# COMP767: Reinforcement Learning

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Notes written from Doina Precup's lectures.

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# 1 Introduction

## 1.1 Definitions

Reinforcement learning is:

**agent-oriented learning** learning by interacting with an environment

**trial and error** only given delayed evaluative feedback

**science of the mind** one which is neither natural science nor applied technology

Framework:

1. agent percieves the **state** of the environment
2. based on the state, it chooses an **action**
3. the action gives the agent a **reward**
4. a **policy** aims to maximize the agent's **long term expected reward**

## 1.2 Key Factors of RL

- trial and error search
- environment is stochastic
- reward may be delayed
- balancing exploration and exploitation

## 1.3 Classical Challenges

- reward
- delayed consequences
- balancing exploration/exploitation
- non-stationarity
- fleeting nature of time and online data

# 2 Bandit