COSC 4368 (Spring 2021)

Review List Midterm Exam on Wednesday, March 10. 1[

The Midterm exam is scheduled for March 10 at 1p online in Blackboard (Mahin will send you an e-mail and the course webpage will list more details about how the midterm exam will be exactly conducted.

Relevant slide shows, pasted from the COSC 4368 Website that are relevant for the midterm exam:

Search

[Search1](http://www2.cs.uh.edu/~ceick/ai/search1.pptx) (Classification of Search Problems, Terminology, and Overview ), [Search2](http://www2.cs.uh.edu/~ceick/ai/search2.pptx) (Problem Solving Agents), [Search3](http://www2.cs.uh.edu/~ceick/ai/search3.pptx) (Heuristic Search and Exploration), [Search4](http://www2.cs.uh.edu/~ceick/ai/search4.pptx) (Randomized Hill Climbing and Backtracking; not covered in textbook), [Search5: Games](http://www2.cs.uh.edu/~ceick/ai/Games2021.pptx) (credit for almost all slides goes to ai.berkely.edu, reduced coverage in 2021),  [Search6: Constraints Satisfaction Problems](http://www2.cs.uh.edu/~ceick/ai/CSP'.pptx) (credit for some slides goes to ai.berkeley.edu),  [Search7: More on Expansion Search](http://www2.cs.uh.edu/~ceick/ai/search7.pptx) (only material which centers on greedy search and A\* will be covered in 2021), [Search8](http://www2.cs.uh.edu/~ceick/ai/backtracking.pdf) (Kamil on Backtracking)

The midterm exam will only ask very basic question about games (Search5) and there will be nothing in the exam about card games. You should know the following approaches algorithms well: Best-first search, A\*, randomized and classical hill climbing, simulated annealing, backtracking (study Kamil’s 4-page introduction to Backtracking (Search8}

Reinforcement Learning, Neural Networks, and Machine Learning in General

* 2021 Machine Learning Transparencies:
  + [A Gentle Introduction to Machine Learning](http://www2.cs.uh.edu/~ceick/ai/4368-ML-Intro.pptx)
  + Reinforcement Learning: [RL1](http://www2.cs.uh.edu/~ceick/ai/RL1.pptx) (Introduction to Reinforcment Learning),
  + [Introduction to Supervised Learning](http://www2.cs.uh.edu/~ceick/ai/Eick_SL.pptx) (also called "Learning from Examples")
  + Neural Networks: [NN1](https://www.bing.com/videos/search?q=neural+network+video&view=detail&mid=54402D363ABB8903202F54402D363ABB8903202F&FORM=VIRE) ([3blue1brown](https://www.3blue1brown.com/): *What is a Neural Network?* (will show the first 12:30 of this video)), [NN2](http://www2.cs.uh.edu/~ceick/ai/NN2.pptx) (Dr. Eick's NN slides),

The midterm will only ask very basic question about neural networks; you should have, on the other hand, in-depth knowledge about the objectives and methods of RL, role of exploration, know what policies do, Bellman Equations, Temporal difference learning, Q-Learning, and SARSA; you should be able to provide the Bellman equations for an example and should be able to apply temporal difference learning for an example world (there will be nothing in the exam where you have to apply SARSA or Q-Learning to an example).

2021 Game Theory Slides: [G1](http://www2.cs.uh.edu/~ceick/ai/G1.pptx): Introduction to Gametheory

Should know what a Nash Equilibrium is and how to compute it for parallel games.

Tentative weights of these topics in the midterm exam: Search 50-55%, Reinforcement Learning 35-40%, Neural Networks 5-10%, Game Theory: 5-10%.

Relevant material from the Russel textbook (Third Edition from 2010):

Chapter 3: pages 64-108; Chapter 4: 120-126 Chapter 5: 161-174 (the discussion of card games is not relevant), Chapter 6: 202-222, Chapter 17: 645-656 666-670 Chapter 18: 727-736 Chapter 21: 830-831, 836-845 853.

Material that was discussed in class that is relevant for the midterm exam (but not necessarily is discussed in the textbook): Simulated Annealing, traditional Hill Climbing and Randomized Hill Climbing, Backtracking (Search 8).

The material discussed in the first week of the semester will be covered in the final exam and not Midterm2.

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