

ELE 206/COS 306 Simon: Midpoint Write-Up

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Question 1. Controller:

For the controller, we tested (almost) all possible variations of inputs while the controller remained in that state (e.g., (almost) all combinations of values of `valid`, `of_out`, `n_tc`, and `rst` are input to check for the correct outputs). The transition conditions were likewise tested, testing for nontransition as well as transition behavior. Negative cases were not checked, generally speaking (e.g., while in the repeat state, the value `valid` was not toggled to check its behavior, since no outputs in the repeat state depend upon it).

Datapath:

For the datapath, we overall tested two things: (1) the function of the internal memory units (`psi`, `n`, `i`, `lvl`, `of` and `mem`, the internal regfile) to make sure that they responded to inputs that would change their state; and (2) that the outputs respond correctly to the inputs provided under various situations.

More concretely, we did the following:

- (a) Testing the `reset`, `i_clr` and `level` inputs
- (b) Testing the functionality of the effect of `p_reflect` on `pattern_leds`, and `lvl` and `pattern_leds` on `valid` (regardless of the value of `level`)
- (c) Testing the functionality of `of_set` and the terminal count outputs `n_tc` and `last_it` when `of` is high (i.e. in the situation that there is overflow)
- (d) Writing to and reading from `mem`, and testing the functionality of `p_correct`
- (e) Testing `last_it` when `of` is low (i.e. in the situation that there is no overflow)
- (f) Testing `psi_ld` and `last_it` for both no overflow and overflow cases

Question 2. We discovered our DONE state did not loop through the patterns correctly, so we modified it to do so. We renamed `OF_set` to `of_set` and `OF_out` to `of_out` to standardize naming conventions. We corrected the `OF` in the INPUT state of the FSM to `of_out`. We defined the behavior of the controller when `rst` is pressed to clear all outputs except `reset`, `mode_leds`, and `p_reflect`. `reset` is set to 1, and `mode_leds` and `p_reflect` are set as they would normally be, given the current state.

Feedback. The coding took about 4 hours each, or 8 hours combined; writing up took about 1 hour.