

CS 511
Formal Methods for High-Assurance Software Engineering
Homework Assignment 09

Out: 1 November 2024
Due: Thursday, 7 November 2024, by 11:59 pm

Repeated below are administrative issues already mentioned in the handout of Assignment 01:

- You need to open a Gradescope account, after which you need to add yourself to the CS511 roster for this semester. The entry code for CS511, Fall 2023, is `WWX2NW`.
If you want to read more on adding yourself to the CS511 roster, go to [Adding a Course](#).
- You also need to create a *GitHub repository* where you store your solutions for *coding exercises with LEAN_4*.
To create a GitHub repository, you need to open a GitHub account. Instructions for how to do this are at the following webpages: [Set Up a GitHub Account](#) and [Create a GitHub Repository](#).
- Typically, each weekly assignment consists of two parts:
 1. One part includes *hand exercises*, *i.e. pencil-and-paper exercises*, and
 2. One part includes *coding exercises* in LEAN_4.

And each of the two parts will consist of:

- `2 easy exercises`, and
- `1 demanding exercise`, which we will call a `problem`,

for a total of `4 easy exercises` and `2 problems` in each weekly assignment.

- Typeset your solutions with Latex to produce a single ‘.pdf’ file containing:
 1. All your solutions for the *hand exercises*, and
 2. Links to your *coding exercises*, which are stored in your GitHub repository. (You should insert the links as active, *i.e.* clickable, *hyperlinks* in your ‘.pdf’ file.)

It is the ‘.pdf’ file produced with Latex that you will submit in Gradescope.

You do not need to use any particular format in naming your ‘.pdf’ file, because Gradescope will keep track of who is submitting it. Nonetheless, it is nice to use suggestive names in case of a mishap and we need to recover your file. So, here is a possible naming:

<your last name>_<your first name>.hw01.pdf

For example, for myself, I would call my file ‘kfourney_assaf.hw01.pdf’.

1 By Hand

Exercise 1 Open **EML.Chapter_6.pdf**: Do Exercise 107 on page 64. ☐

Exercise 2 [**LCS, page 163**]: Do Exercise 2.4.6 (the last on that page). ☐

PROBLEM 1 Open **Lecture Slides 26**: Do the two parts of the exercise on page 7.

2 With Lean_4

Exercise 4 From Macbeth's book:

1. Exercise 6.2.7.1 ,
2. Exercise 6.2.7.2 ,
3. Exercise 6.2.7.3 . ☐

Exercise 4 From Macbeth's book:

1. Exercise 6.3.6.1 ,
2. Example 6.3.6.2 ,
3. Example 6.3.6.3 . ☐

PROBLEM 2 From Macbeth's book:

1. Exercise 6.3.6.5 ,
2. Exercise 6.3.6.7 . ☐

We will post an appropriate Lean 4 template for this homework on Piazza by the end of Friday, November 1 (today). ☐