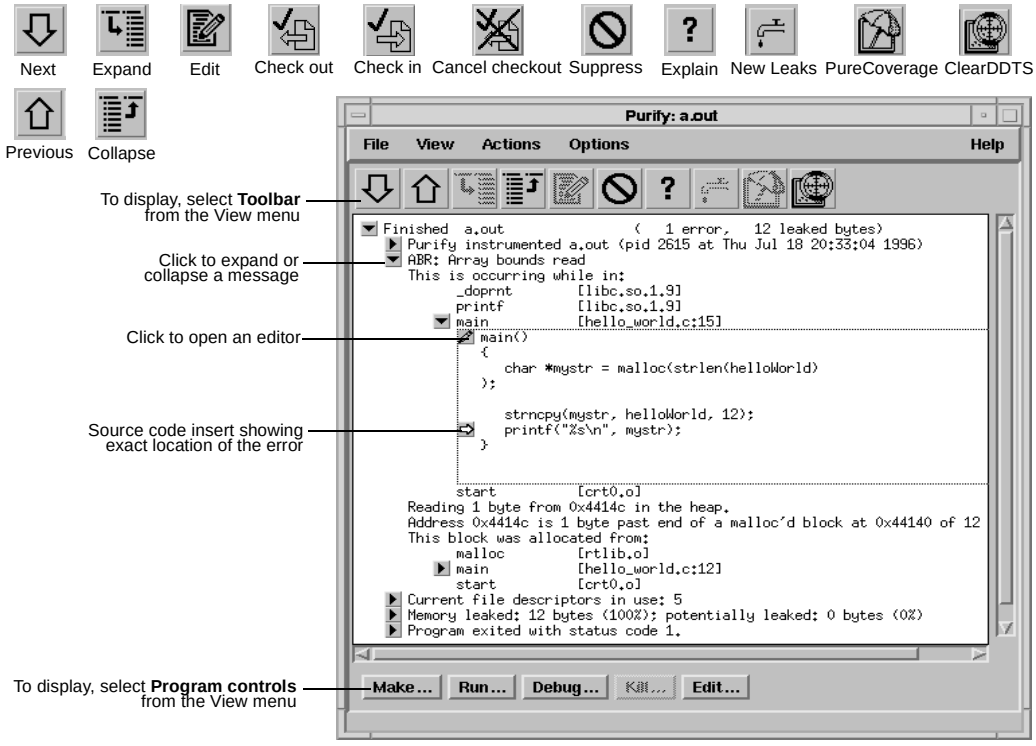
Using the Purify Viewer

To build a Purify'd program: `% purify cc -g <filename>.o`
Purify opens the Viewer by default when you run a Purify'd program: `% a.out`
To also open a saved view file (`.pv` file) in a Viewer:
`% setenv PURIFYOPTIONS '-view-file=./%v.pv'; a.out; purify -view ./a.out.pv`



Running a make-run-debug-edit cycle

You can run an entire debugging cycle from the Viewer using the program controls: start a make, run an executable, or launch the debugger or editor.

Keyboard accelerators

Key	Action	Menu equivalent
Control-n, or Down arrow	Move to the next message in the outline hierarchy	Next in the Actions menu
Control-p, or Up arrow	Move to the previous message in the outline hierarchy	Previous in the Actions menu
Return	Expand the selected message	Expand in the Actions menu
DEL	Collapse the selected message	Collapse in the Actions menu
Space	Expand if selected message is currently collapsed; Collapse if selected message is expanded	

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Purify messages

Message	Description	Severity*	Message	Description	Severity*
ABR	Array Bounds Read	W	**NPR**	Null Pointer Read	F
ABW	Array Bounds Write	C	**NPW**	Null Pointer Write	F
BRK	Misuse of Brk or Sbrk	C	**PAR**	Bad Parameter	W
BSR	Beyond Stack Read	W	**PLK**	Potential Leak	W
BSW	Beyond Stack Write	W	**SBR**	Stack Array Bounds Read	W
COR	Core Dump Imminent	F	**SBW**	Stack Array Bounds Write	C
FIU	File Descriptors In Use	I	**SIG**	Signal	I
FMM	Freeing Mismatched Memory	C	**SOF**	Stack Overflow	W
FMR	Free Memory Read	W	**UMC**	Uninitialized Memory Copy	W
FMW	Free Memory Write	C	**UMR**	Uninitialized Memory Read	W
FNH	Freeing Non Heap Memory	C	**WPF**	Watchpoint Free	I
FUM	Freeing Unallocated Memory	C	**WPM**	Watchpoint Malloc	I
IPR	Invalid Pointer Read	F	**WPN**	Watchpoint Entry	I
IPW	Invalid Pointer Write	F	**WPR**	Watchpoint Read	I
MAF	Malloc Failure	I	**WPW**	Watchpoint Write	I
MIU	Memory In-Use	I	**WPX**	Watchpoint Exit	I
MLK	Memory Leak	W	**ZPR**	Zero Page Read	F
MRE	Malloc Reentrancy Error	C	**ZPW**	Zero Page Write	F
MSE	Memory Segment Error	W			

** Message severity: F=Fatal, C=Corrupting, W=Warning, I=Informational*

Suppressing messages

Message suppression using a `.purify` file

Suppressing messages from the Viewer: Click the message, then select **Suppress** from the Options menu. This suppresses messages for the current session. To make the suppression permanent, click **Make permanent** or add the directive shown at the bottom of the suppression dialog to a `.purify` file in one of these standard directories:

- The program directory, to suppress messages from programs in that directory
- Your home directory, to suppress messages from all programs that you run
- The `<purifyhome>` directory, to suppress messages from all programs run by all users at your site

You can also use the `-suppression-filenames` option to specify the filenames of your choice.

Message suppression directive syntax and examples

Suppression syntax in a .purify file: `suppress <message-type> <function-call-chain>`
For `<message-type>`, specify the acronym for the message to be suppressed, wildcard "*" is permitted.
For `<function-call-chain>`, specify a semi-colon delimited chain of call-site specifications each of which may be either a function name or a filename (enclosed in double quotes). Wildcards "*" and "?" are permitted. "..." matches any series of functions.

For example:

- To suppress UMRs from the function `sqrt` add: `suppress umr sqrt`
- To suppress ABRs in any method of class `color` with prefix `test` add: `suppress abr color::test*`
- To suppress all messages from the static and shared versions of `libc` add: `suppress * "libc*"`
- To suppress array bounds messages in all functions called from `main` add: `suppress ab* ...; main`

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API functions

Include `<purifyhome>/purify.h` in your code and always link with `<purifyhome>/purify_stubs.a`
Useful compile/link options include: `-I`purify -print-home-dir` -L`purify -print-home-dir``

Commonly used functions	Description
`int purify_describe (char *addr)`	Prints specific details about memory
`int purify_is_running (void)`	Returns `"TRUE"` if the program is Purify'd
`int purify_new_inuse (void)`	Prints a message on all memory newly in use
`int purify_new_leaks (void)`	Prints a message on all new leaks
`int purify_new_fds_inuse (void)`	Lists the new open file descriptors
`int purify_printf (char *format, ...)`	Prints formatted text to the Viewer/log-file
`int purify_watch (char *addr)`	Watches for memory write, `malloc`, `free`
`int purify_watch_n (char *addr, int size, char *type)`	Watches memory: type = "`r`", "`w`", "`rw`"
`int purify_watch_info (void)`	Lists active watchpoints
`int purify_watch_remove (int watchno)`	Removes a specified watchpoint
`int purify_what_colors (char *addr, int size)`	Prints color coding of memory

Build-time options

Set build-time options on the link line to build Purify'd programs:
`% purify -cache-dir=$HOME/cache -always-use-cache-dir cc ...`

Commonly used build-time options	Default
`-always-use-cache-dir`	**`no`**
Forces all Purify'd object files to be written to the global cache directory	
`-cache-dir`	**`<purifyhome>/cache`**
Specifies the global directory where Purify caches instrumented object files	
`-collector`	**not set**
Specifies the collect program to handle static constructors (for use with `gcc`, `g++`)	
`-ignore-runtime-environment`	**`no`**
Prevents the run-time Purify environment from overriding the option values used in building the program	
`-linker`	**system-dependent**
Sets the alternative linker to build the executables instead of the system default	
`-print-home-dir`	
Prints the name of the directory where Purify is installed, then exits	

Using Purify with other Rational Software products

Product	Command line syntax
PureCoverage	`% purify <purifyoptions> purecov <purecovoptions> cc ...`
Quantify	Cannot instrument for Purify and Quantify simultaneously

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Run-time options

Set run-time options using the `PURIFYOPTIONS` environment variable:

```
% setenv PURIFYOPTIONS "-log-file=mylog.%v.%p 'printenv PURIFYOPTIONS'"
```

Commonly used run-time options	Default
`-auto-mount-prefix` Removes the prefix used by file system auto-mounters	**`/tmp_mnt`**
`-chain-length` Sets the maximum number of stack frames to print in a report	**`6`**
`-fds-in-use-at-exit` Specifies that the file descriptor in use message be displayed at program exit	**`yes`**
`-follow-child-processes` Controls whether Purify monitors child processes in a Purify'd program	**`no`**
`-jit-debug` Enables just-in-time debugging	**not set**
`-leaks-at-exit` Reports all leaked memory at program exit	**`yes`**
`-log-file` † Writes Purify output to a log file instead of the Viewer window	**`stderr`**
`-messages` Controls display of repeated messages: `"first"`, `"all"` or in a `"batch"` at program exit	**`first`**
`-program-name` Specifies the full pathname of the Purify'd program if `argv[0]` contains an undesirable or incorrect value	**`argv[0]`**
`-show-directory` Shows the directory path for each file in the call chain, if the information is available	**`no`**
`-show-pc` Shows the full pc value in each frame of the call chain	**`no`**
`-show-pc-offset` Appends a pc-offset to each function name in the call chain	**`no`**
`-view-file` † Saves Purify output to a view file (`.pv` file) instead of the Viewer. To examine a view file, use `purify -view <filename>.pv`	**not set**
`-user-path` Specifies a list of directories in which to search for programs and source code	**not set**
`-windows` Redirects Purify output to `stderr` instead of the Viewer if `-windows=no`	**not set**

† *Can use conversion characters listed below.*

Conversion characters for filenames

Use these conversion characters when specifying filenames for options such as `-log-file` and `-view-file`.

Character	Converts to
`%V`	Full pathname of program with "/" replaced by "_"
`%v`	Program name
`%p`	Process id (pid)
qualified filenames (`./%v.pv`)	Absolute or relative to current working directory
unqualified filenames (no '/')	Directory containing the program