SDCC
Small Device C Compiler

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What is SDCC?

- Standard C compiler: ISO C90, ISO C99, ISO C11, ISO C23
- Freestanding implementation or part of a hosted implementation
- Supporting tools (assembler, linker, simulator, ...)
- Works on many host systems
- Targets various 8-bit architectures, has some unusual optimizations that make sense for these targets
- User base: embedded developers and retrocomputing/-gaming enthusiasts
- Latest release: SDCC 4.4.0, January 2024

Project

- Bug and feature request trackers at SourceForge
- Mailing lists sdcc-user and sdcc-devel
- svn repository at SourceForge
- Wiki
- Compile farm fornightly regression testing

SDCC vs. GCC/LLVM

- SDCC specializes in targets hard to support in GCC/LLVM: few registers, non-orthogonal architecture
- Less steep learning curve vs. GCC
- Internal interfaces more stable vs. LLVM

- Standard compliance, in particular wrt. ISO C23 (partially PT-funded)
- Optimizations (partially NGI0-funded)
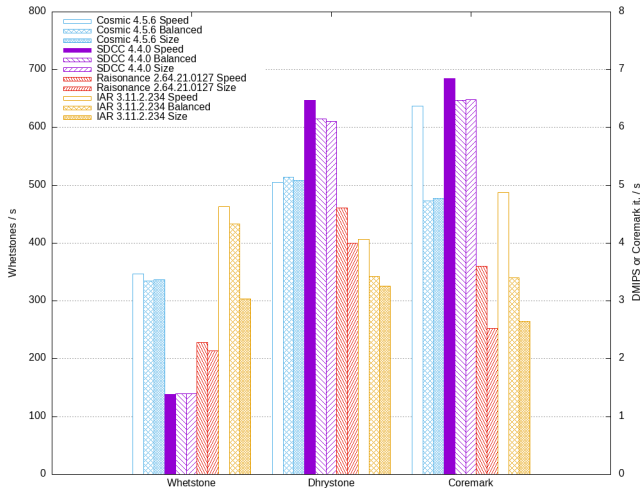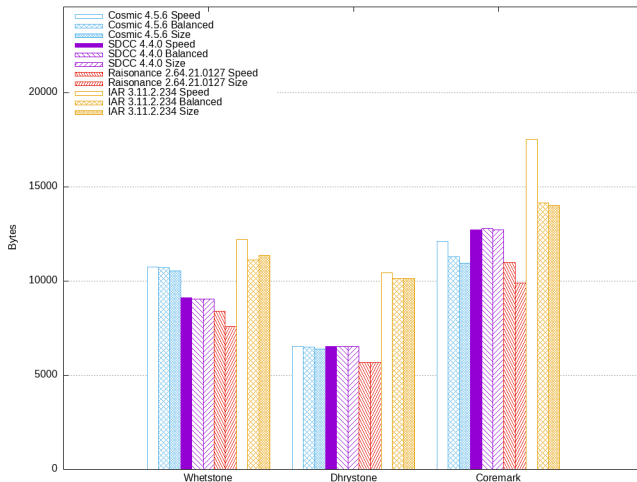- mos65c02 and r800 ports

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- ST Microelectronics STM8 - nice architecture for C
- Currently most advanced port
- SDCC competes very well vs. non-free compilers
- NRND by device manufacturer

STM8 early 2024 benchmark scores

STM8 early 2024 benchmark code sizes

- Oldest port, stable but missing some features present for newer targets
- SDCC has fallen behind non-free compilers wrt. code size
- Important architecture, due to large number of device manufacturers
- Many slightly different variants wrt. features added since the original Intel 8051

- Current μC architecture by NXP
- Missing FOSS community for the architecture

- Simple architecture by Padauk for very small devices (a SoC typically at less than 1 cent)
- SDCC is the only C compiler
- pdk16 port still missing
- hardware multihreading unsupported

- Unmaintained
- Users sometimes contribute patches

- Commonly found in older embedded systems
- Now mostly relevant to the retrocomputing/retrogaming community
- SDCC is often used via downstream projects (e.g. z88dk, gbdk, devkitSMS)

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Future

- Refocus on MCS-51
- Explore S08 possibilities
- Look into multihreading for Padauk
- f8