Problem 1
In lecture, we discussed how one might implement a windshield wiper control program using the modified state transition logic methodology. One of the benefits of this method is that it allows the designers to add features to a design in a well structured way; this problem is an exercise in doing just that. This exercise is based on the wiper control scheme from lecture; you will modify and enhance that transition logic diagram.

(a) Begin with the state transition structure from lecture. Modify this structure so that instead of stopping the wiper the moment someone turns off the engine or wiper control, it will finish moving from one side of the windshield to the other, only stopping at the end of its motion. This is to prevent the formation of an Ugly Windshield Line when the wiper or the engine is turned off. Draw the complete state transition diagram for this design. Use one piece of paper for this part.\(^1\)

(b) Add to your design the state transition logic which would be used to implement a delay function which allows the wiper to pause between motions across the windshield. The wiper should only pause at its “home” position at one side. The duration of the pause will be specified elsewhere, so just assume there is a variable \texttt{PauseTime} which specifies how long to wait in seconds.

(c) Now add a windshield cleaning function. When the cleaning button is pressed, the wiper system should immediately spray cleaning solution (I think we used to call it “soapy water” back in the days of stone axes, carburetors, and full service gas stations where your windshield was often cleaned by \textit{people}) on the windshield for 3 seconds while \textit{simultaneously} (that was a hint) operating the wipers. The wipers should remain operating for at least 6 seconds to make sure the windshield is cleaned up. If you need to communicate information between tasks (there goes another hint), specify what information is being communicated from which task to which other task by listing variable(s) for each piece of information communicated. This diagram or set of diagrams should again be on its own page.

\(^1\)Sorry about the heavy tree use, but it’s a lot easier on the grader to use one page per answer, and people need to be encouraged to write large, clear, legible diagrams.