

# Foundation Of Software

Half-term project

Objective: Design the syntax, semantics and type system for your own language

# Requirements

Should have at least:

- Functions
- Arithmetic on Nat
- Booleans
- *Implementation* of (1) small step semantics, (2) type system, (3) an interpreter

But also, pick two or more out of:

- Product/Sum types
- Record/Variants types
- State
- Exception
- Recursion

*Prove:*

*Correctness of the interpreter*

*Safety of your typesystem*

# Attack plan:

First on paper (**due in two weeks**):

- Build a team of **2** or **3** students
- Abstract syntax for your own language **on paper**
- Small step semantics **on paper**
- Definition of a type system **on paper** that you think will guarantee safety

Then formalize everything in Lean 4 in the next remaining 2 weeks and a half (*due may 6<sup>st</sup>*)