Reasoning and Decision Making under Uncertainty	Prof. Dr. Frank Deinzer
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	Würzburg-Schweinfurt

Work Sheet 2
Reinforcement Leaning – Chapter 2

Note:

Do not use ready-made implementations for the following tasks. Implement the tasks yourself from scratch.

Exercise 1

Reinforcement Learning – Multi-Armed Bandits

a) Implement the multi-armed bandit problem from chapter 2.3 of [1]. Make sure that you can vary the parameters. Use the parameters from Figure 2.1 as one possible fixed parameter set. Implement the automatic parameter generation as described in the book.

b) Reproduce the results from the example in Figure 2.2 of the book. Can you replicate the same behavior of average rewards and percentage of optimal actions with your implementation? Create plots that show the behavior of your implementation similar to these in the book.

c) The example in Figure 2.3 shows the effect of initial action-values. What happens in your implementation if you evaluate even more initial values Q and different ϵ-greedy settings?

References

[1] Richard S. Sutton and Andrew G. Barto. *Reinforcement Learning: An Introduction.* MIT Press, Cambridge, MA, 2018.