

## CS4271 Critical Systems & their Verification

Review Questions and Revision Exercises  
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Ack: A Banerjee for some exercises

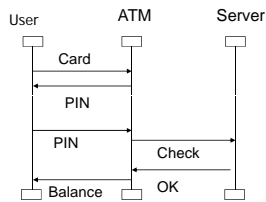
1

### Exercise: ATM access

- Consider the scenario of an user accessing an ATM machine. Describe a successful access scenario (card entry / PIN request / PIN entry / PIN authentication / Account Balance request / Balance detail) using a set of messages on a MSC. Can you identify any incomparable events in the MSC?

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### MSC for ATM access

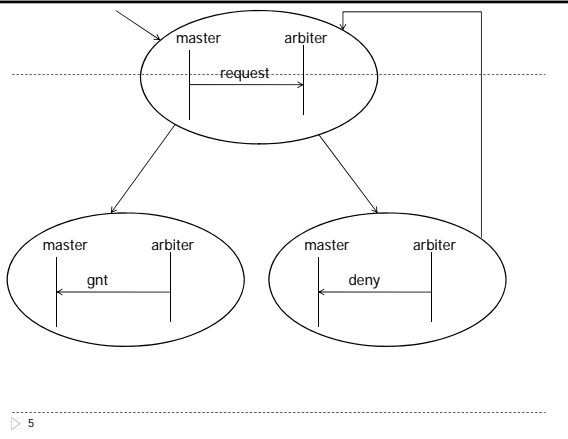


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### Exercise: MSG Modeling

Consider a simple master device communicating with an arbiter to get access to a shared resource. To start a transfer, it sends a request signal req to the arbiter. On receiving a request from a master, the arbiter grants by a gnt signal if the transaction slave is ready, else, it makes the master wait by sending the deny signal. The master continues to request till it receives the gnt. Describe the above protocol using a MSG.

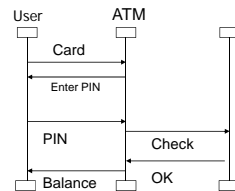
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### Exercise: MSG simulation

- This is our "old friend" MSC
  - What are the minimal events?
  - Consider infinite repetition of this MSC.
    - Would simulation of such a MSG require bounded memory, or not?



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### Exercise: MSC simulation

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- Can you develop a “sufficient” condition to check whether an MSG requires unbounded memory for simulation under asynchronous concatenation.
- Your sufficient condition should be correct – any MSG you pass should indeed take up only bounded memory for simulations.
- Your sufficient condition should be liberal – it should not fail too many MSGs which actually require bounded memory.