## CSc 84020 Homework 1

- 1. Prove the following:
  - (a) For every purely reactive agent, there is a behaviourally equivalent standard agent.
  - (b) There exist standard agents that have no behaviourally equivalent purely reactive agent.
  - (c) State-based agents are equivalent in expressive power to standard agents (so for every state-based agent there is a behaviourally equivalent standard agent).

(45 points)

2. Suppose the vacuum world from Lecture 3 "Deductive reasoning agents" contains obstacles which the agent has to avoid, and that the agent has a sensor to detect the obstacles. Write down a ne logic-based solution for the agent.

(25 points)

3. Suppose that the vacuum world agent's sensors (the one from the lecture that sees the dust, and the new one that can see obstacles are now *noisy* so they only give the right answer 80% of the time. How does this change the logic-based control program? Assume that if the agent tries to move into a square that contains an obstacle, it does not move.

(35 points)