**CSC 417 Unit 1 Day 2 Outline**

1. Advanced Computer Games
   1. Checkers
      1. Rote vs. Generalized Learning
         1. Rote learning resulted in strong openings and endgames, but a poor midgame
         2. Generalized learning resulted in a strong midgame, but poor openings and endgames
         3. Rote learning is useful for situations requiring specific actions
            1. Checkers (and chess) have established openings that help players avoid early mistakes
            2. When there are fewer pieces on the board in the endgame, it is easier to examine all possibilities
         4. Generalization is useful when there are many possible actions
            1. The midgames of checkers (and chess) have too many possibilities to fully search
         5. Identifying good heuristics for a task can be harder than the task itself!
      2. Chinook (checkers program)
         1. Combined search techniques (w/iterative deepening) with databases of “fixed” moves
            1. Database of openings
            2. Search and heuristics for midgame
            3. Database of endgames
         2. Search depth varied (up to 46 ply)
         3. Defeated world checkers champion in 1992 (4 wins, 2 losses, 34 draws)
            1. Checkers has 5 \* 1020 positions
            2. Perfect play results in a draw
   2. Non-search-based techniques
      1. Turing Machine
         1. Components
            1. Infinitely long tape with “boxes” (memory locations)
            2. Each box may contain a symbol
            3. Each box may be read, written, or erased by the read/write head
            4. Instructions specifying how to modify squares
            5. Listing of states (which define actions) and transitions
      2. Finite State Machines
         1. Consist of one or more states (finite number)
         2. One state active at a time
         3. FSM transitions between states
         4. States must be known in advance