Introduction – Modern Fortran

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Standards – a short history

FORTRAN 77: First "real" standard, describe the features in detail
Fortran 90: Introduction of array operations, derived types, modules, ...
Fortran 95: Relax certain restrictions, limited garbage collection
Fortran 2003: Object-oriented programming, C-Fortran interfacing, submodules, ...
Fortran 2008: Coarrays
Fortran 2018: Further enhancements to C-Fortran and Coarrays

General characteristics and compiler support

The Fortran standards put emphasis on:

- Performance: many opportunities for optimisation
  Note that this puts some burden on the programmer too!
- Type-safety: sometimes the standard is stricter than you find in other languages

Overview of compiler support:

- Tables in the *ACM Fortran Forum*
- Polyhedron site: `https://www.fortran.uk/fortran-compiler-comparisons/`

Subjects

The following subjects will be discussed today:

- Organisation in general: Modules, submodules, control structures
- Data handling: Array operations, user-defined operations, derived types
- Interaction with the environment: I/O features, IEEE arithmetic, operating system
- Object-oriented programming: classes, inheritance
- Modernising existing code: alternatives to COMMON blocks and GOTOs