1 Model checking in NuSMV

We briefly mentioned Dekker’s algorithm in class as an example of an algorithm that guarantees mutual exclusion of two processes. You can read about this algorithm here http://tinyurl.com/j8dug4b. In this assignment you will model Dekker’s algorithm (and some variants) in NuSMV, model check it.

Your tasks for this assignment are the following:

1. Install NuSMV http://nusmv.fbk.eu/. You can learn a bit about how it works through this tutorial http://nusmv.fbk.eu/NuSMV/tutorial/v26/tutorial.pdf, which also contains an example of a mutual exclusion algorithm (not Dekker).

2. Implement a model of Dekker’s algorithm in NuSMV and verify the following property (or whether they are false). You can choose whether to use CTL or LTL based on the property you’ll have to verify.

   • The two processes never enter the critical section at the same time.
   • Eventually process one enters the critical section.
   • Whenever a process asks to enter the critical section it eventually enters the critical section.
   • Whenever a process enters the critical section it eventually leaves it.

If some of the properties above are false, can you change the fairness condition to make them true?

3. Provide two (meaningful) properties involving the Until operators that respectively hold and do not hold for the Dekker’s algorithm.

What to turn in? Submit a zip containing
• Your NuSMV implementation

• Screen shots of the results of all the logical formulas you verified.