

## Lecture 2: Markov Decision Processes

## └ Markov Reward Processes

## └ Return

## Return

## Definition

The *return*  $G_t$  is the total discounted reward from time-step  $t$ .

$$G_t = R_{t+1} + \gamma R_{t+2} + \dots = \sum_{k=0}^{\infty} \gamma^k R_{t+k+1}$$

- The *discount*  $\gamma \in [0, 1]$  is the present value of future rewards
- The value of receiving reward  $R$  after  $k + 1$  time-steps is  $\gamma^k R$ .
- This values immediate reward above delayed reward.
  - $\gamma$  close to 0 leads to "myopic" evaluation
  - $\gamma$  close to 1 leads to "far-sighted" evaluation