

# CPSC 433: Artificial Intelligence

## Questions to prepare yourself for the Midterm

- Name the subareas of AI.
- What is the general structure of an AI system, what knowledge is used and why do we have abstraction levels?
- What is the difference between computation and search?
- What are the advantages of computation, what are the disadvantages?
- What is the definition of a search model?
- What is the definition of a search process?
- What is the definition of a search instance?
- What is the definition of a search derivation?
- For what do we need the components of a search model, process, instance, derivation?
- What are the problem specific components of
  - set-based search
  - and-tree-based search
  - or-tree-based search?
- Given a concrete search model, a concrete search process to the model and a search instance, write down the search derivation produced by the process for the search instance.  
(Note: describing model, process and instance cannot be done in a short fashion, therefore: do not panic!)
- Given a problem and a search paradigm, produce a search model and search process that solves instances of the problem and follows the paradigm.
- What are the differences between and-tree-based search and or-tree-based search?
- Given two terms, decide if they are unifiable and if yes, generate their mgu.  
Examples:  $f(x,y,g(x,c,d)) \approx f(g(y,a,d),a,g(x,c,d))$   
 $f(x,y,x) \approx f(a,g(x,b,c),d)$   
 $f(x,c,d) \approx f(f(x,c,d),c,d)$
- Given two terms, apply the set-based search process for generating their mgu and write down a possible search derivation. Examples: see above
- Given a solvable unification problem and our set-based search model for it. If we have two different search processes for the model, will the mgu produced by the processes be different?
- Given two clauses and the Resolution inference rule, produce all clauses that are the result of applying the rule to the clauses.  
Examples:  $Q(a) \vee Q(b), \neg Q(x)$   
 $P(a,b) \vee P(x,d), \neg P(a,y)$   
 $P(a,b) \vee P(x,d), \neg P(b,y)$

- Given a clause and the inference rule Factorization, produce all clauses resulting from the application of the rule.

Examples:  $Q(a) \vee Q(x)$

$P(a,b) \vee P(x,d) \vee P(a,y)$

$\neg P(b,y) \vee \neg P(x,y)$

$P(a,x) \vee P(b,y)$

- Given some clauses and a state in a model elimination search, produce all possible successor states.
- Given a state in model elimination search that has only leafs with sol-entry yes, check if it really fulfills the end condition.
- Given an or-tree-based search state for a constraint satisfaction problem instance (and the instance) and a leaf in this state, list all possible successor states that extend the leaf.
- What is the difference between and-tree-based search and and-or-tree-based search?
- What is the difference between tree-based search and graph-based search?
- What are general things that can be measured by a search control?
- Which parts of states can be measured by search controls?