

CS 6110, Spring 2022, Assignment 6  
Given 3/4/22 – Due 3/15/22 by 11:59 pm via your Github

**NAME:**

**UNID:**

**CHANGES:** Please look for lines beginning with underlined words when they are made. none yet.

**Answering, Submission:** Have these on your private Github: a folder Asg6/ containing your submission, which in detail comprises:

- A clear README.md describing your files.
- Files that you ran + documentation (can be integrated in one place).
- A high level summary of your cool findings + insights + learning – briefly reported in a nicely bulleted fashion in your PDF submission.

**Start Early, Ask Often!** Orientation videos and further help will be available (drop a note anytime on Piazza for help).

I encourage students constructing answers jointly! *But that does not mean copy solutions, but discuss the question plus surrounding issues.*

1. (40 points) I've checked in Logic[1-5].als. There are two parts to this assignment:

(a) (20 points)

- i. (10 points) Go through what I've provided in the above models, and for each file, produce a gist of the encodings I've done and a two-line comment saying how the encoding works. (Save Logic4.als for the next part.)
- ii. (10 points) Get into Logic4.als and make sure that f2 indeed is encoding a general two-ary function. To "make sure," you must demonstrate a sufficient number of alloy tests/checks/runs and/or model-examination. Have at least 3-4 convincing demos of checks you came up with.

(b) (20 points)

- i. (10 points) Lecture 16, Slide 4, Image of question 13(b): Encode this assertion similar to the encoding in Logic5.als and check for validity.
- ii. (10 points) Lecture 16, Slide 4, Image of question 13(c): Encode this assertion similar to the encoding in Logic5.als and check for validity.

Your Answer Here
------------------------

2. (40 points)

(a) (20 points)

- i. (10 points) Go through Mike-Gordon-Slides.pdf and also read Mike Gordon's book, making notes about the proof rules of Hoare Logic presented there. Include assignment, if, for, while, precondition strengthening, and postcondition weakening.
- ii. (10 points) Get Dafny and Verifast installed. Please report issues you faced. Say which platform. Put notes in the tools GDoc to help each other.

(b) (20 points) Run the first two Dafny exercises in Lec16.pdf and ask questions on Piazza. All details are given to you.

Your Answer Here
------------------------

3. (20 points) Write a summary of your project along these lines, occupying two pages. Note: I'm adding topics to the GDoc [bit.ly/CS6110-S22-Project-Suggestions](https://bit.ly/CS6110-S22-Project-Suggestions) and please add details there (this is a writeable GDoc also) or even new topics are welcome to be recorded there. In any case, please profit from the ideas there. Push it into your Github which can then be used to drive your project also.

- A project name (tentative names are OK), a topic, and about 10 lines (12pt font) on why it matters to someone studying SW verification.
- A description of the verification technologies that you'll learn by doing this project. (It could be a topic not yet covered in class such as static analysis.)
- A few diagrams and other details you like to add to give me a better idea of the work.
- If you'd like to have a project partner, plz note that.
- Assuming you have 70% of the CS 6110 time available for your project, a brief timeline of how you'll deliver your working project by the last day of Spring.

Your Answer Here
------------------------