

Rust: A Richly Typed, Memory-safe, Algebraic Systems Language for Writing Perfect Code

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1 Borrow Checker

Rust approaches memory management with a new paradigm. It uses neither a garbage collector nor forces memory management on the programmer; instead it achieves memory safety using a borrow checker. The borrow checker has two rules: data has one owner and data may have multiple readers or one writer. When a piece of non-global data is instantiated, a sized portion of data from the stack, or a chunk of data in the heap, is allocated to it. The variable that the data is assigned to is its owner. Passing data by value (IE not through a pointer) moves the data to the function it was passed into. This data is gone, it can neither be accessed nor modified.

Gjengset (2021)

Rustteam (2023b)

Rustteam (2023a)

Kernighan and Ritchie (1972)

Oatman (2022)

References

Gjengset, Jon. *Rust for Rustaceans: Idiomatic Programming for Experienced Developers*. No Starch, 2021. In this book, the author goes beyond the basics by exploring exploring common advanced programming patterns and concepts. Instead of defining a trait, he shows meaningful, stateful, applications of traits in specific problems.

Kernighan, Bryan and Dennis Ritchie. *The C Programming Language*. Prentice Hall, 1972. In this book, the authors, having created the C programming language, give a deep dive into it. This book teaches the reader C, but more importantly, it teaches how computer registers, memory, and data work and are stored at the most basic level. Although it follows a different paradigm from Rust, it is impossible to cohesively cover a programming language without paying homage to C.

Oatman, Tris. 2022 “<https://www.youtube.com/noboilerplate>.”. This Youtube channel is an excellent secondary/tertiary source for concise, complete analysis of the Rust language. While other sources merely gives the facts, this channel shows real-world applications as well as fun independent use cases.

Rustteam. 2023 “<https://doc.rust-lang.org/stable/rust-by-example/>.”. Rust by example is a website that shows you many of the features of rust through

thorough code examples and descriptions. It is a great way to get concise, correct code, in order to better explain complex ideas.

Rustteam. 2023 “Rust Programming Language.”. This is the official Rust Language website. It is created and maintained by the Rust Team (Rust maintainers) as well as many contributions from the community. It mostly serves as a launching point for learning and participating in Rust. As well as maintaining links, this site has a blog for Rust news for updates and feature announcements.