Artificial Intelligence Assignment

1. What do you understand by underestimation and overestimation of a heuristic function? Under what condition does A* give an optimal solution?

2. Explain the Unification algorithm used for reasoning under predicate logic with an example.

3. Describe how alpha-beta pruning improves the searching procedure in a MIN-MAX game. Explain with the help of an example.

4. Write the context-free grammar that can accept the sentence "Ram hit the ball".

5. What is the use of the cut and fail predicate in Prolog?

6. Give an example of a problem for which breadth-first search would work better than depth-first search.

7. Solve the following cryptarithmetic problem using constraint satisfaction.

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  TWO
+ TWO
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 FOUR
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8. Using the following information for a database
   - Anyone whom Mary loves is a football star.
   - Any student who does not pass does not play.
   - John is a student.
   - Any student who does not study does not pass.
   - Anyone who does not play is not a football star.

   a. Translate the above statements into clausal form.
   b. Show that the predicate If John does not study, then Mary does not love John is true using resolution.

9. Create a frame network for terrestrial motor vehicles (cars, trucks, motorcycles) and give one complete frame in detail for cars, which includes the slots for the main parts, their attributes, and relations between parts.

10. Develop a parse tree for the sentence "Jack slept on the sofa" using the following rules

    S→ NP VP
    NP→ N | DET N
    VP→ V | PP
    PP→ PREP NP
    N→ Jack | sofa
    V→ slept
    DET→ the
    PREP→ on

11. Draw the conceptual dependency structure for:
    Susan gave the keys to Peter.
    Bill is a Programmer.