

## Lecture 2: Markov Decision Processes

## └ Markov Decision Processes

## └ Value Functions

# Value Function

## Definition

The *state-value function*  $v_\pi(s)$  of an MDP is the expected return starting from state  $s$ , and then following policy  $\pi$

$$v_\pi(s) = \mathbb{E}_\pi [G_t \mid S_t = s]$$

## Definition

The *action-value function*  $q_\pi(s, a)$  is the expected return starting from state  $s$ , taking action  $a$ , and then following policy  $\pi$

$$q_\pi(s, a) = \mathbb{E}_\pi [G_t \mid S_t = s, A_t = a]$$