

Midterm Exam

ARTIFICIAL INTELLIGENCE

Class: KSTN 2005

Questions: 3 – Total mark: 10 – Time: 60 minutes

Open book

Question 1 (4 marks):

Hill Climbing can be applied to a traveling salesman-like problem as follows. Each path going through all the cities is viewed as a state and each state transition is performed by switching the order of two cities in a path. The heuristic function value of a path is defined as its total length.

Consider the city map with four cities A, B, C, and D, and their pairwise distances as in Figure 1. Apply Steepest-Ascent Hill Climbing to look for a shortest possible path that visits each city exactly once (not required to go back to the start city), assuming the initial path is B–A–D–C, whose total length is $1 + 4 + 3 = 8$.

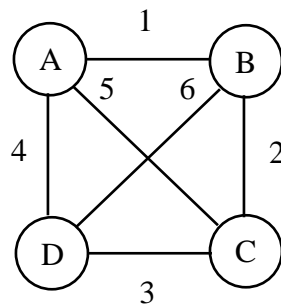


Figure 1

Question 2 (5 marks): Tony, Mike, and John belong to the Alpine Club. Every member of the Alpine Club is either a skier or a mountain climber or both. No mountain climber likes rain, and all skiers like snow. Mike dislikes whatever Tony likes and likes whatever Tony dislikes. Tony likes rain and snow.

Represent this information by predicate logic sentences in such a way that you can represent the question “Who is a member of the Alpine Club who is a mountain climber but not a skier?” as a predicate logic expression. Use resolution refutation with answer extraction to answer it.

Question 3 (1 mark):

Represent the following knowledge by a semantic network: A person can be a female or a male. Mary is a female and John is a male. Tom is a son of Mary’s and John’s.

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