

**CS394R**  
**Reinforcement Learning:**  
**Theory and Practice**

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# Good Morning Colleagues

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- Are there any questions?

# Logistics

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- Do programming assignments!

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- Understand every step of the math
  - Go back to sections 3.7 and 3.8 if need be

# Chapter 4

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- Solution methods **given a model**
  - So no exploration vs. exploitation
- Why is it called dynamic programming?

# Student Discussion

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- Ali on policy iteration

# Policy Evaluation

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- Exercises 4.1, 4.2



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- What if non-Markov?

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  - True in general?

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  - Then: no model, but bootstrapping

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- Relationship to n-armed bandit?

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  - Why action values preferable?
- Relationship to n-armed bandit?
  - multiple situations (associative)
  - nonstationary
- (book slides)

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- MC expense independent of number of states
- No bootstrapping in MC
  - Not harmed by Markov violations



# First/Every Visit

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- Why is every visit trickier to analyze?

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- Why is every visit trickier to analyze?
- Every visit still converges to  $V^\pi$ 
  - Singh and Sutton '96 paper
  - Revisited in Chapter 7 (replacing traces)

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We settle the above mentioned open problem, for the case of a discounted cost criterion, under the assumption that every state-action pair is used to initialize the observed trajectories with the same frequency.



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  - Why consider off-policy methods?

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