

Rust Programming Notes - 30 Questions & Answers

1. Q: What is Rust?

A: Rust is a systems programming language focused on safety, speed, and concurrency.

2. Q: Who created Rust?

A: Rust was created by Graydon Hoare at Mozilla Research in 2010.

3. Q: What are Rust's key features?

A: Memory safety without garbage collection, zero-cost abstractions, concurrency support.

4. Q: What is Cargo in Rust?

A: Cargo is Rust's package manager and build system.

5. Q: What is rustc?

A: rustc is the Rust compiler.

6. Q: What is the file extension for Rust source files?

A: .rs

7. Q: How to compile and run a Rust program?

A: Use 'rustc filename.rs' to compile, './filename' to run, or 'cargo run' for projects.

8. Q: What is the main() function in Rust?

A: It is the entry point of a Rust program.

9. Q: What are variables in Rust?

A: Containers for storing data, declared with 'let'.

10. Q: What is mut in Rust?

A: 'mut' makes a variable mutable.

11. Q: What is shadowing in Rust?

A: Redeclaring a variable with the same name, possibly with a different type.

12. Q: What are Rust's basic data types?

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A: Integer, floating point, boolean, character, string, tuple, array.

13. Q: What is a tuple in Rust?

A: A fixed-size collection of values of different types.

14. Q: What is an array in Rust?

A: A fixed-size collection of values of the same type.

15. Q: What is ownership in Rust?

A: The set of rules governing how memory is managed in Rust.

16. Q: What is borrowing in Rust?

A: Borrowing allows references to data without taking ownership.

17. Q: What is a reference in Rust?

A: A pointer to a value without owning it.

18. Q: What is a slice in Rust?

A: A view into a contiguous sequence of elements in a collection.

19. Q: What is a struct in Rust?

A: A custom data type that groups related values.

20. Q: What is an enum in Rust?

A: A type that can be one of several variants.

21. Q: What is match in Rust?

A: A control flow construct that allows pattern matching.

22. Q: What is Result in Rust?

A: An enum used for error handling, with `Ok(T)` and `Err(E)` variants.

23. Q: What is Option in Rust?

A: An enum that represents a value that can be `Some(T)` or `None`.

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24. Q: What is panic!() in Rust?

A: A macro that stops execution when an unrecoverable error occurs.

25. Q: What is unwrap() in Rust?

A: A method that extracts the value inside an Option or Result, panicking if it's None or Err.

26. Q: What is a trait in Rust?

A: A collection of methods that types can implement.

27. Q: What is impl in Rust?

A: A keyword used to define implementations for structs, enums, or traits.

28. Q: What is lifetimes in Rust?

A: A way to describe how long references are valid.

29. Q: What is concurrency in Rust?

A: Achieved through threads, async/await, and channels.

30. Q: What is the difference between String and &str?

A: String is an owned, growable heap-allocated string; &str is a string slice, a reference to a string.