# 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

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## Breakpoints and Watchpoints

| | |
|---|---|
| **break** [*file*:]*line*<br>**b** [*file*:]*line* | set breakpoint at *line* number [in *file*]<br>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*<br>[**silent**]<br>*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*]<br>**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*]<br>**c** [*count*] | continue running; if *count* specified, ignore this breakpoint next *count* times |
| **step** [*count*]<br>**s** [*count*] | execute until another line reached; repeat *count* times if specified |
| **stepi** [*count*]<br>**si** [*count*] | step by machine instructions rather than source lines |
| **next** [*count*]<br>**n** [*count*] | execute next line, including any function calls |
| **nexti** [*count*]<br>**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*]<br>**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<br>**b** individual bytes<br>**h** halfwords (two bytes)<br>**w** words (four bytes)<br>**g** giant words (eight bytes) |
| *f* | printing format. Any **print** format, or<br>**s** null-terminated string<br>**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* | create new GDB command *cmd*; execute |
| *command-list* | script defined by *command-list* |
| **end** | end of *command-list* |
| **document** *cmd* | create online documentation for new GDB |
| *help-text* | 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 |

## GDB License

| | |
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| **show copying** | Display GNU General Public License |
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