RUST ESSENTIALS PDF, EPUB, EBOOK

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Rust Essentials - Second Edition | Packt

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Thank you for your interest You will be notified when this product will be in stock. I agree to the. Terms and Conditions. How It Works? IMEI Number. Exchange Discount Summary On the other side of the programming-language spectrum, we have Haskell, which is widely known to be a very safe and reliable language, but with very little or no control of the level of memory allocation and other hardware resources.

We can plot different languages along this control—safety axis, and it seems that when a language is safer, it loses low-level control; the inverse is also true: a language that gives more control over resources provides much less safety, shown as follows:. Rust lets you specify exactly how your values should be laid out in memory and how that memory should be managed; this is why it works well at both ends of the control and safety line. This is the unique selling point of Rust: it breaks the safety-control dichotomy that, before Rust, existed in programming languages.

With Rust, control and safety can be achieved together without losing performance. Rust can accomplish both these goals without a garbage collector, in contrast to most modern languages such as Java, C , Python, Ruby, Go; in fact Rust doesn't even have a garbage collector yet though one is planned. Rust is a compiled language: the strict safety rules are enforced by the compiler so that they do not cause runtime overhead.

As a consequence, Rust can work with minimal runtime or even no runtime at all; so, it can be used for real time or embedded projects, and it can easily integrate with other languages or projects. Rust is meant for developers and projects where not only performance and low-level optimizations are important, but where there is also a need for a safe and stable execution environment. Moreover, Rust adds a lot of high-level functional programming techniques within the language so that it feels like a low-level and a high-level language at the same time.

The Rust developers designed Rust to be a general-purpose and multi-paradigm language. Besides this, it inherits a lot from functional languages and also incorporates advanced techniques for concurrent programming. In Rust, the typing of variables is static because Rust is compiled and strong. Think about dangling pointers, buffer overflows, null pointers, segmentation faults, data races, and so on.

The Rust compiler called rustc is very intelligent and can detect all these problems while compiling your code, thereby guaranteeing memory safety during execution. This is done by the compiler by retaining complete control over memory layout, without needing the runtime burden of garbage collection see Chapter 6 , Pointers and Memory Safety. In addition, its safety also implies much less possibilities for security breaches. Rust compiles native code like Go and Julia. However, in contrast to these two, Rust doesn't need runtime with garbage collection.

Most other popular modern languages such as. As one of its mechanisms for concurrency, Rust adopts the well-known actor model from Erlang. Lightweight processes called threads perform work in parallel. They do not share heap memory but communicate data through channels, and data races are eliminated by the type system see Chapter 8 , Concurrency and Parallelism. These primitives make it easy for programmers to leverage the power of many CPU cores that are available on current and future computing platforms.

The rustc compiler is completely self hosted, which means that it is written in Rust and can compile itself by using a previous version. It can call C's code as simply and efficiently as C can call its own code, and conversely, C can also call Rust code see Chapter 9 , Programming at the Boundaries. The following is the logo of Rust:. Other Rust characteristics that will be discussed in more detail in later chapters are as follows:. Its variables are immutable by default see Chapter 2 , Using Variables and Types. Higher-order functions and closures see Chapter 5 , Generalizing Code with Higher-order Functions and Parametrization. A hygienic macro system see Chapter 7 , Organizing Code and Macros. Zero-cost abstractions, which means that Rust has higher-language constructs, but these do not have an impact on performance. In conclusion, Rust gives you ultimate power over memory allocation as well as removing many security and stability problems that are commonly associated with native languages.

Dynamic languages such as Ruby or Python give you the initial coding speed, but you pay the price later when you have to write more tests, runtime crashes, or even production outages. The Rust compiler forces you to get a lot of things right at compile-time, which is the least expensive place to identify and fix bugs. Rust's object orientation is not that explicit or evolved as common object-oriented languages such as Java, C , and Python as it doesn't have classes. Compared with Go, Rust gives you more control over memory and resources, so lets you code on a lower level. Go also works with a garbage collector, and it has no generics or a mechanism to prevent data races between its goroutines that are used in concurrency.

Julia is focused on numerical computing performance; it works with a JIT compiler and doesn't give you that low-level control that Rust gives. Although Rust is designed to be a systems language, it has a broad range of possible applications due to its richness of constructs, making it an ideal candidate for applications that fall into one or all of the following categories:. Embedded systems that require a very minimal runtime footprint or a resource-constrained environment, such as a Raspberry Pi, Arduino, or robotics.

Tools or services that can't support the long warm-up delays that are common in Just In Time JIT compiler systems and need instantaneous startup. Rust is especially suited when code quality is important, that is for:. Due to the design of Rust's compiler, many kinds of browser security bugs are prevented automatically. Servo itself is an open source project with more than contributors. The platform comes for the three major operating systems Linux 2. You should use the current official stable release 1. If you would like to investigate or use the latest developments, install the nightly build version. For Windows, double-click on the. Adding Rust's directory to the search path for executables is an optional part of the installation, so make sure that this option is selected.

Verify the correctness of the installation by showing Rust's version with rustc —V or rustc - -version , which produces an output like rustc 1. However, at this moment, only the ARM architecture is supported by it. The Rust installation directory containing rustc can be found on your

machine in the following folder:. If the Rust home folder was added to the search path for executables, rustc can be run from any command-line window.

The rustc command has the following format: rustc [options] input. The options are one letter directives for the compiler after a dash, such as -g or -W , or words prefixed by a double dash, such as - -test or - -no-analysis. All the options with some explanation are shown when invoking rustc -h. In the next section, we will verify our installation by compiling and running our first Rust program.

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However, to be able to work with new features which are only contained in the more recent version, it is mandatory to compile your code to that specific version. Rust has a very dynamic cycle of progression. Work is performed on three releases called channels or builds simultaneously -- nightly, beta, and stable, and they follow a strict six-week release cycle like web browsers:. The beta and stable channel builds are only updated as new features are backported to their branch. With this arrangement, Rust allows users to access new features and bug fixes quickly. Here is a concrete example: 1.

Six weeks later, on 30th July, Rust 1. Some features in an experimental stage can only work when the code contains an attribute [feature]. Since its production release 1. This is manifest if you view a Google Trends survey:. Although Rust is designed to be a systems language, due to its richness of constructs, it has a broad range of possible applications, making it an ideal candidate for applications that fall into one or all of the following categories:. Due to Rust's compiler design, many kinds of browser security bugs are prevented automatically. Servo is itself an open source project with more than contributors.

Parts of Servo are merged into Gecko the engine on which Firefox is based , thus lending the Servo project's advancements to Firefox. On Windows, double-click on the rustup-init. Verify the correctness of the installation by showing Rust's version by typing rustc -V or rustc - -version in a console, which produces output like the following:. The rustup tool enables you to easily switch between stable, beta, and nightly compilers and keep them updated. Moreover, it makes cross-compiling simpler with binary builds of the Standard Library for common platforms. The Rust installation directory containing rustc can be found on your machine in the following folder unless you have chosen a different installation folder :. The rustc command has the following format:. The options are one-letter directives for the compiler after a dash, like -g or -W , or words prefixed by a double dash, like - -test or - -version.

All options with some explanation are shown when invoking rustc -h. In the next section, we verify our installation by compiling and running our first Rust program. To view a local copy of the Rust documentation as a website, type rustup doc into a terminal. Let's get started by showing a welcome message to the players of our game. The output executable gets its name from the source file. Compiling and running are separate consecutive steps, contrary to dynamic languages like Ruby or Python where these are performed in one step.

Let's explain the code a bit. If you have already worked in a C, or Java, or C like environment, this code will seem quite familiar. As in most languages, execution of code starts in a main function, which is mandatory in an executable program. In a larger project with many source files, the file containing the main function would be called main. We see that main is a function declaration because it is preceded by the keyword fn , short and elegant like most Rust keywords. The after main denotes the parameter list, which is empty here.

The closing brace appears after the code, in the column right beneath fn. Our program has only one line, which is indented by four spaces to improve readability Rust is not whitespace sensitive. This line prints the string Welcome to the Game! Rust recognizes this as a string, because it is surrounded by double quotes " ". This string was given as argument to the println! The code line ends in a semicolon, ;, as most, but not all, code lines in Rust do see Chapter 2 , Using Variables and Types. Exercises : Write, compile, and execute a Rust program, name. What is the smallest possible program in Rust in terms of code size? The println! Cargo is Rust's package and dependency manager, like Bundler, npm, pub, or pip for other languages. Although you can write Rust programs without it, Cargo is nearly indispensable for any larger project. The installation procedure from the previous section includes the Cargo tool, cargo , so Rust is shipped with the batteries included.

Let's remake our first project, welcome , using Cargo through the following steps:. Step 2 has also produced a file called Cargo. At this moment, it contains only the following:. The same format is used to lock down the versions of libraries or packages your project depends on. If your project is built in the future, when updated versions of the libraries are available, Cargo will make sure that only the versions recorded in Cargo. This ensures a repeatable build process. The cargo -list gives you an overview of the commands you can use within this tool.

Exercise : Make, build, and run a project, name , that prints out your name with Cargo. You can search for crates with specific terms, or browse them alphabetically or by number of downloads. The site looks like the following:. Because Rust is a systems programming language, the only thing you need is a good text editor but not a word proecessor for writing the source code, and everything else can be done using commands in a terminal session. However, some developers appreciate the functionalities offered by more fully-fledged text editors specific for programming or Integrated Development Environments IDEs. Rust has a lot of possibilities in this regard. These come with a varying range of features, such as syntax highlighting, code formatting, code completion, linting, debugging, Cargo project support, and so on.

Sublime Text is a very complete text editor, including color schemes. The Rust plugin provides syntax highlighting and auto-completion; type one or more letters, choose an option from the list that appears with an arrow key and then press Tab to insert the code snippet, or simply select a list option through a mouse click. Warnings or errors appear in the lower panel; if everything is OK the output of the program appears together with a message like the following:. A pop-up menu appears, click on RustEnhanced if you only want to compile, click on RustEnhanced Run if you want to execute the program. A SublimeLinter plugin exists that provides an interface to rustc , called SublimeLinter-contrib-rustc. It does additional checks on your code for stylistic or programming errors. The interactive shell rusti or Read-Evaluate-Print-Loop REPL is in development for Rust, which is common for dynamic languages, but remarkable for a statically compiled language.

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Installing Rust - Rust Essentials - Second Edition [Book]

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Exchange Offer cannot be clubbed with Bajaj Finserv for this product. Please apply exchange offer again. Your item has been added to Shortlist. View All. Return form will be sent to your email Id:. Academic Texts. Programming Languages Books. Rust Essentials - Second Edition. Compare Products. You have reached the maximum number of selection. You can select only upto 4 items to compare. View Order. Free Installation. Hover to zoom. Sold Out! Be the first to review. Rs 2, The book is for developers looking for a quick entry into using Rust and understanding the core features of the language. Basic programming knowledge is assumed. Rust is the new, open source, fast, and safe systems programming language for the 21st century, developed at Mozilla Research, and with a steadily growing community.

It was created to solve the dilemma between high-level, slow code with minimal control over the system, and low-level, fast code with maximum system control. This book will give you a head start to solve systems programming and application tasks with Rust. We start off with an argumentation of Rust's unique place in today's landscape of programming languages. You'll install Rust and learn how to work with its package manager Cargo. The various concepts are introduced step by step: variables, types, functions, and control structures to lay the groundwork. Then we explore more structured data such as strings, arrays, and enums, and you'll see how pattern matching works.

Throughout all this, we stress the unique ways of reasoning that the Rust compiler uses to produce safe code.

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Although Rust is designed to be a systems language, it has a broad range of possible applications due to its richness of constructs, making it an ideal candidate for applications that fall into one or all of the following categories:. Embedded systems that require a very minimal runtime footprint or a resource-constrained environment, such as a Raspberry Pi, Arduino, or robotics. Tools or services that can't support the long warm-up delays that are common in Just In Time JIT compiler systems and need instantaneous startup. Rust is especially suited when code quality is important, that is for:.

Due to the design of Rust's compiler, many kinds of browser security bugs are prevented automatically. Servo itself is an open source project with more than contributors. The platform comes for the three major operating systems Linux 2. You should use the current official stable release 1. If you would like to investigate or use the latest developments, install the nightly build version. For Windows, double-click on the. Adding Rust's directory to the search path for executables is an optional part of the installation, so make sure that this option is selected. Verify the correctness of the installation by showing Rust's version with rustc —V or rustc - -version , which produces an output like rustc 1. However, at this moment, only the ARM architecture is supported by it.

The Rust installation directory containing rustc can be found on your machine in the following folder:. If the Rust home folder was added to the search path for executables, rustc can be run from any command-line window. The rustc command has the following format: rustc [options] input. The options are one letter directives for the compiler after a dash, such as -g or -W , or words prefixed by a double dash, such as - -test or - -no-analysis. All the options with some explanation are shown when invoking rustc -h. In the next section, we will verify our installation by compiling and running our first Rust program. Let's get started by showing a welcome message to the players of our game:. Open your favorite text editor such as notepad or gedit for a new file and type in the following code:. This produces an executable program welcome.

Run this program with welcome or. The output executable gets its name from the source file. Compiling and running are separate, consecutive steps, contrary to dynamic languages such as Ruby or Python where these are performed in one step. Let's explain the code a bit to you. As in most languages, execution of the code starts in a main function, which is mandatory in an executable program. In a larger project with many source files, the file containing the main function would be called main. We can see that main is a function declaration because it is preceded by the keyword fn , which is short and elegant like most Rust keywords. The closing brace appears after the code here, right beneath fn. Our program has only one line, which is indented by four spaces to improve readability Rust is not whitespace sensitive.

This line prints the string, "Welcome to the Game! Rust recognizes this as a string because it is surrounded by double quotes " ". This string was given as an argument to the println! The code line ends with a semicolon ; , as most, but not all, code lines in Rust do see Chapter 2 , Using Variables and Types. Write, compile, and execute a Rust program name. The println! Cargo is Rust's package and dependency manager, and it is similar to Bundler, npm, pub, or pip for other languages. Although you can write Rust programs without it, Cargo is nearly indispensable for any large project; it works the same whether you work on a Windows, Linux, or a Mac OS X system. The installation procedure from the previous section includes the Cargo tool, so Rust is shipped with tooling included. It makes a tidy folder structure and some templates for your project with the cargo new command. If your project contains unit tests, it can execute them for you by using cargo test. If your project depends on packages,

it will download them and build these packages according to the needs of your code by using cargo update.

Let's remake our first project welcomec using Cargo by performing the following steps:. The ——bin option tells Cargo that we want to make an executable program a binary. This creates the following directory structure:. A folder with the same name as the project is created; in this folder, you can put all kinds of general information such as a License file, a README file, and so on. In addition, a src subfolder is created that contains a template source file named main. This contains the same code as our welcome. The file Cargo. This file is editable, so other sections can be added. For example, you can add a section to tell Cargo that we want a binary with the name welcome:. We can build our project no matter how many source files it contains using the following command:.

Step 2 has also produced a file named Cargo. At the moment, the application only contains:. The same file format is used to lock down the versions of libraries or packages that your project depends on. If your project is built in the future when updated versions of the libraries are available, Cargo will make sure that only the versions recorded in Cargo. This ensures a repeatable build process. Make, build, and run a project name that prints out your name with Cargo. You can search for crates using specific terms or browse them alphabetically or according to the number of downloads:.

Since Rust is a systems programming language, the only thing that you need is a good text editor but not a word processor! However, some developers appreciate the functionalities offered by more fully fledged text editors which are specifically for programming or IDE's short for integrated development environments. Rust is still young but a lot of possibilities have already come up on this front although some of them need to be updated in the latest Rust version.

Most Rust developers work with Vim or Emacs. After you have installed Sublime Text you might want to get a registered version , you must also install the Package Control package. Then, select Rust from the list, you will see something like the following screenshot:. Sublime Text is a very comprehensive text editor, which includes color schemes. The Rust plugin provides syntax highlighting and auto-completion.

Type one or more letters, choose an option from the list that appears with an arrow key and press Tab to insert the code snippet, or simply select a list-option through a mouse click. To compile and execute Rust code, follow these steps:. Mark Tools Build System Rust in the menu. Warnings or errors will appear in the lower pane; if everything is okay, a message similar to [Finished in 0. Alternatively, you can use the menu items: Tools Build and Tools Run.

A SublimeLinter plugin exists that provides an interface to rustc, which is called SublimeLinter-contrib-rustc. It does additional checks on your code for stylistic or programming errors. You can install it, as explained earlier, through Package Control and then use it from the menu Tools SublimeLinter. On top of all the editing functionality offered by Eclipse, it is project-based using Cargo. Moreover it has code completion and debugging functionality using the GDB debugger. Here you can edit or paste your code, and evaluate it. The rusti is an interactive shell or Read-Evaluate-Print-Loop REPL that is being developed for Rust; this is common for dynamic languages, but it is remarkable for a statically compiled language.

In this chapter, we gave you an overview of Rust's characteristics, where Rust can be applied, and compared it to other languages. We made our first program, demonstrated how to build a project with Cargo, and gave you choices to make a more complete development environment. In the next chapter, we look at variables and types and explore the important concept of mutability.

He received a Ph. He worked for 20 years in the software industry as a developer and consultant in several companies, and for 10 years as project manager at the University Hospital of Antwerp. He wrote a number of introductory books for new programming languages, notably Dart, Julia, Rust, and Red, all published by Packt. About this book Starting by comparing Rust with other programming languages, this book will show you where and how to use Rust.

All of the code is organized into folders. Each folder starts with a number followed by the application name. For example, Chapter This also contains the Cargo project and package manager. To work more comfortably with Rust code, a development environment like Sublime Text can also be of use. Chapter 1, Starting with Rust, contains detailed instructions on how to set up your Rust environment. Rust Essentials. Rust High Performance. Learning Rust. Skip to content. Branches Tags. Could not load branches. Could not load tags. Latest commit. Git stats 7 commits. Failed to load latest commit information. Code files added. Nov 8,

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