

Cleanscape Fortran-lint GUI User's Guide

Version 7.0



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NOTE: Some screenshots in this document may be of older versions. In such cases the salient feature(s) on that screen are unchanged in the newer version.

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PART I Introduction

1.1 WELCOME

Thank you for your product purchase! With Cleanscape Fortran-lint (Flint), you have the most powerful static source (lint) analysis available for Fortran 77/90/95 code. Flint in its command-line form has been assisting Fortran programmers for a quarter century; the GUI is an ease-of-use enhancement to the venerable Flint product for a new generation programmers – and anyone tired of command prompts or desiring the productivity gains from using a GUI.

1.2 DOCUMENTATION

This is the “quick start” guide for the Flint static analyzer. There are three modes of Flint operation on Unix/Linux, and two on Windows:

- A. *Cleanscape GUI*
- B. *Command line*
- C. *Xlint graphical browser (Unix/Linux only)*. This product remains under support, but the Flint GUI effectively supersedes its functionality.

This document's sole purpose is to describe the ease-of-use enhancements provided by Cleanscape GUI over the Flint command-line product. Flint is very rich in analysis controls and reporting; to gain maximum benefit from your product purchase, we urge you to read and keep handy the companion document, [Flint Reference Manual](#) (last bookmark in the Acrobat .pdf version of this document).

While on the topic of documentation: if you choose Cleanscape GUI, be sure to check out the Online Help facility! It's concise yet useful information. The Table of Contents and many interrelated items in the help text are hyperlinked to make information access quick and easy.

New features in the latest release are marked in this document with **NEW v7.0**.

1.3 PURPOSE

A. Function

1. Flint is a programming tool that simplifies the debugging and maintenance of both large and small Fortran programs. The Flint GUI provides ease-of-use enhancements to the venerable Flint command line product.
2. The Flint source code analyzer that can detect over 1200 potential problems, including:
 - a. Inappropriate arguments passed to functions
 - b. Inappropriate library calls
 - c. Non-portable code
 - d. Type usage conflicts across different modules
 - e. Unused variables and dead code

B. Application

1. Flint can be used to:

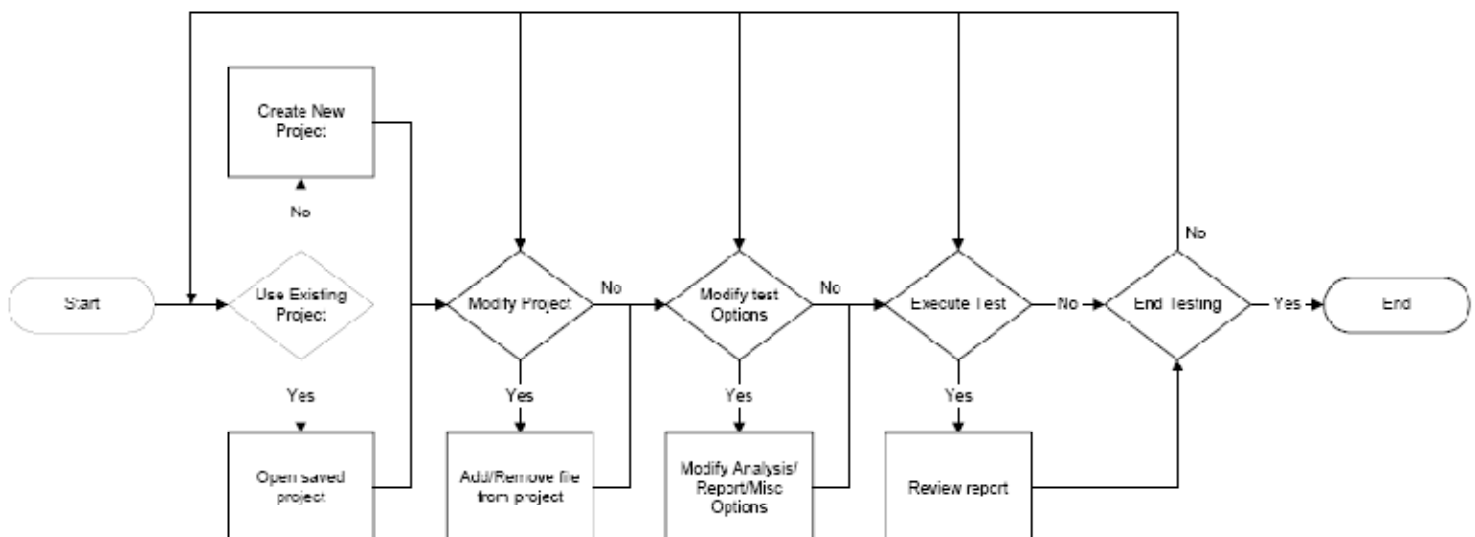
- a. Check source files before they are compiled
- b. Isolate obscure problems
- c. Identify problems before debugging is required

C. Advantages

1. The diagnostic messages produced by Flint are more detailed than those produced by standard compilers, and cover a much wider range of syntactic and semantic problems – up to 1200 checks on your source code!
2. Flint analyzes source files both individually and as a group, and can therefore identify problems that are beyond the scope of a compiler – especially the global (program) scope.
3. Flint is effective in reducing development time and improves Fortran programming style.
4. Analysis and other report results are hyperlinked from the message to the related line of source using your favorite editor.
5. Cleanscape exclusive report content enhances your ability to comprehend and manage your program. These reports include call trees, cross reference for the entire program, USE trees, and include trees.

D. Flow of Analysis

1. The following flowchart illustrates the Flint test process:



PART II Requirements, Installation, and Uninstallation

2.1 WINDOWS

A. System Requirements

1. Hardware

Any configuration sufficient to run Windows is sufficient for Flint.

2. Operating System

- a. Microsoft Windows 98® and 98® SE
- b. Microsoft Windows NT® 4.0 with Service Pack 6a (SP6a)
- c. Microsoft Windows 2000® with Service Pack 2 (SP2)
- d. Microsoft Windows XP® with Service Pack 2 (SP2)
- e. Microsoft Windows Vista®

3. Web Browsers

- a. Firefox® 1.2 or above
- b. Microsoft Internet Explorer® 5.x or above
- c. Mozilla® 1.7 or Netscape Navigator® 4.7x or above
- d. Opera® 6.x or above

B. Software Setup Procedure

1. Installation

- a) Download `flintgui<ver>_win.exe` to a temporary directory, then run it.
- b) An installer window will appear and extract a number of files to the installation directory you specify (hereinafter referred to as `<install_dir>`; the default is `c:\cleanscape\flint`). The installer exits automatically, and no reboot is required, though you must close/reopen any command prompts.
- c) The installer automatically creates a shortcut for the Flint GUI on the desktop. To run the GUI, double-click the shortcut follow the instructions to obtain a license key as described in Section 3.
- d) Finally, the installer adds the `main` subdirectory to your system PATH – necessary for running Flint (or any of its associated support programs) from the command line. To do this manually, enter the following command:

```
set PATH=<install_dir>\main;%PATH%
```

2. Additional steps for Windows 2000+ user privileges / access control

If you're installing Flint under Windows 2000 or later as Administrator, and you want to make the program accessible to ordinary Users, some additional steps are required. For more information, see Section 6.1.

C. Uninstallation

NOTE: You will need owner privileges if that is how the product was installed.

1. Manual uninstallation

- a) Delete the installation directory and its subdirectories.
- b) Delete the Flint GUI icon from the desktop

c) Remove the Cleanscape directory from your PATH:

- In Windows 98, delete the appropriate "set path=" statement from your `c:\autoexec.bat` file.
- In Windows NT/2K/XP/Vista, right click your "My Computer" icon on the desktop, select "Properties", click the "Advanced" tab, click the "Environment Variables" button, double-click the text field "Path" in the System Variables area, and from that string, delete `<install_dir>\main`

2. Restore your system to the point just before Flint installation – not available for Windows NT/2k

The installer created a system restore point just prior to installation. If you have not added new programs in the interim, you can safely roll your system back to this point. For Win98, use `scanreg /restore`

2.2 UNIX/LINUX

A. System Requirements

1. Hardware

A minimum of 256 MB memory is required for Flint.

2. Operating System. Note the GUI version may differ amongst the various hosts.

- a. Most GNU/Linux OSes, including RedHat®, SuSE®, Debian®, Ubuntu®
- b. HP HP-UX®
- c. IBM AIX®
- d. SGI Irix®
- e. Sun Solaris®
- f. Mac OS-X® Tiger

3. Web Browsers

- a. Firefox® 1.2 or above
- b. Seamonkey® 1.0 or above
- c. Opera® 6.x or above
- d. Mozilla® 1.7 or Netscape Navigator® 4.7x or above

B. Software Setup Procedure

Installation – installation as root is easier and recommended. Refer to the installation notes for details. The '#' below represents the root prompt.

- a) Download the latest version of flintgui<ver>_<OS>.taz to a temporary directory, e.g., /tmp.
- b) Create installation directory, e.g., /usr/local/cleanscape, and cd to it.
- c) Use the following commands to extract the files:

```
# gunzip /tmp/flintgui<ver>_<OS>.taz
# tar xpvf /tmp/flintgui<ver>_<OS>.tar
```
- d) Start the GUI:

```
# flintgui &
```

and follow the instructions to obtain a license key as described in Section 3.
- e) If this is a server-based application, start the daemon on the server as root:

```
# startup
```

NOTE: The daemon must be running on the server before clients can access/ use the product.
- f) If you intend to run Cleanscape Flint from the command line, be sure you have started the daemon as described in step e). These additional commands are required (examples below are for sh/bash):

```
# export CSIAPPPBASE=<install_dir>
# export FLINTHOME=$CSIAPPPBASE/flintgui.dir/main
# export PATH=$FLINTHOME:$PATH
```

C. Uninstallation – manual process

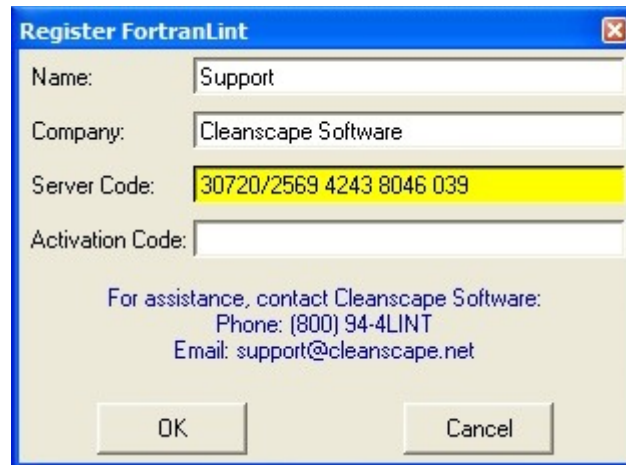
- a) Delete the installation directory and its subdirectories.
- b) Delete files myeditor.lst and ftemplate.csi from all users' \$HOME directories.

PART III Activating Flint

A. Registration Process – GUI

The first time you run the program, a registration prompt will be displayed. You must "register" the program before you can use it. This will run every time the activation key (provided by Cleanscape) expires.

1. If Flint is not registered, a dialog box will be displayed. The following dialog will appear (**NOTE:** your server code will be different!):

A screenshot of a Windows-style dialog box titled "Register FortranLint". It contains four text input fields: "Name:" with "Support", "Company:" with "Cleanscape Software", "Server Code:" with "30720/2569 4243 8046 039" (highlighted in yellow), and "Activation Code:" which is empty. Below the fields, it says "For assistance, contact Cleanscape Software: Phone: (800) 94-4LINT Email: support@cleanscape.net". At the bottom are "OK" and "Cancel" buttons.

| | |
|------------------|--------------------------|
| Name: | Support |
| Company: | Cleanscape Software |
| Server Code: | 30720/2569 4243 8046 039 |
| Activation Code: | |

For assistance, contact Cleanscape Software:
Phone: (800) 94-4LINT
Email: support@cleanscape.net

OK Cancel

2. To obtain your activation key, contact Cleanscape Software and provide the server code listed on the "Register Flint" window. The "Server Code" is on the line with a yellow background. HINT: Highlight the server code with your mouse. Unix users, you now have a copy; Windows users, type CTRL-C on your keyboard to copy the server code.

To reach Cleanscape, call 800-94-4LINT or +505-246-0267 or send email to support@cleanscape.net.

3. Enter your name, company name and the activation key. HINT: Copy the activation key from your email from Cleanscape, then paste it in the activation code text box (Windows users, type CTRL-V on your keyboard). When ready, press OK.
4. You should then see an "About Flint" dialog box. At this stage, Flint is now registered and operational. If you do not see this dialog box, contact Cleanscape for further assistance (see #2 directly above for contact info).

B. Registration Process – command line

0. If you wish, you can register the product using the GUI – the license key is created and stored correctly using either method. Just be sure to set up the environment variables per the instructions in Section 2.1.B.1.d or 2.2.B.f above! If you use this method, you can skip the rest of this section.

1. Run the command, `flint activate`

Hit <Enter> to leave the number of license servers at its default of 1.

The next line from the activation program will contain your server code. On Windows machines, it starts with “30720/”.

To obtain your activation key, contact Cleanscape Software and provide this server code.

To reach Cleanscape, call 00-94-4LINT or +505-246-0267 or send email to support@cleanscape.net.

2. Once the activation key is entered, Flint is registered and operational.

The next three sections describe in detail the operation of Flint

- from the GUI [Part IV](#)
- from the command line [Part V](#)

PART IV Running the Flint GUI

A. Overview

The Cleanscape GUI is a tried-and-true graphical interface used successfully for years. It is also the interface for our C/C++ offerings, and the planned interface for Java analyzers and test tools.

The Cleanscape GUI provides hyperlinking between the various reports (in the Reports frame) and the line of source in the source file that caused the message, using your favorite editor.

Advantages of the Cleanscape GUI include:

- Fast
- Easy to learn, navigate, and use
- Information readily at the programmer's fingertips
- Point-and-click control for options-laden Flint command-line product.
- Access code at the relevant point using your favorite editor!

NEW v7.0 The GUI has two new reports: USE tree, which displays the USE hierarchy for the selected files), and include tree for both the Fortran INCLUDE line and #include directives. For details, see Sections 4.B and 4.H below.

Supported code editors are listed below. It is also possible for users to integrate their own editor; see Section 6.2 for details on the `seteditor` program. For user-contributed editors, visit http://www.cleanscape.net/products/contributed_editors.html.

Windows editors:

- | | | |
|----------------------|-----------------------|----------------------------|
| • Borland CodeWright | • Gvim | • TextPad |
| • Crimson Editor | • GWD Text Editor | • UltraEdit |
| • Emacs | • MultiEdit | • Visual SlickEdit |
| • Epsilon | • Starbase CodeWright | • Visual Studio 6 – 2010 * |

Unix/Linux editors:

- | | | | |
|---------|----------|----------|----------|
| • Elvis | • Joe * | • Pico * | • Xemacs |
| • Emacs | • Nano * | • Vi * | |
| • Jed * | • Nedit | • Vim * | |

* Multiple instances of these editors will open with each link click.

All elements of the GUI are also controllable from the keyboard; this is discussed in [Section K](#) below.

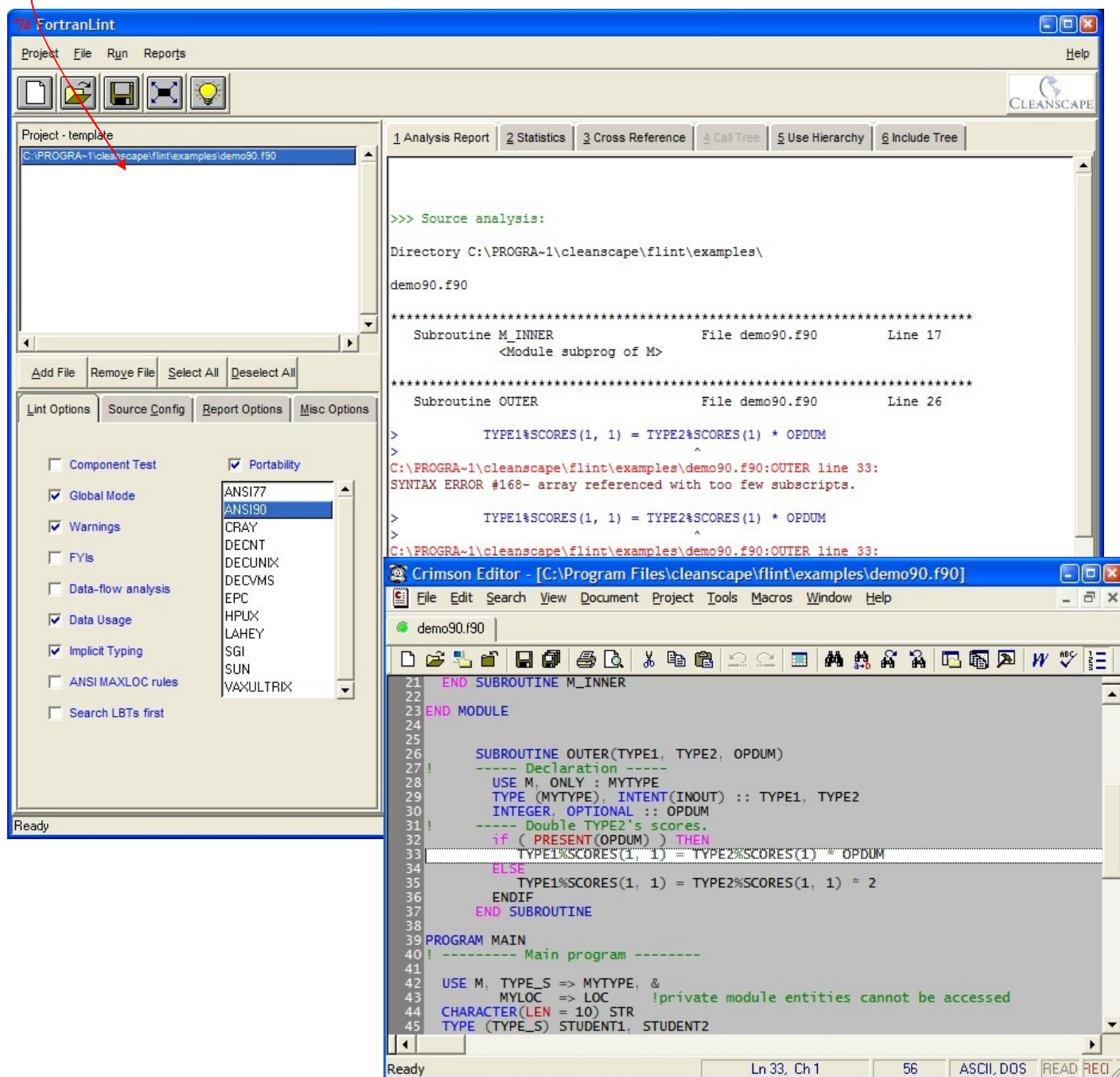
The following screenshots depict a sample Flint session.

NOTE: A sample Unix/Linux screen shot is shown in addition to one from Windows. All subsequent screen shots are Windows-based, but the functionality is identical between the two environments.

The Crimson Editor (previously selected as shown in the Reports tab in the lower left frame) was activated when the red line containing “33” in the Analysis Report was left-mouse-clicked. Flint positioned the editor to the line in the source file that caused the analysis result.

It is possible to open any file listed in the Project window (upper left frame of the GUI) by right-mouse-clicking on the desired filename.

The Flint GUI remembers settings (e.g., checkboxes, include path, external editor – but not filenames) from the previous session by creating a template file in the bin subdirectory or your \$HOME directory on Unix/Linux. There is no template file upon installation.



X-Deep/32 Root Window (:0 SW Mode)

Project File Run Reports Help

Project - ftemplate

/usr/local/cleanscape/flintgui.dir/examples/demo90.f90

/usr/local/cleanscape/flintgui.dir/examples/demo90.f90

Add File Remove File Select All Deselect All

Lint Analysis Source Config Reports Misc Options

☒ Global Mode

☒ Warnings

☐ FYIs

☐ Data-flow analysis

☒ Data Usage

☐ Implicit Typing

☐ ANSI MAXLOC rules

☐ Search LBTs first

☒ Portability

ANSI77

ANSI90

CRAY

DECNT

DECUNIX

DECVMS

EPC

HPUX

LAHEY

SGI

SUN

VAXULTRIX

1 Analysis Report 2 Statistics 3 Cross Reference 4 Call Tree

>>> Source analysis:

Directory /usr/local/cleanscape/flintgui.dir/examples/
demo90.f90

Subroutine M_INNER File demo90.f90 Line 16
<Module subprog of M>

Subroutine OUTER File demo90.f90 Line 25

> TYPE1%SCORES(1, 1) = TYPE2%SCORES(1) * OPDUM
^

.../cleanscape/flintgui.dir/examples/demo90.f90:OUTER line 32:
SYNTAX ERROR #168- array referenced with too few subscripts.

> TYPE1%SCORES(1, 1) = TYPE2%SCORES(1) * OPDUM
^

.../cleanscape/flintgui.dir/examples/demo90.f90:OUTER line 32:
PORT ERROR #456- ANSI-F90 does not allow an array to be referenced with
too few subscripts.

Program MAIN File demo90.f90 Line 38

> USE M, TYPE_S => MYTYPE, &
> MYLOC => LOC !private module entities cannot be accessed
> ^

.../cleanscape/flintgui.dir/examples/demo90.f90:MAIN line 42:
SYNTAX ERROR #661- entity not accessible in module M.

> AVE = MAIN_INNER(STUDENT1%SCORES)
^

.../cleanscape/flintgui.dir/examples/demo90.f90:MAIN line 49:
INTERFACE ERROR #252- I*4 array passed to dummy arg which is a R*4 array.

.../cleanscape/flintgui.dir/examples/demo90.f90:MAIN line 46:
USAGE ERROR #126- local variable STUDENT2 is referenced but never set.

.../cleanscape/flintgui.dir/examples/demo90.f90:MAIN line 48:
USAGE WARNING #127- local variable STR is set but never referenced.

Function MAIN_INNER File demo90.f90 Line 53
<Internal subprog of MAIN>

.....

Ready

B. Components

Where possible, each component features “balloon” help which will appear if you hover the mouse over an item or control description. Additional help for each item may be found in the Online Help (see [Section 4.I](#)).

1. Program menu: 

2. Shortcut bar: 

3. Project window: 

Any file listed in the Project window can be opened in the selected editor by right-mouse-clicking the filename. Any filenames too long to fit the window are shortened to ~60 characters and an ellipsis is prepended. The full filename appears in a balloon tip if hovering the mouse over the name, as shown above.

4. Project shortcut buttons: 

5. Lint Options tab (with “Portability” listbox activated). Flint provides 12 portability options to help determine issues porting your code to different hosts. The ANSI77 and ANSI90 options are the most commonly used.

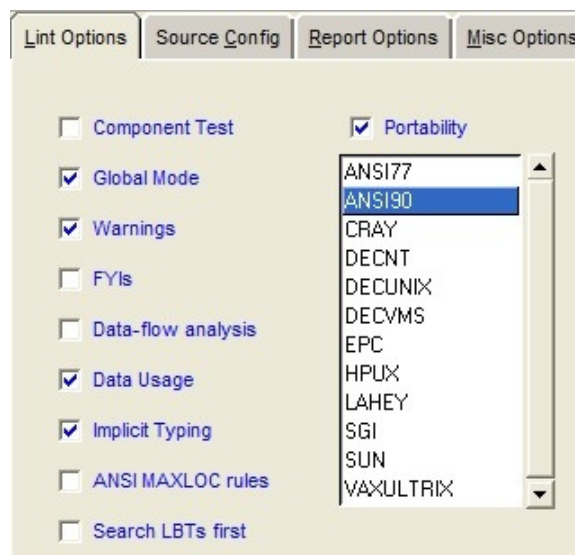
This kind of point-and-click control makes using the options-laden Flint command-line product easy! **NOTE:** Your suggestions to improve this feature are appreciated – email suggestions to sales@cleanscape.net.

USAGE NOTE: Due to the rich extent of Flint analyses, it is recommended that first-time projects turn off FYI and dataflow analysis, then progressively add levels once prior analyses are assessed/ addressed. Individual analyses can be enabled/disabled by number in the appropriate text box on the [Miscellaneous Options tab](#).

NEW v7.0

The Component Test option allows users to test a subset of their sourcebase within the context of their entire program. When checked, external program `usescan` (see [Section 6.3](#)) is invoked to resolve all `USE` statement targets and `INCLUDE` and `#include` files. The resulting files are included in the analysis.

Component Test can be important to locate and resolve module definitions for the USE Tree report (see [Section 4.H](#)).



6. **Source Config tab.** “Dialect” is analogous to “Portability”; an example in English is, “Tell Flint that the incoming source was written for a Solaris compiler (dialect) and I want to know issues porting to a Lahey compiler (portability)”. Also note the preprocessor option: if checked, Flint will search for `cpp` in your PATH; you can define a new path and/or preprocessor name (e.g., the `fpp` that came with your Fortran compiler) in the textbox at bottom.

The location text box will also accept directives preceded by a dash, passing them on unchanged to the preprocessor.

The Source Config tab contains the following options:

- ☐ Debug Lines
- ☐ 132 Columns
- ☐ HPF directives
- ☒ Preprocessor
- ☐ Two-byte INTEGERS
- ☐ Ignore INCLUDE paths
- ☐ Ignore VMS logicals
- ☐ OpenMP directives

Language: Automatic
Dialect: Automatic
Source Format: Automatic

"Include" directories:

Preprocessor location, if not in PATH:

7. Report Options tab

Examples for all reports in Section 4.H below.

NEW v7.0

USE Tree: display the USE module hierarchy rooted at each calling subprogram.

Include Tree: display the inclusion of header files from either Fortran `INCLUDE` lines or preprocessor `#include` directives.

The Report Options tab contains the following options:

- ☒ Cross-Reference
- ☐ Call Tree
- ☒ Free Form
- ☐ Tabular
- ☐ Lower case
- ☒ INCLUDE Tree
- ☒ USE Tree
- ☐ Sort Subprograms
- ☒ Statistics
- ☐ Source Listing
- ☐ Condense Tree
- ☐ Squash Tree
- ☐ Sort Tree
- ☒ Trim Tree
- ☐ No Library
- ☐ No Undefined
- ☒ Auto-save reports
- ☒ Auto-load reports

External Editor:

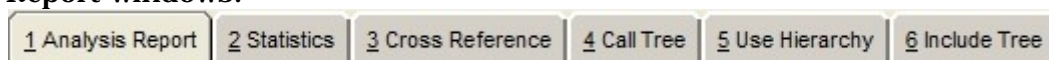
Editor location:

8. Miscellaneous Options tab:

The Miscellaneous Options tab contains the following options:

- Define symbols:
- Undefine symbols:
- Call Tree Roots:
- Cross Reference Filters:
- Disable these messages:
- Enable these messages:

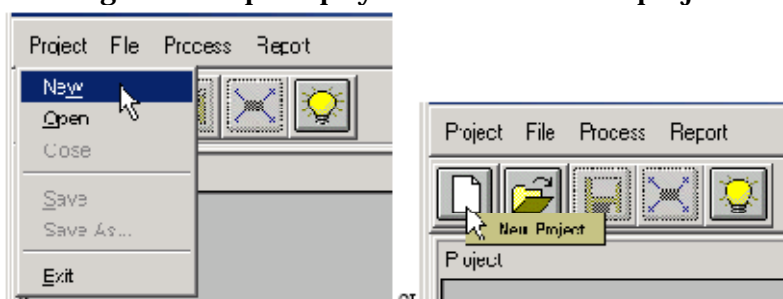
9. Report windows:



Example reports appear in [Section H](#) below.

C. Creating a new project

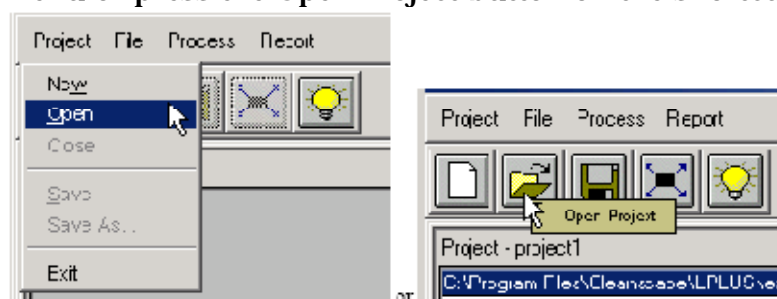
1. To create a new project, select Project/New from the menu or press the New Project button on the shortcut bar. Note: If a project is already open, a dialog box will prompt you to save the old project first.



2. A new project name appears in the title, which can be saved to any desired name later.

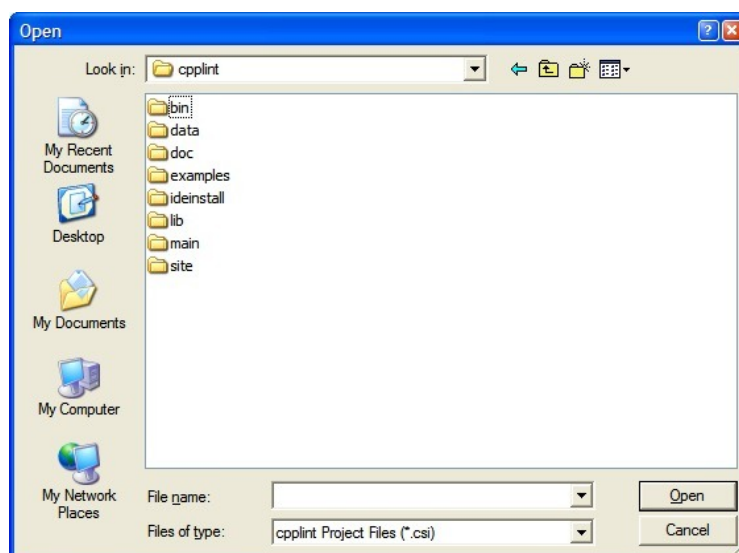
D. Opening an existing project

1. To open an existing Cleanscape GUI project, select Project/Open from the menu or press the Open Project button on the shortcut bar:

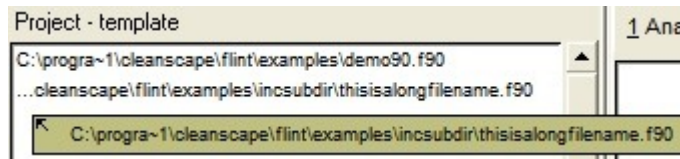


2. A standard Open dialog box will appear:

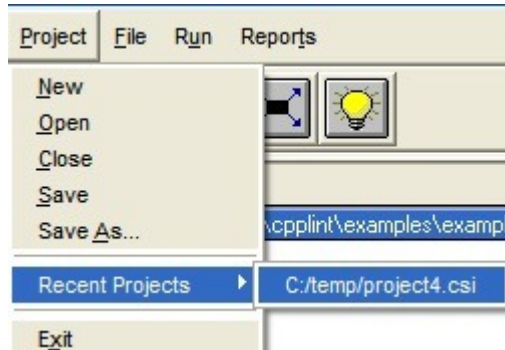
- a. Browse to find/select a project file (with extension .csi).
- b. When ready, press the Open button in the lower right corner.



- Files associated with the project are displayed in the Project window:

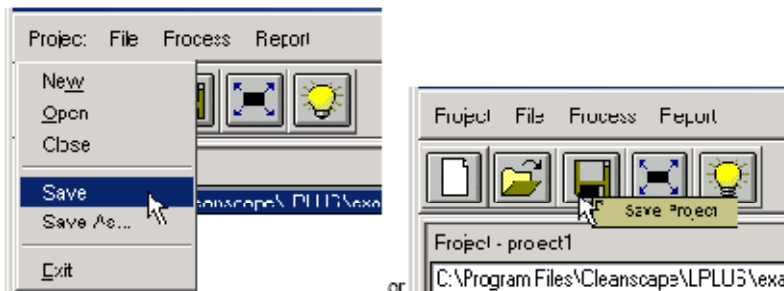


- It is also possible to open recent projects using the Recent Projects menu:



E. Saving a project

- To save the current state of a project, select Project/Save from the menu or press the Save Project button on the shortcut bar:

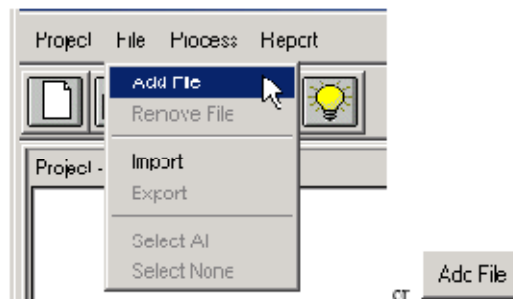


- If this is a new project, the Save As window will appear.
 - Enter a name for the project.
 - When done, press the Save button.
 - You can also use the "Save As..." feature in the Project dropdown to save an existing project under a new name.

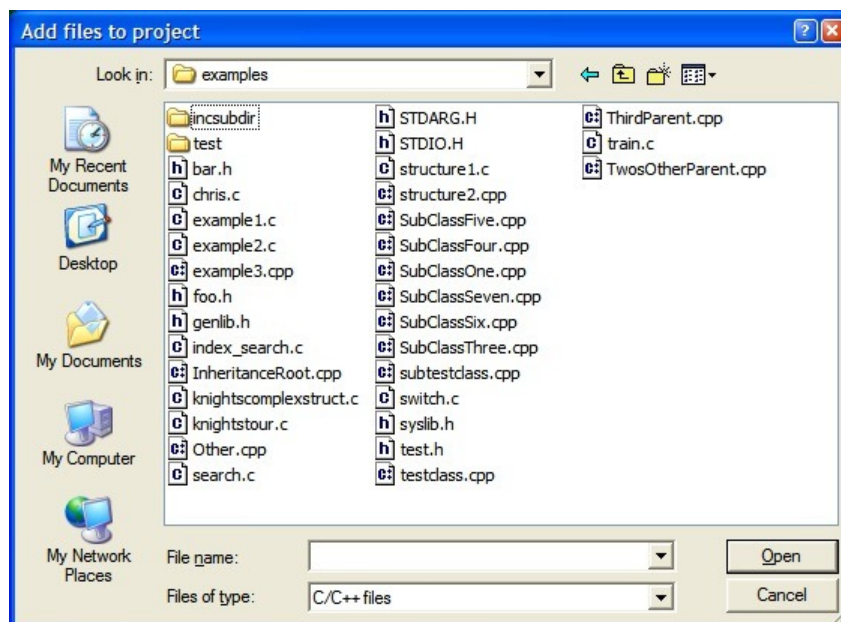
F. Modifying a project

1. Add files to a project

- a. To add one or more files to a project, select **File/Add File** from the menu to add files into the project or press the **Add File** button on the project shortcut bar:

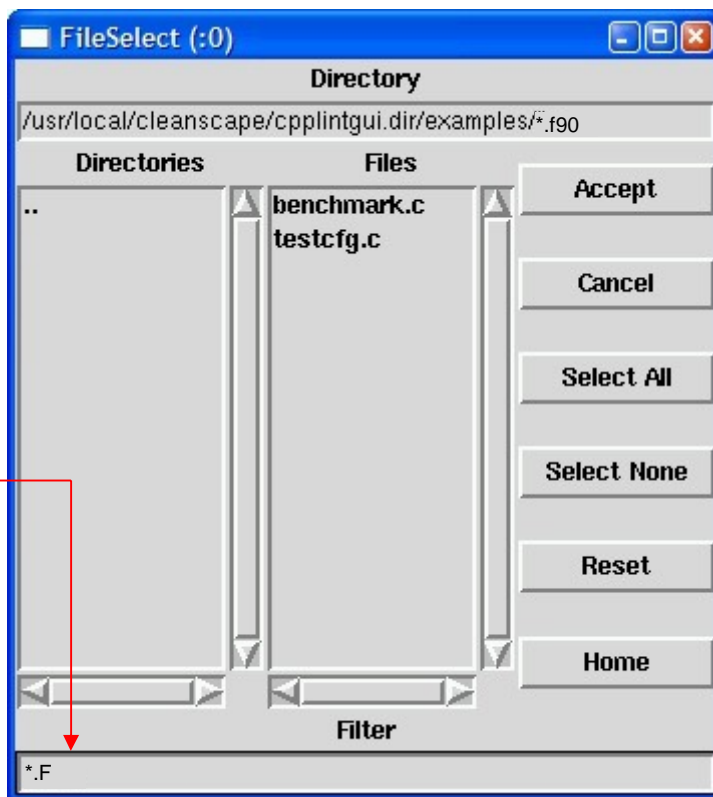


- b. The Add file window will appear:



- c. For the Flint GUI, Fortran source files will be the default file type (.f, .f90).

- d. **UNIX NOTE:** The default file type is .f90, which can be modified by entering the appropriate type (e.g., *.F) in the Filter textbox at the bottom of the dialog. It is also possible to permanently modify the filter type by editing the "Default Add File filter" line in text file
~/cpplint.ini.

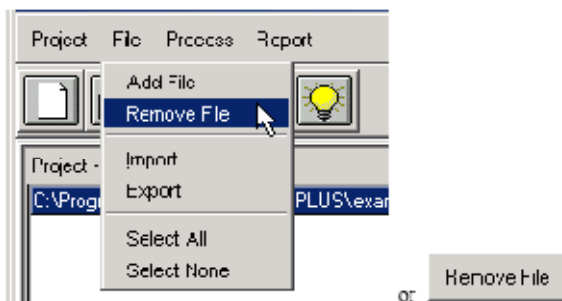


e. Multi-file selection:

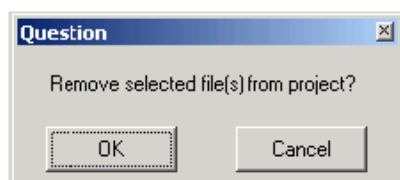
- 1) The file-selection dialog supports multiple-file selection under both MS-Windows and *nix.
- 2) To add multiple files individually, use <Control> + Left Mouse Button. Each selected file will be highlighted.
- 3) To add a group of files:
 - (i) Left-click on the first file.
 - (ii) Hold down the <Shift> key.
 - (iii) Click the last file. The first, last, and all in-between will be highlighted.
 - (iv) When done, press the Open (Windows) or Accept (*nix) button.

2. Removing files from a project

- a. To remove individual source files from a project, select the files to be removed, and then press the Remove File button. To remove all files from a project (i.e., to clear the file list), first press Select All, and then press the Remove File button.



- b. Press the OK button to confirm the removal operation:



- c. The updated file list is displayed in the project window.
- d. Note that this operation has no effect on the actual file on-disk.

G. Execute test

1. Create a new project or open an existing project for testing.

To create a new project, see [Section 4.C](#).

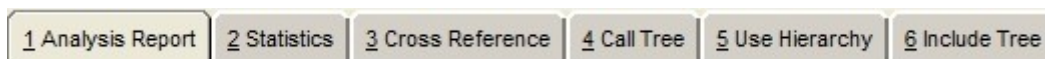
To open an existing project, [Section 4.D](#).

2. Select the files to be analyzed as explained in [Section 4.F.1](#).
3. Modify options as necessary, using the tabs in the lower left frame of the GUI, as displayed in [Sections 4.B.5-8](#). See balloon help, Online Help, and the [Flint Reference Manual](#) (last bookmark in the Acrobat .pdf version of this file) for descriptions of each option.
4. To analyze the selected files, use Process/Analyze Files from the menu or press the Execute test button on the shortcut bar:



H. Review reports

1. To view the generated reports, click on the appropriate report tab:



2. To print reports, or to save them to disk, use the Report menu dropdown at the top of the screen. Reports may be printed or saved collectively or individually.
3. Samples of each of the reports are depicted below. Remember that clicking any entry in **red** will open the source file at the appropriate source line in the specified External Editor.

| | | | | | |
|-------------------|--------------|-------------------|-------------|-----------------|----------------|
| 1 Analysis Report | 2 Statistics | 3 Cross Reference | 4 Call Tree | 5 Use Hierarchy | 6 Include Tree |
|-------------------|--------------|-------------------|-------------|-----------------|----------------|

```

>         TYPE1%SCORES(1, 1) = TYPE2%SCORES(1) * OPDUM
>
...\\examples\\incsubdir\\thisisalongfilename.f90:OUTER line 33:
PORT ERROR #456- ANSI-F90 does not allow an array to be referenced with
too few subscripts.

*****
Program MAIN                                File thisisalongfilename.f90   Line 39
>  USE M, TYPE_S => MYTYPE, &
>         MYLOC  => LOC      !private module entities cannot be accessed
>
...\\examples\\incsubdir\\thisisalongfilename.f90:MAIN line 43:
SYNTAX ERROR #661- entity not accessible in module M.

>  AVE = MAIN_INNER( STUDENT1%SCORES )
>
...\\examples\\incsubdir\\thisisalongfilename.f90:MAIN line 50:
INTERFACE ERROR #252- I*4 array passed to dummy arg which is a R*4 array.

...\\examples\\incsubdir\\thisisalongfilename.f90:MAIN line 47:
USAGE ERROR #126- local variable STUDENT2 is referenced but never set.

...\\examples\\incsubdir\\thisisalongfilename.f90:MAIN line 49:
USAGE WARNING #127- local variable STR is set but never referenced.

*****
Function MAIN_INNER                        File thisisalongfilename.f90   Line 54
<Internal subprog of MAIN>

*****

Global checking:

USAGE WARNING #743- module entity set but not referenced:  M:AVE

```

1 Analysis Report 2 Statistics 3 Cross Reference 4 Call Tree

```
>>> Statistics:

Number of source files:      1

Source files:      54 lines,      1262 bytes      ( 18% comments, 82% code )
Include files:     14 lines,       352 bytes      (  5% comments, 95% code )
Total parsed:      68 lines,      1614 bytes      ( 15% comments, 85% code )

Total subprograms:      5
  Subroutines:          2
  Functions:            1
  Program:              1
  Block Data:           0
  Module:               1

Individual message summary
-----
USAGE ERR #126-      2x: local variable * is referenced but never set.
USAGE WARN #127-     1x: local variable * is set but never referenced.
SYNTAX ERR #168-     1x: array referenced with too few subscripts.
INTRFC ERR #252-     1x: * array passed to dummy arg which is a * array.
PORT ERR #456-       1x: * does not allow an array to be referenced with too
                        few subscripts.
USAGE WARN #509-     1x: array subscript is not integer data type.
SYNTAX ERR #661-     1x: entity not accessible in module *.
USAGE ERR #742-      1x: module entity referenced but not set: *, *
USAGE WARN #743-     1x: module entity set but not referenced: *, *

Total messages: 10

      Errors  Warnings  FYIs
-----
Syntax:          2         0  <supp>
Interface:       1         0  <supp>
Data usage:      3         3  <supp>
ANSI-F90 port:   1         0      0
Lahey port:      1         0      0
```

1 Analysis Report 2 Statistics 3 Cross Reference 4 Call Tree

```
This is a primary tree starting at the program 'PROCDAT'

PROCDAT--+-GETUNIT
          |
          +-READNAME
          |
          +-SETTYPE--PRINT (1)--PRINTIT--+-DIPSTAT--*PRINT*
          |                               |
          |                               +-GETUNIT
          |
          +-PRINT see 1
```


| 1 Analysis Report | 2 Statistics | 3 Cross Reference | 4 Call Tree |
|-------------------|--------------|-------------------|-------------|
|-------------------|--------------|-------------------|-------------|

```

*** Records:

STUDENT1 : type TYPE_S : local
           in (demo90.f90:MAIN) is  44-D  46-SA  47-SA  49-RA
STUDENT2 : type TYPE_S : local
           in (demo90.f90:MAIN) is  44-D  46-RA  47-RA
TYPE1 : type MYTYPE : local
        in (demo90.f90:M::M_INNER) is  16-P  17-D  19-S
        in (demo90.f90:OUTER) is  25-P  28-D  32-S  34-S
TYPE2 : type MYTYPE : local
        in (demo90.f90:M::M_INNER) is  16-P  18-D  19-R
        in (demo90.f90:OUTER) is  25-P  28-D  32-R  34-R

*** Vars/Arrays:

AVE : I*4 : public entity of module M
      in (demo90.f90:M) is  10-D
      in (demo90.f90:MAIN) is  49-S
DUM (:,:) : R*4 : local
           in (demo90.f90:MAIN::MAIN_INNER) is  (demo90.inc)3-P
                                                  (demo90.inc)4-D
                                                  (demo90.inc)6-RA
                                                  (demo90.inc)7-RA
                                                  (demo90.inc)9-R
FOO : R*4 : public entity of module M
      in (demo90.f90:M) is  9-RB
I : I*4 : local
      in (demo90.f90:MAIN::MAIN_INNER) is  (demo90.inc)6-RS
                                                  (demo90.inc)9-R
J : I*4 : local
      in (demo90.f90:MAIN::MAIN_INNER) is  (demo90.inc)7-RS
                                                  (demo90.inc)9-R
LOC (adj) : R*4 : private entity of module M
           in (demo90.f90:M) is  9-D
OPDUM : I*4 : local
        in (demo90.f90:OUTER) is  25-P  29-D  31-RA  32-R
STR : CHAR*10 : local

```

NEW v7.0 Use Tree. Note that items in normal color (black in this case) are missing their module definitions and can't be hyperlinked. In such case, try adding Component Test analysis on the Lint Options tab (see Section 4.B.5).

```

BEGIN USE TREE

hc_global_routines.f
  global_hc_init
  comhc
  global_hc_assign_inputs
  comhc
  hc_electric_field_mod
  comhc
  hc_utilities
  global_hc_wbc_comp
  comhc
  hc_wbc_comp
  global_hc_check_wbc_ion_pos
  comhc
  hc_wbc_comp
  global_hc_check_wbc_neut_pos
  comhc
  hc_wbc_comp
  global_hc_begin
  comhc
  hc_start
  global_hc_end
  comhc
  hc_start
  global_hc_launch
  comhc
  hc_batch
  global_hc_store_raw_data
  hc_init_div_diag
  comhc

```

NEW v7.0 Include Tree. Flint scans both INCLUDE lines and #include directives.

```

BEGIN INCLUDE TREE

Source File hc_global_routines.f
  hc_global_opts
  comtor
  walls_com
  cgeom
  comtor
  walls_com
  params
  comtor
  walls_com
  cgeom
  crand

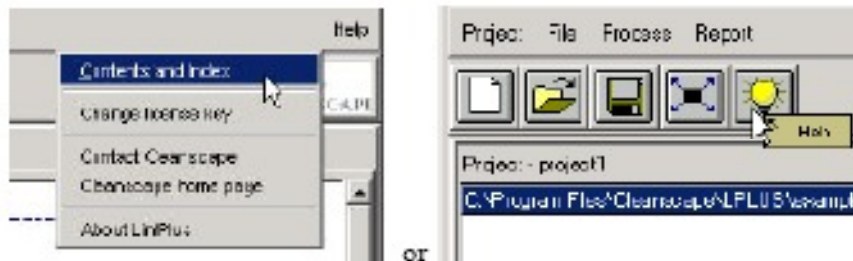
```


I. Online Help

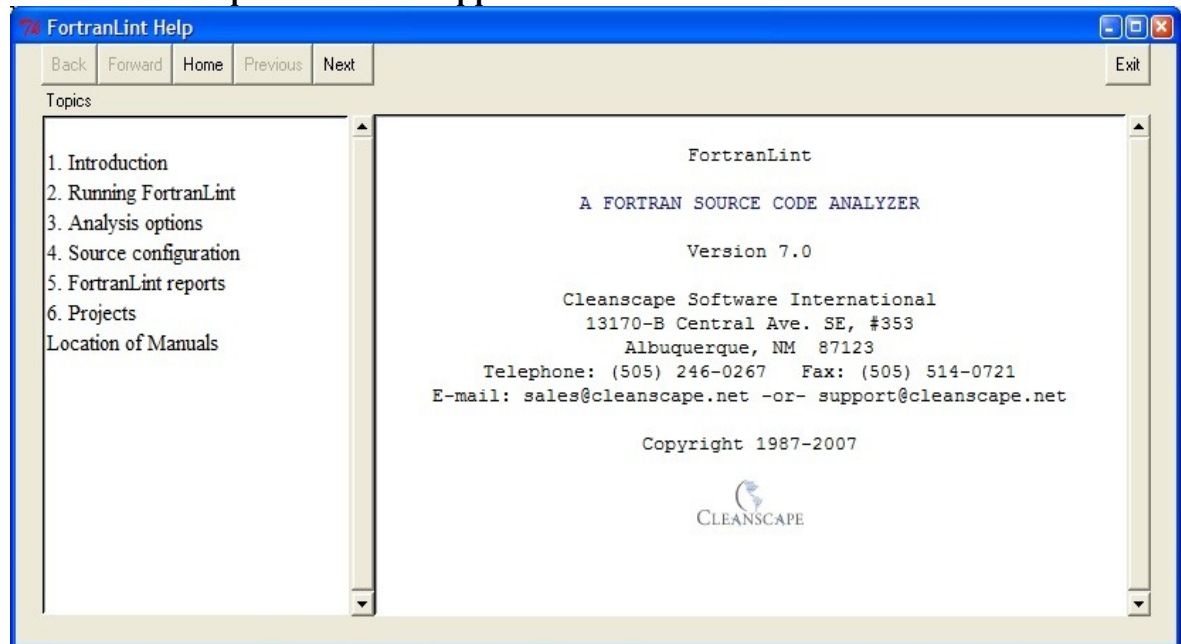
The Online Help System contains concise yet useful information for running the Cleanscape GUI. The Table of Contents and many interrelated items in the help text are hyperlinked to make information access quick and easy.

1. Accessing the Help System

- a. To access the online help system, select Help/Contents and Index from the menu or press the Help button:



- b. The Flint Help browser will appear:

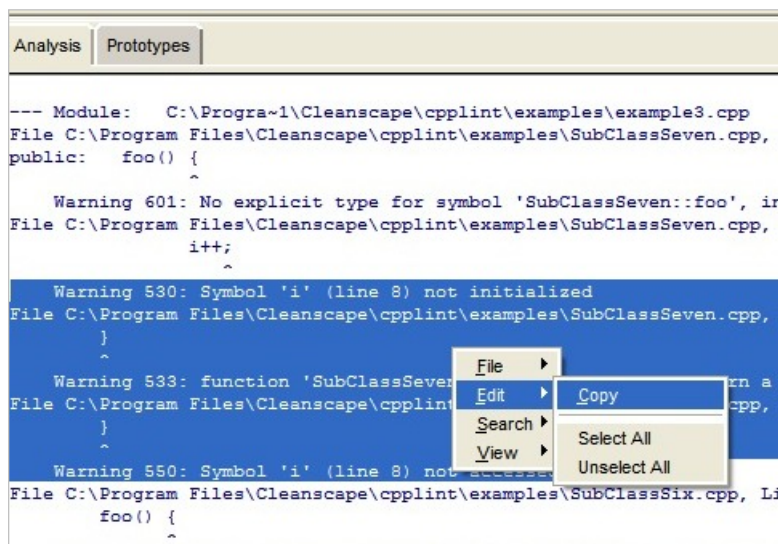


J. Sub-Menu Functions

There are several "right-mouse-click" options available while in the Reports frame on the right hand side of the GUI. These features should be self-explanatory for those familiar with graphical environments. The more commonly used features are shown in detail below.

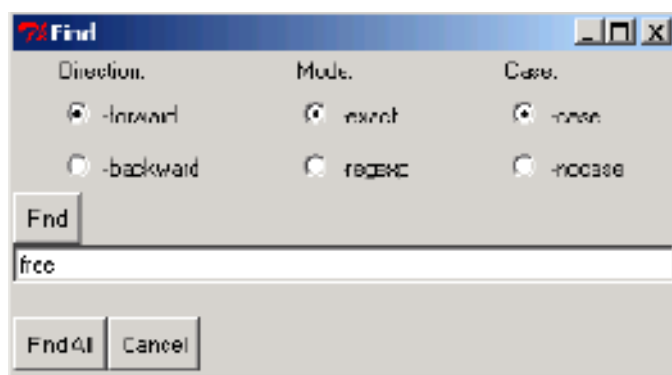
1. Copy

- a. Click and hold the left mouse button while dragging to select text.
- b. Press the right mouse button inside reports frame
- c. Select Edit -> Copy
- d. The text can now be pasted into other applications (e.g., Microsoft Word).



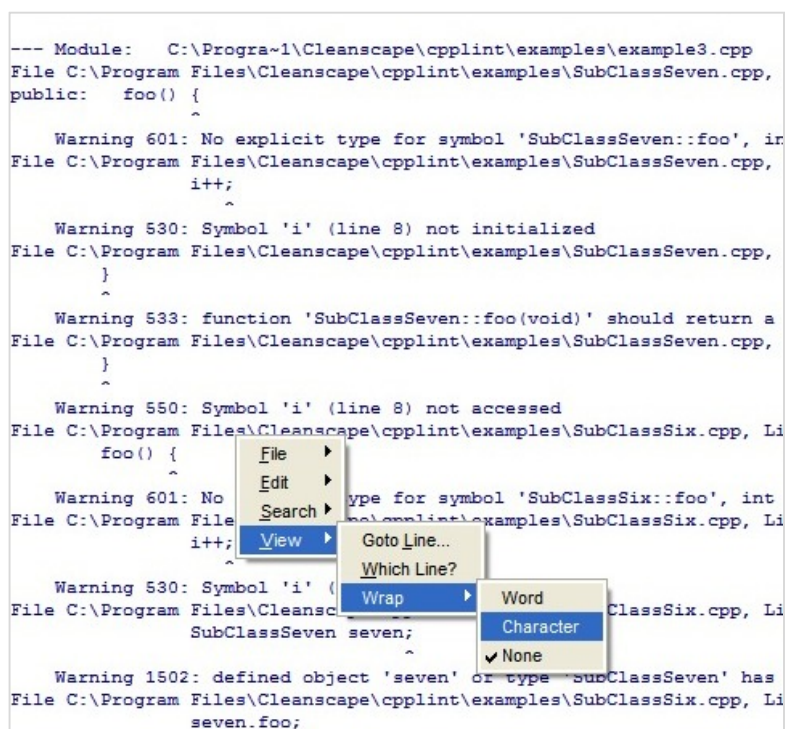
2. Search

- Press the right mouse button inside a report frame.
- Select Search -> Find.
- Enter string to search and select the desired options:
- The search result(s) will be highlighted.



3. Line Wrap

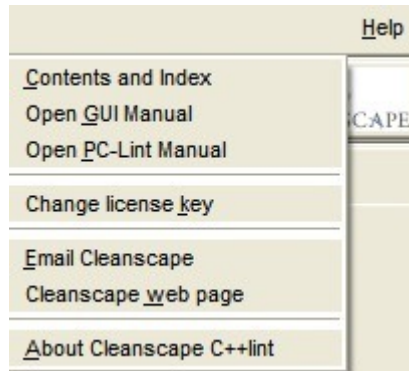
- Press the right mouse button inside a report frame
- Select View -> Wrap. The default is None.



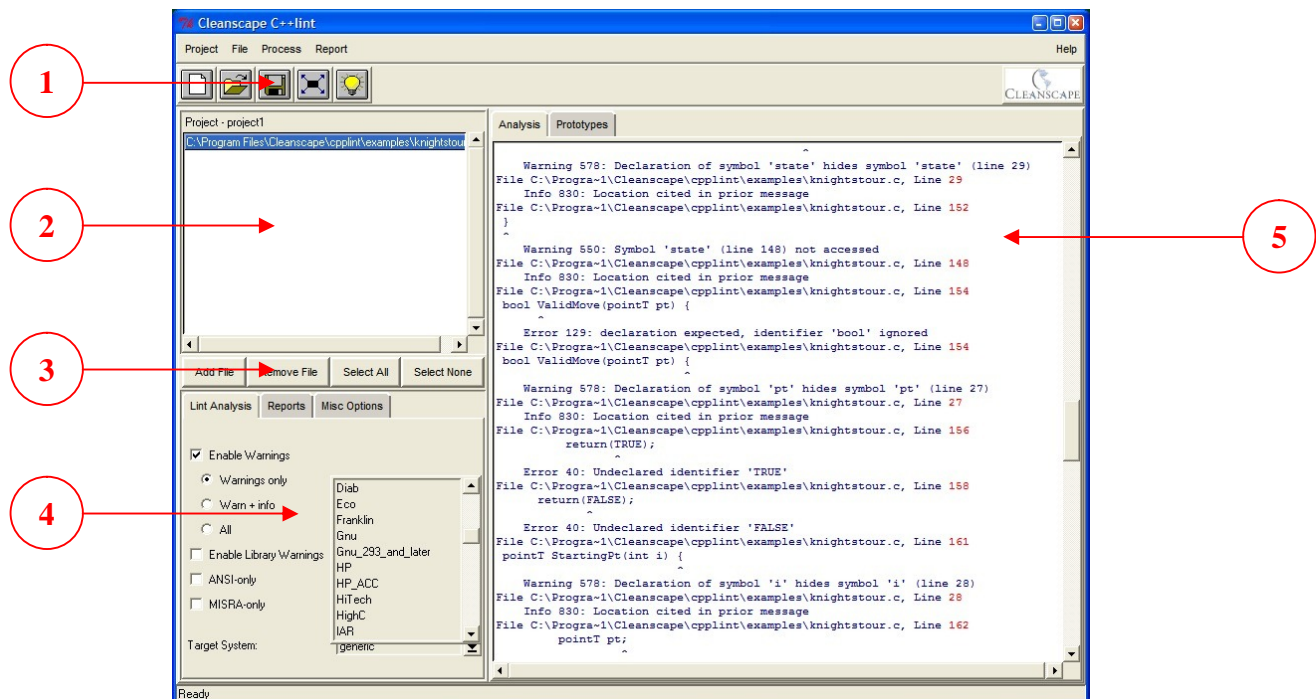
K. Operating the GUI using the Keyboard; Keyboard Shortcuts

All aspects of the Flint GUI can be controlled from the keyboard. This capability was added to [comply](#) with the US Government's [Section 508](#) provisions.

1. Accessing dropdown menus and items using keyboard accelerators. This is the standard mode common to all Windows products.
 - a. Select the desired menu by holding down the <ALT> key, then pressing the underlined letter for that menu item. For instance, this screen image was obtained by pressing and holding <ALT>, then typing the "h" key:



- b. To open the GUI manual, release the <ALT> key and then press "g".
2. Navigating amongst screen elements. There are 5 screen elements in the GUI, as shown below:



- a. The <TAB> key scrolls between these five screen elements and all active items within each element. <SHIFT>+<TAB> reverses the scrolling. The item with focus will have a dotted line around its border. *Note:* Because of the background color, the icon buttons in Element 1 will not show the dotted-line highlighting.

- b. For buttons (including radio buttons), pressing the space bar will “push” the button.
 - c. For checkboxes, pressing the space bar will “check/uncheck” the box.
 - d. For dropdown boxes, pressing the space bar will open the dropdown; the up/down arrows will navigate the dropdown, and the <ENTER> key will select.
3. Keyboard shortcuts.
- a. The standard Windows shortcuts are available. For instance, pressing <F1> will bring up the Help listing; <ALT>+<F4> exits the program.
 - b. Use the alt-key combination to access a menu, then type just the underlined letter to access a submenu item. For instance, to invoke Project-Save As, one would type <ALT>+<p>, then <a>. Alternately, the arrow keys can be used to navigate submenu selections once the menu dropdown has been activated with <ALT>+<p>.
 - c. The following keyboard shortcuts are also available within the GUI:

| | |
|-----------|--|
| <ALT>+<o> | <u>O</u> pen Project |
| <ALT>+<g> | R <u>u</u> n the Analysis (<u>G</u> o) |
| <ALT>+<x> | <u>E</u> xit GUI |
| <ALT>+<l> | J <u>u</u> mp to <u>L</u> int analysis tab (in Element 4) |
| <ALT>+<c> | J <u>u</u> mp to S <u>o</u> urce <u>C</u> onfig tab (in Element 4) |
| <ALT>+<r> | J <u>u</u> mp to <u>R</u> eports tab (in Element 4) |
| <ALT>+<m> | J <u>u</u> mp to <u>M</u> isc Options tab (in Element 4) |
| <ALT>+<1> | J <u>u</u> mp to R <u>e</u> port # <u>1</u> (Analysis report in Element 5) |
| <ALT>+<2> | J <u>u</u> mp to R <u>e</u> port # <u>2</u> (Statistics report in Element 5) |
| <ALT>+<3> | J <u>u</u> mp to R <u>e</u> port # <u>3</u> (Xref report in Element 5) |
| <ALT>+<4> | J <u>u</u> mp to R <u>e</u> port # <u>4</u> (Call tree report in Element 5) |
| <ALT>+<5> | J <u>u</u> mp to R <u>e</u> port # <u>5</u> (USE tree report in Element 5) |
| <ALT>+<6> | J <u>u</u> mp to R <u>e</u> port # <u>6</u> (Include tree report in Element 5) |

L. Changing fonts / sizes

To change the fonts and sizes used within the GUI, edit the text file `flint.ini` located in the `main` subdirectory on Windows or your `$HOME` directory if *nix.

In that file, you will see a section starting with `[fonts]`. Change the values from default to a value specified as follows:

`name size style`

where `name` is any font name on your system (enclose in curly braces if spaced),
`size` is an integer font size, and
`style` is one of: `normal` `bold` `italic` `underline`

Example: `report text = {Lucida Console} 9 normal`

Specifying all three font characteristics is recommended.

NOTES: The GUI will attempt to substitute Helvetica 10 or Courier for invalid fonts. The case of the font name can be a factor.

PART V Running Flint from the Command Line

A. Introduction

Flint has a command line facility suitable for standalone operation or for inclusion in scripts, e.g., for “make lint” purposes.

For details on the actual operation of Flint and its control and reporting options, refer to the companion document, [Flint Reference Manual](#) (last bookmark in the Acrobat .pdf version of this file).

B. Operation

To run Flint in command line mode, you need to have set the environment variables as defined in Section 2.1.B.1.d or 2.2.B.f and registered the product as described in [Section 3](#).

The format of the Flint command line is quite simple:

```
flint <parameters_to_be_supplied_to_PC_lint> <source_filename(s)>
```

Entering `flint` without parameters yields a command summary.

Details on all the command line parameters may be found starting in Chapter 3 of the [Flint Reference Manual](#) (last bookmark in the Acrobat .pdf version of this file).

Other important sections in the Flint reference manual include cross-reference format/content sub-options (Chapter 8), in which very finely honed cross-reference results may be obtained, and the Unix install guide (Appendix A), which also provides details on the license daemon (not used under Windows).

NOTE 1: USE and INCLUDE reports are available only from the Flint GUI, but they may then be saved to disk as text files; see Sections 4.B.5 and 4.H.2.

NOTE 2: If desired, a subset of the sourcebase can be analyzed within the context of the entire program using external program `usescan`. See Section 6.3.

C. Return Codes

A return code of zero (0) indicates that Flint ran and ran successfully without encountering any source errors.

A return code >1 indicates that either

- There was a problem securing a valid license key to run the program, or
- There were one or more messages resulting from the Flint analysis over the source code.

A detailed description is of course available in the analysis report. If there was a problem starting the program or securing a key, contact support@cleanscape.net. If you are under maintenance, you may also contact Cleanscape Support for questions regarding any analysis output message.

For more information Flint's return codes and their uses, see Section 6.5 of the [Flint Reference Manual](#) (last bookmark in the Acrobat .pdf version of this file).

PART VI MISCELLANEOUS INFORMATION

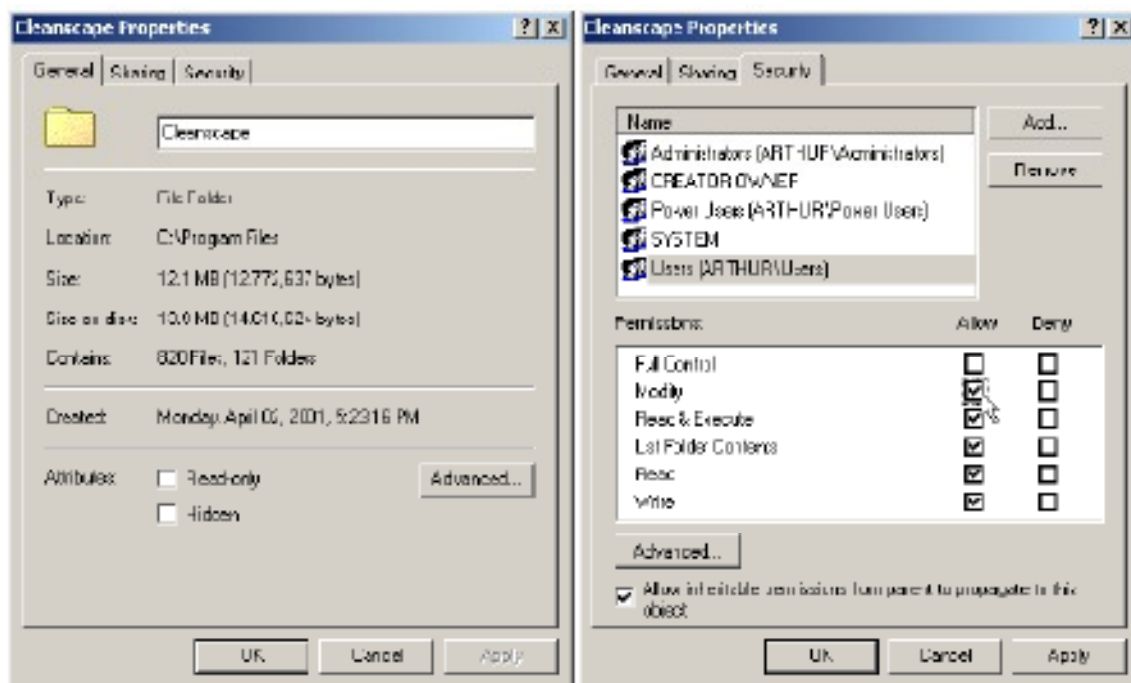
6.1 ADDITIONAL STEPS FOR WINDOWS 2000+

A. Applicability

1. This section applies to users running Windows 2000+ who belong to the “Users” group, and only to that group.

B. Details

1. For Flint to run correctly, users must have “write” and “modify” access rights to the installation directory and all its subdirectories.
 - a. Log in as “administrator” and finish installing Flint.
 - b. Double-click on the “My Computer” icon on the desktop.
 - c. Navigate to and double-click on the installation folder. Select Properties from the sub-menu.
 - d. Select “Security” tab on the Properties screen:



- e. Select the “Users” group and enable “Modify” and “Write” permissions.
- f. Click the “Apply” button.
- g. Click the “OK” button. This should close the Properties window.
- h. Flint is now ready to run on Win2k for the “Users” group.

6.2 ADDING AN EXTERNAL EDITOR TO THE GUI USING *SETEDITOR*

A. Introduction

By popular demand, Cleanscape has added the ability for users to specify their own favorite editor to any Cleanscape product (as opposed to submitting a feature request to Cleanscape Support). This is implemented via an external program called `seteditor`, located in the 'bin' subdirectory.

User contributions welcome! Send them to support@cleanscape.net; any contributions will receive appropriate credit and be placed in a "master" file located at http://www.cleanscape.net/products/contributed_editors.html.

B. Operation

On any platform, it is possible to edit file `myeditor.lst` manually; see the comments inside the file, which is located in `bin` subdirectory on Windows or your `$HOME` directory on Unix/Linux. The Unix/Linux session on the next page shows the contents of `myeditor.lst` (which looks substantially similar under Windows).

Windows.

You can either run `seteditor` from the command line or via Explorer.

From a DOS shell (`cmd` or command prompt), run the following command:

```
"<install_dir>\bin\seteditor"
```

From Explorer, navigate to the above directory and then double-click `seteditor.exe`.

Unix.

From a shell prompt, run the following command:

```
<install_dir>/bin/seteditor
```

Three pop-up dialogs (Windows) or a sequence of shell interactions (Unix/Linux) will guide you through

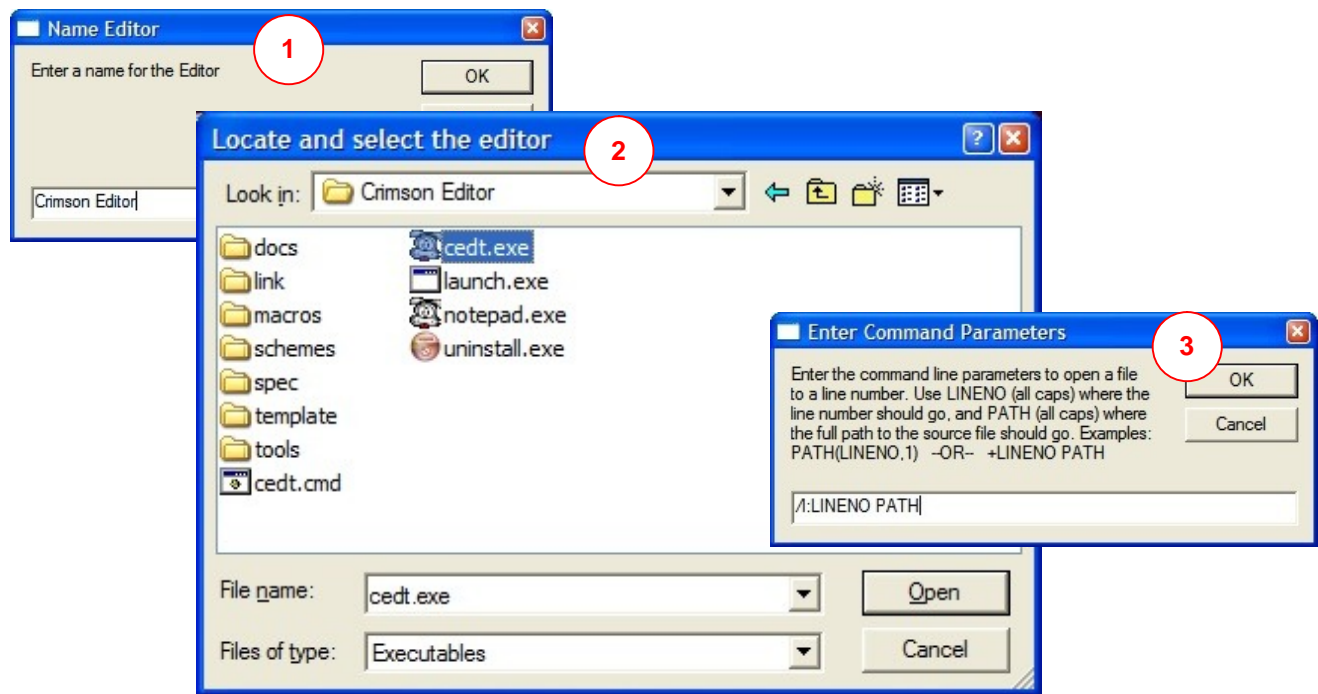
1. Naming the editor (a label identifier)
2. Locating the editor executable itself
3. Setting command line parameters to open a file and jump to a line number.

A sample Windows session depicting the dialogs for all three steps (and labeled as such) is shown on the next page, as is a Unix/Linux shell session.

NOTE: Refer to your editor's documentation to get the editor's command line information required (i.e., specifying the filename to open and the line number to jump to when opening the file). If your editor does not support jumping to line numbers from the command line, you can still invoke the editor but it will be impossible to align the analysis message to the "offending" source line.

We also recommend setting your editor to run as a single instance.

Any number of editors may be added in this fashion. Added file information is stored in file `myeditor.lst`; once successfully added, email your `myeditor.lst` file to support@cleanscape.net for inclusion in a Master file to share with other Cleanscape customers!



```
suse:/home/chris
suse:~$ /usr/local/cleanscape/bin/seteditor

This program adds an external editor to the Cleanscape GUI(s).
You will need to supply the command line switches for loading a file and
jumping to a line number. Enter 'quit' to consult the editor documentation
first if necessary, or <Enter> to proceed:

Use CTRL-C to exit at any of the following prompts.
Enter a name for the Editor: Kwrite
Enter the path for the Editor (default /usr/bin): /opt/kde3/bin
Enter the filename for the Editor (default kwrite):
Is this a text-based editor intended to run inside a console window? (y/n): n

Enter the command line parameters to open a file to a line number.
Use LINENO (all caps) where the line number should go, and
PATH (all caps) where the full path to the source file should go.
Examples: PATH(LINENO,1) --OR-- +LINENO PATH
Parameters (default +LINENO PATH): --line LINENO PATH
Kwrite has been added to the list for Cleanscape GUI(s).
suse:~$ cat myeditor.lst
# This file holds information required to add an editor to the Cleanscape GUI.
# A line with '#' in column one is a comment.

# Program "seteditor" interactively adds a file, or edit this file using the
# template/example below (sans '#' in column one). "path_line" in the template
# represents your editor's command line parameters for specifying
# 1) the source file's fully qualified pathname (denoted as PATH) and
# 2) how to jump to a specified line when opening a file (denoted as LINENO).

# Note that PATH and LINENO must be in all caps, the executable starts with
# '/', and the editor path does NOT have a trailing '/'.

# "text_based" in the template is either a Y or a N and indicates whether the
# editor is text-based and intended to run inside a console window. This
# field is ignored (but must still be present) for windows.

# TEMPLATE:
# editor-label__editor-filename__editor-path__text-based__path-line

# EXAMPLE:
# Joe__/joe__usr/bin__Y__+LINENO PATH

Kwrite__kwrite__opt/kde3/bin__N__--line LINENO PATH
suse:~$
```


6.3 TESTING SELECTED FILES IN PROGRAM CONTEXT USING *USESCAN*

A. Introduction

Also by popular demand, Cleanscape has added the ability for users to test only a subset of their sourcebase within the context of the entire program. Specifically, users specify only a handful of source files, then use external program `usescan` to automatically include the other source files necessary to resolve INCLUDED files and USED modules.

B. Operation

Windows.

From the Flint GUI, `usescan` is used to implement Component Test from the Lint Options tab in the lower left frame of the GUI (see Section 4.B.5).

You can run `usescan` from the command line; to see a help listing from a DOS shell (cmd or command prompt), run the following command:

```
"<install_dir>\bin\usescan /?"
```

Unix.

From the Flint GUI, `usescan` is to implement Component Test from the Lint Options tab in the lower left frame of the GUI (see Section 4.B.5).

To see a help listing from a shell prompt, run the following command:

```
<install_dir>/bin/usescan -?
```

A sample session is depicted on the next page.

```
READY (C:\tmp\archives\ffiles\di\vi\mp\di\v6\src) c:\progra~1\cleanscape\flint\
bin\usescan C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90 c:\tmp\archives\ffiles\
di\vi\mp\commons C:\tmp\archives\ffiles\di\vi\mp\comsrc\90 C:\tmp\archives\
ffiles\di\vi\mp\comsrc\hc_global_routines.f
```

35 source files were found in 35 iterations:

```
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\hc_global_routines.f
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_batch.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_follow.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_freespace_transition.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_inside_ion.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_inside_neutral.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_ion_transport.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_neutral_transport.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_outside_ion.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_outside_neutral.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_prompt.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_release.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_stack.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_start.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_output.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_stick.f90
C:\tmp\archives\ffiles\di\vi\mp\di\v6\src\90\hc_vessel_interact.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_init_div_data.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_init_lib_data.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_lddata.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_lib_setup.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_newst.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_nsprb.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_rnlup.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_rnprb.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_interp.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_stlup.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_storage_setup.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_tlprb.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_utilities.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\90\hc_wbc_comp.f90
C:\tmp\archives\ffiles\di\vi\mp\comsrc\comhc.f
C:\tmp\archives\ffiles\di\vi\mp\comsrc\hc_get.f
C:\tmp\archives\ffiles\di\vi\mp\comsrc\hc_init_div_data.f
C:\tmp\archives\ffiles\di\vi\mp\comsrc\hc_put.f
```

For command line operation, copy the list into a file and add -E <filename> to the Flint command line or your .cfg configuration file if you have one.

In the Flint GUI, insert the individual filenames in your .csi project file.

NOTE: For the GUI, it is easier to just use the Component Test Lint Option.