ASSIGNMENT-4

Q. Implement the Search Algorithms described in this lecture in LISP and/or C. Comment on how suited each language would be for each type of search?

Q. How suited would PROLOG be in implementing the search algorithms? Comment on how this might be done and what difficulties might exist.

Q. Trace the constraint satisfaction procedure to solve the following cryptarithmetic problem:

```
        CROSS

    +   ROADS

    ----------------

        DANGER
```

OR

```
      S  E  N  D                          BASE
    + M  O  R  E                        +  BALL
    --------------        OR           ------------------
      M  O  N  E  Y                       GAMES
```

Q. Discuss how constraint satisfaction might work it implemented its search strategy via:

    i. depth first search

    ii. breadth first search

    iii. best first search

Q. Represent the following in partitioned semantic networks:

    i. Every player kicked a ball.

    ii. All players like the referee.

    iii. Andrew believes that there is a fish with lungs.

Q. Pick a problem area and represent the knowledge in frame based system.

Q. Describe a rational agent function for the modified performance measure that deducts one point for each movement. Does the corresponding agent program require internal state?

Q. Discuss possible agent designs for the cases in which clean squares can become dirty and the geography of the environment is unknown. Does it make sense for the agent to learn from its experience in these cases? If so, what should it learn?

Q. Discuss back propagation algorithm for learning in multilayer neural network.

Q. Explain the concept of forward and backward state space search in detail.

Q. To which category of clustering schemes does the k-means algorithm belong? What is its major advantage?

Q. Which are the factors that influence the computation duration of this algorithm?

Q. Write in detail about the decision trees and decision lists with an example.

Q. How parameter estimation is done? Explain with an example.

Q. Represent the following sentences in first-order logic, using a consistent vocabulary

(which you must define):

(i) Not all students take both History and Biology.

(ii) Only one student failed History.

(iii) Only one student failed both History and Biology.

(iv) The best score in History was better than the best score in Biology.

(v) Every person who dislikes all vegetarians is smart.

(vi) No person likes a smart vegetarian.

(vii) There is a woman who likes all men who are not vegetarians.

(viii) There is a barber who shaves all men in town who do not shave themselves.

(ix) No person likes a professor unless the professor is smart.

(x) Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time.

Q. Give a predicate calculus sentence such that every world in which it is true contains exactly one object.

Q. Represent the sentence "All Germans speak the same languages" in predicate calculus.

  Use *Speaks(x, l)*, meaning that person x speaks language l.