Artificial Intelligence (CS60045)
Assignment 2 (Theory)

Name: **Roll Number:**

*Answer the following questions and submit it as a **pdf file** in moodle. This assignment should be submitted by **11th August, 2016.***

Q1:
Describe in brief a ***Robot soccer player*** as an intelligent agent. Give the PEAS specification for the task environment.

Q2:
The travelling salesman problem (TSP) can be posed with a set of cities C={c1, …cn} and a distance function d(ci, cj), which returns a positive integer for each pair of distinct cities. The objective is to find the shortest path that visits each city exactly once.

a. Specify the TSP as a search problem.
b. A powerful, admissible heuristic for TSP is based on estimating the remaining cost for completing a partial tour with the sum of the link costs for the minimum spanning tree connecting the graph of cities not yet in the tour. Show how this heuristics can be derived from a relaxed version of the TSP.

Q3:

a. Prove the following:
   i. A* search is complete.
   ii. A* search is optimal.
b. Weighted A* can be described as best-first search with:
   $f(n) = g(n) + w \cdot h(n)$ or as $f(n) = (1-w) \cdot g(n) + w \cdot h(n)$
   Using one of these formulations, provide a bound on the maximum sub-optimality of a path that weighted A* can return as a function of w.