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 env`	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*`:`]*func*	set breakpoint at *func* [in *file*]
`break +`*offset*	set break at *offset* lines from current stop
`break -`*offset*	
`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*]...	register values [for regs *rn*] in selected frame; `all-reg` includes floating point
`info all-reg` [*rn*]	
`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*	resume execution at specified *line* number
`jump *`*address*	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 conv	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 evaluating; **ptype** gives more detail
ptype [*expr*]	
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**:

complaint *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 ...	groups with the following options:
h ...	
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 ...	groups with the following options:
p ...	
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 surrounding *lines*, specified as:
[*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

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