

Building Standalone Programs and Using Libraries

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Objectives

- make programs outside Jupyter playground
 - SSH (command line)
 - editors, not web browsers
- build system
- use libraries
- split a program into multiple files (\approx use something defined in another file)

Build system

many languages have “build system” to help you use external libraries

- Go: `go` is it
- Julia: no particular build system
- OCaml: `dune` <https://dune.build/>
- Rust: `cargo`

Using libraries

using a library entails different procedures depending on how “embedded” it is into the language

- some libraries are **“builtin”**
 - automatically available in every program
- some libraries are **“standard”**
 - you need to master how to refer to names in it
 - you “import” (or “use”) the library and/or use prefixes to refer to names in it
 - installed with the language, so you don’t need to install it

Using libraries

- some libraries are “external”
 - you may have to install it
 - you may have to tell the compiler where it is
- the unit of installing and importing a library is called differently among languages
 - Go : package
 - Julia : module
 - OCaml : module
 - Rust : crate

Importing a library to your program

- assume M is a library name and n a name defined in M
- Go:
 - `import "M"` and call $M.n$
- OCaml:
 - call $M.n$
 - `open M` and call n

Importing a library to your program

- Julia:
 - `import M` and call $M.n$
 - `using M` and call n
- Rust:
 - assume C is the name of a crate
 - a crate may contain nested modules ($C \ni M_0 \ni \dots \ni n$)
 - call $C :: M_0 :: M_1 :: \dots :: n$
 - `use $C :: M_0 :: M_1 :: \dots :: n$` and call n
 - anywhere between the two

Repository of libraries

- master how to get information you need (names of functions, their types, etc.) from those repositories
- is it builtin? standard? external?
- OCaml: opam <https://opam.ocaml.org/>
- Julia: Julia packages <https://julialang.org/packages/>
- Go: <https://pkg.go.dev/>
- Rust: <https://crates.io/>