

CS 472 – Provably Correct Programming

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Questions

Nobody has responded yet.

Hang tight! Responses are coming in.

Interactive Theorem Provers

- In the theorem prover, we can:
 1. Write **definitions**, in a math-like programming language
 2. Write **proofs** about those definitions, using logic “tactics”
 3. See the **proof state** at each point in a proof (what do we know? what do we still need to show?)
 4. Automatically **check** that each step of our proofs is valid

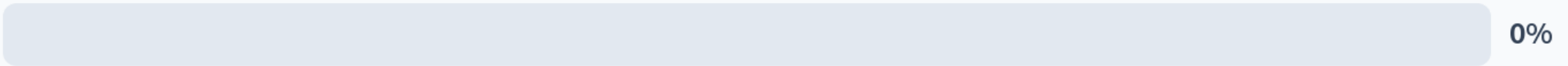
Writing Definitions in Coq/Rocq

- The definition language is an OCaml-like functional programming language, called Gallina
- Key features: inductive types, pattern matching, and recursion
- Purpose is to *define mathematical objects*, not to write programs (though the two are often the same!)

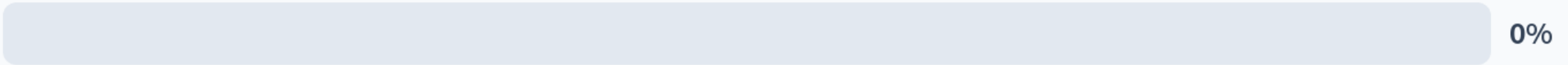
- See Basics.v from the textbook

Have you used a functional language with datatypes and pattern matching before?

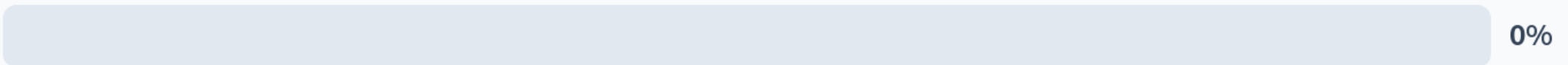
Yes



No



Not sure



Inductive Definitions

Inductive day :=	Types are sets!	
monday	{monday, tuesday, ..., saturday, sunday}	
tuesday		
wednesday	day is a type	day is a set
thursday	monday : day	monday ∈ day
friday	tuesday : day	tuesday ∈ day
saturday
sunday.	saturday : day	saturday ∈ day
	sunday : day	sunday ∈ day

Exercise: nandb

- Complete the exercise “nandb” in Basics.v: fill in the definition of nandb, and prove that the examples work
- Submit your definition and example proofs for Exercise 1/16 on Gradescope
- It may help to refer to the definitions of negb, andb, and orb earlier in the file

Inductive Definitions

How would you define the natural numbers?

Questions

Nobody has responded yet.

Hang tight! Responses are coming in.

HW1: Basics.v

- Complete the listed exercises in Basics.v
- Due Friday 1/24 at 11:59 PM
- Submit via Gradescope (autograder coming soon)