

## Lecture 2: Markov Decision Processes

## └ Extensions to MDPs

## └ Partially Observable MDPs

## Belief States

(no exam)

## Definition

A *history*  $H_t$  is a sequence of actions, observations and rewards,

$$H_t = A_0, O_1, R_1, \dots, A_{t-1}, O_t, R_t$$

## Definition

A *belief state*  $b(h)$  is a probability distribution over states, conditioned on the history  $h$

$$b(h) = (\mathbb{P}[S_t = s^1 \mid H_t = h], \dots, \mathbb{P}[S_t = s^n \mid H_t = h])$$