

- subroutines.
2. Executable part
 - the use of the data objects.
 - expression and assignment
 - execution control.
 3. IO part
 - I/O statement
 - edit of the i/o format.

The last 2 files : `hpf_err.f`, `hpf_pure.f` are HPF programs. They are designed to exercise every constraint defined in the HPF specification, version 1.0.

Each test file is coded to be syntax right but has certain semantic errors, which can be detected by semantics checking pass of our project.

5.0 Applied Programs

There are two suites of applied programs, which are regarded as typical and persuadable, are selected in testing HPF front-end. One is a set of HPF programs to solve Black Hole problem; the other is rk solver, which are both developed by NPAC.

6.0 Conclusion

This test suite contents HPF source code 23138 lines, which are all passed by the HPF front-end successfully.

We also tried the Fortran 90 test programs with the IBM compiler, `xlf90`, the DEC compiler, `f90`, and the Parasoft compiler, `f90`. The IBM compiler fares best, only reporting one syntax error. The DEC compiler reports four syntax errors. The Parasoft compiler reports about two dozen. To the best of our knowledge all these reports are erroneous. For the HPF test programs, this front-end is the best absolutely.

Appendix

D.B. Carpenter, PCRC Fortran 90 and HPF Syntax Test Suite, Feb. 12, 1996

The suite currently consists of 8 standard Fortran 90 programs and one HPF program. The programs were constructed synthetically from the formal syntax definition of the languages. They exercise every syntax rule at least once. The tables of syntax rules used to generate the codes are also supplied with the test suite.

The test programs are annotated with comments flagging the first use (within the file) of each syntax rule. When a parser erroneously flags a syntax error on a particular line, these annotations should enable rapid isolation of the unrecognised syntax rule.

The first eight codes

test1.f90 - test8.f90

are standard Fortran 90. They are designed to exercise every BNF syntax rule in appendix B of the Fortran 90 Handbook.

testh.f90

is an HPF program. It is designed to exercise every BNF rule in appendix B of the High Performance Fortran Language Specification, version 1.0.

The test programs were constructed specifically to test Fortran parsers, and by construction they are syntactically legal programs. They also respect the non-syntactic constraints of Fortran: variables are declared, expressions are properly typed, explicit procedure interfaces are provided, referenced modules are defined, referenced statement labels exist, etc, wherever these things are required by the rules of Fortran. Additionally all referenced procedures are defined. It should therefore be possible to compile and link all test programs.

4.0 Semantics test

In this part, there are 35 files

exec_test1.f - exec_test19.f ,

spec_test1.f - spec_testA.f ,

io_test1.f - io_test4.f ,

hpf_err.f , hpf_pure.f

Among these files, **exec_test***, **spec_test*** and **io_test*** are standard Fortran 90 programs. They are designed to exercise each constraint defined in the Fortran 90 specification . These constraints are organized in three parts:

1. Specification part

- intrinsic and derived type.
- the declaration and specification of the data objects.

Summary of HPF Front-end Test

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November 6, 1996

1.0 Overview

As we build up a HPF front-end package in public domain for HPCC community, a test suite is developed simultaneously. This package not only serves as a tester to our own package, but also can be used to test other HPF compiler's front-end.

This test suite is divided into two parts: one is designed to test a HPF front-end specially, the other is some typical applied programs.

In the first part there are three components, each of them is composed of several HPF programs:

- Example programs: the main features of language components is touched in different programs.
- Syntax test: to test the parsing, syntax-analysing part of a HPF front-end.
- Semantics test: to test the semantics-checking part of a front-end.

2.0 Examples

The examples in our test suite were edited from two books:

- Migrating to F90
- HPF handbook

Check these two books for details.

3.0 Syntax test

The Fortran syntax test suite is designed as a test of Fortran 90 and High Performance Fortran (HPF) compilers. It targets the parsing, or syntax-checking, phase of the compilers.