NuSMV Assignments

Digital Design Verification (CS6760)
Exercise-1: Microwave-Oven Transition System

- Specify this system in NuSMV.
- You may need Boolean variables like start, close, heat, error etc.
- Write your own formal properties over this system.
- Also, check the following properties:
  - $G \neg (start \land close \land heat \land error)$
  - $F(\neg heat \land \neg error)$
Exercise-2: Missionaries and Cannibals Problem

• **Description:**

Three missionaries and three cannibals want to cross a river but they have only one boat that holds two. If the cannibals ever outnumber the missionaries on either bank, the missionaries will be eaten. The boat cannot cross the river by itself with no people on board. The problem consists of finding a strategy to make them cross the river safely.

• **Exercise:**

Implement in SMV a system that encodes the above problem, and prove with NuSMV that there exists a solution to the problem, by checking the appropriate properties and recording the counterexample generated.
Exercise-3: Colour-Tile Rotation Problem

- Model the Colour-Tile Rotation Problem in SMV
- Write formal properties to determine reachable goal states
  - State a (false) property stating that the goal configuration below cannot be reached.
- When NuSMV determines that the goal is false it will also print out a sequence of steps giving the trace that reaches the goal.
MODULE main

... ...

VAR

colours: array 0..8 of {RED, BLUE, YELLOW};

Choice: 0..3;

... ...

Modelling of transition relation (rotation)

... ...

Initial & Goal States

... ...

Reachability Properties

... ...