Project 20: Probabilistic reinforcement learning

1) Implement the model described in Chapter 10 (Section 7.4) of *Computational Foundations of Cognitive Neuroscience.* Show that it can reproduce the main result in Rothenhoefer et al. (2021), the effect of reward distribution on dopamine responses.

2) Simulate the dynamics in Eq. 24. What does this predict about the correlations between representations of sequentially paired stimuli? Compare this to experimental measurements of orbitofrontal cortex activity reported by Sadacca et al. (2018).

References:

Rothenhoefer, K. M., Hong, T., Alikaya, A., & Stauffer, W. R. (2021). Rare rewards amplify dopamine responses. *Nature Neuroscience, 24*, 465-469.

Sadacca, B. F., Wied, H. M., Lopatina, N., Saini, G. K., Nemirovsky, D., & Schoenbaum, G. (2018). Orbitofrontal neurons signal sensory associations underlying model-based inference in a sensory preconditioning task. *Elife, 7*, e30373.