IITJ, B.Tech 3rd year(CSE), II Semester
First Mid-Sem. Examination-2015
CS324: Artificial Intelligence

Duration: 1 Hour   Max. Marks 17

Instructions:

- Attempt all questions.

- All questions are written in detail and complete in every respect.

- Avoid seeking clarifications from the invigilators.

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1. Use resolution to show that the following set of clauses is unsatisfiable.   [3]

$$\{p(a,z), \neg p(f(f(a)),a), \neg p(x,g(y)) \vee p(f(x),y)\}$$

2. Derive $\perp$ from the following set of clauses using the resolution principle.   [3]

$$\{p(a) \vee p(b), \neg p(a) \vee p(b), p(a) \vee \neg p(b), \neg p(a) \vee \neg p(b)\}$$

3. Write the axioms describing predicates: *grandchild, grandfather, grandmother, soninlaw, fatherinlaw, brother.*   [3]

4. Suppose there is a production system with four initial facts: A, B, C, D and following three rules: [3]

$$R_1 : \; if \; A \; then \; E$$
$$R_2 : \; if \; B \wedge F \; then \; G$$
$$R_3 : \; if \; C \wedge E \; then \; F$$

   Using these rules and facts, explain "backward chaining", and show explicitly how it can be used to determine the truth of G?

5. The doctors usually diagnose a patient's disease based on symptoms, for example, on the evidence of fever, shivering, and data of blood-test, a patient is diagnosed having malaria. Though, the evidences are symptoms, the cause of these symptoms has been malaria. Which of the forward or backward rule chaining is efficient for reasoning for patients diagnosis? Justify. Also, demonstrate the reasoning process that uses this approach, considering any suitable set of rules having premises and consequences.   [5]