

Introducing the Fortran-lang community

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Overview

Why Fortran?

- 60+ years of high-level, high-performance computing

Fortran-lang community

- State of the Fortran ecosystem
- A new online community for Fortran users
- Fortran-lang open source software

The future is bright

- Current projects

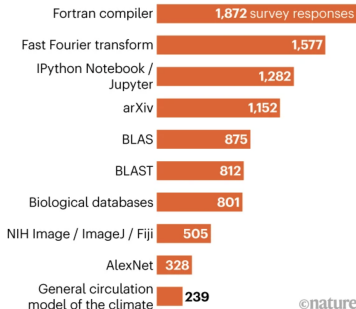
Fortran Summary

- Developed in 1954-1957 at IBM (over 60 years old).
- Name stands for *FOR*mula *TRAN*slation.
- The purpose was (and remains) translation of mathematical formulae to machine code for scientists and engineers.
- First high-level, cross-platform programming language; highly influential.
- Many scientific apps and libraries developed in Fortran.
- Base language has evolved, current standard ISO/IEC 1539-1:2018.
- Supports multiple programming paradigms: procedural, object-oriented, functional, parallel

Relevance of Fortran for Science

TOP CHOICES FOR SCIENCE CODE

Readers voted on which of the ten software codes in this article had the biggest impact on their work. They could choose up to three. Here are the results.



©nature

- Ten computer codes that transformed science, *Nature* 589, 344-348 (2021)

Languages



- Python 57.0%
- Fortran 18.3%
- C 16.3%
- Cython 4.2%
- C++ 3.4%
- Meson 0.5%
- Other 0.3%

■ SciPy (<https://github.com/scipy/scipy>)

Languages



- R 37.4%
- C 33.0%
- Fortran 23.5%
- Shell 1.2%
- M4 1.1%
- TeX 1.0%
- Other 2.8%

■ R (<https://github.com/wch/r-source>)

Some wisdoms from the past

“FORTRAN has for most of [its] life been the blue-collar worker of the programming language set. What it lacked in [*savoir faire*] and style, it returned in cost effectiveness.”

— Martin N. Greenfield

Source: Greenfield, Martin N. “History of FORTRAN standardization.” Proceedings of the June 7-10, 1982, National Computer Conference. 1982.

“FORTRAN is a language to avoid—unless you want some answers.”

— Anonymous

Source: Mark Jones Lorenzo, The History of the Fortran Programming Language, 2019, SE BOOKS.

Why we use Fortran?

- Performance
- Native N -d array syntax including slicing and whole array expressions
- Simplicity (strong, static typing, syntax is easy to understand)
- Backward compatibility longevity
- Parallel

The State of Fortran

Read more about Fortran in our CSE paper:

Kedward, L. J., et al. (2022). The State of Fortran. *CSE*, 24(2), 63-72.
<https://doi.org/10.1109/MCSE.2022.3159862>

Fortran Ecosystem

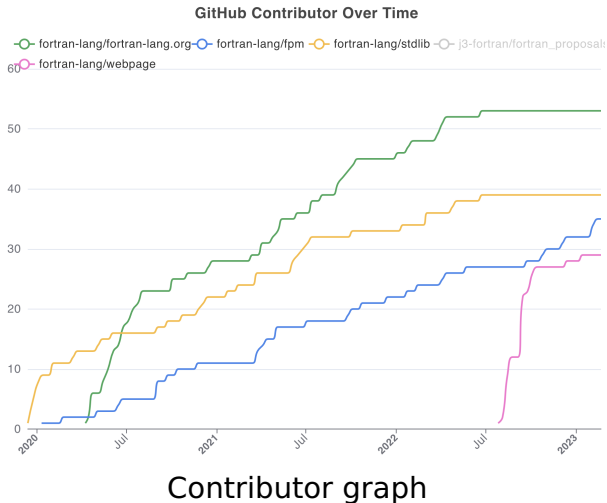
Problem

Stagnation of the Fortran ecosystem across multiple fronts due to lack of organization and communication between isolated communities.

- Lacking general-purpose programming tools (projects tend to re-invent the wheel)
- Building and distributing Fortran software is difficult (no single recommended method)
- No prominent website for new users to discover and learn to use Fortran
- Poor user experience in terms of tooling compared with other languages

Formation of Fortran-lang

- In 2019 a small group of developers including Ondřej Čertík and Milan Curcic forms in recognition of the shortcomings
- After a few months of discussions the Fortran **stdlib** and **Fortran package manager** repositories are born.
- April 2020 the **Fortran-lang website** is launched.
- May 2020 the **Fortran Discourse** is open.
- From here a snowball starts to form...



Fortran-lang – Website



English ▾

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Search

Join us!

Mailing list

Subscribe to our [mailing list](#) to discuss anything Fortran related, announce Fortran projects, discuss development of core fortran-lang.org projects (stdlib, fpm), and get the latest news.

Discourse

Join the discussion about all things Fortran on the [fortran-lang discourse](#).

Twitter

 Follow @fortranlang

RSS feed

RSS clients can follow the [RSS feed](#).

Fortran

High-performance parallel programming language

[Get started](#)

Features

High performance

Fortran has been designed from the ground up for computationally intensive applications in science and engineering. Mature and battle-tested compilers and libraries allow you to write code that runs close to the metal, fast.

Statically and strongly typed

Fortran is statically and strongly typed, which allows the compiler to catch many programming errors early on for you. This also allows the compiler to generate efficient binary code.

Easy to learn and use

Fortran is a relatively small language that is surprisingly easy to learn and use. Expressing most mathematical and arithmetic operations over large arrays is as simple as writing them as equations on a whiteboard.

News

- [Fortran newsletter: June 2022](#)
- [Fortran newsletter: May 2022](#)
- [Fortran newsletter: April 2022](#)
- [Fortran newsletter: March 2022](#)
- [Fortran newsletter: February 2022](#)

Tweets from @fortranlang



Fortran
@ · Feb 20




Semantic Versioning 2.0 in Fortran:

minhqdao/version-f



<https://fortran-lang.org/en/>

Fortran-lang – Discourse



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all categories ▾LatestTopCategories

CategoryTopics

Help41 / month

Posts requests for help here.

Visual Studio Code Homework fpm stdlib

Uncategorized16 / month

Topics that don't need a category, or don't fit into any other existing category.

Language enhancement4 / month

To discuss new features to the Fortran language. Once an idea is more developed, one will submit it to the Fortran proposals repository:

Projects1 / month


Community projects like Google Summer of Code or other organized programs and projects in the Fortran-lang community.


GSoC-2023 STF 2022 GSoC-2022 GSoC-2021

Announcements8 / month


Use this category to announce anything Fortran related, such as:


Latest

 **Welcome to Discourse**0
Jun '22


 ☒ Auto format with modern FORTRAN extension does not work2
12m


Visual Studio Code

 Integer root of floating point value8
4h


 ☒ Problem to use flang(-new)4
4h

Help

 Feedback for generics prototype8
5h

 Exceptions proposal27
7h

Language enhancement

 GSOC 2023 Contribution3
7h

GSoC-2023

<https://fortran-lang.discourse.group/>

What about tooling?



Source: <https://comic.browserling.com/49>

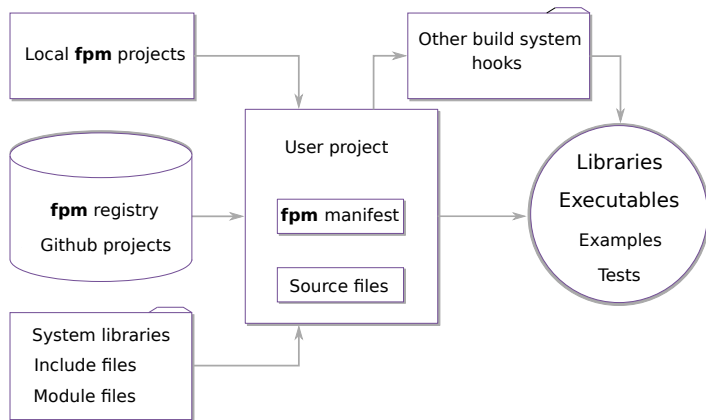
Fortran Package Manager - fpm

Aim

Fortran-specific build system and package manager to ease the learning curve for starting new Fortran projects and composing Fortran software

- GitHub: <https://github.com/fortran-lang/fpm>
- Automatically scans sources for module and submodule dependencies
- Incremental and parallel builds
- Tree-shaking
- fpm is written in Fortran! (Lower the barrier for Fortran users to contribute)

Fortran Package Manager - fpm



Source: Kedward, L. J., et al. (2022). The State of Fortran. *CSE*, 24(2), 63-72.

<https://doi.org/10.1109/MCSE.2022.3159862>

Fortran standard library (stdlib)

Aim

Develop a community-driven *de facto* standard library for Fortran

- GitHub: <https://github.com/fortran-lang/stdlib>
- Specification: <https://stdlib.fortran-lang.org>

Modules

ansi	hashmaps	math	specialfunctions
array	io	optval	stats
ascii	io_npy	quadrature	string_type
bitsets	kinds	random	stringlist_type
error	lingalg	selection	strings
hash_32,64_bit)	logger	sorting	version

LFortran Compiler

- New LLVM-based Community Compiler
- Also aims to support interactive usage (Jupyter notebooks)
- Multiple backends (LLVM, x86, C, Julia, WASM, ...)
- Modular design centred around two modules—AST and ASR
- Can be used as a library for developing standalone tools
- Used for prototyping newly suggested language features (generics!)
- Website: <https://lfortran.org/>
- Live playground: <https://dev.lfortran.org/>




Fortran support for Visual Studio Code

Visual Studio | Marketplace


Sign in

Visual Studio Code > Programming Languages > Modern Fortran

New to Visual Studio Code? [Get it now.](#)



Modern Fortran

The Fortran Programming Language  | 270,911 installs | ★★★★★ (13) | Free

Fortran language support, syntax highlighting, Language Server support, Debugging, Diagnostics and much more.

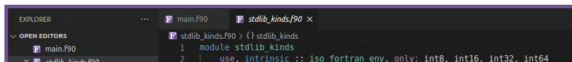
[Install](#) [Trouble Installing?](#)

[Overview](#) [Version History](#) [Q & A](#) [Rating & Review](#)

Modern Fortran

downloads 738k installs 271k CI passing version v3.4.2023022101 license MIT

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Modern Fortran snippet

The Future is Bright

- Google Summer of Code 2023 (hopefully will be accepted for the third year in a row—announcements today!)
- Fortran-lang received funding from the Sovereign Tech Fund (<https://sovereigntechfund.de/fortran.html>)
 - Fpm package registry
 - LFortran compiler
- Growing number of fpm packages
- First “experiments” using fpm in Fortran training courses (Universität Bonn, Forschungszentrum Jülich)

The End... or a New Beginning?

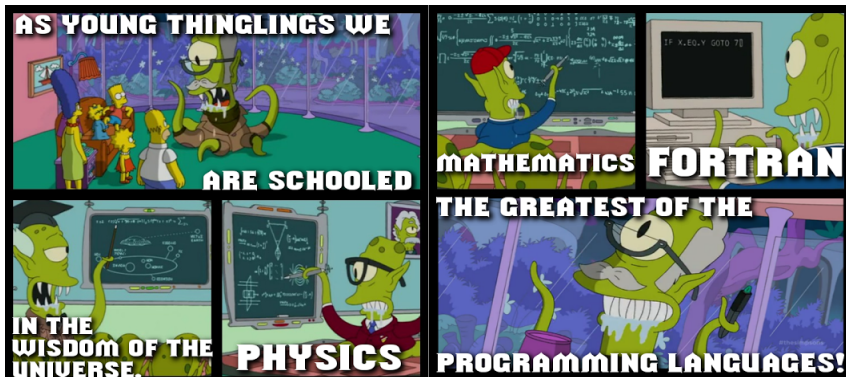


Image from u/crazycold15 (Reddit)
Originally in Simpsons episode "The Man Who Came to Be Dinner" (2015)
<https://youtu.be/kMQvC03Wx50?t=80>