In this assignment, you will specify, synthesize and analyze an asynchronous control circuit in two different synthesis styles: (i) Petri net-based method, and (ii) Burst-Mode machine method. For the former, you will use the petrify CAD tool, and for the latter, you will use the MINIMALIST CAD package.

You are to design the control circuit for an elevator. Assume the following:

- The elevator services only two floors.

- Each floor either has an “up” button or a “down” button on the panel next to the elevator door. The elevator itself has both the “up” and “down” buttons on its inside panel.

- The events (pressing and releasing of the buttons) are available as inputs to the elevator control you are designing. Make any simplifying assumptions here, e.g., buttons are “chatterless,” and human responses are much slower than any latency through your controller.

- You may assume any reasonable set of output signals generated by the control circuitry, but the final outputs should be level signals, not transition signals (since they must drive level-sensitive motors, lamps, etc.). For example, the control circuit could produce the following outputs: “go up”, “go down”, “open door” and “close door” (and perhaps others). At any time, the outputs generated should be consistent and unambiguous (i.e., “go up” and “go down” should not be simultaneously asserted, for example.)

- You will find it useful (and perhaps necessary) to partition your elevator control into several modules, and implement them as a collection of interacting FSM’s. For example, you might find it useful to implement tiny controllers for each of the buttons, which interact with a “master” controller that implements most of the control functionality.

- Make any additional reasonable assumptions you deem necessary. However, clearly state and justify each assumption.

TASKS:

1. Write the specification for the elevator control circuit as (i) a Petri net, and (ii) a Burst-Mode specification. You may use certain “advanced” features of these specification styles if you would like, but beware that certain features cannot be synthesized using the existing tools (e.g., extended burst-mode features), even though they may be valid for simulation etc. Appropriately decompose your specification into a collection of interacting controllers.

2. Use Petrify and MINIMALIST to synthesize the control circuits. The instructions on how to use these tools were given in class, and are available on the website. Try a few different tool options, e.g., synthesis-for-speed vs. synthesis-for-area.

3. Present a brief analysis and discussion of the results, including a detailed comparison of the two different synthesis styles.

DELIVERABLE: A short report with: (i) pictures of your specifications, (ii) a table of results, and (ii) a brief discussion (1–2 pages).