

## Essential Commands

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

## Starting GDB

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

## Stopping GDB

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

## Getting Help

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

## Executing your Program

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

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

## Shell Commands

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

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

## Breakpoints and Watchpoints

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

## Program Stack

<b>backtrace</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>bt</b> [ <i>n</i> ]	
<b>frame</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>up</b> <i>n</i>	select frame <i>n</i> frames up
<b>down</b> <i>n</i>	select frame <i>n</i> frames down
<b>info</b> <b>frame</b> [ <i>addr</i> ]	describe selected frame, or frame at <i>addr</i>
<b>info</b> <b>args</b>	arguments of selected frame
<b>info</b> <b>locals</b>	local variables of selected frame
<b>info</b> <b>reg</b> [ <i>rn</i> ]...	register values [for regs <i>rn</i> ] in selected frame; <b>all-reg</b> includes floating point
<b>info</b> <b>all-reg</b> [ <i>rn</i> ]	
<b>info</b> <b>catch</b>	exception handlers active in selected frame

## Execution Control

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

## Display

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

## Automatic Display

<b>display</b> [ <i>/f</i> ] <i>expr</i>	show value of <i>expr</i> each time program stops [according to format <i>f</i> ]
<b>display</b>	display all enabled expressions on list
<b>undisplay</b> <i>n</i>	remove number(s) <i>n</i> from list of automatically displayed expressions
<b>disable</b> <b>disp</b> <i>n</i>	disable display for expression(s) number <i>n</i>
<b>enable</b> <b>disp</b> <i>n</i>	enable display for expression(s) number <i>n</i>
<b>info</b> <b>display</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</i> } <i>addr</i>	read memory at <i>addr</i> as specified <i>type</i>
\$	most recent displayed value
\$ <i>n</i>	<i>n</i> th displayed value
\$\$	displayed value previous to \$
\$\$ <i>n</i>	<i>n</i> th displayed value back from \$
\$_	last address examined with <b>x</b>
\$_	value at address \$_
\$ <i>var</i>	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>whatis</b> [ <i>expr</i> ]	show data type of <i>expr</i> [or \$] without evaluating; <b>ptype</b> gives more detail
<b>ptype</b> [ <i>expr</i> ]	
<b>ptype</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>	<i>script</i> 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 <b>set</b> and <b>show</b> :	
<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</i> :] <i>num</i>	line number [in named file]
[ <i>file</i> :] <i>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</b> <b>gdb</b>	run GDB under Emacs
<b>C-h</b> <b>m</b>	describe GDB mode
<b>M-s</b>	step one line ( <b>step</b> )
<b>M-n</b>	next line ( <b>next</b> )
<b>M-i</b>	step one instruction ( <b>stepi</b> )
<b>C-c</b> <b>C-f</b>	finish current stack frame ( <b>finish</b> )
<b>M-c</b>	continue ( <b>cont</b> )
<b>M-u</b>	up <i>arg</i> frames ( <b>up</b> )
<b>M-d</b>	down <i>arg</i> frames ( <b>down</b> )
<b>C-x</b> <b>&amp;</b>	copy number from point, insert at end
<b>C-x</b> <b>SPC</b>	(in source file) set break at point

## GDB License

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<b>show warranty</b>	There is NO WARRANTY for GDB. Display full no-warranty statement.

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Roland Pesch (pesch@cygnus.com)

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