

**CS 335-31 - Artificial Intelligence**

**Final Exam**

May 5, 2004

1. Answer the following questions within no more than one or two lines. Justify all your answers.

(a) Can you enumerate the main players in the expert system development team?

(b) What is the main structure of a rule-based expert system?

(c) What is the function of the inference engine of a rule-based expert system?

(d) What is the core difference between forward and backward chaining inference?

(e) Can you mention two major disadvantages of rule-based expert systems?

(f) What is the main idea behind applying Bayesian Reasoning to expert systems?

- (g) What is the main contribution of fuzzy expert systems?
  
  
  
  
  
  
  
  
  
  
- (h) Can you explain what fuzzification and defuzzification mean?
  
  
  
  
  
  
  
  
  
  
- (i) In fuzzy sets the relation between elements and set is one of...
  
  
  
  
  
  
  
  
  
  
- (j) What is a hedge when applied to fuzzy variables?
  
  
  
  
  
  
  
  
  
  
- (k) Can you enumerate and briefly describe the main components of a frame-based expert system?
  
  
  
  
  
  
  
  
  
  
- (l) What is the functionality of “when changed” and “when needed” methods for frame-based expert systems?
  
  
  
  
  
  
  
  
  
  
- (m) What is the main contribution of ANNs?

- (n) What is a perceptron?
  
- (o) What is the purpose of activation functions on ANNs?
  
- (p) What type of activation functions (ANNs) can you enumerate?
  
- (q) How does an ANN learn?
  
- (r) Enumerate and briefly describe the main paradigms of Evolutionary Computation
  
- (s) What is an artificial chromosome? (Genetic Algorithms) What does it represent?
  
- (t) What kind of operations can be applied to chromosome reproduction?
  
- (u) What is the purpose of a fitness function in Evolutionary Computation?



2. Can you describe all the steps needed in a Genetic Algorithm implementation?

3. Pick one of the artificial intelligence paradigms learned thru the semester and apply it to a domain of your choice (it cannot be one used in one of the class projects of any group). Explain how will you apply it, why did you pick that paradigm for that domain, and how the process will work.