Exam 2

- **Date and Time:** Fri 12/22, 2:00 to 4:30 pm. Please arrive a few minutes early for seating.
- **Location**: RH 215
- **Format:** Exam is closed-book and closed notes. You are allowed a piece of paper 8.5 x 5.5 inches and write whatever you want on it (front and back.) *Points will be taken off if your notes exceed the specified size.*
- **Please bring:** a pen, pencil, eraser and a basic scientific calculator.
- **Not allowed:** PCs, tablets and cell phones.

What to Study

- **Lecture slides :** *Constraint Satisfaction Problems*, *Logical Agents*, *Machine Learning*, and *Deep Learning*.
- **Homework**: Solutions for HWs 3 and 4.
- **Reading in textbook**: See **Reading Assignments** on BrightSpace.

List of Topics

- Constraint Satisfaction Problems
  - Introduction
  - Backtracking Search for CSPs
  - Variable ordering
    - Minimum remaining values (MRV) heuristic
    - Degree heuristic
  - Value ordering
    - Least constraining value heuristic
  - Inference
    - Forward checking
    - Arc consistency (AC-3) algorithm

List of Topics

- Logical Agents
  - Propositional Logic
    - Syntax and semantic
  - Inference
    - Model checking, truth-table enumeration
    - Resolution
      - Proof by contradiction
      - Conversion to CNF and clauses
    - Forward and backward chaining
      - Modus ponens
      - Definite clauses

List of Topics

- Machine Learning
  - General concepts
  - Supervised learning, unsupervised learning, semi-supervised learning, reinforcement learning.
  - Decision tree learning
    - Decision tree learning algorithm
    - Information gain for choosing attributes

List of Topics

- Deep Learning
  - Deep Neural Networks
    - Concepts
    - Feedforward networks
      - Single layer perceptron
      - Multi-layer perceptron
      - Training of feedforward networks
        - Loss functions
        - Back propagation and gradient decent
  - Convolutional neural networks