in-ulm.de/~mascheck/>) - A goldmine of information. A must-read.
- #ksh channel page (<https://www.mirbsd.org/ksh-chan.htm>) - #ksh Freenode channel page maintains a solid collection of recommended links.
- The Grymoire Unix pages (<http://www.grymoire.com/Unix/>) - Good scripting information, especially read the quoting (<http://www.grymoire.com/Unix/Quote.html>) guide.
- Heiner's "Shell Dorado" (<http://www.shelldorado.com>) - Tips, tricks, links - for every situation.

- The Single Unix Specification (version 4, aka POSIX-2008) (<http://pubs.opengroup.org/onlinepubs/9699919799/>)
- The Austin Group (<http://www.opengroup.org/austin/>) - List archives (<http://dir.gmane.org/gmane.comp.standards.posix.austin.general>), Bug tracker (http://austingroupbugs.net/main_page.php)
- comp.unix.shell FAQ (<http://cfajohnson.com/shell/cus-faq.html>)
- Advanced Bash-Scripting Guide (<https://tldp.org/LDP/abs/html/index.html>) - last update: 10 Mar 2014, but still very useful guide.

Documentation / Reference

- **Bash**: man page (<http://tiswww.case.edu/php/chet/bash/bash.html>) info page (<http://tiswww.case.edu/php/chet/bash/bashref.html>)
- **AT&T ksh**: ksh88 (<http://www2.research.att.com/sw/download/man/man1/ksh88.html>) ksh93 (<http://www2.research.att.com/sw/download/man/man1/ksh.html>)
- mksh (<https://www.mirbsd.org/htman/i386/man1/mksh.htm>) (pdksh successor)
- zsh (<http://zsh.sourceforge.net/Doc/>)
- dash (<http://man7.org/linux/man-pages/man1/dash.1.html>)
- Heirloom Bourne shell (<http://heirloom.sourceforge.net/man/sh.1.html>)
- Thompson shell (<http://v6shell.org/man/osh.1.html>)

Assorted interesting links

- History and development of the traditional Bourne shell family (<http://www.in-ulm.de/~mascheck/bourne/>) - very interesting and nice to read!
- Interview with Chet Ramey (http://www.computerworld.com.au/article/222764/-z_programming_languages_bash_bourne-again_shell)
- Interview with Steve Bourne (http://www.computerworld.com.au/article/279011/a-z_programming_languages_sh) • Stephen Bourne - BSDCan 2015 keynote (<https://www.youtube.com/watch?v=2kEJoWfobpA>)
- Interview with David Korn (<http://news.slashdot.org/story/01/02/06/2030205/david-korn-tells-all>)
- Kernighan on the Unix pipeline (computerphile video) (<https://www.youtube.com/watch?v=bKzonnwoR2I>)
- Linux in general, with some shell related stuff: nixCraft: Linux Tips, Hacks, Tutorials and Ideas (<http://www.cyberciti.biz/>)
- Linux tutorials, guides and how-tos: RoseHosting Blog (<https://www.rosehosting.com/blog/>), bash script for installing WordPress (<https://www.rosehosting.com/blog/script-install-wordpress-on-a-debianubuntu-vps/>) and some basic shell commands (<https://www.rosehosting.com/blog/basic-shell-commands-after-putty-ssh-logon/>)
- Bashphorism list from the Bash IRC channel on Freenode
- Some more or less funny commandline stuff
- How to Enable SSH on Ubuntu Tutorial (<https://thishosting.rocks/how-to-enable-ssh-on-ubuntu/>)
- How To Make an Awesome Custom Shell with ZSH (<https://linuxstans.com/how-to-make-an-awesome-custom-shell-with-zsh/>)

Bash Libraries (needs review)

- An oo-style bash library for bash 4 (<http://sourceforge.net/projects/oobash/>) - provides tools for rapid script development and huge libraries.
- General purpose shell framework for bash 4 (<https://github.com/hornos/shf3>) - in development.
- General purpose bash library for bash 4 (<https://github.com/chilicuill/learn/blob/master/sh/lib>) - active development

Contact

Visit us in `irc.freenode.net` ,
channel `#bash` 😊

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