ASA·I 浅井

```
info: you are at WITS
info: j.w.w. Reed Mullanix
warning: favonia on stage
```

A typical implementation day

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Exception: Failure "type error".
Raised at Stdlib.failwith in file "std
lib.ml", line 29, characters 17-33
Called from <unknown> in file "./test.
ml", line 12, characters 9-17
Called from Topeval.load_lambda in fil
e "toplevel/byte/topeval.ml", line 89,
 characters 4-14
```

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A user-perceived stack backtrace

not call backtrace for debugging! diagnostics are for users, not *you!*

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Allowing multiple spans (locations in source files)

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- However, full structuredness is challenging for very ad-hoc messages
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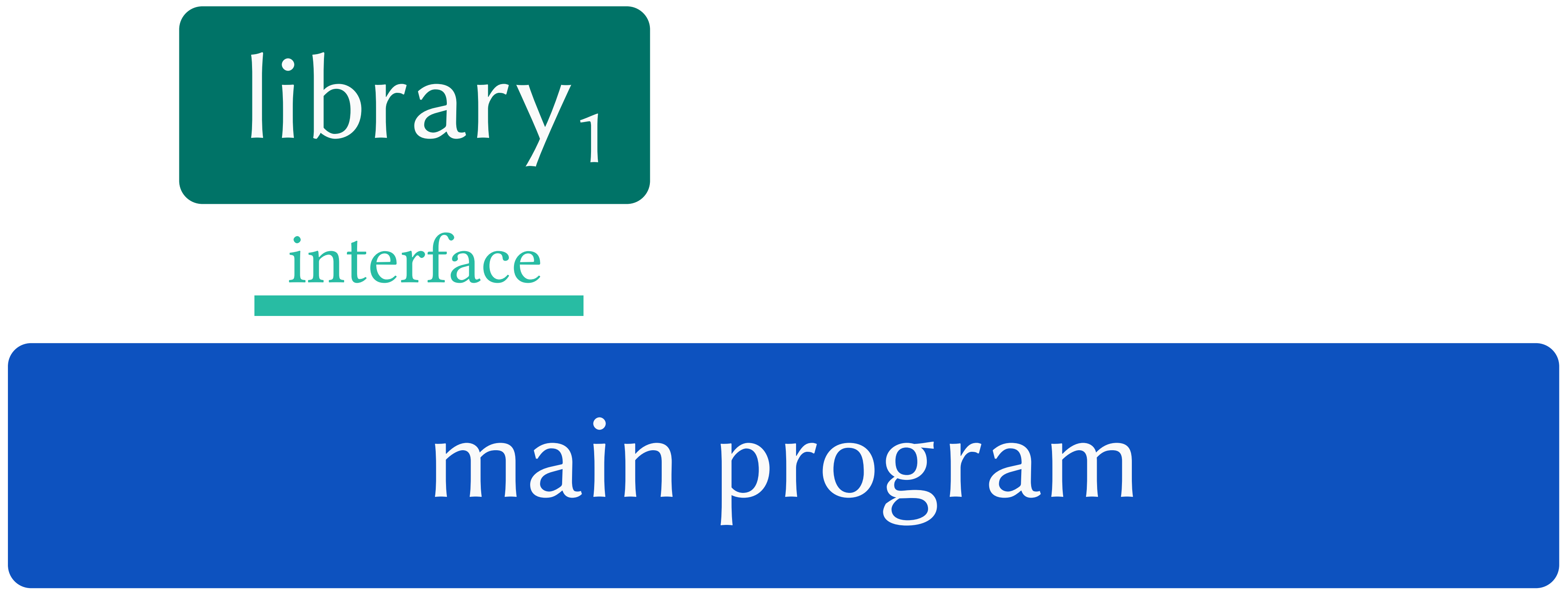
- Some structuredness, especially the classification, helps users identify (= Google) relevant help documents
- However, full structuredness is challenging for very ad-hoc messages Think about all possible errors from parsing
- Which one? We support both the 100% and 50% style!

Compositionality

It should be easy to use a library that also uses asai



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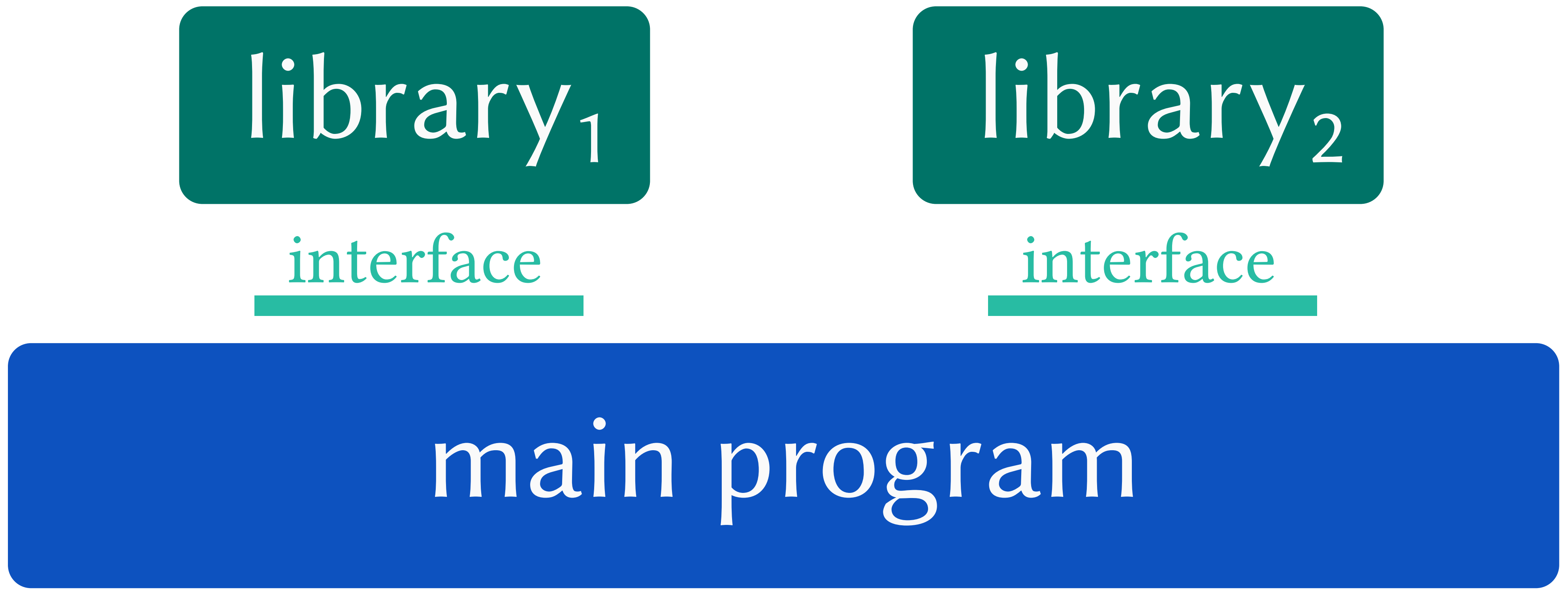

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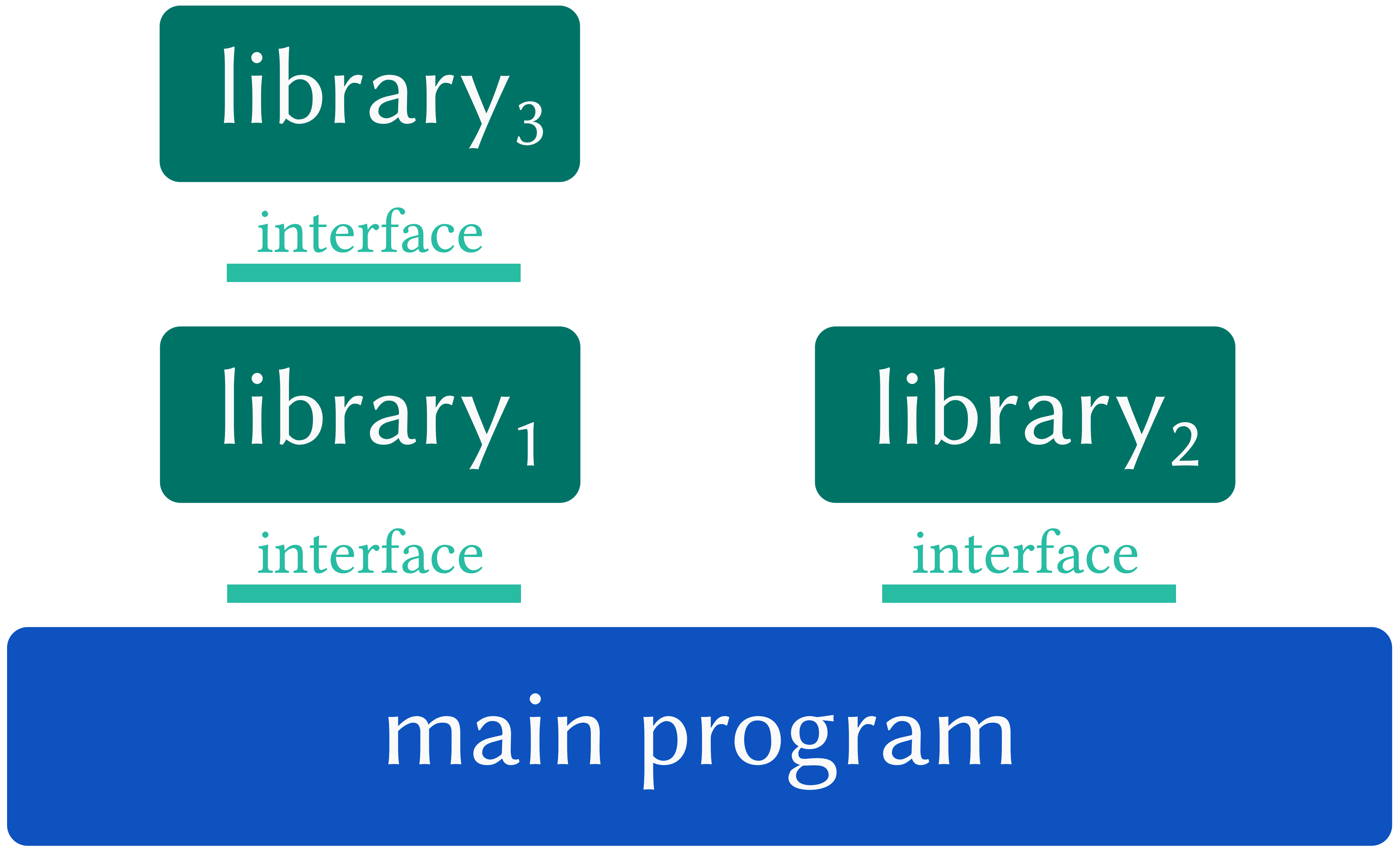
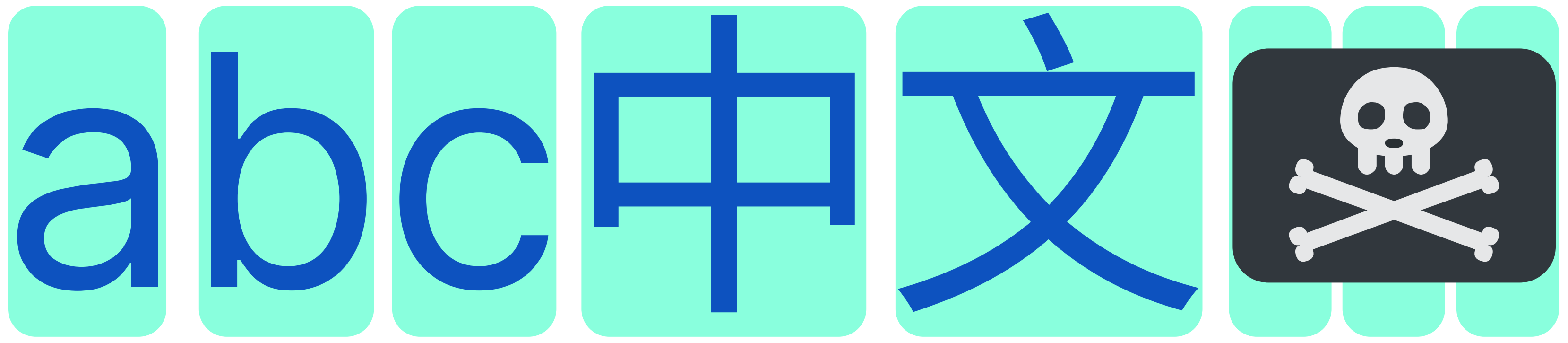


Unicode Support

abc中文☠️

Unicode Support



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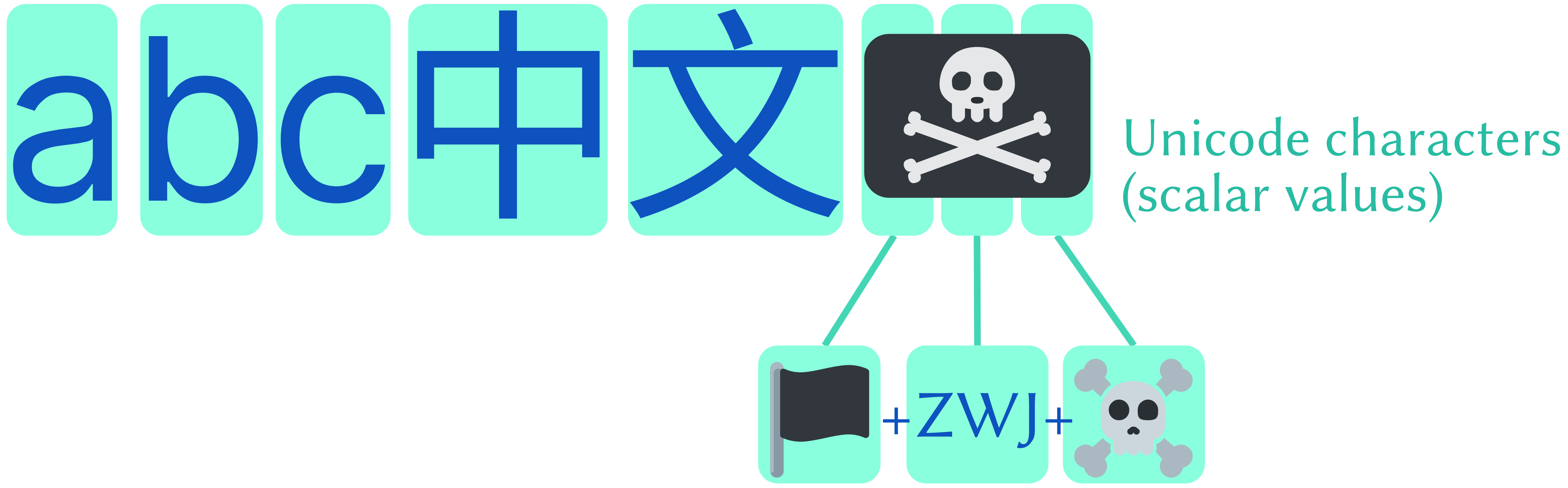

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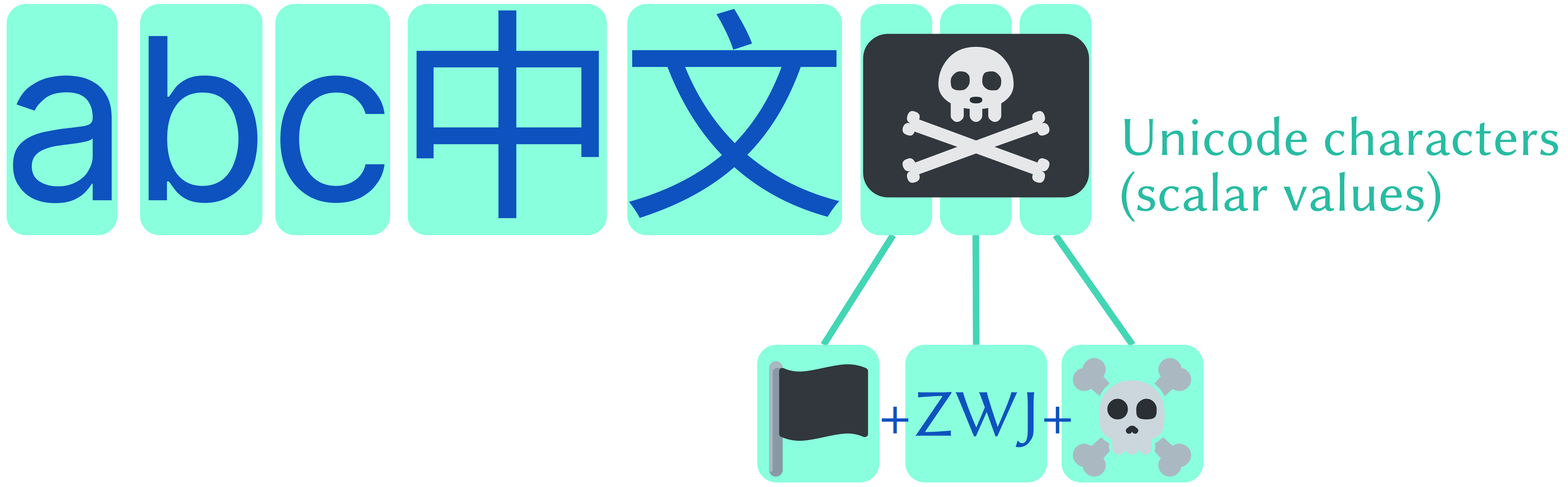

No easy way to predict the visual widths

Your fonts, terminals, and maybe locales matter

Many programs use (broken) heuristics

Unicode Support

```
2 |     vec![(), ()].iter().sum::<i32>();
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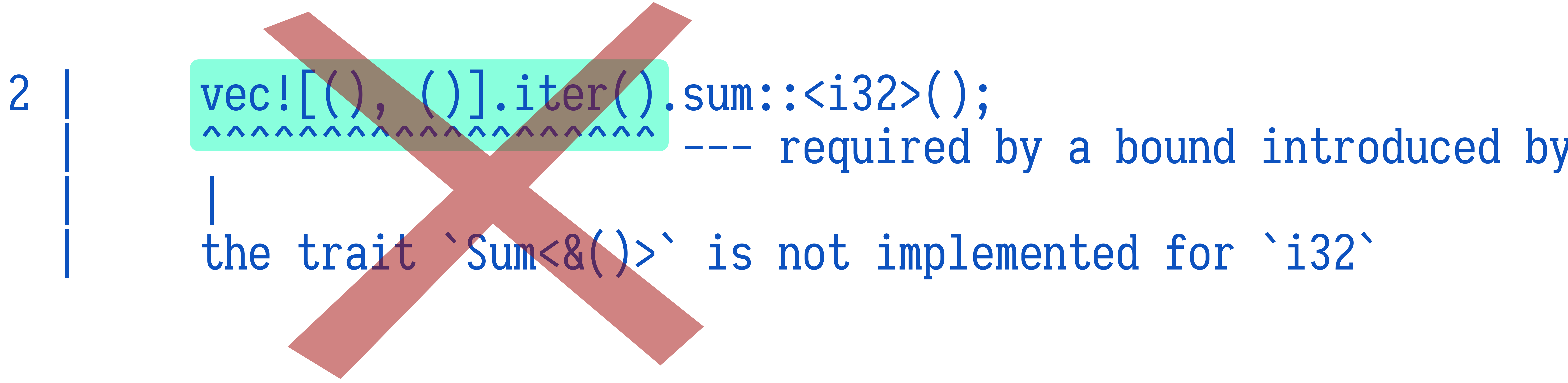

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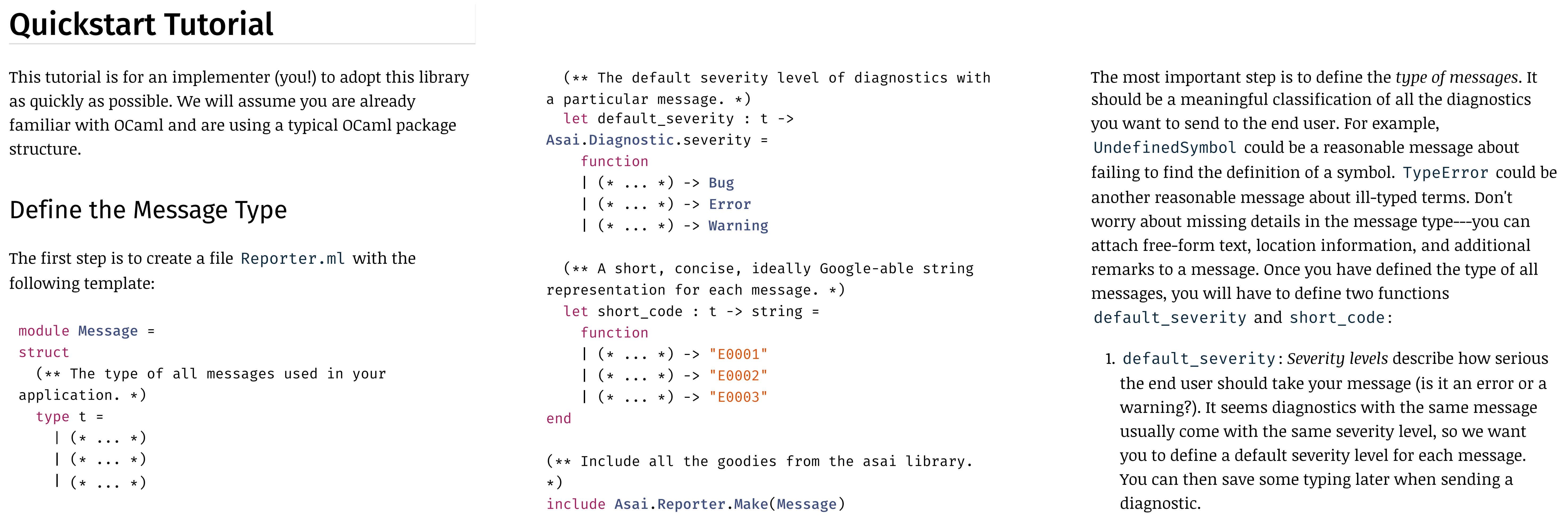
You cannot know the visual width!

If it fails for emojis, it fails. Period.

Tutorial-Oriented Design



Quickstart Tutorial

This tutorial is for an implementer (you!) to adopt this library as quickly as possible. We will assume you are already familiar with OCaml and are using a typical OCaml package structure.

Define the Message Type

The first step is to create a file `Reporter.ml` with the following template:

```
module Message =
struct
  (** The type of all messages used in your
application. *)
  type t =
    | (* ... *)
    | (* ... *)
    | (* ... *)

  (** The default severity level of diagnostics with
a particular message. *)
  let default_severity : t ->
Asai.Diagnostic.severity =
    function
    | (* ... *) -> Bug
    | (* ... *) -> Error
    | (* ... *) -> Warning

  (** A short, concise, ideally Google-able string
representation for each message. *)
  let short_code : t -> string =
    function
    | (* ... *) -> "E0001"
    | (* ... *) -> "E0002"
    | (* ... *) -> "E0003"
end

(** Include all the goodies from the asai library.
*)
include Asai.Reporter.Make(Message)
```

The most important step is to define the *type of messages*. It should be a meaningful classification of all the diagnostics you want to send to the end user. For example, `UndefinedSymbol` could be a reasonable message about failing to find the definition of a symbol. `TypeError` could be another reasonable message about ill-typed terms. Don't worry about missing details in the message type---you can attach free-form text, location information, and additional remarks to a message. Once you have defined the type of all messages, you will have to define two functions `default_severity` and `short_code`:

1. `default_severity`: *Severity levels* describe how serious the end user should take your message (is it an error or a warning?). It seems diagnostics with the same message usually come with the same severity level, so we want you to define a default severity level for each message. You can then save some typing later when sending a diagnostic.

https://redprl.org/asai/asai/quickstart.html

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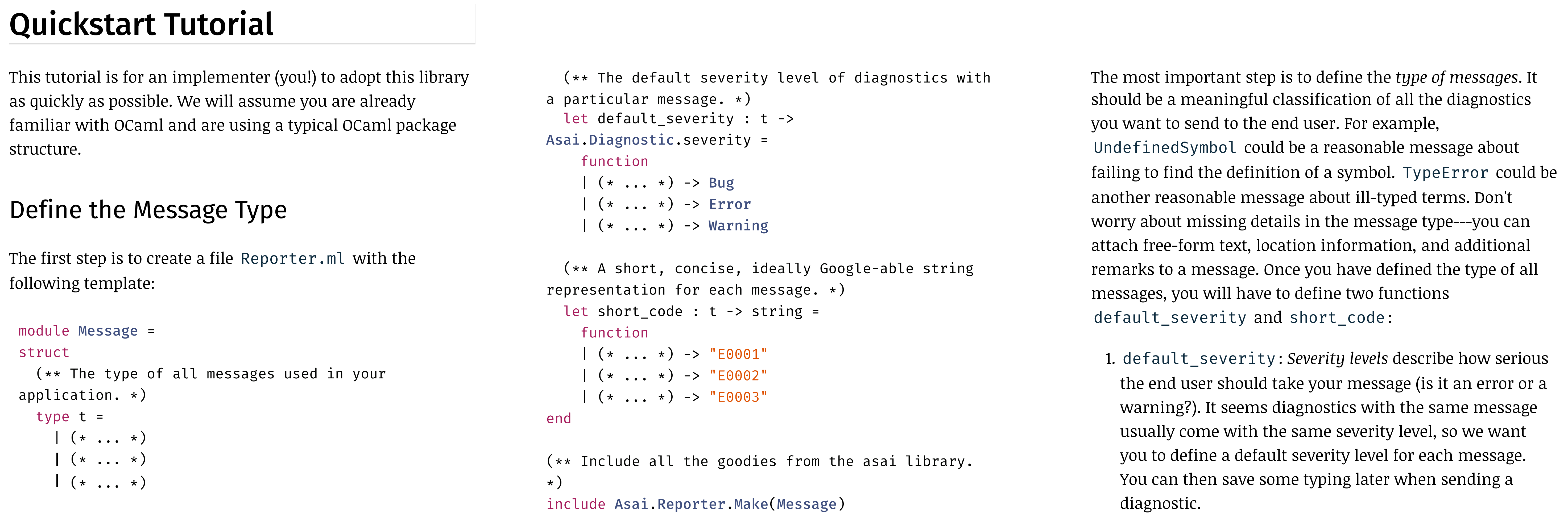

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Write a tutorial to improve your design

rubber duck design™

Related OCaml Work

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representaiton (type of diagnostics)	LSP-style	Rust-style

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Current plan: bridge these two libraries

Success Stories

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forester: Jon Sterling's tool to generate his website

(not a proof assistant!)

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`https://ocaml.org/p/asai`