CSE4107 Class Test 1, Spring-20XX

Marks: 10 Time: 25 min.

1	Describe two	o important	environment	contrasts tl	hat are	generally	considered	for desi	ionino	rational a	agents	(2)	١
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- 2. Prove or disprove $\exists x(Mat(x) \land Tk(Hab, x))$ from the following knowledgebase using resolution. (3)
 - a) Std(Hab)
 - b) $Mat(MatFor(y)) \lor \neg Std(y)$
 - c) $\neg Std(y) \lor Tk(y, MatFor(y))$
- 3. Elaborate the concept of Unification? (2)
- 4. Show that

$$\forall x, y, z ((Br(x, y) \land Sn(z, x)) \Rightarrow Nw(z, y))$$
 is a syntactically correct sentence of First Order Logic. (3)

- 1. Explain the characteristics of a rational Agent. (2)
- 2. Convert the following FOL sentence into CNF. (3)

$$\forall x (Std(x) \land Tk(x, CSE1203) \leftrightarrow CStd(x))$$

- 3. Why backward chaining algorithms are said to be goal oriented? (2)
- 4. Prove or disprove the proposition M using a typical forward chaining algorithm on the knowledgebase that follows. (3)

$$A, B, C, D, G \land M \Rightarrow H, A \land H \Rightarrow E, C \land K \Rightarrow L, H \land K \Rightarrow S, B \land F \Rightarrow G, B \land D \Rightarrow K, \\ D \land F \Rightarrow G, D \land G \Rightarrow M, D \land L \Rightarrow H.$$

- 1. How is a Term defined in the syntax of First Order Logic? (2)
- 2. Resolve P2("Bt", "Rt") from the following clauses, considering that the variables are standardized. (3)

$$P1(y, F1(x)) \lor P2(y, u)$$

 $\neg P1("Bt", z) \lor P3(u, F2(x))$
 $\neg P3("Rt", v)$

- 3. Explain the matching rules that are involved during Unification. (2)
- 4. Derive the most general unifier, if possible, for the following set of FOL sentences. (3)

$$S = \{P1(F2("Mk"), z, "B1", u), P1(y, "Rd", x, F3(z))\}$$

- 1. What are the basic components of an Agent? (2)
- 2. Consider the following situation of 'Find Gold avoiding Monsters' problem.

$$\begin{split} S_{i,\,j} & \Longleftrightarrow M_{i\text{-}1,\,j} \vee M_{i+1,\,j} \vee M_{i,\,j\text{-}1} \vee M_{i,\,j\text{+}1} \\ \neg M_{1,1} \wedge \neg M_{2,1} \wedge S_{2,1} \wedge \neg G_{2,1} \end{split} \qquad \qquad (i \geq 1) \wedge (j \geq 1) \wedge (i \leq 4) \wedge (j \leq 4) \\ A_{2,1} \end{split}$$

Derive $M_{3,1} \vee M_{2,2}$ using the inference rules of propositional logic. (3)

- 3. How Resolution is used to prove or disprove a sentence? (2)
- 4. Convert the following English sentence to CNF of FOL. (3)

A student of the department of EEE must take EEE1101 and PHY1201.