Quantitative Verification – Exercise sheet 11

Exercise 11.1
Compute the MECs (both states and actions) of the following MDP.

Exercise 11.2
On Figure 1, check whether $R \geq 1 [C \leq 2]$ holds.

Figure 1: State rewards are bold-faced and underlined.
Exercise 11.3
The *instantaneous reward* of a path at time $t$ associates with a path, the reward in the state of that path when exactly $t$ time units have elapsed. In general, *instantaneous reward* refers to the expected reward of a model at a particular instant in time. See lecture slides for more details. Are memoryless schedulers sufficient to obtain optimal instantaneous rewards? If yes, give a proof sketch. If no, give a counterexample.

Exercise 11.4
We have seen expected step-bounded reward and expected long-run average reward. How can you rephrase (bounded) reachability as an instance of these problems?