

Shell command line editing

Cursor to start of line	Ctrl-A
Cursor to end of line	Ctrl-E
Cut to clipboard from cursor to end of line	Ctrl-K
Cut to clipboard from start of line to cursor	Ctrl-U
Insert from clipboard to cursor	Ctrl-Y
Clear screen	Ctrl-L
Transpose current with previous character	Ctrl-T
Incremental reverse history search	Ctrl-R
Insert Ctrl-<char>	Ctrl-V Ctrl<char>
Uppercase from cursor to end of word	Esc-U
Lowercase from cursor to end of word	Esc-L
Cut to clipboard from cursor to end of word	Esc-D
Cut to clipboard from cursor to start of word	Esc-W

Shell commands

Change to the user's home directory	cd
Change to the directory <dir>	cd <dir>
Change to the parent directory	cd ..
Change to the directory <dir> in the user's home directory	cd ~/dir
Print current directory	pwd
Print the names of files in the current directory	ls
Print modes, owner, size, date and names of files in the current directory including hidden files (name starts with a dot)	ls -al
Same as above, order by last modified date, newest last	ls -tral
Print the content of the file <file>	cat <file>
Rename the file <old> to <new>	mv <old> <new>
Copy the content of file <file1> to <file2>	cp <file1> <file2>
Remove file <file>	rm <file>
Search the text snippet <pattern> in file <file>	grep <pattern> <file>
Search for printable text snippets in file <file>	strings <file>
Show content of file <file> in binary and ASCII format	hexdump -C <file>
Show comprehensive documentation of program <prog>	man <prog>
Get short help information for program <prog>	prog --help

Acronyms

BIOS	B asic i nput/ o utput s ystem
GCC	G NU c ompiler c ollection
GNU	G nu's n ot U nix (recursive)
GUI	G raphical u ser i nterface
HMI	H uman- m achine i nterface
KVM	K ernel v irtual m achine
KVM (switch)	K eyboard/ v ideo/ m ouse (switch)
RAM	R andom- a ccess m emory
ROM	R ead- o nly m emory
SMP	S ymmetric m ulti p rocessing (multi-core processor)
UP	U niprocessor (single-core processor)
UTF	U nicode t ransformation f ormat, e.g. UTF-8 character encoding

Git

Show overall status	git status
Clone upstream repository from <URL> named <name>.git, then change into the cloned directory	git clone <URL> cd <name>
Initialize local repo	git init
Show all branches	git branch -a
What was changed locally?	git diff
Show changes in relation to previous stage <ref>	git diff <ref>
Add changes to local repo, prepare for commit	git add .
Commit changes to local repo	git commit -m "message"
Submit local to upstream	git push
Was upstream updated?	git remote update git status -uno
Synchronize local repo with upstream	git pull
Show development history	git log
Revert all local changes (dangerous if inadvertently)	git reset --hard
Revert to stage <ref>	git checkout <ref>

Package managers: An excerpt

System or computer language	Package manager
Debian, Ubuntu Linux distributions	dpkg, apt
RedHat, Fedora Linux distributions	rpm, dnf
C / C++	Conan
Java	Maven
Rust	Cargo
Javascript	NPM
Python	Pip
PHP	Composer

Derivation

Interface between...	and...	Derivation
user program	Linux kernel	no
network client	network server	no
shared memory of program #1	memory access from program #2	no
forking program	forked program	no
program source code	modified version of the source code	YES
program calling a function	a function in another source code	YES
program calling a function	a function in another executable	YES
program calling a function	a function in a plugin	YES

Build commands

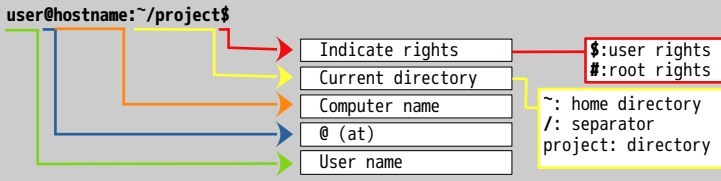
Classic	./configure make sudo make install
Cmake	mkdir _build cd _build cmake .. make; sudo make install
Meson	mkdir _build meson setup _build meson -C _build compile sudo meson -C _build install

Booting a computer (Linux embedded system / Linux PC)

1. Boot-ROM / BIOS
 2. Bootloader (U-Boot, Barebox / Grub)
 3. Linux kernel
 4. INIT process (SYS-V / Systemd)
- SecureBoot verifies the integrity of each component before starting it.



Terminal prompt (default configuration)

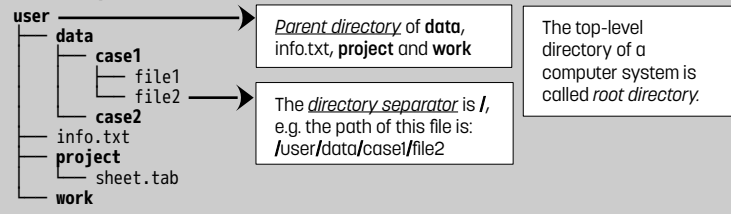


Command line

user@hostname:~/project\$ **command** [options] [arguments]

command: The program or command to be executed (e.g. ls, echo, cd).
options: Additional modifiers that change the behavior of the command
arguments: File name or data to which the command is applied

Directory tree



Bits and Bytes: Binary and hexadecimal notation

bit: a single storage cell that can be 0 or 1 (binary notation)
Byte: 8 bits, can represent numbers from 0 to 255

Hexadecimal notation:
 0->0 1->1 2->2 3->3 4->4 5->5 6->6 7->7
 8->8 9->9 10->A 11->B 12->C 13->D 14->E 15->F

The number 181 in **binary**, **decimal** and **hexadecimal** notation:
 1 0 1 1 1 0 1 0 1 = 10110101
 $1*2^7 + 0*2^6 + 1*2^5 + 1*2^4 + 0*2^3 + 1*2^2 + 0*2^1 + 1*2^0 = 181$
 $1*2^3 + 0*2^2 + 1*2^1 + 1*2^0, 0*2^3 + 1*2^2 + 0*2^1 + 1*2^0 = B5$

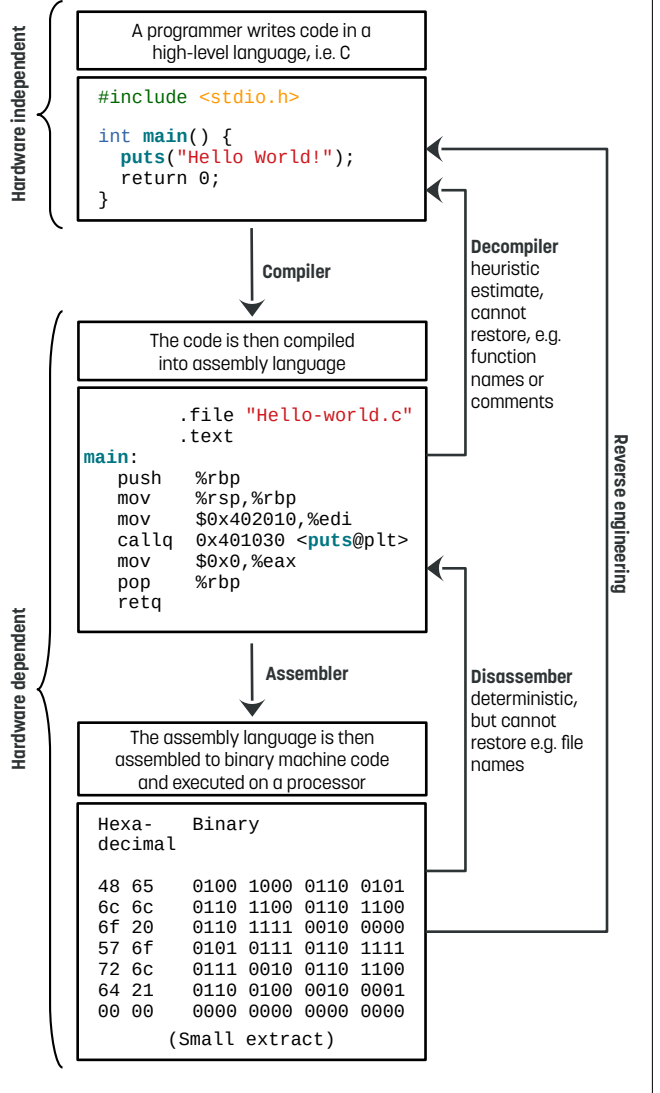
String encoding: ASCII

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
Non printable control symbols								BS	LF	CR					
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
Non printable control symbols															
20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
"	#	\$	%	&	'	()	*	+	,	-	.	/		
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
p	q	r	s	t	u	v	w	x	y	z	{		}	~	

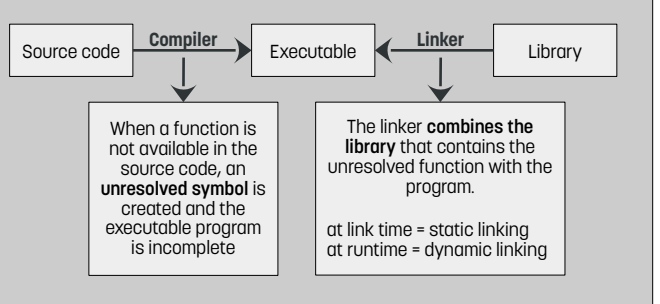
High-level computer languages (examples)

	Interpreter languages	Compiler languages
General purpose	PHP, Javascript, Python	C/C++, C#, Rust, Java
Problem oriented	APL, R	Fortran, Cobol

From source code to binary executable (and back)



Link dependencies



Callgraph of a program with libraries and their symbols

