

Essential Commands

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

Starting GDB

<b><code>gdb</code></b>	start GDB, with no debugging files
<b><code>gdb</code></b> <i>program</i>	begin debugging <i>program</i>
<b><code>gdb</code></b> <i>program</i> <i>core</i>	debug coredump <i>core</i> produced by <i>program</i>
<b><code>gdb --help</code></b>	describe command line options

Stopping GDB

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

Getting Help

<b><code>help</code></b>	list classes of commands
<b><code>help</code></b> <i>class</i>	one-line descriptions for commands in <i>class</i>
<b><code>help</code></b> <i>command</i>	describe <i>command</i>

Executing your Program

<b><code>run</code></b> <i>arglist</i>	start your program with <i>arglist</i>
<b><code>run</code></b>	start your program with current argument list
<b><code>run ... &lt;inf &gt;outf</code></b>	start your program with input, output redirected
<b><code>kill</code></b>	kill running program
<b><code>tty</code></b> <i>dev</i>	use <i>dev</i> as stdin and stdout for next <b><code>run</code></b>
<b><code>set args</code></b> <i>arglist</i>	specify <i>arglist</i> for next <b><code>run</code></b>
<b><code>set args</code></b>	specify empty argument list
<b><code>show args</code></b>	display argument list

<b><code>show env</code></b>	show all environment variables
<b><code>show env</code></b> <i>var</i>	show value of environment variable <i>var</i>
<b><code>set env</code></b> <i>var</i> <i>string</i>	set environment variable <i>var</i>
<b><code>unset env</code></b> <i>var</i>	remove <i>var</i> from environment

Shell Commands

<b><code>cd</code></b> <i>dir</i>	change working directory to <i>dir</i>
<b><code>pwd</code></b>	Print working directory
<b><code>make ...</code></b>	call “ <b><code>make</code></b> ”
<b><code>shell</code></b> <i>cmd</i>	execute arbitrary shell command string

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

Breakpoints and Watchpoints

<b><code>break</code></b> [ <i>file</i> :] <i>line</i>	set breakpoint at <i>line</i> number [in <i>file</i> ]
<b><code>b</code></b> [ <i>file</i> :] <i>line</i>	eg: <b><code>break main.c:37</code></b>
<b><code>break</code></b> [ <i>file</i> :] <i>func</i>	set breakpoint at <i>func</i> [in <i>file</i> ]
<b><code>break +offset</code></b>	set break at <i>offset</i> lines from current stop
<b><code>break -offset</code></b>	
<b><code>break *addr</code></b>	set breakpoint at address <i>addr</i>
<b><code>break</code></b>	set breakpoint at next instruction
<b><code>break ... if expr</code></b>	break conditionally on nonzero <i>expr</i>
<b><code>cond</code></b> <i>n</i> [ <i>expr</i> ]	new conditional expression on breakpoint <i>n</i> ; make unconditional if no <i>expr</i>
<b><code>tbreak ...</code></b>	temporary break; disable when reached
<b><code>rbreak</code></b> <i>regex</i>	break on all functions matching <i>regex</i>
<b><code>watch</code></b> <i>expr</i>	set a watchpoint for expression <i>expr</i>
<b><code>catch</code></b> <i>x</i>	break at C++ handler for exception <i>x</i>

<b><code>info break</code></b>	show defined breakpoints
<b><code>info watch</code></b>	show defined watchpoints

<b><code>clear</code></b>	delete breakpoints at next instruction
<b><code>clear</code></b> [ <i>file</i> :] <i>fun</i>	delete breakpoints at entry to <i>fun</i> ()
<b><code>clear</code></b> [ <i>file</i> :] <i>line</i>	delete breakpoints on source line
<b><code>delete</code></b> [ <i>n</i> ]	delete breakpoints [or breakpoint <i>n</i> ]

<b><code>disable</code></b> [ <i>n</i> ]	disable breakpoints [or breakpoint <i>n</i> ]
<b><code>enable</code></b> [ <i>n</i> ]	enable breakpoints [or breakpoint <i>n</i> ]
<b><code>enable once</code></b> [ <i>n</i> ]	enable breakpoints [or breakpoint <i>n</i> ]; disable again when reached
<b><code>enable del</code></b> [ <i>n</i> ]	enable breakpoints [or breakpoint <i>n</i> ]; delete when reached

<b><code>ignore</code></b> <i>n</i> <i>count</i>	ignore breakpoint <i>n</i> , <i>count</i> times
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<b><code>commands</code></b> <i>n</i> [ <i>silent</i> ]	execute GDB <i>command-list</i> every time breakpoint <i>n</i> is reached. [ <i>silent</i> suppresses default display]
<b><code>end</code></b>	end of <i>command-list</i>

Program Stack

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

Execution Control

<b><code>continue</code></b> [ <i>count</i> ]	continue running; if <i>count</i> specified, ignore this breakpoint next <i>count</i> times
<b><code>c</code></b> [ <i>count</i> ]	

<b><code>step</code></b> [ <i>count</i> ]	execute until another line reached; repeat <i>count</i> times if specified
<b><code>s</code></b> [ <i>count</i> ]	
<b><code>stepi</code></b> [ <i>count</i> ]	step by machine instructions rather than source lines
<b><code>si</code></b> [ <i>count</i> ]	

<b><code>next</code></b> [ <i>count</i> ]	execute next line, including any function calls
<b><code>n</code></b> [ <i>count</i> ]	
<b><code>nexti</code></b> [ <i>count</i> ]	next machine instruction rather than source line
<b><code>ni</code></b> [ <i>count</i> ]	

<b><code>until</code></b> [ <i>location</i> ]	run until next instruction (or <i>location</i> )
<b><code>finish</code></b>	run until selected stack frame returns
<b><code>return</code></b> [ <i>expr</i> ]	pop selected stack frame without executing [setting return value]
<b><code>signal</code></b> <i>num</i>	resume execution with signal <i>s</i> (none if <b><code>0</code></b> )
<b><code>jump</code></b> <i>line</i>	resume execution at specified <i>line</i> number
<b><code>jump *address</code></b>	or <i>address</i>
<b><code>set var=expr</code></b>	evaluate <i>expr</i> without displaying it; use for altering program variables

Display

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

Automatic Display

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

Expressions

<i>expr</i>	an expression in C, C++, or Modula-2 (including function calls), or:
<i>addr@len</i>	an array of <i>len</i> elements beginning at <i>addr</i>
<i>file::nm</i>	a variable or function <i>nm</i> defined in <i>file</i>
<i>{type}addr</i>	read memory at <i>addr</i> as specified <i>type</i>
<b>\$</b>	most recent displayed value
<b>\$n</b>	<i>n</i> th displayed value
<b>\$\$</b>	displayed value previous to <b>\$</b>
<b>\$\$n</b>	<i>n</i> th displayed value back from <b>\$</b>
<b>\$_</b>	last address examined with <b>x</b>
<b>\$_</b>	value at address <b>\$_</b>
<b>\$var</b>	convenience variable; assign any value

<b>show values</b> [ <i>n</i> ]	show last 10 values [or surrounding <i>\$n</i> ]
<b>show conv</b>	display all convenience variables

Symbol Table

<b>info address</b> <i>s</i>	show where symbol <i>s</i> is stored
<b>info func</b> [ <i>regex</i> ]	show names, types of defined functions (all, or matching <i>regex</i> )
<b>info var</b> [ <i>regex</i> ]	show names, types of global variables (all, or matching <i>regex</i> )
<b>what is</b> [ <i>expr</i> ]	show data type of <i>expr</i> [or <b>\$</b> ] without evaluating; <b>p<sub>type</sub></b> gives more detail
<b>p<sub>type</sub></b> [ <i>expr</i> ]	
<b>p<sub>type</sub></b> <i>type</i>	describe type, struct, union, or enum

GDB Scripts

<b>source</b> <i>script</i>	read, execute GDB commands from file <i>script</i>
<b>define</b> <i>cmd</i>	create new GDB command <i>cmd</i> ; execute
<i>command-list</i>	script defined by <i>command-list</i>
<b>end</b>	end of <i>command-list</i>
<b>document</b> <i>cmd</i>	create online documentation for new GDB
<i>help-text</i>	command <i>cmd</i>
<b>end</b>	end of <i>help-text</i>

Signals

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

Debugging Targets

<b>target</b> <i>type param</i>	connect to target machine, process, or file
<b>help target</b>	display available targets
<b>attach</b> <i>param</i>	connect to another process
<b>detach</b>	release target from GDB control

Controlling GDB

<b>set</b> <i>param value</i>	set one of GDB's internal parameters
<b>show</b> <i>param</i>	display current setting of parameter

Parameters understood by **set** and **show**:

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

<b>show commands</b>	show last 10 commands
<b>show commands</b> <i>n</i>	show 10 commands around number <i>n</i>
<b>show commands +</b>	show next 10 commands

Working Files

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

Source Files

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

GDB under GNU Emacs

<b>M-x gdb</b>	run GDB under Emacs
<b>C-h m</b>	describe GDB mode
<b>M-s</b>	step one line ( <b>s<sub>te</sub>p</b> )
<b>M-n</b>	next line ( <b>n<sub>e</sub>xt</b> )
<b>M-i</b>	step one instruction ( <b>s<sub>t</sub>e<sub>p</sub>i</b> )
<b>C-c C-f</b>	finish current stack frame ( <b>f<sub>i</sub>nish</b> )
<b>M-c</b>	continue ( <b>c<sub>o</sub>nt</b> )
<b>M-u</b>	up <i>arg</i> frames ( <b>u<sub>p</sub></b> )
<b>M-d</b>	down <i>arg</i> frames ( <b>d<sub>o</sub>wn</b> )
<b>C-x &amp;</b>	copy number from point, insert at end
<b>C-x SPC</b>	(in source file) set break at point

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