REASON

Schedule

- Intro
- Data structures
- ReasonReact
- GraphQL

DON'T PANIC

JavaScript developer friendly syntax

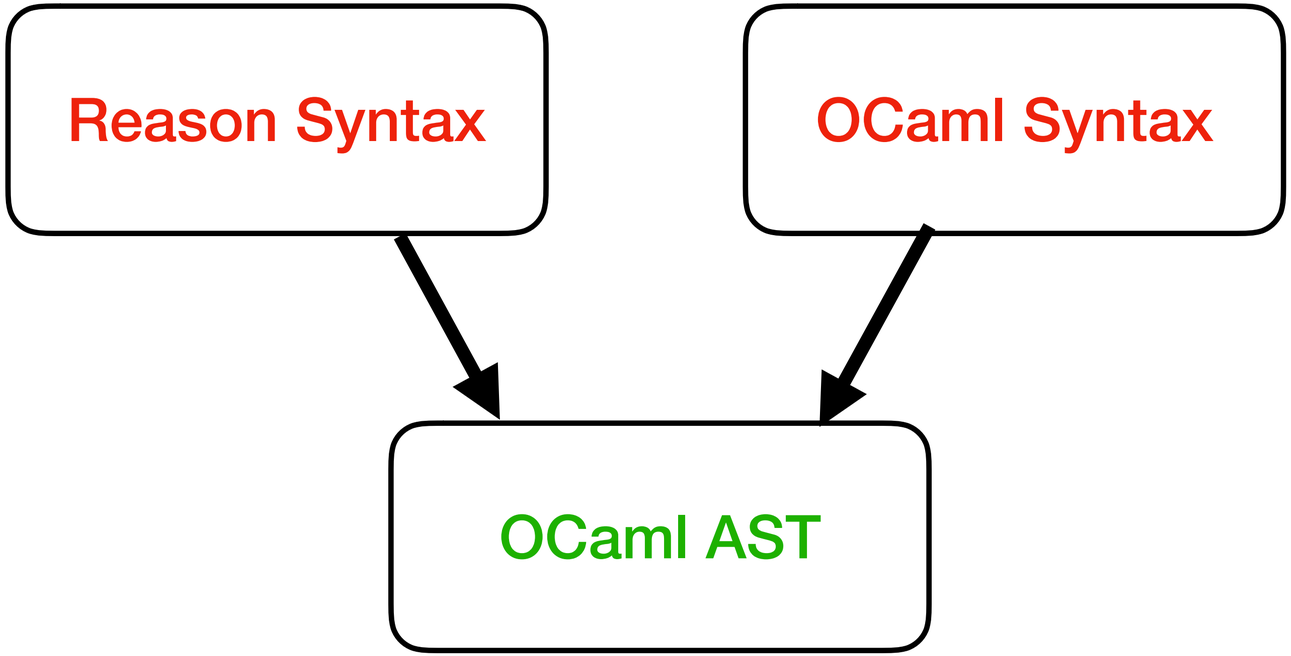
```
let meaningOfLife = 41 + 1;
```

```
let add = (x, y) => x + y;

add(2, 2);

add(41, 1);
```

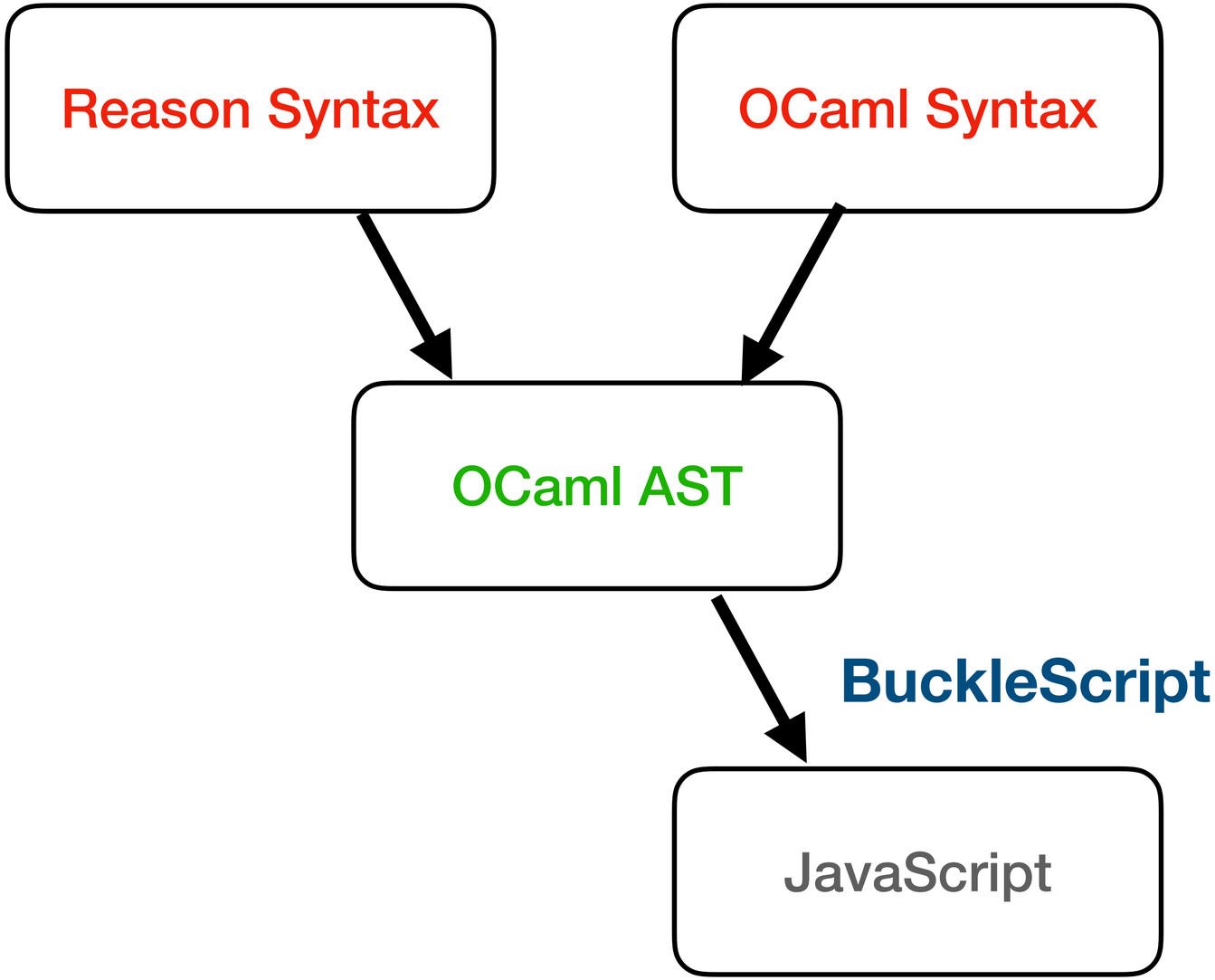
```
let fruits = ["Apple", "Orange"];
```

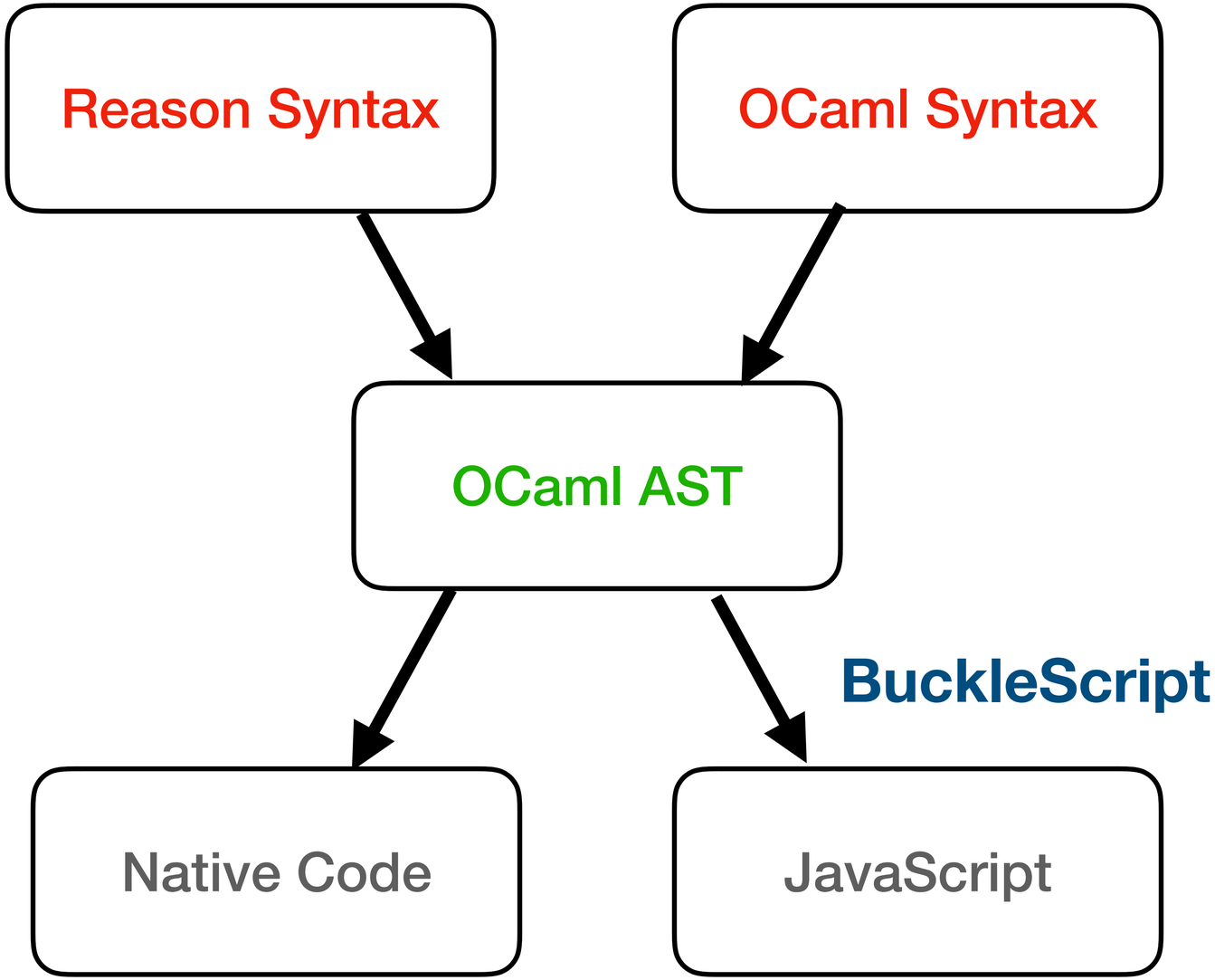
```
if (true) {
  print_string("Hello World!");
};
```

OCaml semantics


Reason Syntax
OCaml Syntax
OCaml AST

Compiles to JavaScript


Reason Syntax
OCaml Syntax
OCaml AST
BuckleScript
JavaScript


Reason Syntax
OCaml Syntax
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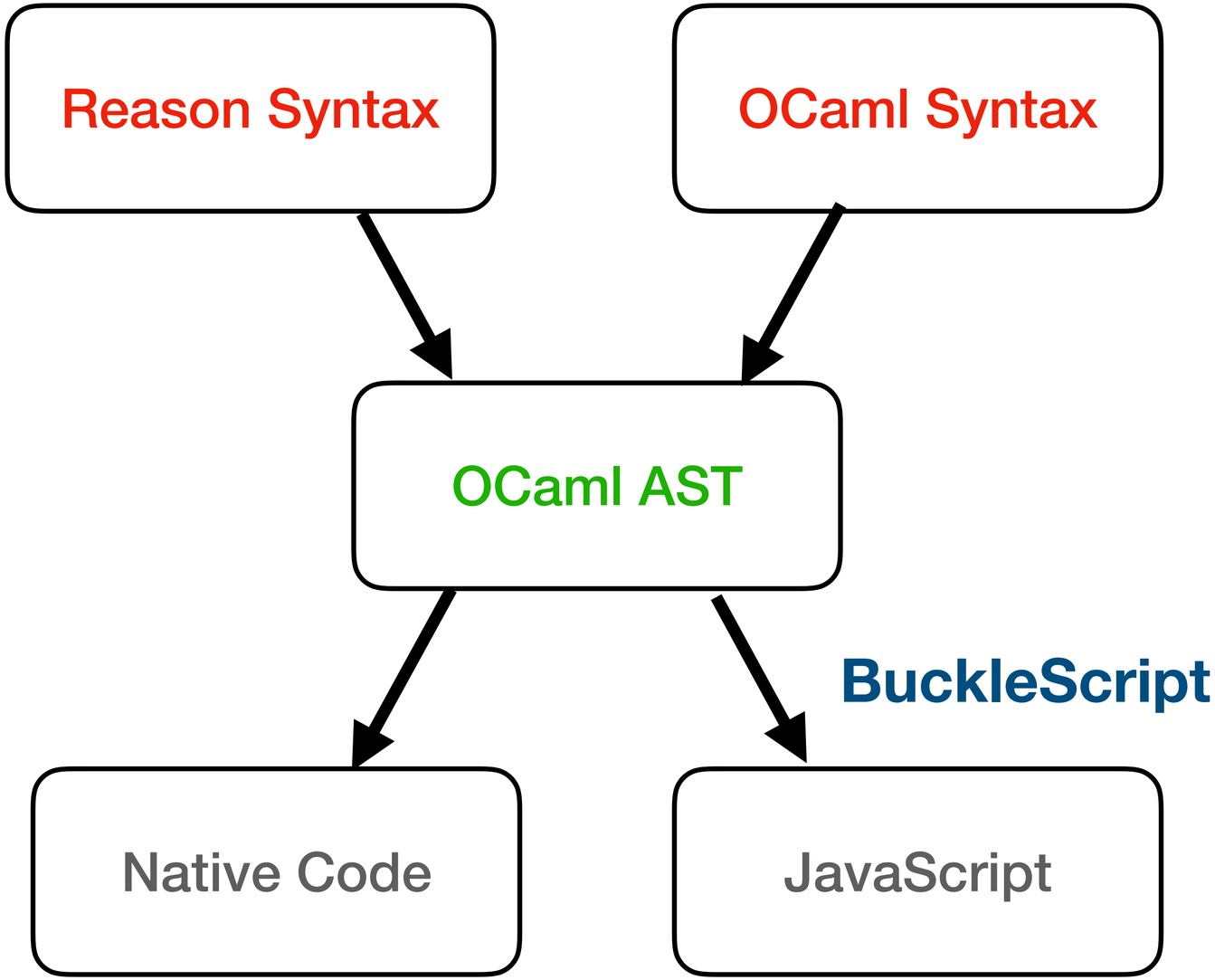
BuckleScript
Native Code
JavaScript

Formatter


Reason Syntax
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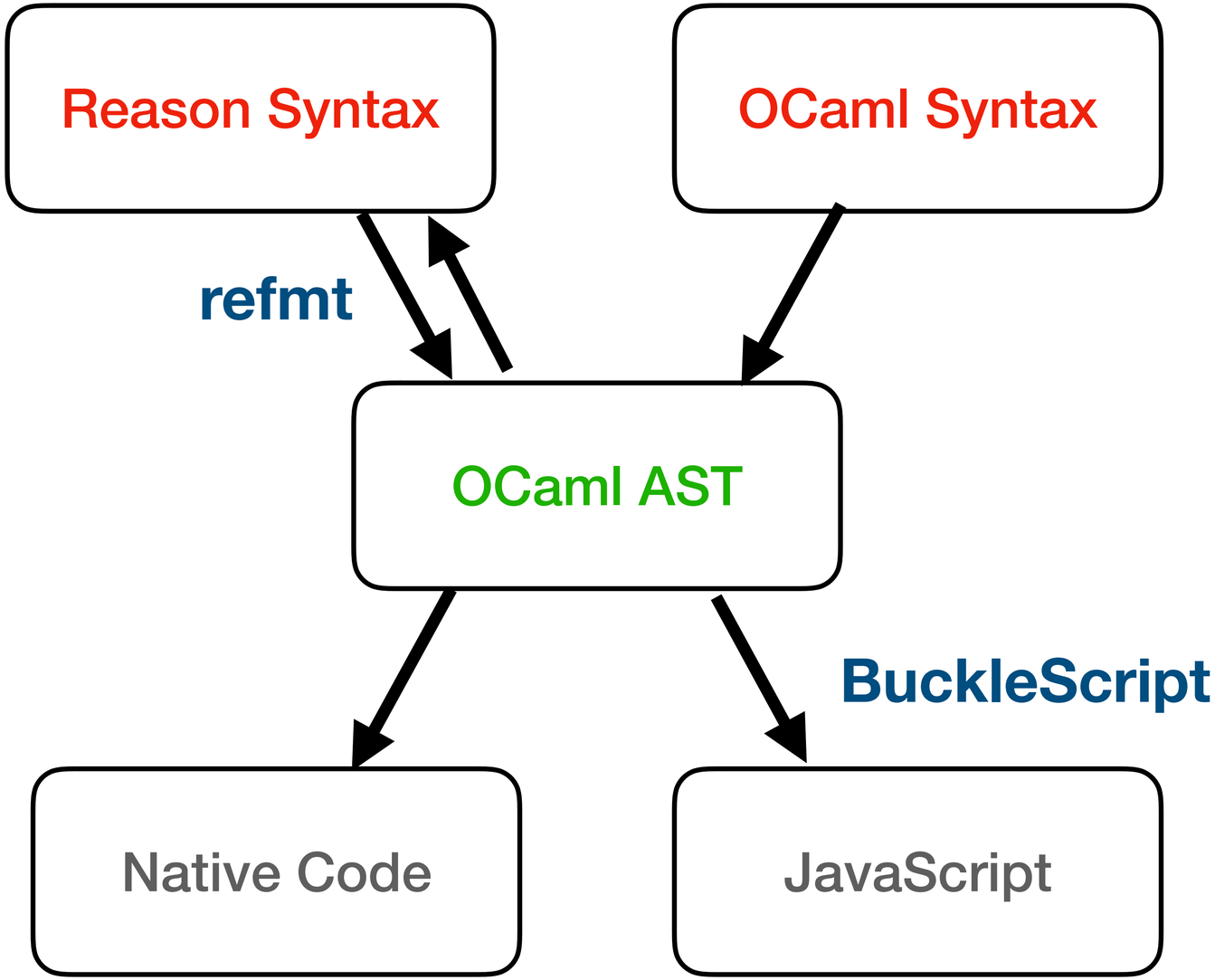
Reason Syntax
OCaml Syntax
refmt
OCaml AST
BuckleScript
Native Code
JavaScript

But why?

Statically Typed Language

Records

```
let jane = {name: "Jane", age: 40};
```

```
let jane = {name: "Jane", age: 40};
```

```
1 | let jane = {name: "Jane", age: 40};

The record field name can't be found.
```

```
type person = {
  name: string,
  age: int,
};

let jane = {name: "Jane", age: 40};
```

```
type person = {
  name: string,
  age: int,
};

let jane = {name: "Jane", age: 40};

let tim = {...jane, name: "Tim"};
```

Variants

```
type direction =
  | Up
  | Down
  | Left
  | Right;
```

```
type direction =
  | Up
  | Down
  | Left
  | Right;

let move = Left;
```

```
type direction =
  | Up(int)
  | Down(int)
  | Left(int)
  | Right(int);

let move = Left(2);
```

JavaScript

```
const state = {
  loading: true,
  error: false,
  data: {},
}
```

```
type data = {names: list(string)};

type request =
  | Loading
  | Error(int)
  | Success(data);
```

```
type color = Black | White;

type kind = Queen | King | Rook | Bishop | Knight | Pawn;

type piece = {
  color,
  kind,
  position: (int, int),
};

let pieces = [
  {kind: King, color: Black, position: (3, 4)},
  {kind: Pawn, color: Black, position: (4, 2)},
  {kind: Knight, color: White, position: (3, 3)},
];
```

Pattern Matching

```
switch (<value>) {
| <pattern1> => <case1>
| <pattern2> => <case2>
| ...
};
```

```
switch (1) {
| 0 => "off"
| 1 => "on"
| _ => "off"
};
```

```
let displayText =
  switch (1) {
  | 0 => "off"
  | 1 => "on"
  | _ => "off"
  };
```

```
type data = {names: list(string)};

type request =
  | Loading
  | Error(int)
  | Success(data);

let ui =
  switch (Loading) {
  | Loading => "Loading ..."
  | Error(code) => "Something went wrong. Error: " ++ string_of_int(code)
  | Success(data) => List.fold_left((a, b) => a ++ b, "Names:", data.names)
  };
```

```
type data = {names: list(string)};

type request =
  | Loading
  | Error(int)
  | Success(data);

let ui =
  switch (Loadi
  | Loading => ing ..."
  | Error(401) => "You aren't authenticated."
  | Error(code) => "Something went wrong. Error: " ++ string_of_int(code)
  | Success(data) => List.fold_left((a, b) => a ++ b, "Names:", data.names)
  };
```

```
type data = {names: list(string)};

type request =
  | Loading
  | Error(int)
  | Success(data);

let ui =
  switch (Loadi
  | Loading => ing ..."
  | Error(401 | 402) => "You aren't authenticated."
  | Error(code) => "Something went wrong. Error: " ++ string_of_int(code)
  | Success(data) => List.fold_left((a, b) => a ++ b, "Names:", data.names)
  };
```

“I call it my billion-dollar mistake …”

– *Tony Hoare*

```
Exception in thread "main" java.lang.NullPointerException
        at NullExp.main(NullExp.java:8)
```

```
▶Uncaught TypeError: Cannot read property 'undefined' of undefined
    at <anonymous>:3:11
```

Lesson I

Don’t implement anything just because it’s easy!

Lesson II

Null is BAD!

```
null; // doesn't exist!
```

Option

```
let foo = None;

let foo = Some(42);

let foo = Some([1, 2, 3]);

let foo = Some("Hello World!");
```

```
let foo = None;

let foo = Some(42);

let foo = Some([1, 2, 3]);

let foo = Some("Hello World!");

switch (foo) {
| None => "Sadly I don't know."
| Some(value) => "It's " ++ value
};
```

Functions

```
let add = (x, y) => x + y;

add(2, 2);
add(41, 1);
```

```
let name = (~firstName, ~lastName) => firstName ++ " " ++ lastName;

/* Jane Doe */
name(~firstName="Jane", ~lastName="Doe");

/* Jane Doe */
name(~lastName="Doe", ~firstName="Jane");
```

BuckleScript


```
$ npm install -g bs-platform
```

Major differences between the OCaml <--> **Reason** ecosystem:

- **Reason** is commonly used in tandem with BuckleScript
- **Reason** is focusing the **npm / yarn** workflow
- **Reason** tries to **unify tools** and optimizes them for the **JS** use-case
- **Reason (as a syntax)** can be used with every major OCaml build tool

Major differences between the **OCaml** <--> Reason ecosystem:

- **OCaml** is using the **opam** package manager & dune (prev. jbuilder) build-tool to target native binaries
- **OCaml** native binaries are **insanely fast** and **efficient**

Goals of the Reason Project:

- Offer an **alternative syntax**, which makes it easier for JavaScript developers to get into OCaml
- Leverage the **OCaml type system** to build **type-safe webapps**
- **Modernize docs** of the OCaml ecosystem during the process

Note: It **doesn't want to replace OCaml nor JavaScript** (all languages even can be mixed inside a project)

WARNING

-Reason is something you are probably not used to

-Some type errors will be confusing

-Your editor will eventually get freaky sometimes

-As soon as you get over the first big hurdles and understand the basic concepts, it will gradually be more enlightening

-Don't overthink it! Go slow and ask questions if something is unclear

```
/* unit */
let nothing = ();

let str = "Some string";

/* Int is its own data type */
let someInt = 1;

/* The dot signals a floating point number */
let someFloat = 1.;

/* Yeah, Reason also supports single characters */
let someChar = 'c';

/* List is immutable, good for small number of entries */
let someList = [1, 2, 3];

/* Arrays are quicker and mutable... good for JS interop */
let someArray = [|1, 2, 3|];

/* Tuples always contain a strict fixed number of elements */
let someTuple = (1, 2);

/* You can annotate variables as well */
let someAnnotated: string = "";

/* Some record (needs type definition of given record) */
let someRecord = {test: "test", good: true };
```

```
/* This is a variant type `color` with 3 tags */
type color = Red | Green | Blue;

/* Tags don't have any concrete value.
Note that we never have to annotate `myColor` */
let myColor = Red;

/* You can define type constructors, which
can attach data to provided Tags */
type distance = int;
type movement =
    | Up(distance)
    | Down(distance)
    | Left(distance)
    | Right(distance);


/* When we want to use `Up`, we need to provide a value */
let myMove = Up(10);
```

The End