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Rust Brain Teasers

Exercise Your Mind

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Rust Brain Teasers

Exercise Your Mind

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edited by Tammy Coron

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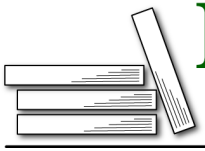

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Encoded using the finest acid-free high-entropy binary digits.
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To Henry, my loyal canine coding companion of thirteen years—who sadly didn't live to see the book's release.

Preface

Rust is a very consistent language. The Rust Core Team has worked hard to ensure that Rust does what you ask and doesn't surprise you by performing additional tasks behind your back. Rust's toolset—particularly Clippy and Rust's safety guarantees—check your program for common mistakes and often suggest improvements. It's common for Rust programmers to notice that writing their program in Rust takes a little longer, but when they run it, it works as expected.

The Rust language has a few quirks. Sometimes they creep in at the cracks between systems, and sometimes they're a conscious design choice to avoid doing something worse. In this book, you'll review a series of self-contained Rust programs that explore these quirks. Each program, known as a brain teaser, teaches an aspect of Rust that is designed to surprise you. As you read each brain teaser, try to guess the program's output correctly. The possible answers are:

- The program won't compile.
- The program produces some unexpected output (for example, "Arithmetic still works!").
- The program panics and terminates with an error message.

After each brain teaser, you'll get an explanation of why the program produces the result it does and how similar issues might affect the code you write in your own programs. To get the most out of this book, try running the code yourself *before* turning the page and reading the answer and discussion. Taking these steps helps to reinforce what you're learning. By understanding these quirks, you can become a better Rust programmer—and hopefully, avoid these pitfalls in your own projects.

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About the Author

Herbert Wolverson is the author of *Hands-on Rust*,[1] and the *Rust Roguelike Tutorial*.[2] He developed and maintains the bracket-lib open source library (now part of the *Amethyst Foundation*) and has been involved in many open source projects over the years.[3] Herbert is the sole proprietor of *Bracket Productions*.

About the Code

The example projects and code are as short as possible and focused on displaying a minimal example of each brain teaser. The examples are contained within a Rust workspace. To execute each sample, change to the example's directory in your terminal and type cargo run.

Some brain teasers require additional library support. In these cases, the Cargo.toml file is displayed next to the example's source code.

About You

This book assumes that you have a working installation of Rust and that you're familiar with making and running Rust applications. Thus, the brain teasers are targeted at beginner- through intermediate-level developers. (If you're on the Rust Core Team, you probably know more about these quirks than I do.)

This book doesn't try to teach your first steps with Rust; if you've never used Rust before, start with *The Rust Programming Language [KN19]* or *Hands-on Rust [Wol21]*).[4]

Keep an Open Mind

This book exposes some of the quirks with Rust—and, sometimes, programming in general. Rust is a fantastic language despite its oddities, and these quirks aren't meant as language criticism. Instead, in many cases, you'll discover *why* things are done the way they are, making them seem less *quirky* and more *deliberate*.

As you work through this book, keep an open mind and approach each brain teaser like a crime scene investigator. All of the clues are present, and once

1. https://pragprog.com/titles/hwrust/hands-on-rust/
2. http://bfnightly.bracketproductions.com/rustbook/
3. https://github.com/amethyst/bracket-lib
4. https://doc.rust-lang.org/book/

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you understand the discussion behind each brain teaser, you'll have a better understanding of why things work the way they do and how to avoid these particular pitfalls. You might even learn some new tricks.

If you'd like to learn more, please feel free to contact Herbert at @herberticus on Twitter or u/thebracket on Reddit.

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