ESS: Exercise Set 6

Reactive Embedded Systems

Question 1:

Design an FSM to control the flow of traffic over a cross-road intersection.

Question 2:

NMEA is a format for sending data from navigational equipment (such as GPS receivers) over a serial port to a microcontroller. It is necessary to check that an NMEA message is received correctly and is not garbled, or a ship/aeroplane could be put on an incorrect course. The following rules specify the syntax of an NMEA message:

- Each message's starting character is a dollar sign.
- The next five characters identify the sender (two characters) and the type of message (three characters).
- All data fields that follow are comma-delimited.
- Where data is unavailable, the corresponding field remains blank (it contains no character before the next delimiter – see Sample file section below).
- The first character that immediately follows the last data field character is an asterisk.
- The asterisk is immediately followed by a checksum represented as a two-digit hexadecimal number.
- <CR><LF> ends the message.

These are examples of correct NMEA sentences.

$GPAAM,A,A,0.10,N,WPTNME*32

$GPGSA,A,3,10,07,05,02,29,04,08,13,,,,,1.72,1.03,1.38*0A

This is an incorrect NMEA sentence (missing asterisk) before two digit checksum

$GPGSV,3,3,11,29,09,301,24,16,09,020,,36,,,76

Write an FSM to parse an NMEA message and determine its validity.