

GNU Coreutils

<http://www.gnu.org/software/coreutils/>

GNU Coreutils

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- Chopping and changing files
- Sorting and organising
- File data, ownership and permissions
- Moving, copying & deleting files
- Formatting of data
- System tools
- Comparisons and sums
- Filenames

Introduction

- Merger of 3 older packages
 - fileutils – including ls, df
 - textutils – including cat, cut
 - sh-utils – including who, test, stty
- Usually standards compliant
 - Various POSIX standards
- ...but extended
 - Feature overload!
 - Sometimes flags for compatibility
- components pre-Linux
 - Works on most commercial Unix as well

Categories

- Chopping and changing files
 - cat, dd, csplit, cut, head, paste, split, tail, tr
- Sorting and organising
 - join, sort, uniq, tsort
- File data, ownership and permissions
 - ls, stat, chown, chgrp, chmod, (touch)
- Moving, copying & deleting files
 - mv, rm, cp, (unlink), shred, install
- Formatting of data
 - fmt, fold, nl, tac, printf, ptx

More Categories

- System tools
 - uname, su, df, uptime, id, who, whoami, tty, chroot
- Comparisons and sums
 - test, cksum, sum, md5sum, sha*sum, comm
- Filenames
 - basename, dirname, pathchk
- Other stuff
 - date, sleep, false, true, yes, expr, factor

Basic options

--help

Basic help text

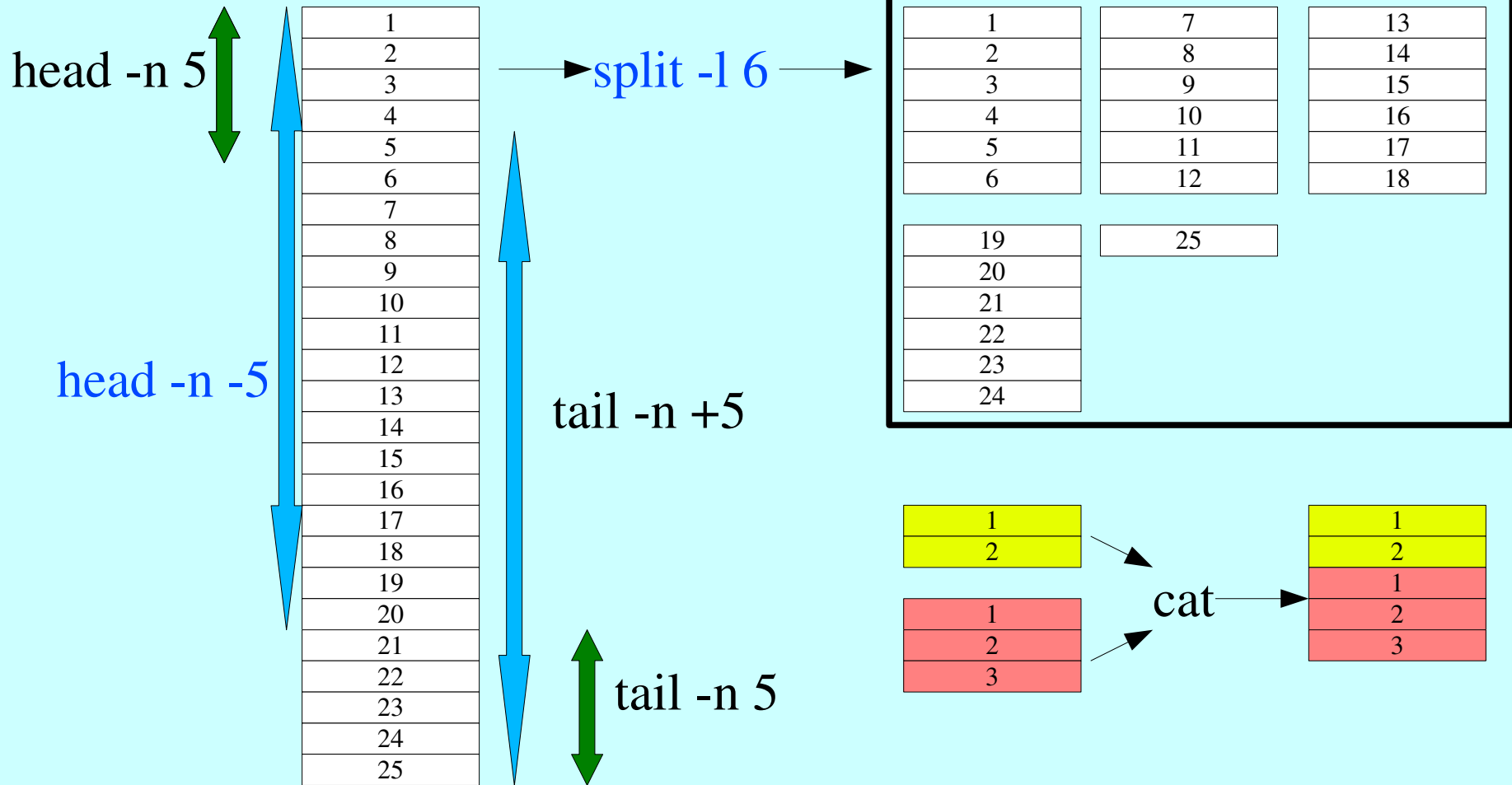
--version

Current coreutils version – also useful to check if the program you are using is actually the coreutils version.

--

All that follows are not options – e.g. `rm -f -- -file`

Chopping and changing (vertical)



- Also use with other tools; e.g. grep

Chopping and changing (horizontal)

10,Manchester,Blue
25,Salford,Orange
33,Bury,Grey
40,Leeds,Brown

→cut -d, -f1,3→

10,Blue
25,Orange
33,Grey
40,Brown

Monday
Tuesday
Wednesday
Thursday
Friday

plain
milk
white
mint
orange

paste -d: days types

Monday:plain
Tuesday:milk
Wednesday:white
Thursday:mint
Friday:orange

- Use 'sed' (not in coreutils) for more complex tasks

Chopping and changing (other)

- `csplit`
 - split by regexp – e.g.
 - `./csplit -z mailfile '/^From /' {'*}`
- `dd`
 - Copy data with some conversion, 'blocking' – e.g.
 - `dd if=afile of=bfile` Just copies that file
 - `dd if=/dev/zero bs=1024k count=10` Creates 10MB empty file
 - `dd if=a of=b ibs=1K skip=10` Skip first 10KB of input
 - `dd if=/dev/hdy of=/dev/hdx bs=1024k` Copy between devices
- `tr`
 - replace and delete characters – e.g.
 - `tr -d '\r'` Delete carriage returns
 - `tr ':' ' , '` Convert : separate to , separated

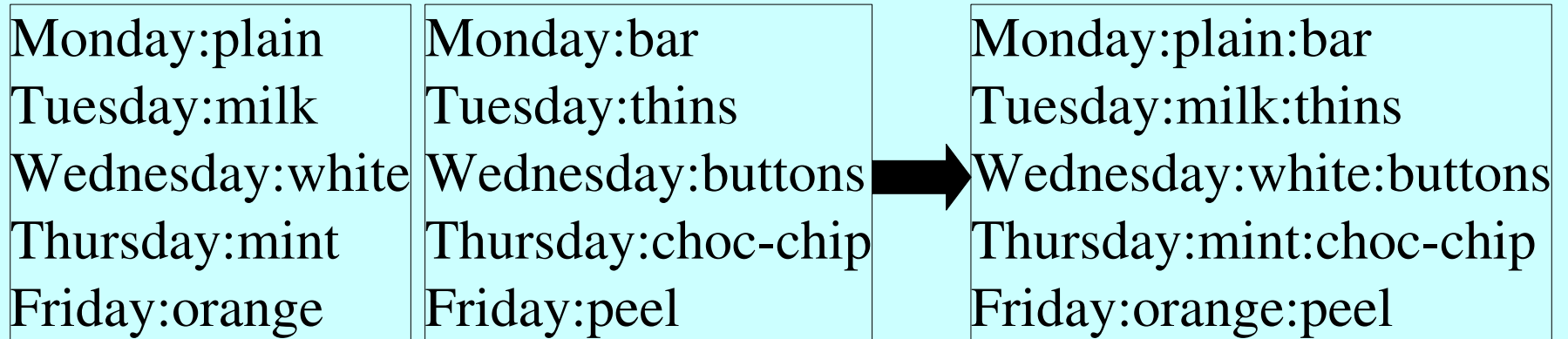
Sorting and organising

- `sort`
 - Multiple fields
 - Alphabetic, numeric and month orders - e.g.
 - `du -ms * | sort -n` Sort a disc usage list numerically
 - `sort -t : -k 5b,5 -k 3,3n` Sort on the 5th and then 3rd field (5th skipping blanks, 3rd numerical)
- `uniq`
 - Remove repeated lines (sort for removal of all dupes)
 - `uniq` Removal of repeated
 - `uniq -u` Only output unrepeated lines

Sorting and organising (2)

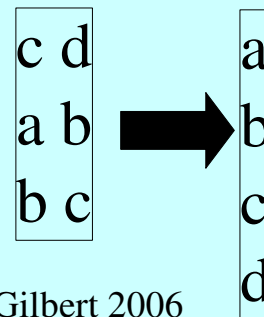
- join

- join -t: a b



- tsort

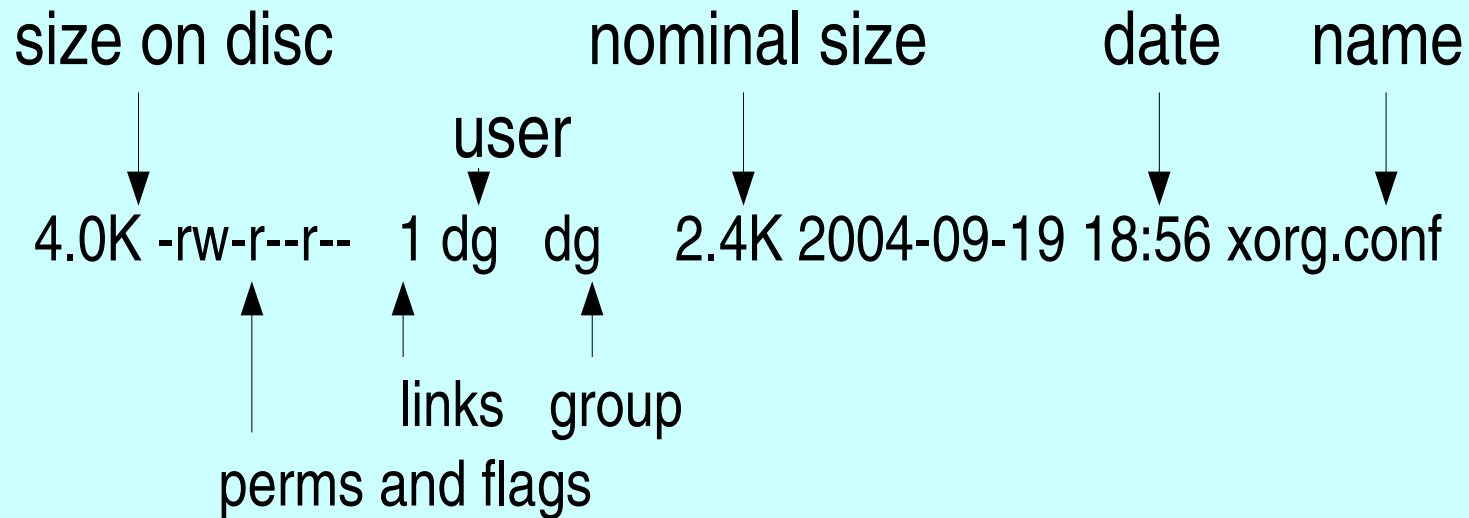
- Topological sort – sorts dependencies – e.g. 'a before b'



Viewing file Data.....

- ls

- ls -l shows detail
- ls -lh Human formats (e.g. GB)
- ls -lt sort on time modified (most recent first)
- ls -ltr least recent first
- ls -lhs



Viewing more file data.....

- stat

- All info as ls – but more selectable, better for scripting?

- stat -c "%s" afile Just gives file size

- stat -f Information on the filesystem (similar to df info)

- stat -f /bin

File: "/bin"

ID: 0 Namelen: 255 Type: ext2/ext3

Blocks: Total: 1923219 Free: 988933 Available: 891239 Size: 4096

Inodes: Total: 977280 Free: 791199

- stat -f -c "%T" /bin Just gives fs type

Changing Ownership

- Owner & group per file
 - chgrp
 - Just change group ownership, -R for recursive
 - --reference=anotherfile Change group to that of a reference file
 - chown
 - Owner
 - chown root /usr/local/bin/myfile
 - Owner & Group
 - chown root:staff myfile
 - The `--preserve-root`
 - Refuse to do recursively on / - good to be careful!

Changing permissions & dates

- `chmod`

- Change permissions and other flags

- `chmod +x afile` Everyone can execute
 - `chmod u+x afile` Owner ('user') can execute
 - `chmod o+x afile` Others can execute
 - `chmod g+x afile` Group can execute
 - `chmod 755 afile` `u=rwx, g=rx, o=rx`
 - `chmod g=u afile` Set group to be same as user

- `--reference` like `chown/chgrp`

- `touch`

- Change the dates on a file

- `touch file` Current time
 - `touch -d "Last tuesday" file` Change to given time!

Moving, Copying & Deleting files

- `mv`
 - both rename and move to other directories
 - `-i` for interactive, `-f` for force
- `rm`
 - `-i` , `-f` as per `mv`, but also `-r` recursive
- `cp`
 - Copy files & directory trees
 - `cp -a dir newdir` Best bet for copying all permissions
 - `cp -ax dir newdir` Stay within one filesystem
 - `--sparse always` Make sparse files

Moving, Copying & Deleting files (2)

- shred
 - 'securely' delete a file
 - shred myfile
 - Effectiveness depends on underlying filesystem
 - 'securely' blank a device
 - shred /dev/xda
- install
 - copy a file, setting all perms as you want
 - install file -m 755 -o root -g staff /usr/local/bin

Formatting of data

- `fold`
 - Wrap lines at given width
 - `fold -w 70 file`
 - `fold -s -w 70 file` Only break on spaces if possible
- `fmt`
 - Smarter than `fold`, knows indentation and full stops
 - `fmt -w 80 file` Format to 80 columns
 - `fmt -u -p NOTE:` Only act on lines starting with 'NOTE:' and make 'uniform spacing'
- `nl`
 - Number lines
 - Take care – tries to add other formatting, looks at contents

Formatting of data (2)

- printf
 - Similar to 'C' printf
 - printf %04d 58 0058 Padding
 - printf '\u20AC' Euro – on any appropriate locale
 - printf -b 'hello\n' Expand \ constructs
- tac
 - output fields in reverse order – default separator is newline
 - so prints line in reverse order
 - can change separator – but tricky to get useful cases
- ptx
 - 'permuted index'
 - each word with all contexts

System tools: Identity

- `id`
 - Lists all the current user info
 - `uid`, current group, list of all groups
 - Options to give individual items
 - `id -Gn` List of all the groups you are in (as names)
- `whoami`
 - Current user name
 - equivalent to `id -un`
- `who`
 - Lists login process information and system boot info
 - `who` Lists users
 - `who -b` Last system boot
 - `uptime` and `w` provide similar info

System tools: identity (su)

- **Substitute User**
 - Often for root
 - Better to use sudo if your system has it
 - Some systems don't have a root user (Ubuntu)
 - `su -` Gives login shell
 - `su auser -c ls` Run 'ls' as user 'auser'

Other system tools

- `uname`
 - Kernel, OS and machine name
 - Useful for fixing unportabilities in scripts
- `df`
 - Disc free
 - `-h` for easy to read sizes (`-H` for SI zealots)
- `tty`
 - Current terminal device name
- `chroot`
 - Run in a 'jail' – not fully secure, can be messy to setup
 - Pretty useful for things like ftp servers and fixing stuff
 - `chroot /mnt/newinstall /bin/bash`

Comparisons and Sums

- sum, cksum, md5sum, sha*sum
 - sum Fairly dumb checksum
 - cksum CRC checksum
 - md5sum, sha1sum Cryptographically strong sums
 - md5sum is common
- comm
 - sort your files first
 - comm -1 -2 a b Lines common to both files
 - comm -3 a b Lines unique to either file

Test

- test for file info
 - File type tests
 - `test -f /bin/l` True if it is a file (not directory or device)
 - Permission tests
 - `test -x /bin/l` Test if file is executable
 - File characteristic tests
 - `test -e /bin/l` Does it exist?
 - `test a -nt b` True if a newer than b
 - String tests
 - `test hello = hello`
 - Numeric tests
 - `test 5 -eq 5`

Test (2)

- Combining

- Boolean

- test -f /bin/ls -a -f /bin/cat and

- test ! -f /bin/ls not

- [is almost equivalent

- [-f /bin/ls]

Note] is a separate argument

Filenames

- `basename`
 - `basename /bin/ls` Gives leaf
- `dirname`
 - `dirname /bin/ls` Gives path
- `pathchk`
 - Check for accessible and portable names
 - file name lengths, empty elements etc

Other stuff

- **sleep**
 - Sleep for given time
 - `sleep 10` 10 seconds
 - `sleep 1m 10s` 1 minute, 10 seconds
- **false, true**
 - Just set exit values, useful in scripts and as dummies
- **yes**
 - Repeat a string
 - `yes "This disc intentionally left blank" > /dev/xda`
- **factor**
 - Factor a number

Other stuff

- `expr`
 - Arithmetic and string manipulation
 - `expr 3 + 2`
 - `expr index abc b` Gives 2
 - Take care – shells tend to have inbuilt less powerful version
- `date`
 - Show, set the current date and time
 - Perform format conversions
 - `date` Show current date and time
 - `date -s '8 May 2005 14:04:23'` Set
 - `date -d "9am PST"` Show given time in local zone