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Notes

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1 Notes

- By default all rust crates link to standard library, which depends on the operating system for features such as threads, scheduling, file, or networking. It also includes `libc` library.
- We can disable inclusion of standard library in rust through the `no_std` attribute.
- Cargo.toml file in a rust project contains project configurations such as dependencies, author, version etc...
- Panic handler function is part of the standard library and it defines the function that the compiler should invoke when the `panic` occurs. Panic handler is a divergent function.
- Rust has a special syntax for `diverging functions` which are functions that do not return;
- `Language items` are special functions and types that are internally required by compiler.
- When you run a rust application first thing that gets executed is not your main function, it is a function that named start. The reason for that because `runtime environment` needs be set up and exists before your main application. This environment creates the stack places the right arguments on to the register.
- When you turn on your computer it first executes a firmware that reside in your motherboard. This firmware is called `bootloader`.
- Bootloader firmware in your motherboard is the one who loads your operating system.
- To be able to use inline assembly language you can use `asm` feature from rust nightly version.

- With rust we can target different platforms or we can specify the target platform for our application with a [JSON file](#). Most fields in the JSON file are required by LLVM.
- Some of the built in libraries in rust such as [core](#), and [compiler builtins](#) are compiled for known host triplets and we sometimes need to cross compile it to work with other targets, to do that we can use [cargo-xbuild](#)!
- We can specify our target platform on [./cargo/config](#) file without having to pass `--target` argument every time we build our application.

```
{
    "llvm-target": "x86_64-unknown-linux-gnu",
    "data-layout": "e-m:e-i64:64-f80:128-n8:16:32:64-S128",
    "arch": "x86_64",
    "target-endian": "little",
    "target-pointer-width": "64",
    "target-c-int-width": "32",
    "os": "linux",
    "executables": true,
    "linker-flavor": "gcc",
    "pre-link-args": ["-m64"],
    "morestack": false
}
```

2 References

- [libc](#)
 - <https://www.gnu.org/software/libc/>
- [attribute](#)
 - <https://doc.rust-lang.org/rust-by-example/attribute.html>
- [panic](#)
 - <https://doc.rust-lang.org/stable/book/ch09-01-unrecoverable-errors-with-panic.html>
- [Diverging Function](#)
 - <https://doc.rust-lang.org/1.30.0/book/first-edition/functions.html#diverging-functions>
- [Language Items](#)
 - <https://manishearth.github.io/blog/2017/01/11/rust-tidbits-what-is-a-lang-item/>

- <https://doc.rust-lang.org/1.5.0/reference.html#language-items>
 - <https://doc.rust-lang.org/1.5.0/book/lang-items.html>
- **Runtime Environment**
 - https://en.wikipedia.org/wiki/Runtime_system
- **ABI**
 - https://en.wikipedia.org/wiki/Application_binary_interface
- **Cross Compiler**
 - https://en.wikipedia.org/wiki/Cross_compiler
- **Bootloader**
 - <https://wiki.osdev.org/Bootloader>
 - <https://en.wikipedia.org/wiki/BIOS>
 - https://en.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface
 - https://en.wikipedia.org/wiki/GNU_GRUB
- **ASM**
 - <https://doc.rust-lang.org/nightly/unstable-book/language-features/asm.html>
- **Specification of Target Platform**
 - <https://llvm.org/docs/LangRef.html#data-layout>
 - [https://en.wikipedia.org/wiki/Linker_\(computing\)](https://en.wikipedia.org/wiki/Linker_(computing))
 - <https://lld.llvm.org/>
 - <https://os.phil-opp.com/red-zone/>
 - <https://en.wikipedia.org/wiki/SIMD>
 - <https://os.phil-opp.com/disable-simd/>
- **Core and Compiler Builtins**
 - <https://doc.rust-lang.org/nightly/core/index.html>
- **Cargo XBuild**
 - <https://github.com/rust-osdev/cargo-xbuild>
- **Cargo Config**
 - <https://doc.rust-lang.org/cargo/reference/config.html>