

# GNU/Linux concepts

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# UNIX

- multitasking, multi-user computer operating system
- originally developed in 1969 by a group of AT&T employees at Bell Labs
  - Brian Kernighan
  - Dennis Ritchie
  - Ken Thompson
- by 1973 had been almost entirely recoded in C

# UNIX design principles

- everything is a file
- small single-purpose programs with the ability to pipe them together
- configuration in ASCII
- The UNIX Philosophy, Mike Gancarz, 1994

## Standard streams

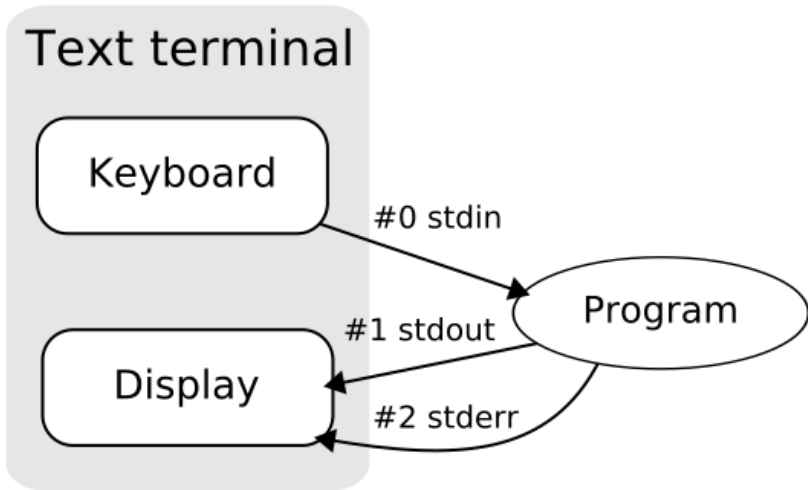


Figure 1: streams

# Richard Stallman, GNU, FSF, GPL

- GNU (GNU's Not Unix), 1983 – gcc, gdb, emacs
- Free Software Foundation, 1985
- GNU General Public License (GPL)
  - Guarantees that free software remains free
  - All software under the GPL make source available to the end user
  - Changes to a GPL'd software package must also be licensed under the GPL
  - Source code from one GPL'd software package can be incorporated into other GPL'd software
- “Free as in Freedom: Richard Stallman's Crusade for Free Software”, Sam Williams, March 2002
  - <http://oreilly.com/openbook/freedom/>

# Linux kernel

- Linus Torvalds
- Minix
- The Linux kernel
  - re-implementation of the UNIX APIs
  - GPL license
- GNU/Linux
- GNU/Hurd
- GNU/kFreeBSD

# GNU/Linux distribution

- Linux kernel
- GNU software
- BSD/Linux utilities
- X.Org
- GUI components
- packaging and support
- added features

# Standards

- Portable Operating System Interface for Unix (POSIX), IEEE
- Single UNIX Specification
- Filesystem Hierarchy Standard (FHS)
- Linux Standards Base (LSB)



# Popular distributions

- GNU/Linux Distribution Timeline
- <http://futurist.se/gldt/>
- <https://github.com/FabioLolix/linuxtimeline>
- Slackware
- Debian
- Ubuntu
- Linux Mint
- Red Hat Enterprise Linux (RHEL)
- Fedora
- CentOS (Community ENTERprise Operating System)
- FreeBSD
- Arch Linux

# Login

- terminals
  - serial
  - virtual (TTY, PTY, PuTTY)
- GUI
- network login

## Login session info

- User ID (UID)
- Group ID (GID)
- privileged user – root, UID 0
- whoami
- id
- tty

# Switching user

- `su` – change user ID (or become superuser)
  - `su -`, `su -l`, `su --login` – provide environment
- `sudo` – execute a command as another user

# Help

- `foo --help, foo -h`
- `man [section] foo`
  - ① Executable programs or shell commands
  - ② System calls (functions provided by the kernel)
  - ③ Library calls (functions within program libraries)
  - ④ Special files (usually found in `/dev`)
  - ⑤ File formats and conventions eg `/etc/passwd`
  - ⑥ Games
  - ⑦ Miscellaneous
  - ⑧ System administration commands (usually only for root)
  - ⑨ Kernel routines [Non standard]
- search through man pages for matches
  - `whatis (man -f)` - manual page descriptions
  - `apropos (man -k)` - search the manpage names and descriptions
- `info`