

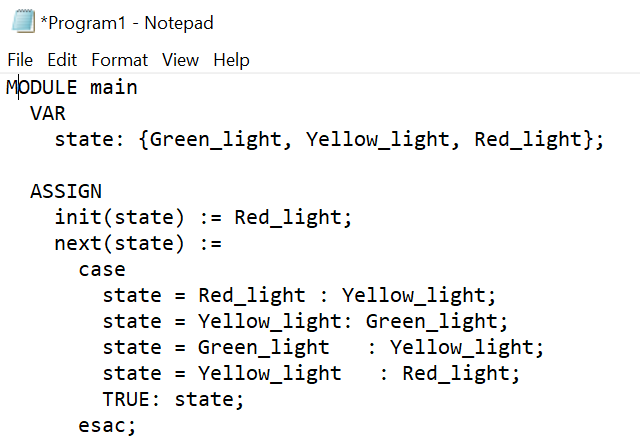
KANWAL SHEHZADI

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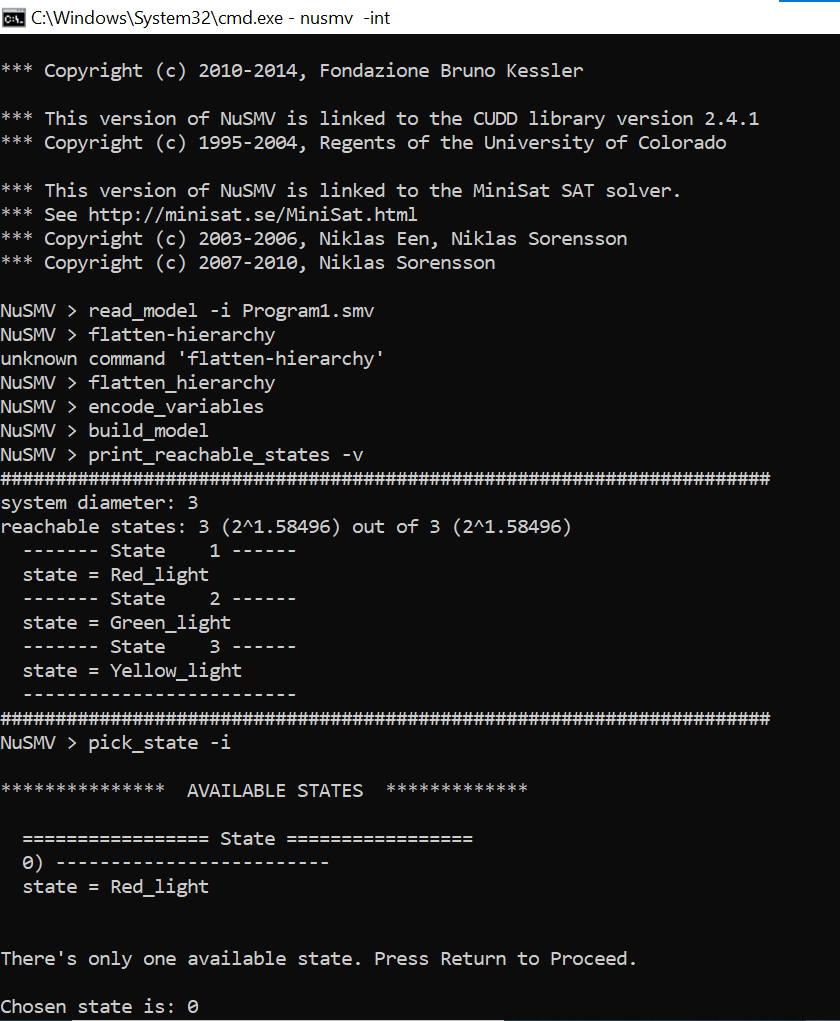


**QUESTION 01**

1. Model the transition system of traffic lights given in Figure # 01 in NuSMV



1. Print initial state and all reachable states of above transition system using NuSMV.



1. Write the safety property of traffic light system formally and informally.

* The informal description of the safety property is that the traffic light should never be in both the Green and Red states at the same time. This ensures that the system always adheres to the expected behavior of the traffic light.
* The safety property can be formally stated as a LTL (Linear Temporal Logic) formula

check\_ltlspec G !(state = Green & state = Red); -- Safety property

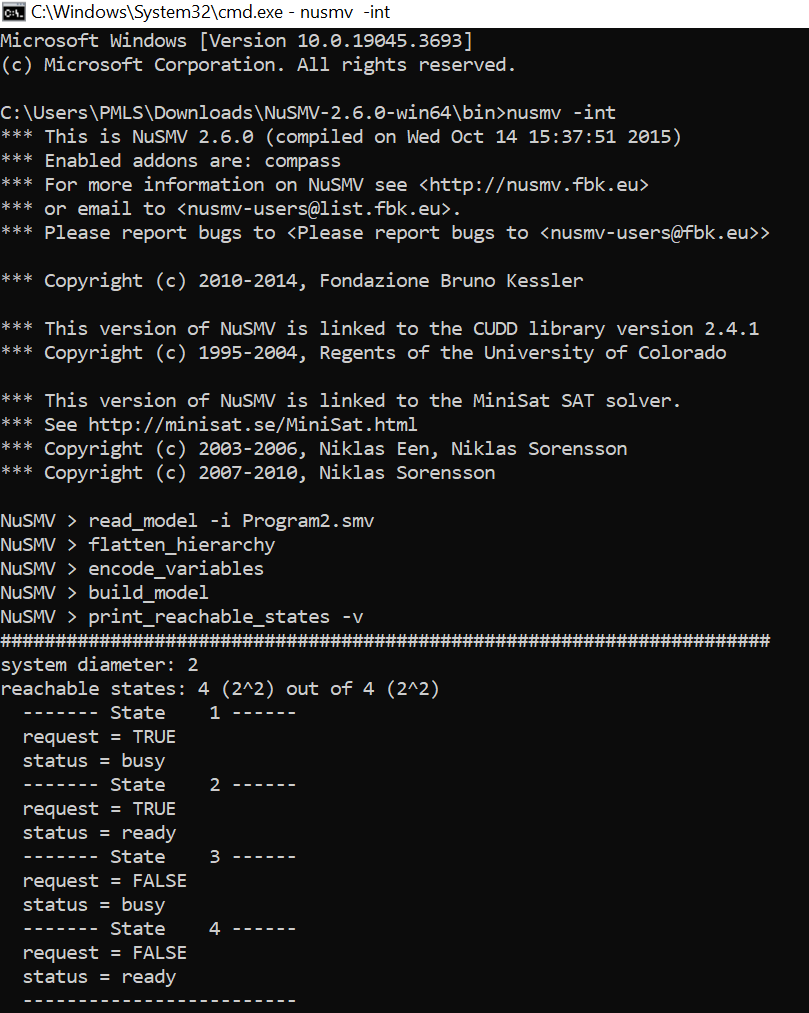
**QUESTION 02**

1. Model the transition system given in Figure # 02 in NuSMV

A screenshot of a computer program

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1. Print initial state and all reachable states of above transition system using NuSMV



A computer screen shot of a black screen

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1. Simulate this model for 5 steps

A computer screen with white lines and dots

Description automatically generated

A screenshot of a computer program

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(4) Identify whether the given LTL specification are true or false for the model (Figure. 2) using NuSMV

a. G(request -> F status=busy)

A black background with white text

Description automatically generated

b. X(request = FALSE)

A computer screen shot of a computer program

Description automatically generated

**QUESTION 03**

A) Write all possible (temporal) executions of this program (2 executions are mentioned here)

A graph with circles and arrows

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B) Construct a Büchi Automaton representing all executions of the above program.

