

# Cleanscape FortranLint® Quick Start Guide

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Cleanscape Software International

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## PART I INTRODUCTION

### .1 DOCUMENTATION

This is the “quick start” guide for the FortranLint graphical user interface. For the main manual, see the file **flintman.pdf** stored in the **doc** subdirectory.

### .2 PURPOSE

#### A. Functions

1. Cleanscape FortranLint is a programming tool that simplifies the debugging and maintenance of both large and small Fortran programs.
2. Cleanscape FortranLint includes a source code analyzer with numerous features, including:
  - a. Compatible with Fortran 77/90/95
  - b. Supports vendor-specific dialects and language extensions
  - c. Runs under UNIX and Windows 98/2000/NT
  - d. Supports command-Line and Graphical User Interface (GUI)
  - e. Analyzes source files both locally and as a group
  - f. Accepts different Fortran source file formats
  - g. Provides a global view to pinpoint areas requiring human programmer judgment
  - h. 30 different command line options
  - i. Customize analysis through the use of environment variables
  - j. Configuration file combines multiple command line options
  - k. Produces function call trees to represent the structure of Fortran programs
  - l. Produces symbol cross-reference tables with detailed information about all global symbols

#### B. Applications

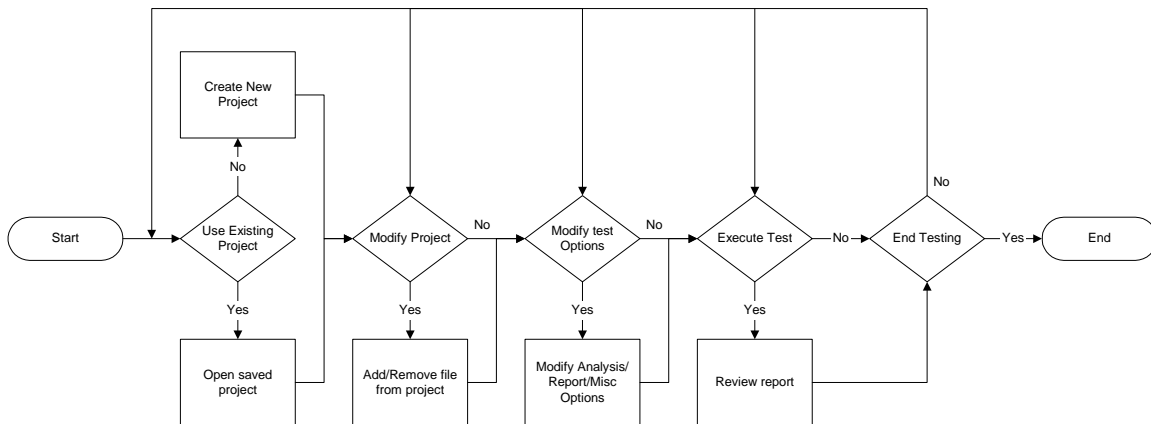
1. Cleanscape FortranLint can be used to:
  - a. Check source files before compiled
  - b. Isolate obscure problems
  - c. Identify problems before debugging is required
  - d. Map out unfamiliar programs
  - e. Enforce programming standards

#### C. Advantages

1. The diagnostic messages produced by FortranLint are more detailed than those produced by standard compilers, and cover a wider range of syntactic and semantic problems.
2. FortranLint analyzes source files both individually and as a group, and can therefore identify problems that are beyond the scope of a compiler.
3. FortranLint is effective in reducing development time and improves Fortran programming style.

## D. Flow of Analysis

1. The following flowchart illustrates the FortranLint analysis process:



## PART II SETUP AND ACTIVATION

### .1 WINDOWS

#### A. System Requirements

##### 1. Hardware

- Minimum 30MB of free hard disk space
- Minimum 128MB of RAM
- Mouse

##### 2. Software

###### a. Operating Systems

- [Microsoft Windows 98®](#) and [98® SE](#)
- [Microsoft Windows NT® 4.0](#) with [Service Pack 6a \(SP6a\)](#)
- [Microsoft Windows 2000®](#) with [Service Pack 2 \(SP2\)](#)
- Linux
- [Sun Solaris®](#)
- Other UNIX platforms

###### b. Web Browsers

- [Microsoft Internet Explorer®](#) 5.x or above
- [Netscape Navigator®](#) 4.7x or above
- [Opera](#) 6.x or above

## B. Software Setup Procedure

### 1. Installation

- a. To install the package, proceed as follows:

- 1) Copy **flintwin.exe** to a temporary directory, then run the program.
- 2) An installer window should appear. Click the *Install* button. This should extract a number of files. After all files are extracted, click *Exit*.
- 3) FortranLint is now installed. The installer creates a shortcut on the desktop automatically. To run FortranLint, double-click the shortcut.

Note: A system reboot is not required.

- 4) If you'd like to use the command-line version of FortranLint, two additional steps are required:
  - (i) Set the environment variable FLINTHOME as follows:

```
SET FLINTHOME=C:\PROGRA~1\CLEANSCAPE\FLINT\MAIN
```

- (ii) Modify PATH as follows:

```
PATH %FLINTHOME%;%PATH%
```

**Note:** Under Windows 98, you may need to add double quotes as follows:

```
PATH "%FLINTHOME%;%PATH%"
```

### 2. Additional steps for Windows 2000

If you're going to install FortranLint under Windows 2000 as Administrator, and you want to make the program accessible to ordinary 'Users', some additional steps are required. For more information, see [Part V.1](#)

### 3. Un-installation

- a. To "uninstall" the MS-Windows FortranLint package:

- 1) Delete the following directory (including subdirectories):

```
C:\Program Files\Cleanscape\FLINT
```

- 2) Remove the FortranLint shortcut from the desktop

## .2 UNIX

### A. Software Setup Procedure

#### 1. Installation

- a. At this point, you should already have a FortranLint "tarball". The tarball will have a name similar to:

```
csilint_SYSTEM.tar.Z    or  
csilint_SYSTEM.tar.gz
```

For example:

```
Standard Linux    - csilint_linux.tar.gz  
libc5-based Linux - csilint_libc5.tar.gz  
Sun Solaris       - csilint_solaris.tar.Z  
HPUX              - csilint_hpux.tar.Z  
etc.
```

Note: The Standard Linux version is intended for recent versions of Linux; use kernel 2.4.15 or above. For versions of Linux that are more than two years old, use the libc5-based version.

2. Copy the tarball to the **/tmp** directory on the target system.

3. Create a directory for Cleanscape applications. For example:

Under Linux or HP-UX:     **mkdir -p /usr/local/cleanscape**  
Under Solaris:           **mkdir -p /opt/cleanscape**  
etc.

Note: If you're going to create a system directory, you'll need to log-in as **root**. Otherwise, any user account may be used.

4. Go to the new Cleanscape directory.

5. Unpack the tarball inside the new directory.

If the tarball's name ends with **.tar.gz** (or **.tgz**), use a command similar to the following:

```
gzip -c -d < /tmp/foo.tar.gz | tar xf -
```

If the name ends with **".tar.Z"** (or **".taz"**), use a command like this:

```
compress -c -d < /tmp/foo.tar.Z | tar xf -
```

Note: Under Linux, you can use a simple command of the following form to unpack either kind of tarball:

```
tar xzf /tmp/foo.tar.gz
```

6. Set up the required environment variables.

Edit your UNIX "login" scripts (and the "login" scripts for any other users who will be running FortranLint). Add commands similar to the following:

- a. For "sh" or "bash" users:

```
CSIDIR=/usr/local/cleanscape  
FLINTHOME=$CSIDIR/flintgui.dir/main  
FLINTHOST=localhost  
export FLINTHOME  
export FLINTHOST  
PATH=$CSIDIR:$FLINTHOME:$PATH
```

- b. For "csh" or "tcsh" users:

```
setenv CSIDIR /usr/local/cleanscape  
setenv FLINTHOME $CSIDIR/flintgui.dir/main  
setenv FLINTHOST localhost  
set path = ( $CSIDIR $FLINTHOME $path )  
rehash
```

Note: "CSIDIR" should specify the new Cleanscape directory created in step 3. Modify the setting shown here as necessary.

- c. After adding the appropriate commands, log out, then log-in again.
- d. If you only plan to run the GUI version of FortranLint, and you don't intend to use the command-line version, you don't need to set FLINTHOME or FLINTHOST. In this case, the following setup commands should be sufficient:
  - 1) For "sh" or "bash" users:

```
CSIDIR=/usr/local/cleanscape
PATH=$CSIDIR:$PATH
```

- 2) For "csh" or "tcsh" users:

```
setenv CSIDIR /usr/local/cleanscape
set path = ( $CSIDIR $path )
rehash
```

Note: "CSIDIR" should specify the new Cleanscape directory created in step 3. Modify the setting shown here as necessary.

7. You should now be able to run FortranLint in GUI mode. To do so, execute the command **flintgui**.

After you "activate" the GUI (see the next section), you will also be able to run the command-line version of FortranLint. To do so, execute the command **flint**.

### PART III      ACTIVATING FortranLint

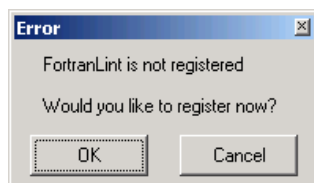
#### .1    ACTIVATION PROCEDURE

##### A.    Registration Process

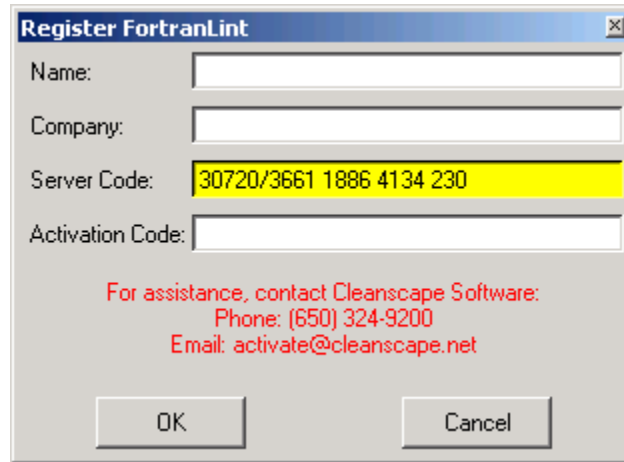
The first time that you run the program, a registration prompt will be displayed. You must "register" the program before you can use them. This is a one-time process.

##### B.    FortranLint Activation Procedure

1. If FortranLint is not registered, a dialog box will be displayed. To continue, press *OK*:



2. FortranLint registration window:



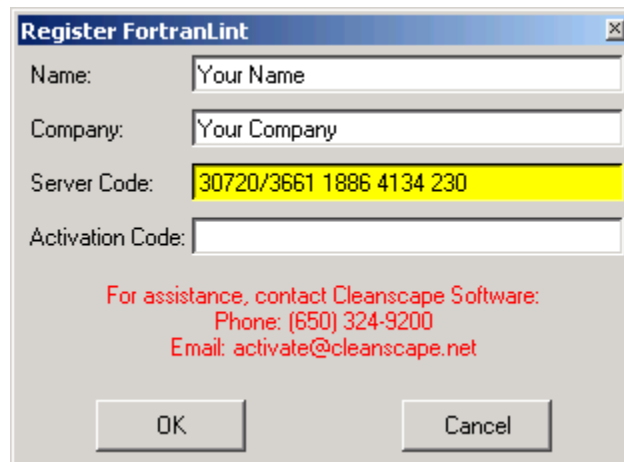
The 'Register FortranLint' dialog box contains the following fields and text:

- Name:
- Company:
- Server Code:  (highlighted in yellow)
- Activation Code:
- For assistance, contact Cleanscape Software:  
Phone: (650) 324-9200  
Email: [activate@cleanscape.net](mailto:activate@cleanscape.net)
- Buttons: OK, Cancel

To obtain your activation code, contact Cleanscape Software and provide the server code listed on the 'Register FortranLint' window. The 'Server Code' is on the line with a yellow background:

To reach Cleanscape, call (650) 324-9200 or send email to [activate@cleanscape.net](mailto:activate@cleanscape.net)

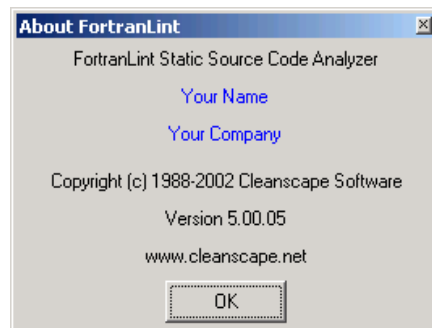
3. Enter your name, company name and the activation code. When ready, press *OK*:



The 'Register FortranLint' dialog box is shown with the following user input:

- Name:
- Company:
- Server Code:  (highlighted in yellow)
- Activation Code:
- For assistance, contact Cleanscape Software:  
Phone: (650) 324-9200  
Email: [activate@cleanscape.net](mailto:activate@cleanscape.net)
- Buttons: OK, Cancel

4. Confirm your registration information. When finished, press *OK*:



The 'About FortranLint' dialog box displays the following information:

- FortranLint Static Source Code Analyzer
- Your Name
- Your Company
- Copyright (c) 1988-2002 Cleanscape Software
- Version 5.00.05
- [www.cleanscape.net](http://www.cleanscape.net)
- Button: OK

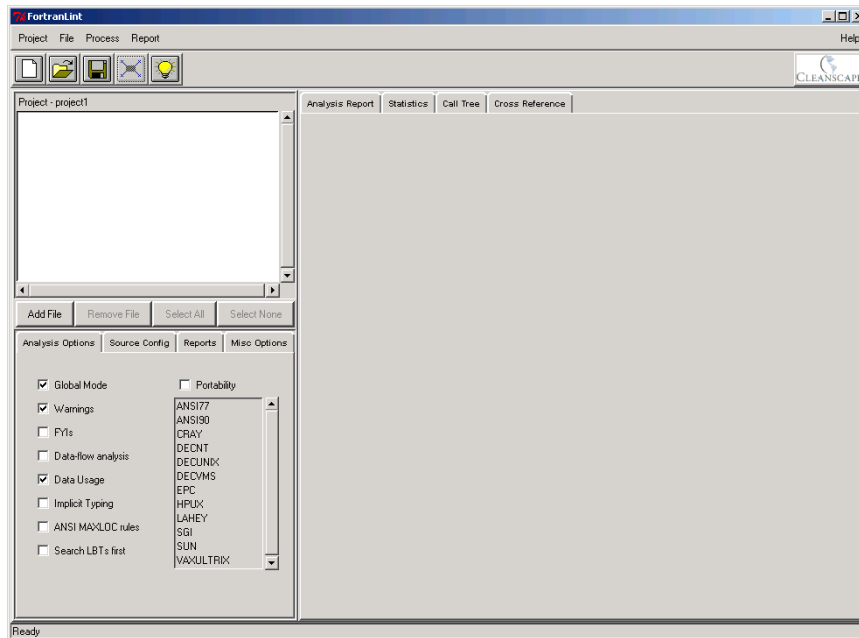
5. FortranLint is now registered and operational.



## PART IV RUNNING FortranLint

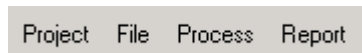
### .1 USER INTERFACE

#### A. Overview



#### B. Components

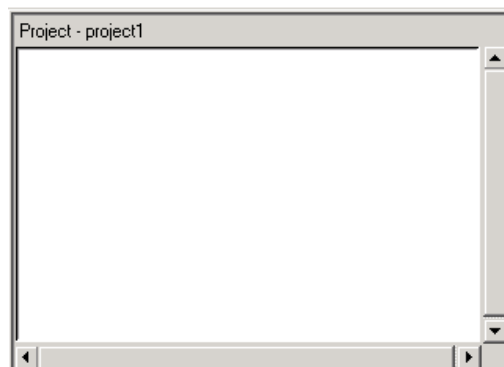
##### 1. Program menu:



##### 2. Shortcut bar:



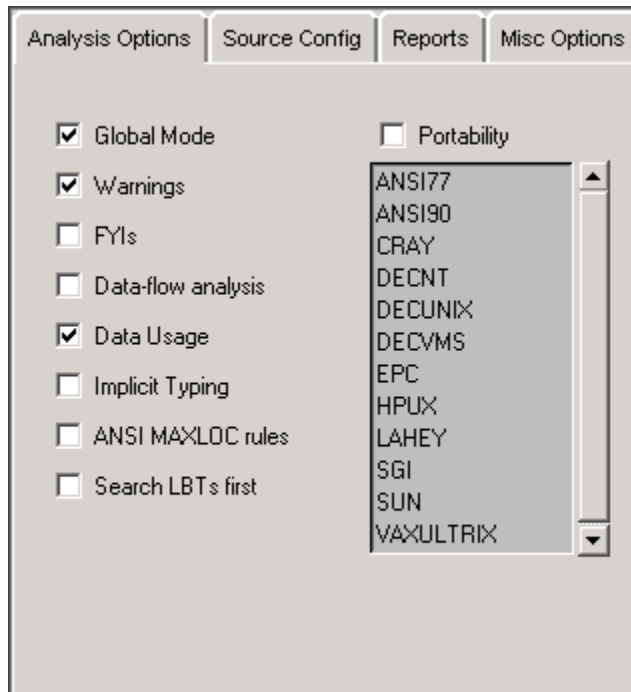
##### 3. Project window:



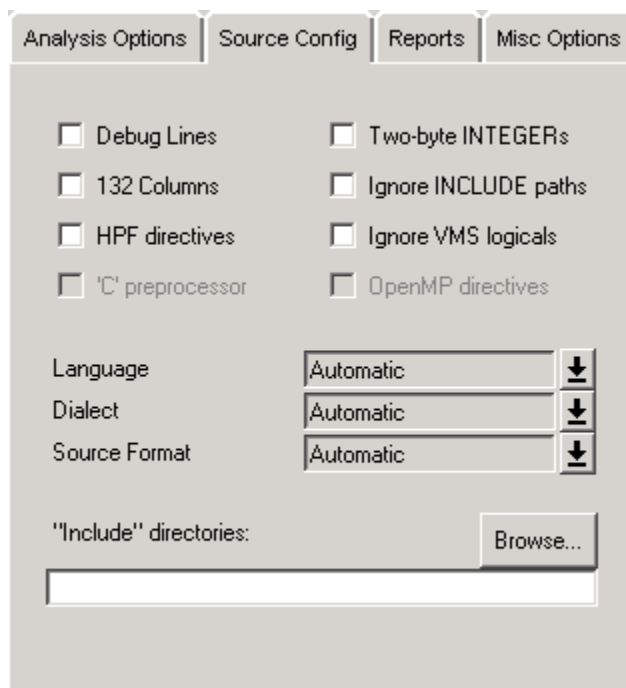
4. Project shortcut buttons:



5. Analysis Options window:



6. Source Configuration options window:



7. Report options window:

Analysis Options | Source Config | Reports | Misc Options

☒ Statistics ☒ Call Tree

☐ Source Listing ☒ Condense Tree

☒ Cross-Reference ☐ Squash Tree

☒ Abridged ☐ Sort Tree

☐ Free Form ☒ Trim Tree

☐ Tabular ☐ No Library

☐ Lower case ☐ No Undefined

Color: Blue  ☒ Auto-save reports

Width: 75 ☒ Auto-load reports

☒ Clip long paths

8. Misc. options window:

Analysis Options | Source Config | Reports | Misc Options

Define symbols:

Undefine symbols:

Call Tree Roots:

Cross Reference Filters:

Disable these messages:

Enable these messages:

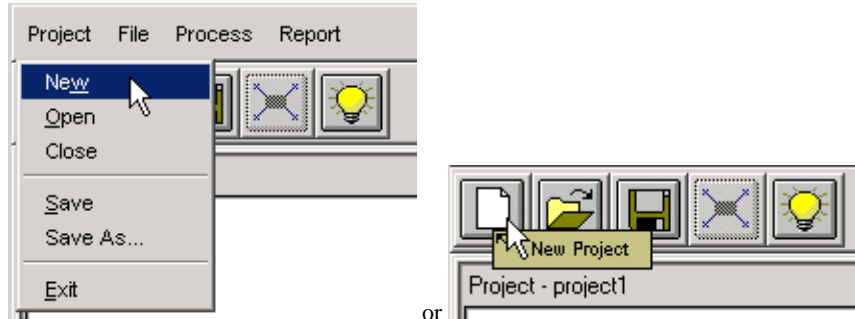
9. Report windows:

Analysis Report | Statistics | Call Tree | Cross Reference

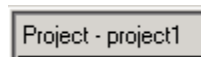
### C. Creating a new project

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.

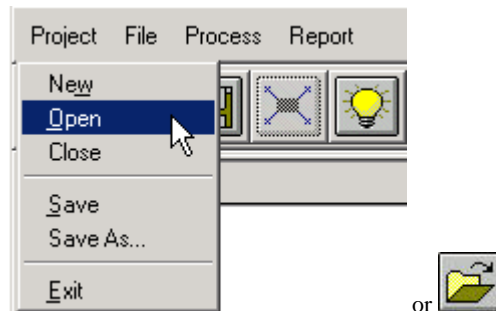


2. A new project name appears in the title:

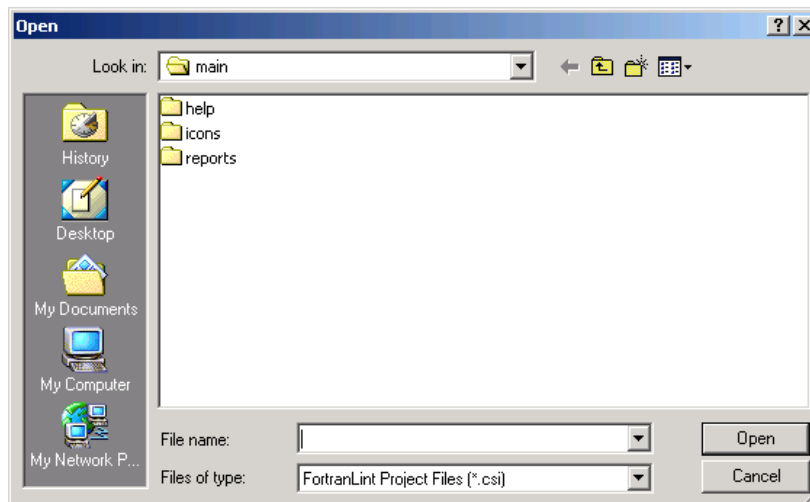


### D. Opening an existing project

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



2. The **Open** window will appear:

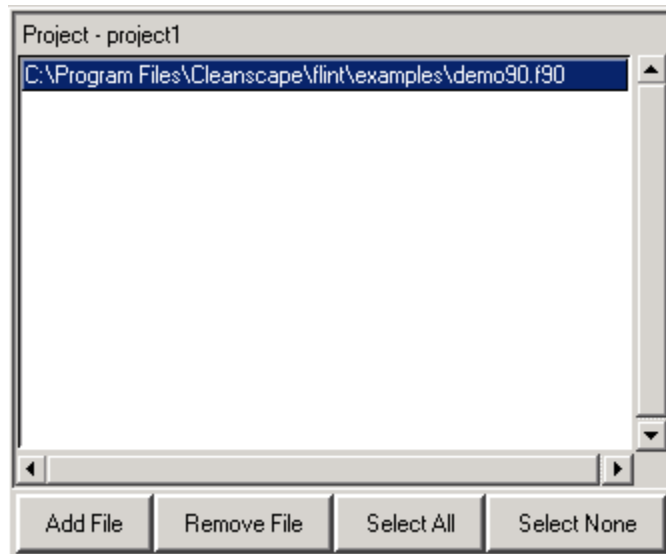


a. Select a project file (*filename.csi*) from the browse window.

b. When ready, press *Open*:

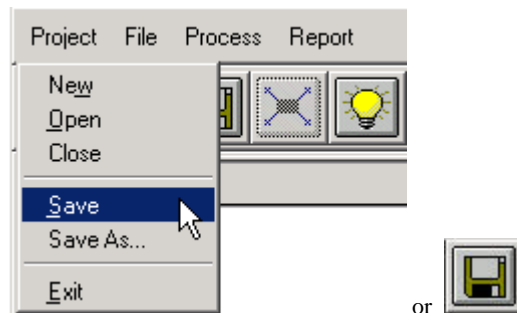


3. Files associated with the project are displayed in the file listing window:

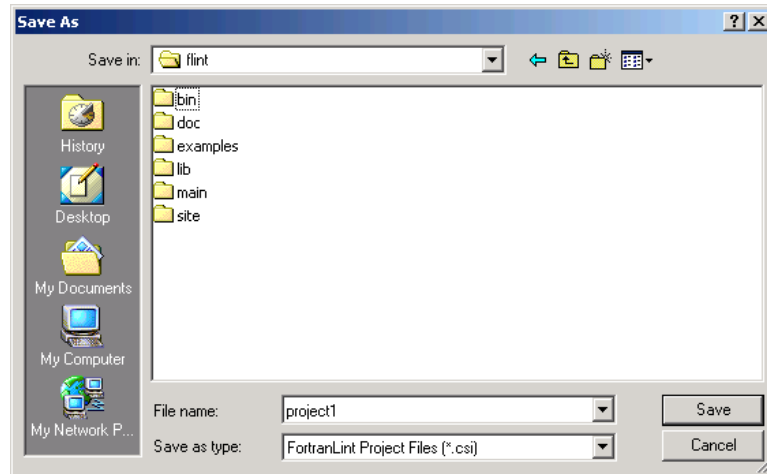


#### E. Saving project

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



2. If this is a new project, the **Save As** window will appear.



- a. Enter a name for the project.



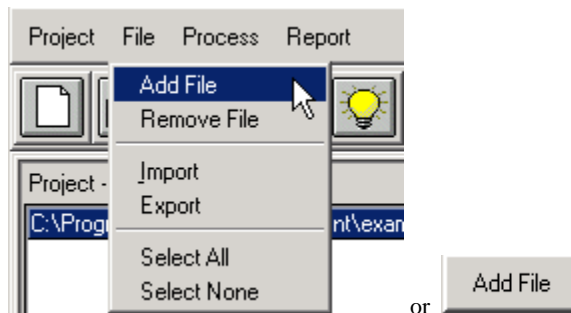
- b. When done, press the *Save* button:



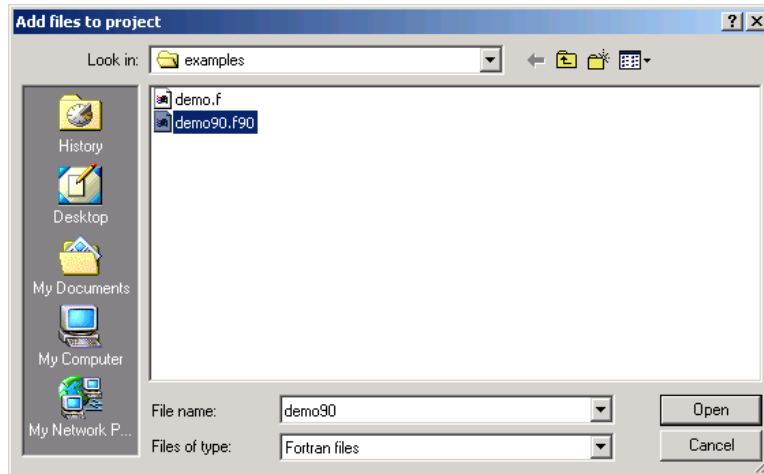
## F. Modifying project

1. Adding 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:



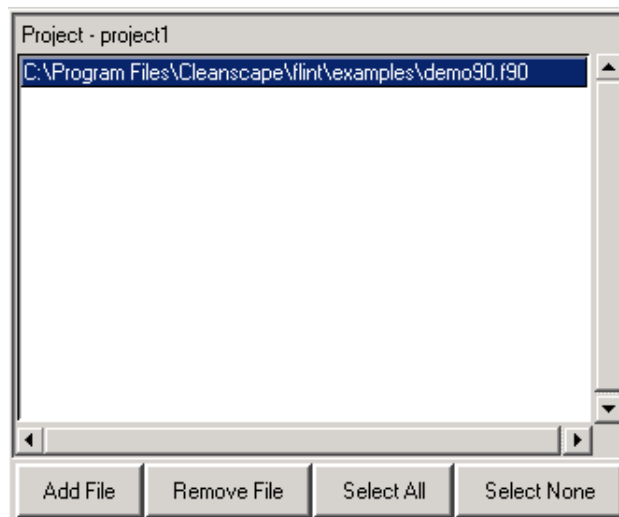
- c. To add Fortran source files to a project, use *Add File* on the *File* menu, or press the *Add File* button.

- 1) The file-selection dialog supports multiple-file selection under both MS-Windows and UNIX.
- 2) To add multiple files individually: use <Control> + Left Mouse Button.
- 3) To add a group of files:
  - (i) Left-click on the first file
  - (ii) Hold down <Shift> + Left Mouse Button
  - (iii) Drag the mouse.

- 4) When done, press the *Save* button:

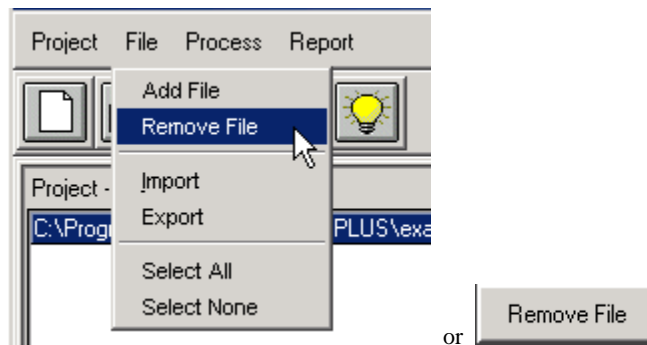
Open

2. Removing files from a project

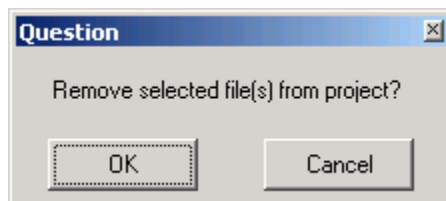


- a. To remove individual source files from a project, select the files to be removed (as explained in the preceding section), then press the *Remove File* button.

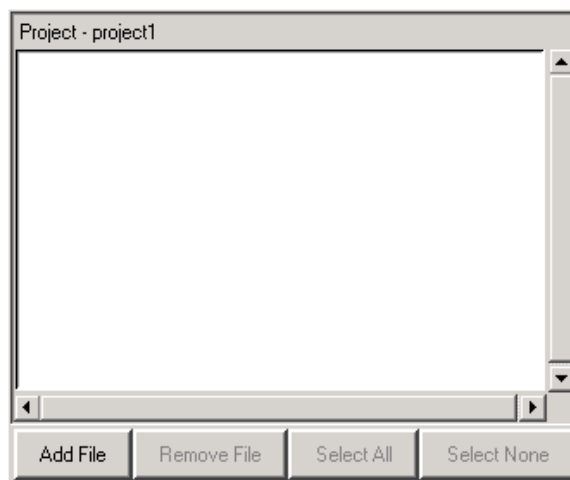
- b. To remove all files from a project (i.e., to clear the file list), press *Select All*, then press *Remove File*.



- c. The following dialog box will appear:



- d. To remove the selected files, press the *OK* button.
- e. The updated file list will be displayed in the project window:



G. Execute test

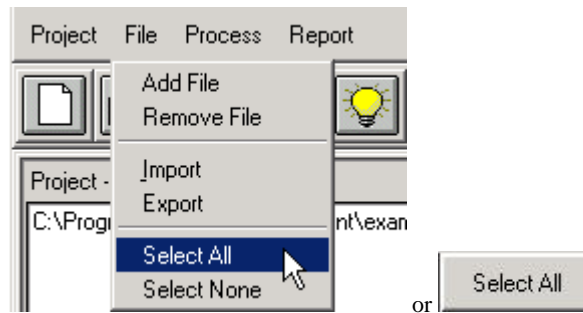
1. Create a new project or open an existing project for testing.

To create a new project, see [section III.2.B.](#)

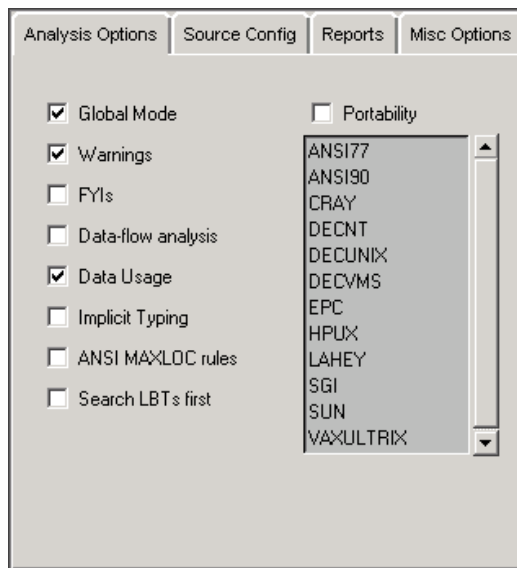
To open an existing project, [section III.2.C.](#)



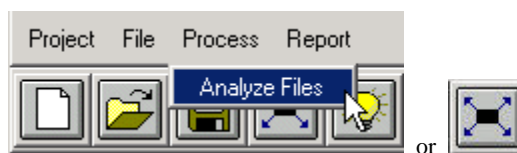
2. Select the files to be analyzed as explained in [Section IV.F.1](#):



3. Modify options as necessary:



4. To analyze the selected files, use *Process/Analyze Files* from the menu or press the *Execute test* button on the shortcut bar:



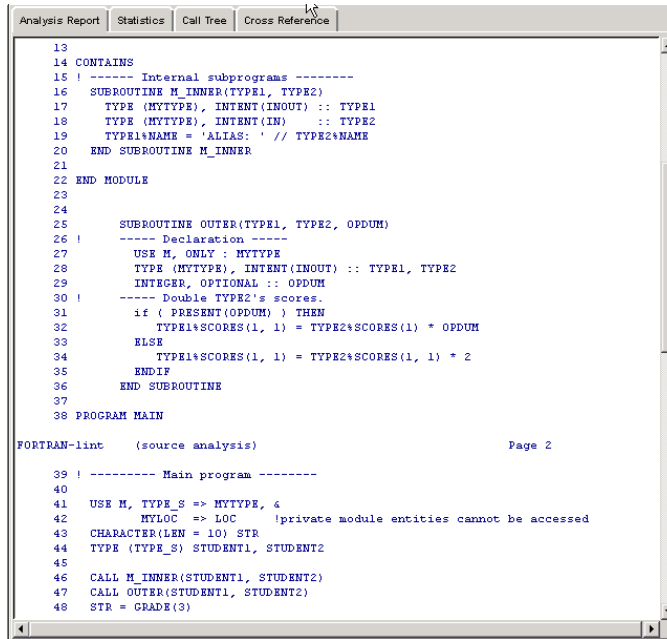
#### H. Review reports

- a. To view the generated reports, use the report tabs:



- b. To print reports, or to save them to disk, use the *Report* menu at the top of the screen. Reports may be printed or saved collectively or individually.

c. Sample Analysis Report:



The screenshot shows the 'Analysis Report' window of FortranLint. The window has tabs for 'Analysis Report', 'Statistics', 'Call Tree', and 'Cross Reference'. The main text area displays the source code of a Fortran program, including internal subprograms and a main program. The code is as follows:

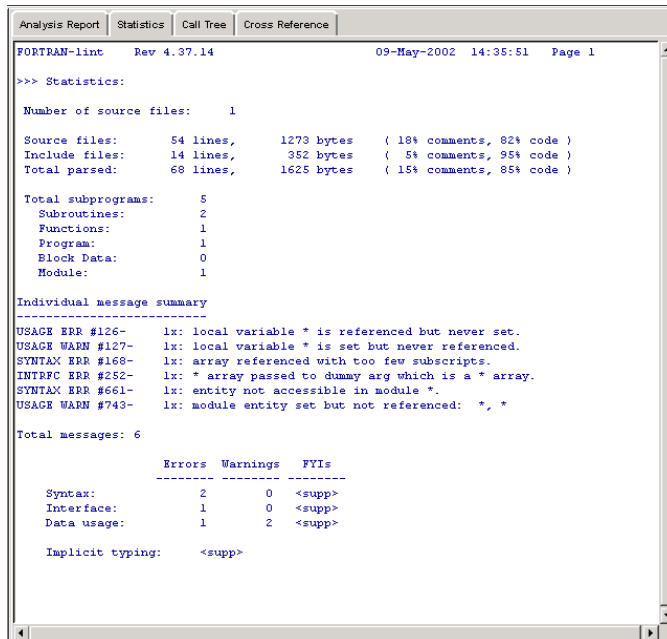
```

13
14 CONTAINS
15 ! ----- Internal subprograms -----
16 SUBROUTINE M_INNER(TYPE1, TYPE2)
17   TYPE (MYTYPE), INTENT(INOUT) :: TYPE1
18   TYPE (MYTYPE), INTENT(IN)    :: TYPE2
19   TYPE1%NAME = 'ALIAS: ' // TYPE2%NAME
20 END SUBROUTINE M_INNER
21
22 END MODULE
23
24
25 SUBROUTINE OUTER(TYPE1, TYPE2, OPDUM)
26 ! ----- Declaration -----
27   USE M, ONLY : MYTYPE
28   TYPE (MYTYPE), INTENT(INOUT) :: TYPE1, TYPE2
29   INTEGER, OPTIONAL :: OPDUM
30 ! ----- Double TYPE2's scores.
31   IF (PRESENT(OPDUM)) THEN
32     TYPE1%SCORES(1,1) = TYPE2%SCORES(1) * OPDUM
33   ELSE
34     TYPE1%SCORES(1,1) = TYPE2%SCORES(1,1) * 2
35   ENDIF
36 END SUBROUTINE
37
38 PROGRAM MAIN
39
40
41 USE M, TYPE S => MYTYPE, 4
42 MYLOC => LOC !private module entities cannot be accessed
43 CHARACTER(LEN = 10) STR
44 TYPE (TYPE_S) STUDENT1, STUDENT2
45
46 CALL M_INNER(STUDENT1, STUDENT2)
47 CALL OUTER(STUDENT1, STUDENT2)
48 STR = GRADE(3)

```

At the bottom of the window, it says 'FORTRAN-lint (source analysis) Page 2'.

d. Sample Statistics report:



The screenshot shows the 'Statistics' window of FortranLint. The window has tabs for 'Analysis Report', 'Statistics', 'Call Tree', and 'Cross Reference'. The main text area displays a summary of the source code analysis, including the number of source files, lines, bytes, and comments, as well as the number of subprograms, subroutines, functions, and programs. The statistics are as follows:

```

>>> Statistics:

Number of source files: 1

Source files: 54 lines, 1273 bytes (18% comments, 82% code)
Include files: 14 lines, 352 bytes (5% comments, 95% code)
Total parsed: 68 lines, 1625 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- 1x: 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.
SYNTAX ERR #661- 1x: entity not accessible in module *.
USAGE WARN #743- 1x: module entity set but not referenced: *, *

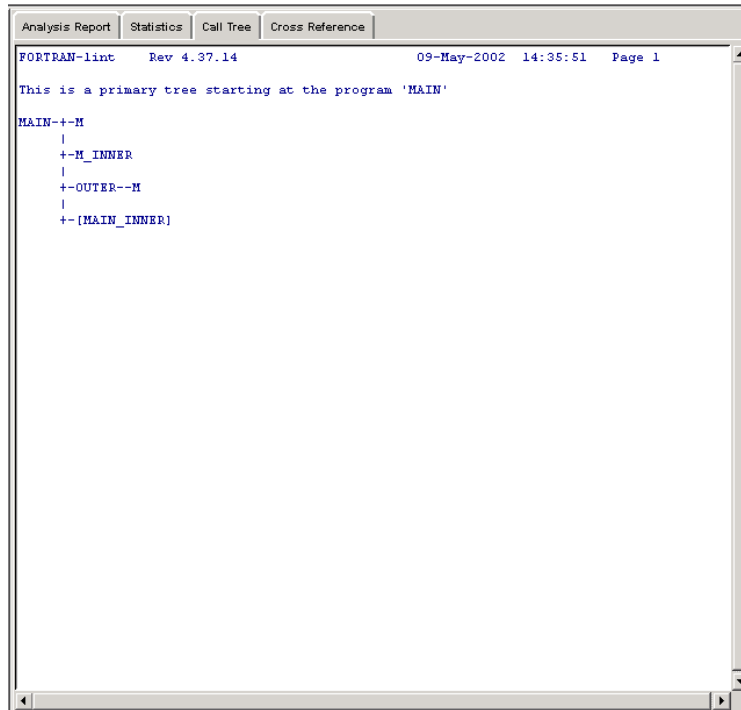
Total messages: 6

Errors Warnings FYIs
-----
Syntax: 2 0 <sup>
Interface: 1 0 <sup>
Data usage: 1 2 <sup>

Implicit typing: <sup>

```

e. Sample Call Tree report:

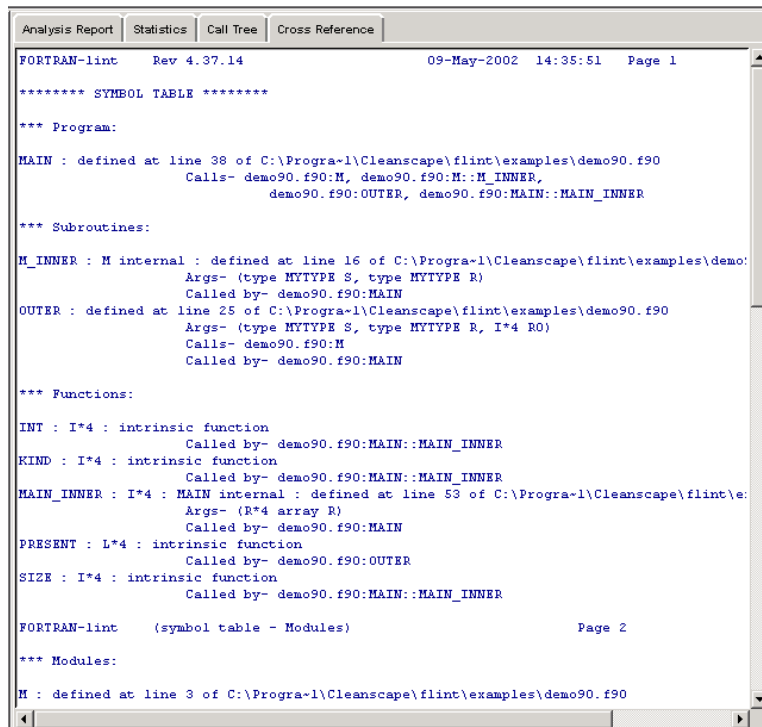


The screenshot shows the 'Call Tree' tab in the FortranLint application. The window title is 'FORTRAN-lint Rev 4.37.14' and the page is 'Page 1'. The text indicates this is a primary tree starting at the program 'MAIN'. The call tree structure is as follows:

```

MAIN--+M
|
+-M_INNER
|
+-OUTER--M
|
+-[MAIN_INNER]
  
```

f. Sample Cross Reference report:



The screenshot shows the 'Cross Reference' tab in the FortranLint application. The window title is 'FORTRAN-lint Rev 4.37.14' and the page is 'Page 1'. The report includes a symbol table with the following information:

```

***** SYMBOL TABLE *****

*** Program:

MAIN : defined at line 38 of C:\Progra-1\Cleanscape\flint\examples\demo90.f90
      Calls- demo90.f90:M, demo90.f90:M::M_INNER,
             demo90.f90:OUTER, demo90.f90:MAIN::MAIN_INNER

*** Subroutines:

M_INNER : M internal : defined at line 16 of C:\Progra-1\Cleanscape\flint\examples\demo90.f90
      Args- (type MYTYPE S, type MYTYPE R)
      Called by- demo90.f90:MAIN

OUTER : defined at line 25 of C:\Progra-1\Cleanscape\flint\examples\demo90.f90
      Args- (type MYTYPE S, type MYTYPE R, I*4 R0)
      Calls- demo90.f90:M
      Called by- demo90.f90:MAIN

*** Functions:

INT : I*4 : intrinsic function
      Called by- demo90.f90:MAIN::MAIN_INNER

KIND : I*4 : intrinsic function
      Called by- demo90.f90:MAIN::MAIN_INNER

MAIN_INNER : I*4 : MAIN internal : defined at line 53 of C:\Progra-1\Cleanscape\flint\examples\demo90.f90
      Args- (R*4 array R)
      Called by- demo90.f90:MAIN

PRESENT : L*4 : intrinsic function
      Called by- demo90.f90:OUTER

SIZE : I*4 : intrinsic function
      Called by- demo90.f90:MAIN::MAIN_INNER

FORTRAN-lint (symbol table - Modules) Page 2

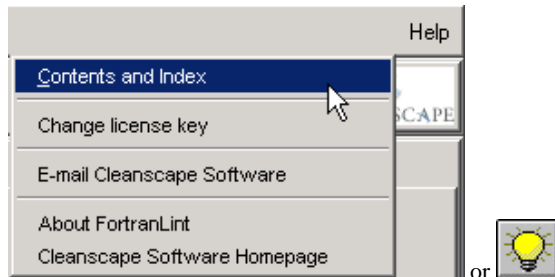
*** Modules:

M : defined at line 3 of C:\Progra-1\Cleanscape\flint\examples\demo90.f90
  
```

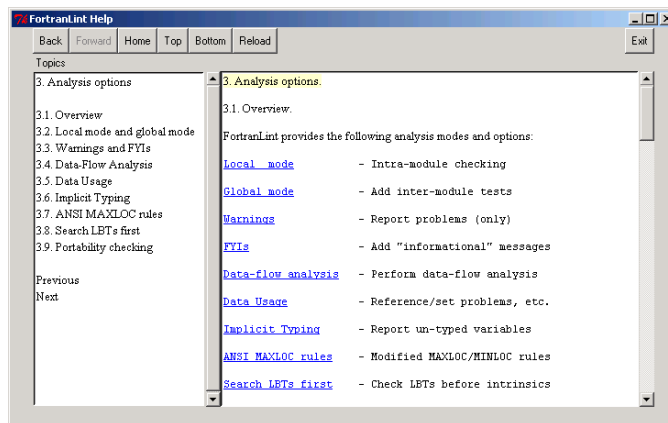
## I. Online Help

### 1. Accessing the Help System

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



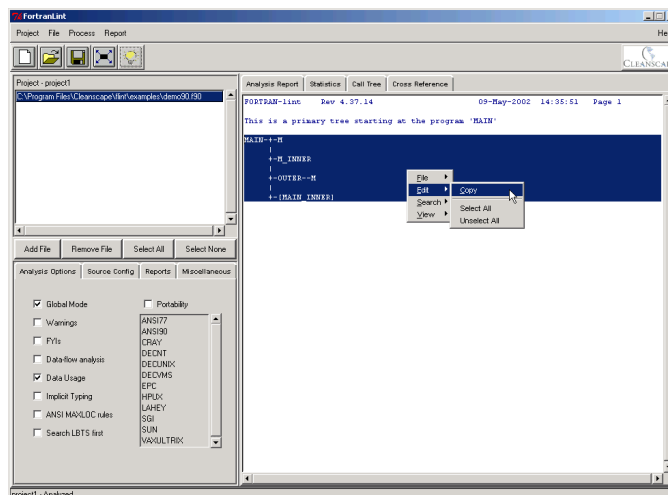
- The **FortranLint Help** browser will appear:



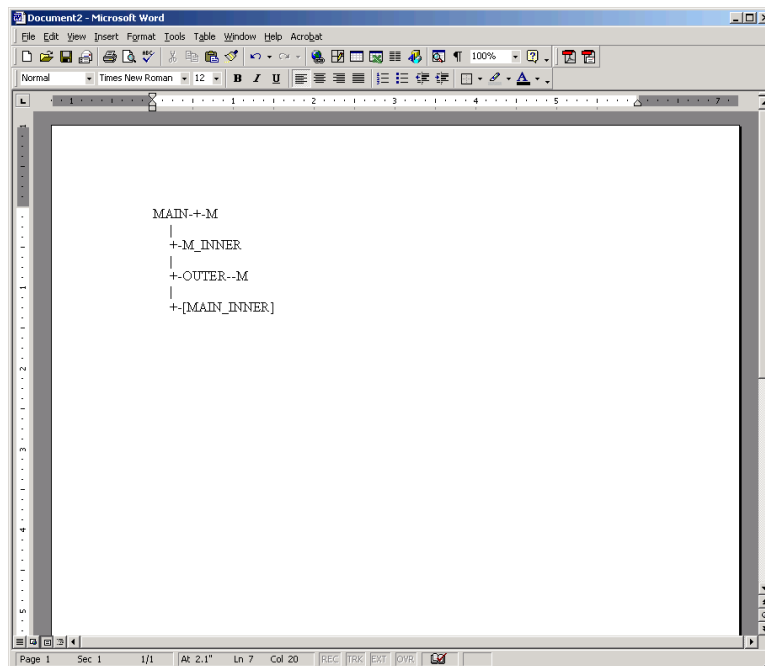
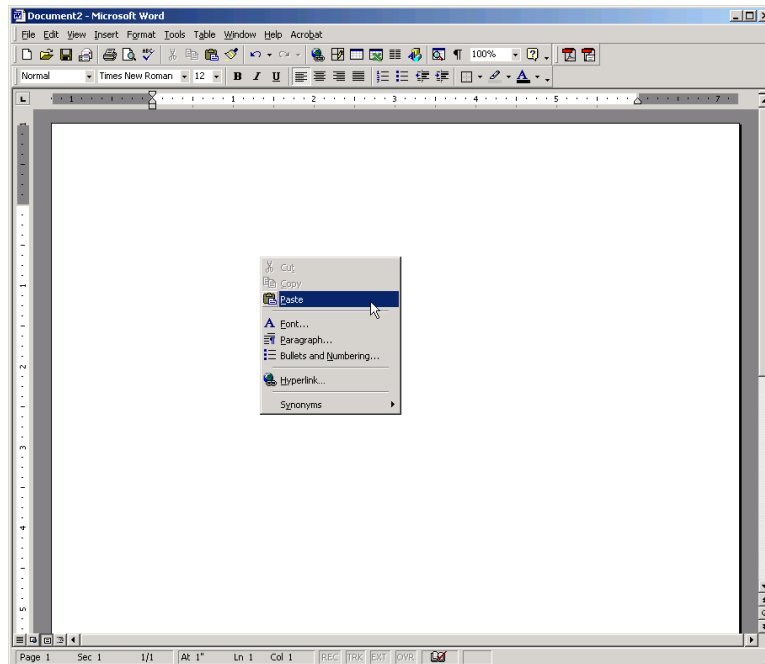
## J. Sub-Menu Functions

### 1. Copy (Microsoft Windows Only)

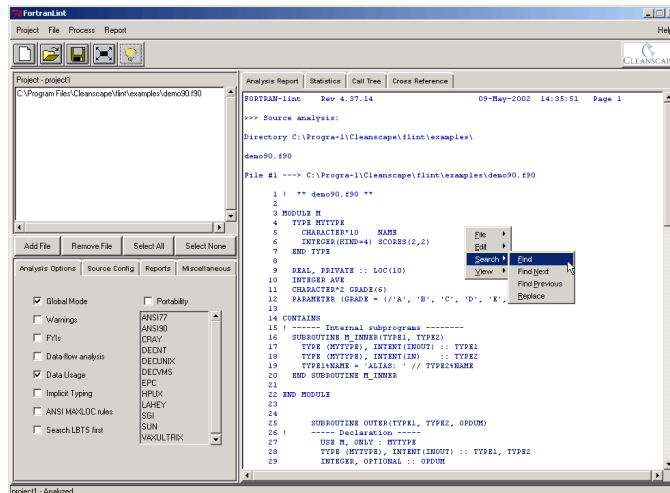
- Press the right mouse button inside reports frame
- Select Edit -> Copy



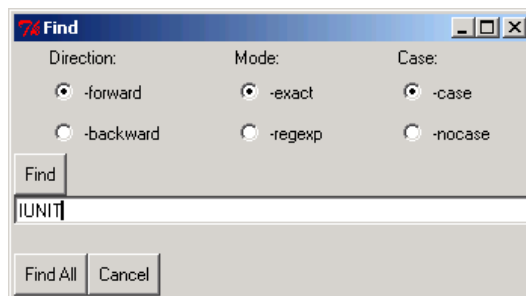
- c. The image can now be pasted into other applications (for example, Microsoft Word):



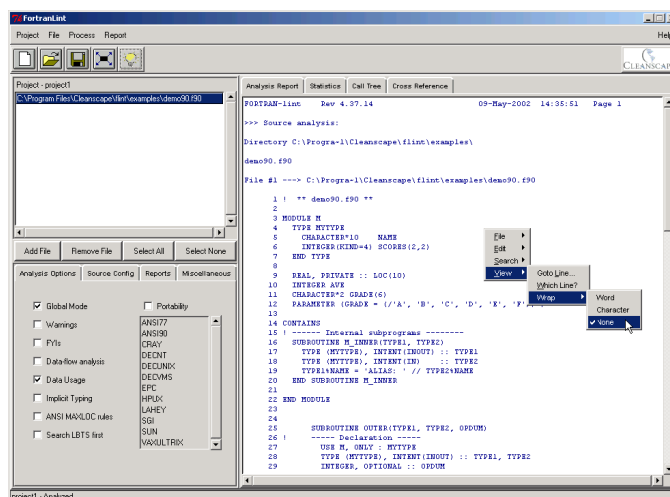
2. Search
  - a. Press the right mouse button inside a report frame
  - b. Select Search -> Find



- c. Enter string to search and select the desired options



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



## PART V MISCELLANEOUS INFORMATION

### .1 ADDITIONAL STEPS FOR WINDOWS 2000

#### A. Important notes

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

#### B. Details

1. For FortranLint to run correctly under Windows 2000, users must have 'write' and 'modify' access rights to the directory "C:\Program Files\Cleanscape" and all sub-directories under it. This document explains the procedure used to change the access rights described above.

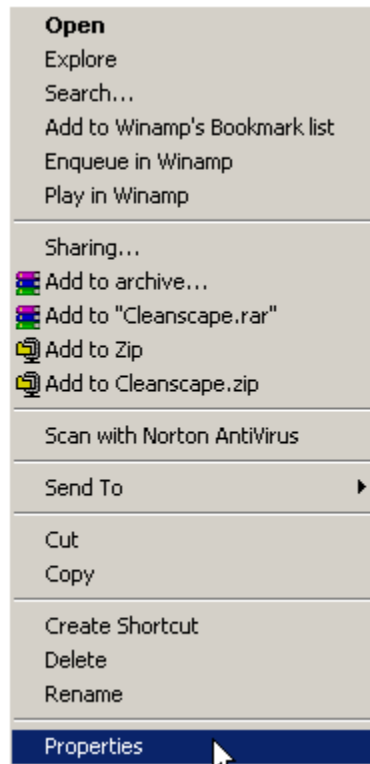
- a. Log in as 'administrator' and finish installing FortranLint for Windows



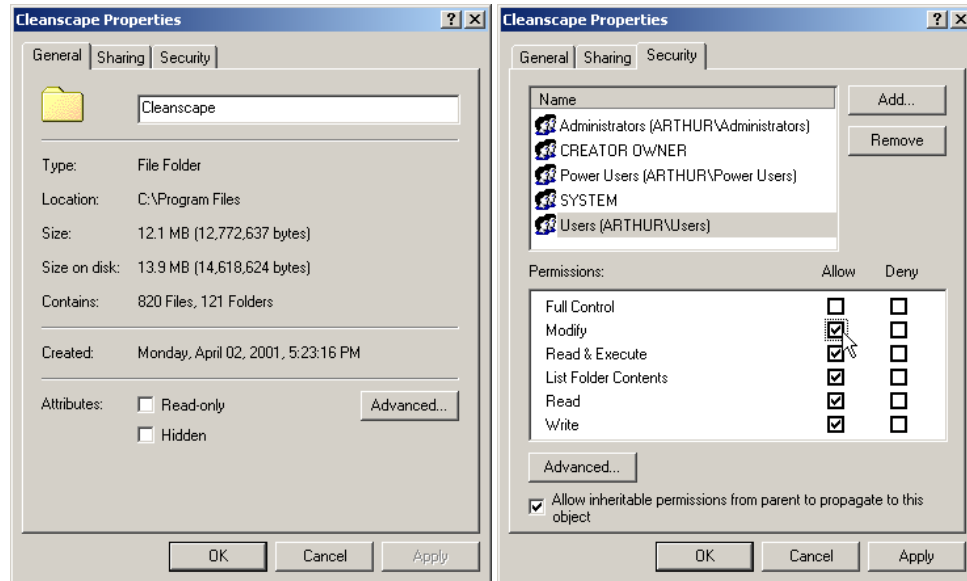
- b. Double-click on the 'My Computer' icon on the desktop



- c. Right-click on the 'Cleanscape' folder and select Properties from the sub-menu.



- d. Select 'Security' tab on the Cleanscape Properties screen:



- e. Select the 'Users' group and enable the 'Modify' and 'Write' permission.
- f. Click the 'Apply' button.
- g. Click the 'Ok' button. This should close the Cleanscape Properties window.
- h. FortranLint is now ready to run on Windows 2000 for the 'Users' group.