AI Mid-2

5.1 - 5.4

- **Adversarial Search** problems are where agents' goals are conflicted. Called games.
- **Zero Sum** games have utility values at the end of game adding to 0.
- **Pruning** allows ignoring portions of search tree that make no difference.
- **Utility Function** defines the final numeric value for a game that ends in terminal state s for a player p
- Initial State, Players, Actions, Result, Terminal State.
- **Ply:** half moves.
- Minimax, time+space Complexity.
- Alpha Beta pruning, complexities.
- Killer move - best move.
- **Transposition Table :** A hash table of previously reached positions.
- Evaluation Function.
- Cutoff Test.
- Features, Expected Value, Material Value, Weighted Linear Function.
- Quiescence, Quiescence search.
- Horizon effect, Singular Extension.
- Forward pruning, beam search.
- Lookup
- Policy
- Retrograde

13.1 - 13.5

- Belief state, it's 3 problems.
- Qualification Problem.
- Laziness, Theoretical Ignorance, Practical Ignorance.
- Degree of belief and Probability Theory.
- Preference, Utility theory and outcome.
- **Decision Theory** = Probability Theory + Utility Theory, **MEU**
- Notations of probability theory.

Sample space, model, proposition, unconditional, evidence, conditional(*posterior*), probability distribution, density function, (full) joint probability distribution, inclusion exclusion principle, Kolmogrov's Axioms
- Di Finetti's proof.
- Probabilistic inference.
- Marginal Probability
- Marginalisation and Conditioning.
- Normalisation
- Independence
- Bayes' Rule
- Conditional Independence

Slide 11

- Risk Aversion
- Markov Decision Process
  <S,A,P,R>
- Assumption of MDP
- Decision Epoch
- Transition Model
- Absorbing State
- Reward Function (Dependency on S, A , J)
- Policy
- Stationary vs Non-Stationary
- Deterministic vs Randomised

17.1-17.2

- Markovian
- Environment History and it's use
- a sequential decision problem for a fully observable, stochastic environment with a Markovian transition model and additive rewards is called a **Markov decision process**.
- Policy and optimal policy.
- Additive and Discounted Reward, Discount factor
- Proper Policy
- Average Reward
- Utility Function Calculation
- **Value Iteration**
- Bellman Equation

- Bellman Update
- **Proof of Contraction**
- Max Norm
- Number of iterations as a function of gamma.

Slide 13

- Linear/Mathematical Programming
- Structure of an LP Model
- Popular Form of LP
- Constrained MDP
- Multi Agent MDP
- Dec-MDP