CSE 140L Lab 3

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Academic Integrity

Your work will not be graded unless the signatures of all members of the group are present beneath the honor code.

To uphold academic integrity, students shall:
- Complete and submit academic work that is their own and that is an honest and fair representation of their knowledge and abilities at the time of submission.
- Know and follow the standards of CSE 140L and UCSD.

Please sign (type) your name(s) below the following statement:

I pledge to be fair to my classmates and instructors by completing all of my academic work with integrity. This means that I will respect the standards set by the instructor and institution, be responsible for the consequences of my choices, honestly represent my knowledge and abilities, and be a community member that others can trust to do the right thing even when no one is watching. I will always put learning before grades, and integrity before performance. I pledge to excel with integrity.
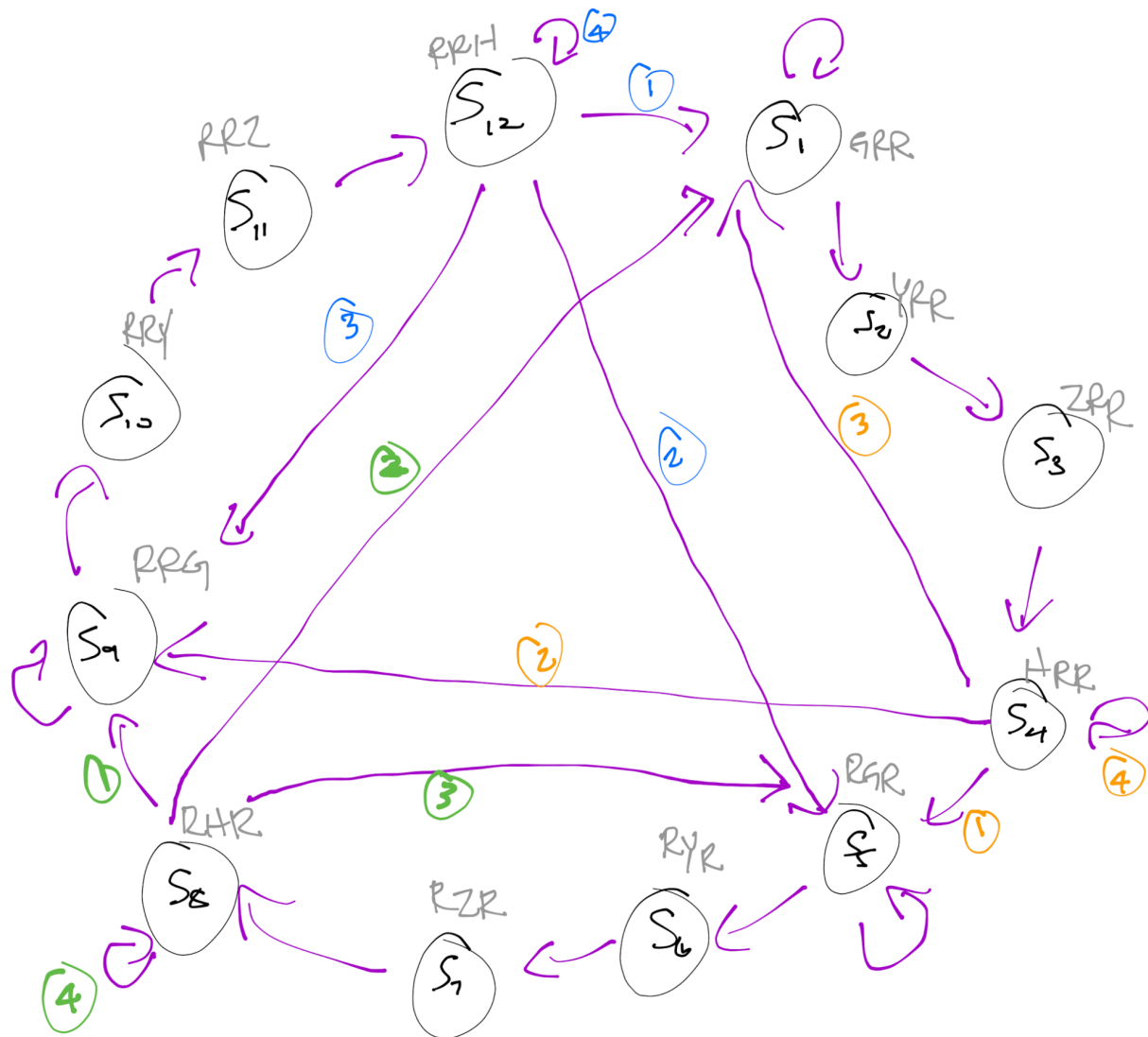
(Amy Nguyen)
(Mark Lorenzo)
(Jared Villanueva)

Free Response

Please answer the following questions.

## 1. Please upload a diagram of your state machine for part 1. (3 pts)

It can be a picture or digital image. Please have a state for every state in the starter code (You can find the enums starting line 17 in traffic_light_controller1.sv)

2. Please upload a diagram of your state machine for part 2. (3 pts)

It can be a picture or digital image. Please have a state for every state in the starter code (You can find the enums starting line 24 in traffic_light_controller2.sv)
TODO
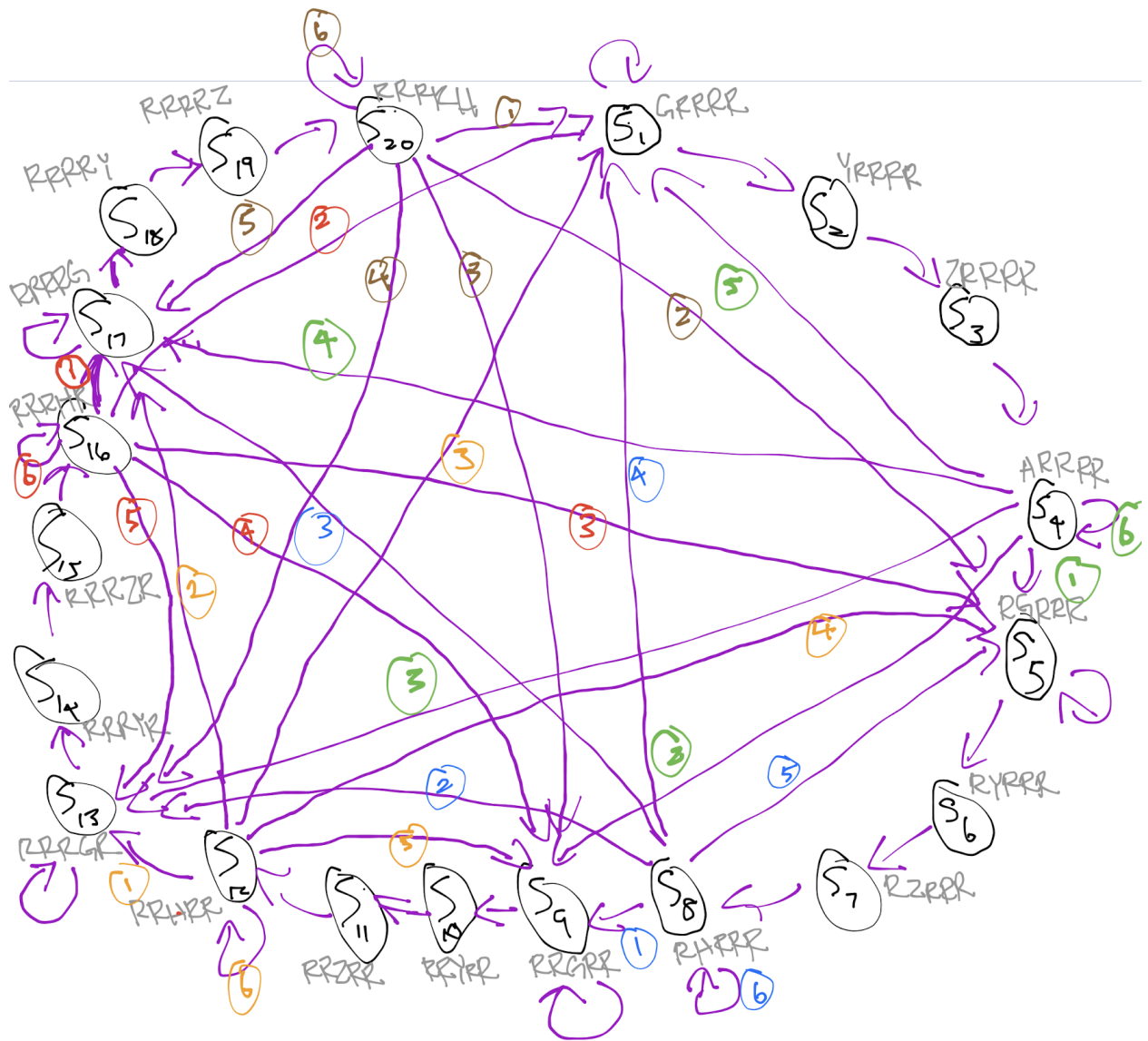
3. How did the testbench test your implementation for part 1? (3 pts)

Word limit: 300 words

The testbench first tests sending traffic on the EWL, turning the ew_left sensor on, and then having that traffic fade, turning the ew_left sensor off, and then transitioning to traffic on the EWS, turning the ew_straight sensor on, and then turning that sensor off once traffic there fades away. Then it sends traffic to NS, turning the ns_sensor on, and verifies that after traffic has faded, which sets the ns_sensor to 0, the NS light stays green. Afterwards, it puts more traffic on NS, turning the ns_sensor on, and verifies that after traffic has faded for at least 5 cycles and traffic presents on other paths, 5 cycles where ns_sensor is off and sensors of other path(s) turn on, the light turns yellow for two cycles and finally red. The final test is when traffic appears simultaneously on EWS, EWL, and NS. EWS should have first priority, followed by EWL and then finally NS.

## 4. How did the testbench test your implementation for part 2? (3 pts)

Word limit: 300 words

The test bench tests the implementation by first testing E_LEFT to W_STR without more traffic. The testbench first tests sending traffic on EastLeft and then traffic on West, then no traffic on EastLeft and then traffic on East, and then traffic on West, and then no traffic on East and no traffic on West. Then it sends traffic on NS, turning the ns_sensor on, and verifies that after traffic has faded, which sets the ns_sensor to 0, the NS light stays green. Afterwards, it puts more traffic on NS, turning the ns_sensor on, and verifies that after traffic has faded for at least 5 cycles and traffic presents on other paths, 5 cycles where ns_sensor is off and sensors of other path(s) turn on, the light turns yellow for 2 cycles and then red. The final test is when traffic appears simultaneously on East/West, East/EastLeft, West/WestLeft, EastLeft/WestLeft and North/South. EastLeft/WestLeft should have first priority, then East/West, then North/South.
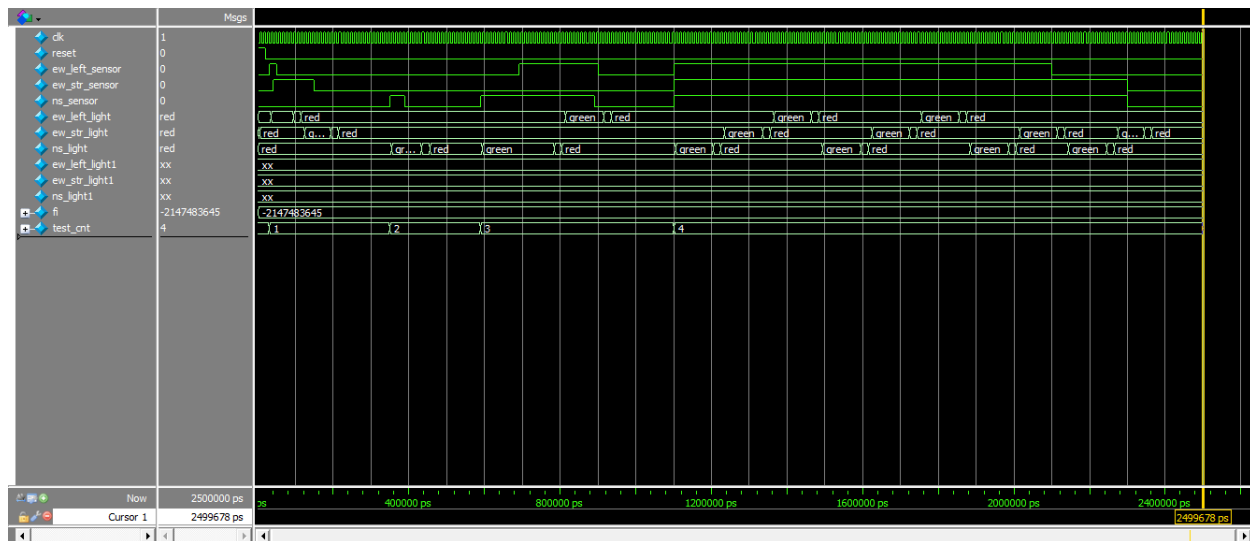
Screenshots

Part 1

Screenshot of the RTL viewer top-level schematic/block diagram in Quartus (3 pts)
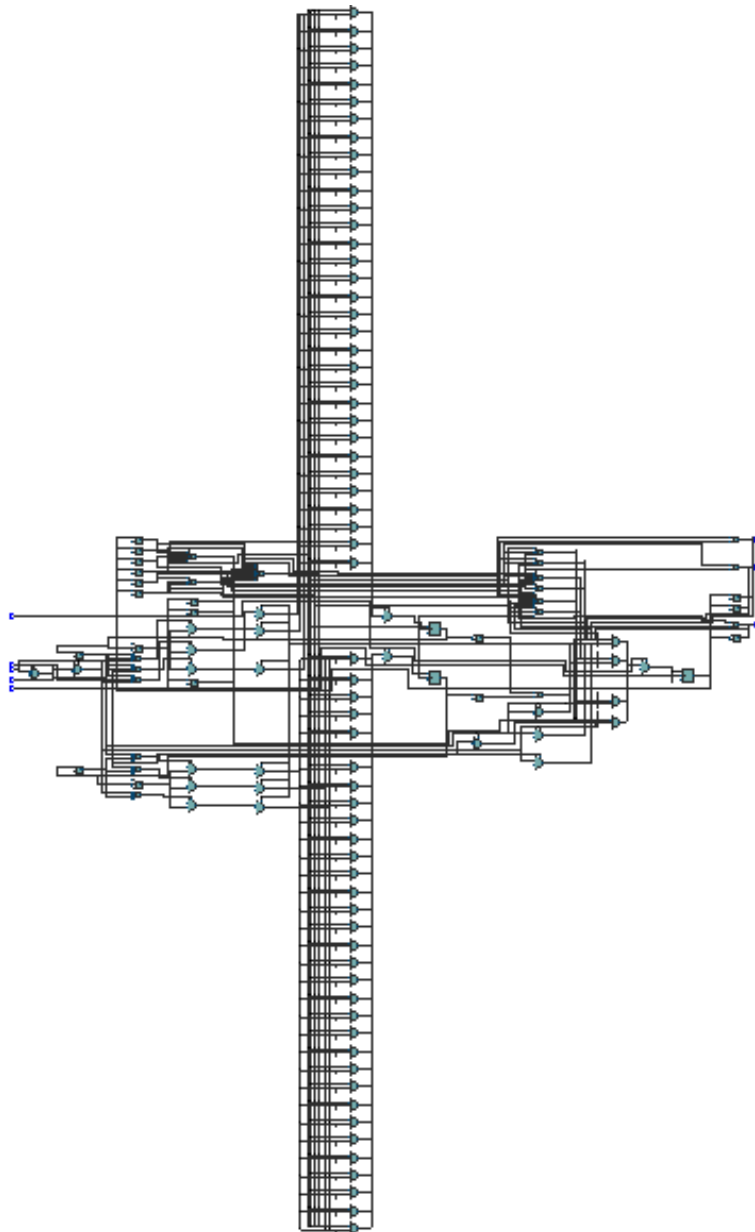
Screenshot of your waveform viewer, showing the presence of traffic and the states of the traffic signals. (3 pts)
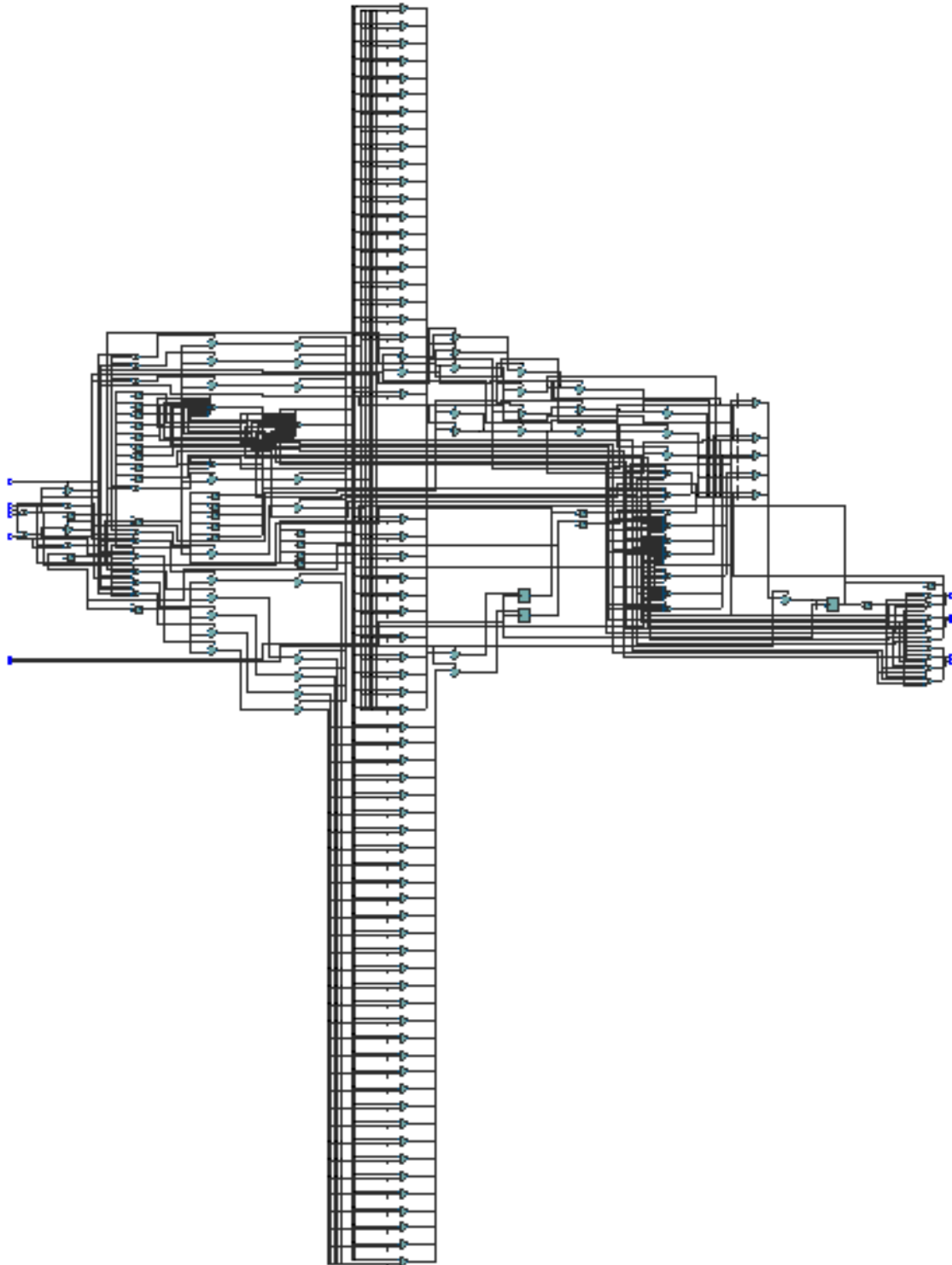

Please include the output file of part 1 testbench in your submission, and name it "output1.txt" (3 pts)
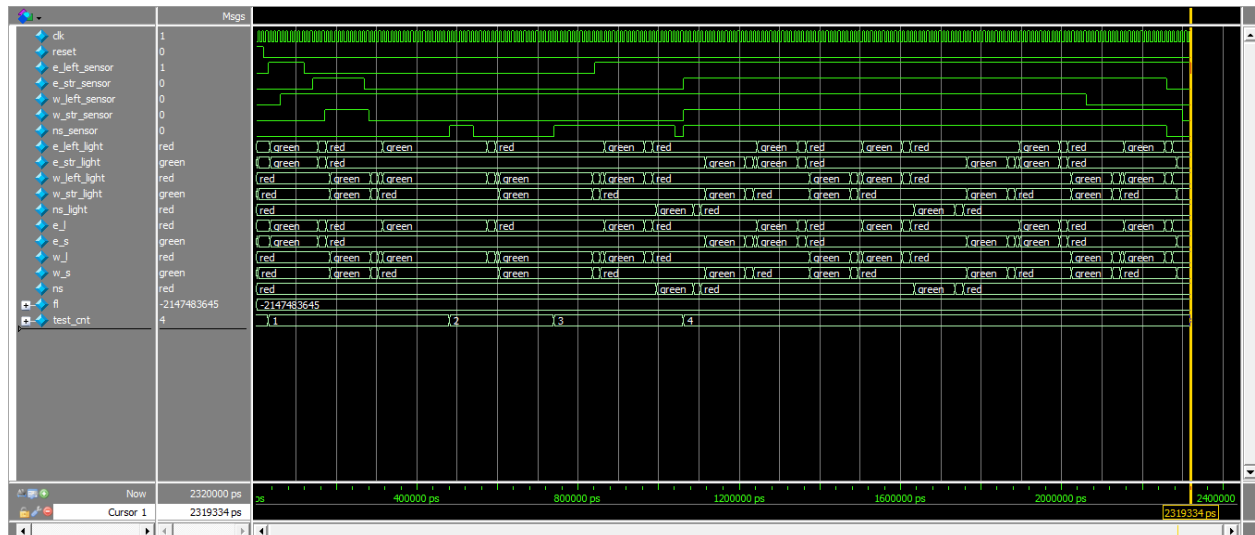
We will be looking for a text file with that name specifically, so be sure to rename it. Nothing is required in the writeup for this question.

Part 2

Screenshot of the RTL viewer top level schematic/block diagram in Quartus
(3 pts)

Screenshot of your waveform viewer, showing the presence of traffic and the states of the traffic signals. (3 pts)

Please include the output file of part 2 testbench in your submission, and name it "output2.txt" (3 pts)

We will be looking for a text file with that name specifically, so be sure to rename it. Nothing is required in the writeup for this question.