

# **TOPIC 5**

# **EXAM REVIEW**

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# Logistics

- Wednesday May 11, 9am – noon or noon – 3
  - Stick to your assigned section!
  - GSB 3.138
- Exam will be on paper with answers entered on canvas
- Open everything – except each other
- Up to 2 problems where you will solve on sheet of paper and upload photo to canvas – partial credit
- I have released a set of practice problems
  - This is not a practice test, just a set of questions to give you a flavor of what to expect
- If you get SSD accommodations, you can take the exam anytime from 9-3, in the classroom

# Topics

- Non-Linear Programming – Neural Networks
- Simulation
- Stochastic Programming
- Dynamic Programming
- Reinforcement Learning

# Non-Linear Programming

- Convolutional Neural Networks
- Optimization algorithms

# Simulation

- Tossing coins a bunch of times
- Calculate means/variances/... of output

# Stochastic Programming

- Expectations
- Sample Average Approximation (SAA)
- Formulating as LP/MIP

# Dynamic Programming

- Multi-period decision making
- Working backwards
- Problem formulation
- Shortest path problems
- Stochastic dynamic programming
- Games against opponents

# Reinforcement Learning

- Deep Q Learning
- Policy Gradients
- Atari/Python
- Improvements



# Programming

- For NN, simulation, and SP solving problems by writing code will be on the exam
- For DP and RL, it's hard to solve a problem in a short amount of time
- It is possible I'll ask you to make a small change to a problem we already solved in class and solve the modified problem
  - Fishing problem with 5 time periods
  - Mining problem with new cost function
  - Play pong with a given tf model

# Questions

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