How to get rid of C

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Problem: C has become unreliable

- 186 undefined behaviours in C standard
- Every real-world program has them
- C compiler maintainers focus exclusively on programs without undefined behaviours benchmarks (SPEC)
- Bug reports are not taken seriously
- \( \Rightarrow \) We want to get rid of C
Gforth components

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high-level code (gforth.fi)
Primitives

- replace with native-code compiler on popular platforms

- keep existing primitives on other platforms
  ⇒ we cannot get rid of C
  remove non-standard usage when gcc acts up
  no longer work around performance problems
  ⇒ slowdown

- Or maybe some primitives in assembly language
  high-level replacement for others
Native-code compiler

- Still want to use image files

- Compiler from image files to native code

- For interactive use:
  - Compiler from threaded-like code to native code
  - threaded-like code allows storing image files

- For bootstrapping:
  - Compiler from image files to assembly language
Support functions

- Called by primitives
  e.g. mixed division

- replaced by native-code compiler

- or high-level code
Calling C

- For system calls
  Alternative: direct system calls
  additional system-specific stuff to implement
  CPU-specific optimizations

- For library calls

- use wrappers like now?

- teach calling convention to native-code compiler
  Use extern: for specifying C functions
Setup, loader, signals

- Could be replaced with Forth code on systems with native-code compiler
- But: two versions to maintain
- not performance-sensitive
  Slowdown from C standards compliance should not be noticable
Conclusion

• Getting away from C is a long-term effort

• Is it worthwhile to get rid of C completely?