CS 210 : ARTIFICIAL INTELLIGENCE

Home Assignment 1

[INSTRUCTIONS :
1. Write on the page with pen, and then scan or take pictures of the pages to make your submission.
2. Your submission should be a PDF Only].

PART A: Exposition Problems

1. Read the Niti Aayog Discussion Paper on AI, June 2018. Find the key areas for AI intervention in India. Consider one area and suggest how would you contribute in the selected area (at least 2 pages).

2. Read Turing's original paper on AI (Turing, 1950). In the paper, he discusses several potential objections to his proposed enterprise and his test for intelligence.

    (a) Discuss the "Heads in the Sand" Objection mention in his article.
    (b) According to you which objections still carry some importance?
    (c) Can you think of new objections arising from developments since he wrote the paper for the next 50 years ?

3. Are reflex actions (such as flinching from a hot fire) rational? Are they intelligent? Jusity your answer.

4. Every year the Loebner prize is awarded to the program that comes closest to passing a version of the Turing test.

    (a) Research and report on the latest winner of the Loebner prize. What techniques does it use? How does it advance the state of the art in AI?
    (b) How would you participate in the contest?

5. For each of the following activities, give a PEAS description of the task environment and characterize it in terms of the properties listed in Book "Artificial Intelligence : A Modern Approach" Section 2.3.2.

Agent	Performance Measure	Environment	Actuator	Sensor
1. Playing soccer				
2. Exploring the subsurface oceans of Titan				
3. Shopping for used AI books on the Internet				
4. Playing a tennis match				
5. Practicing tennis against a wall				
6. Performing a high jump				
7. Knitting a sweater				
8. Bidding on an item at an auction				

6. From the problem no 5, identify the type of agent for the given activities:

Agent Type	Observable/Not	Deterministic/Stochastic	Episodic/ Sequential	Static /Dynamic	Discrete/Continuous	Single-agent/Multi-agent
1. Playing soccer						
2. Exploring the subsurface oceans of Titan						
3. Shopping for used AI books on the Internet						
4. Playing a tennis match						
5. Practicing tennis against a wall						
6. Performing a high jump						
7. Knitting a sweater						
8. Bidding on an item at an auction						

7. Formulate the following 8-Puzzel problem as State Space Representation in AI.

5	4	
6	1	8
7	3	2

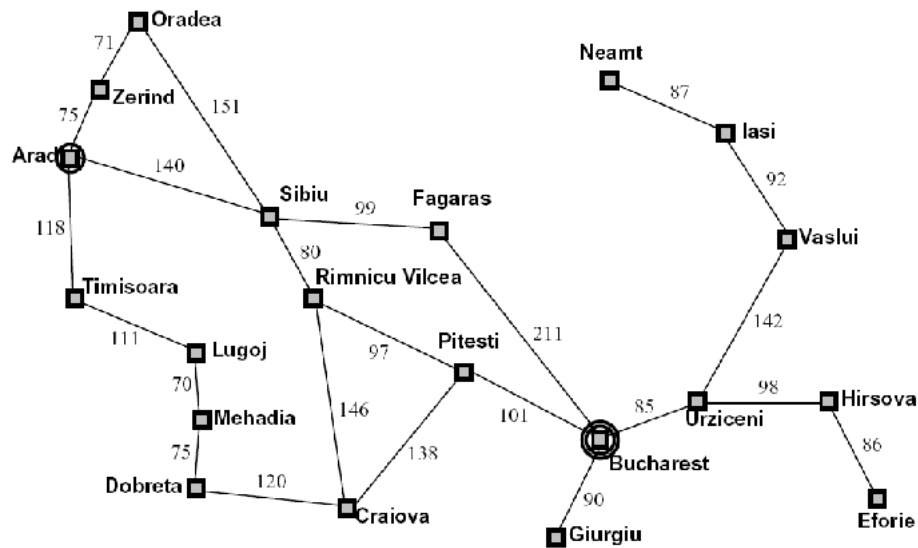| 1	4	7
2	5	8
3	6	

Initial State   Goal State

8. Suppose two friends John and David live in different cities on a map, such as The Romania map discussed in class. Consider John and David are in Arad and Bucharest respectively.

a) Write a detailed formulation for this search problem.
b) How large is the state space.

9. Compare and discuss the search algorithm performance in term of Completeness, Optimality, Time complexity and Space complexity as in the following table?

	Time complexity	Space complexity	Completeness	Optimality
(a) Depth first search				
(b) Breadth first search				
(c) Depth limited search, depth(d=3)				
(d) Uniform cost Search				
(e) Greedy Best First Search				
(f) A* Algorithm				

10. Explain the difference between steepest ascent hill climbing and Best First search with reference to Qno 7 mentioned problem. State the heuristic used.