GDB QUICK REFERENCE

GDB Version 4

Essential Commands

`gdb` *program* [*core*]	debug *program* [using coredump *core*]
`b` [*file*`:`]*function*	set breakpoint at *function* [in *file*]
`run` [*arglist*]	start your program [with *arglist*]
`bt`	backtrace: display program stack
`p` *expr*	display the value of an expression
`c`	continue running your program
`n`	next line, stepping over function calls
`s`	next line, stepping into function calls

Starting GDB

`gdb`	start GDB, with no debugging files
`gdb` *program*	begin debugging *program*
`gdb` *program core*	debug coredump *core* produced by *program*
`gdb --help`	describe command line options

Stopping GDB

`quit`	exit GDB; also `q` or `EOF` (eg `C-d`)
`INTERRUPT`	(eg `C-c`) terminate current command, or send to running process

Getting Help

`help`	list classes of commands
`help` *class*	one-line descriptions for commands in *class*
`help` *command*	describe *command*

Executing your Program

`run` *arglist*	start your program with *arglist*
`run`	start your program with current argument list
`run` . . . <*inf* >*outf*	start your program with input, output redirected
`kill`	kill running program
`tty` *dev*	use *dev* as stdin and stdout for next `run`
`set args` *arglist*	specify *arglist* for next `run`
`set args`	specify empty argument list
`show args`	display argument list
`show environment`	show all environment variables
`show env` *var*	show value of environment variable *var*
`set env` *var string*	set environment variable *var*
`unset env` *var*	remove *var* from environment

Shell Commands

`cd` *dir*	change working directory to *dir*
`pwd`	Print working directory
`make` . . .	call "`make`"
`shell` *cmd*	execute arbitrary shell command string

[ ] surround optional arguments . . . show one or more arguments

Breakpoints and Watchpoints

`break` [*file*`:`]*line* `b` [*file*`:`]*line*	set breakpoint at *line* number [in *file*] eg: `break main.c:37`
`break` [*file*`:`]*function*	set breakpoint at *function* [in *file*]
`break +`*offset* `break -`*offset*	set break at *offset* lines from current stop
`break *`*addr*	set breakpoint at address *addr*
`break`	set breakpoint at next instruction
`break` . . . `if` *expr*	break conditionally on nonzero *expr*
`cond` *n* [*expr*]	new conditional expression on breakpoint *n*; make unconditional if no *expr*
`tbreak` . . .	temporary break; disable when reached
`rbreak` *regex*	break on all functions matching *regex*
`watch` *expr*	set a watchpoint for expression *expr*
`catch` *x*	break at C++ handler for exception *x*
`info break`	show defined breakpoints
`info watch`	show defined watchpoints
`clear`	delete breakpoints at next instruction
`clear` [*file*`:`]*fun*	delete breakpoints at entry to *fun*()
`clear` [*file*`:`]*line*	delete breakpoints on source line
`delete` [*n*]	delete breakpoints [or breakpoint *n*]
`disable` [*n*]	disable breakpoints [or breakpoint *n*]
`enable` [*n*]	enable breakpoints [or breakpoint *n*]
`enable once` [*n*]	enable breakpoints [or breakpoint *n*]; disable again when reached
`enable del` [*n*]	enable breakpoints [or breakpoint *n*]; delete when reached
`ignore` *n count*	ignore breakpoint *n*, *count* times

`commands` *n*
  [`silent`]
  command-list
	execute GDB *command-list* every time breakpoint *n* is reached. [`silent` suppresses default display]

`end`	end of *command-list*

Program Stack

`backtrace` [*n*] `bt` [*n*]	print trace of all frames in stack; or of *n* frames—innermost if *n*>`0`, outermost if *n*<`0`
`frame` [*n*]	select frame number *n* or frame at address *n*; if no *n*, display current frame
`up` *n*	select frame *n* frames up
`down` *n*	select frame *n* frames down
`info frame` [*addr*]	describe selected frame, or frame at *addr*
`info args`	arguments of selected frame
`info locals`	local variables of selected frame
`info reg` [*rn*] `info all-reg` [*rn*]	register values [for reg *rn*] in selected frame; `all-reg` includes floating point
`info catch`	exception handlers active in selected frame

Execution Control

`continue` [*count*] `c` [*count*]	continue running; if *count* specified, ignore this breakpoint next *count* times
`step` [*count*] `s` [*count*]	execute until another line reached; repeat *count* times if specified
`stepi` [*count*] `si` [*count*]	step by machine instructions rather than source lines
`next` [*count*] `n` [*count*]	execute next line, including any function calls
`nexti` [*count*] `ni` [*count*]	next machine instruction rather than source line
`until` [*location*]	run until next instruction (or *location*)
`finish`	run until selected stack frame returns
`return` [*expr*]	pop selected stack frame without executing [setting return value]
`signal` *num*	resume execution with signal *s* (none if `0`)
`jump` *line* `jump *`*address*	resume execution at specified *line* number or *address*
`set var=`*expr*	evaluate *expr* without displaying it; use for altering program variables

Display

`print` [`/`*f*] [*expr*] `p` [`/`*f*] [*expr*]	show value of *expr* [or last value `$`] according to format *f*:
`x`	hexadecimal
`d`	signed decimal
`u`	unsigned decimal
`o`	octal
`t`	binary
`a`	address, absolute and relative
`c`	character
`f`	floating point
`call` [`/`*f*] *expr*	like `print` but does not display `void`
`x` [`/`*Nuf*] *expr*	examine memory at address *expr*; optional format spec follows slash
N	count of how many units to display
u	unit size; one of `b` individual bytes `h` halfwords (two bytes) `w` words (four bytes) `g` giant words (eight bytes)
f	printing format. Any `print` format, or `s` null-terminated string `i` machine instructions
`disassem` [*addr*]	display memory as machine instructions

Automatic Display

`display` [`/`*f*] *expr*	show value of *expr* each time program stops [according to format *f*]
`display`	display all enabled expressions on list
`undisplay` *n*	remove number(s) *n* from list of automatically displayed expressions
`disable disp` *n*	disable display for expression(s) number *n*
`enable disp` *n*	enable display for expression(s) number *n*
`info display`	numbered list of display expressions

Expressions

expr	an expression in C, C++, or Modula-2 (including function calls), or:
addr@*len*	an array of *len* elements beginning at *addr*
file`::`*nm*	a variable or function *nm* defined in *file*
{*type*}*addr*	read memory at *addr* as specified *type*
`$`	most recent displayed value
`$`*n*	*n*th displayed value
`$$`	displayed value previous to $
`$$`*n*	*n*th displayed value back from $
`$_`	last address examined with `x`
`$__`	value at address $_
`$`*var*	convenience variable; assign any value
`show values` [*n*]	show last 10 values [or surrounding $*n*]
`show convenience`	display all convenience variables

Symbol Table

`info address` *s*	show where symbol *s* is stored
`info func` [*regex*]	show names, types of defined functions (all, or matching *regex*)
`info var` [*regex*]	show names, types of global variables (all, or matching *regex*)
`whatis` [*expr*]	show data type of *expr* [or `$`] without
`ptype` [*expr*]	evaluating; `ptype` gives more detail
`ptype` *type*	describe type, struct, union, or enum

GDB Scripts

`source` *script*	read, execute GDB commands from file *script*
`define` *cmd* *command-list*	create new GDB command *cmd*; execute script defined by *command-list*
`end`	end of *command-list*
`document` *cmd* *help-text*	create online documentation for new GDB command *cmd*
`end`	end of *help-text*

Signals

`handle` *signal act*	specify GDB actions for *signal*:
`print`	announce signal
`noprint`	be silent for signal
`stop`	halt execution on signal
`nostop`	do not halt execution
`pass`	allow your program to handle signal
`nopass`	do not allow your program to see signal
`info signals`	show table of signals, GDB action for each

Debugging Targets

`target` *type param*	connect to target machine, process, or file
`help target`	display available targets
`attach` *param*	connect to another process
`detach`	release target from GDB control

Controlling GDB

`set` *param value*	set one of GDB's internal parameters
`show` *param*	display current setting of parameter

Parameters understood by `set` and `show`:

`complaints` *limit*	number of messages on unusual symbols
`confirm` *on/off*	enable or disable cautionary queries
`editing` *on/off*	control `readline` command-line editing
`height` *lpp*	number of lines before pause in display
`language` *lang*	Language for GDB expressions (`auto`, `c` or `modula-2`)
`listsize` *n*	number of lines shown by `list`
`prompt` *str*	use *str* as GDB prompt
`radix` *base*	octal, decimal, or hex number representation
`verbose` *on/off*	control messages when loading symbols
`width` *cpl*	number of characters before line folded
`write` *on/off*	Allow or forbid patching binary, core files (when reopened with `exec` or `core`)
`history` ... `h` ...	groups with the following options:
`h exp` *off/on*	disable/enable `readline` history expansion
`h file` *filename*	file for recording GDB command history
`h size` *size*	number of commands kept in history list
`h save` *off/on*	control use of external file for command history
`print` ... `p` ...	groups with the following options:
`p address` *on/off*	print memory addresses in stacks, values
`p array` *off/on*	compact or attractive format for arrays
`p demangl` *on/off*	source (demangled) or internal form for C++ symbols
`p asm-dem` *on/off*	demangle C++ symbols in machine-instruction output
`p elements` *limit*	number of array elements to display
`p object` *on/off*	print C++ derived types for objects
`p pretty` *off/on*	struct display: compact or indented
`p union` *on/off*	display of union members
`p vtbl` *off/on*	display of C++ virtual function tables

`show commands`	show last 10 commands
`show commands` *n*	show 10 commands around number *n*
`show commands +`	show next 10 commands

Working Files

`file` [*file*]	use *file* for both symbols and executable; with no arg, discard both
`core` [*file*]	read *file* as coredump; or discard
`exec` [*file*]	use *file* as executable only; or discard
`symbol` [*file*]	use symbol table from *file*; or discard
`load` *file*	dynamically link *file* and add its symbols
`add-sym` *file addr*	read additional symbols from *file*, dynamically loaded at *addr*
`info files`	display working files and targets in use
`path` *dirs*	add *dirs* to front of path searched for executable and symbol files
`show path`	display executable and symbol file path
`info share`	list names of shared libraries currently loaded

Source Files

`dir` *names*	add directory *names* to front of source path
`dir`	clear source path
`show dir`	show current source path
`list`	show next ten lines of source
`list -`	show previous ten lines
`list` *lines*	display source centered around *lines*, specified as one of:
[*file*`:`]*num*	line number [in named file]
[*file*`:`]*function*	beginning of function [in named file]
`+`*off*	*off* lines after last printed
`-`*off*	*off* lines previous to last printed
`*`*address*	line containing *address*
`list` *f*`,`*l*	from line *f* to line *l*
`info line` *num*	show starting, ending addresses of compiled code for source line *num*
`info source`	show name of current source file
`info sources`	list all source files in use
`forw` *regex*	search following source lines for *regex*
`rev` *regex*	search preceding source lines for *regex*

GDB under GNU Emacs

`M-x gdb`	run GDB under Emacs
`C-h m`	describe GDB mode
`M-s`	step one line (`step`)
`M-n`	next line (`next`)
`M-i`	step one instruction (`stepi`)
`C-c C-f`	finish current stack frame (`finish`)
`M-c`	continue (`cont`)
`M-u`	up *arg* frames (`up`)
`M-d`	down *arg* frames (`down`)
`C-x &`	copy number from point, insert at end
`C-x SPC`	(in source file) set break at point

GDB License

`show copying`	Display GNU General Public License
`show warranty`	There is NO WARRANTY for GDB. Display full no-warranty statement.