HW #2 – Logical Foundations in Coq

Published: 18.5.23
Due: 10.6.23 by 23:59.

Please read the submission instructions carefully.
Complete the following exercises in the files Tactics.v, Logic.v, IndProp.v and ProofObjects.v attached to this assignments.

- from `Tactics.v`:
  - app_length_twice
  - combine_split
  - eqb_sym
  - forall_exists_challenge
  - plus_n_n_injective
- from `Logic.v`:
  - contrapositive
  - dist_not_exists
  - In_map_iff
  - All
  - tr_rev_correct
  - not_exists_dist
  - classical_axioms
- from `IndProp.v`:
  - R_fact
  - filter_challenge
  - palindromes
  - NoDup
  - pigeonhole_principle
- from 'ProofObjects.v':
  - equality__leibniz_equality
  - equality__leibniz_equality_term
  - leibniz_equality__equality
  - pe_implies_or_eq
  - pe_implies_true_eq
  - pe_implies_pi

Submission instructions:

In order for the auto grader to work correctly on your Coq files (and give you full credit for your work!), please be careful to follow these rules:

- Do not Zip the Coq files or place them within a folder.

- Use only the files attached to this assignment. Do not use any other version of these files. The other exercises in these files (not listed above) are marked optional in the exercise files.
- Do not alter the "markup" that delimits exercises: the Exercise header, the name of the exercise, the "empty square bracket" marker at the end, etc. Please leave this markup exactly as you find it.
- Do not delete exercises. If you skip an exercise (e.g., because it is marked "optional," or because you can't solve it), it is OK to leave a partial proof in your [.v] file; in this case, please make sure it ends with [Admitted] (not, for example [Abort]).
- It is fine to use additional definitions (of helper functions, useful lemmas, etc.) in your solutions. You need to put these between the exercise header and the theorem you are asked to prove. The previous item also applies such lemmas that you end up being unable to prove, hence end it with [Admitted], then make sure to also end the main theorem in which you use it with [Admitted], not [Qed]. This will help you get partial credit, in case you use that main theorem to solve a later exercise.
- Make sure your file can run till the end. If you have any problematic lemmas - end them with [Admitted].

The completed exercise is to be submitted via Moodle.

Good Luck!