COMP6991 23T3

Metaprogramming

Examples of metaprogramming

> Compiler plugins

   > e.g. Project lombok

> Macro systems

   > e.g. C, Rust

> Runtime reflection

   > e.g. Java, C#

> Embedded DSLs

   > e.g. jOOQ, elisp

   > Combinators, e.g. Nom

Why?

> Purpose-fit syntax

> Increased validation

> Convenience

> Syntax extension

Why not?

> Difficult to write / maintain?

> Difficult to understand?

> Integration with base language?

Macros in C

Macros in Rust

Declarative macros

(Macros by example)

> "Easy" to read

> "Easy" to write

> Simple semantics

> Limited in capability

C macros -> Rust

Procedural macros

(Proc macros)

> Fully-fledged Rust code!

> fn(TokenStream) -> TokenStream

> Very difficult to write?

> Very difficult to read?

> Extremely powerful

> Intricate implications

vec![...]

Macro metavariables

> Reference:

https://doc.rust-lang.org/reference/macros-by-example.html#metavariables

Macrokata!

for (a; b; c) { ... }

Awesome macros!

```
> sqlx

> yew
```