Mansoura University
Faculty of Computers & Information
Computer Science Dept.

Artificial Intelligence
May 2008 CS & IS
Time allowed 3 hrs

تخلفات

Answer the following questions:

1)a) discuss the equation : agent = architecture + program

b) What are the four Types of agent program, Discuss two of them.

2)a) Discuss the informed search strategy A*, apply it using example. Prove that A* is optimal, assuming that h is admissible for Tree-Search or consistent for Graph-Search.

b) Discuss four of properties of task environments(ODESA D)
(Observability, Deterministic, Episodic, Static, Agents, Discrete)

3) a) Describe the Wumpus world using PEAS (Performance measure, Environment, Actuators, Sensors) description and task environment characterization (ODESA D)

b) Write an algorithm for Backtracking algorithm for CSP.

4) a) Write the steps to convert propositional sentence into CNF, then apply the conversion on $B1 \Leftrightarrow (P1 \vee P2)$

b) Consider the following Joint table

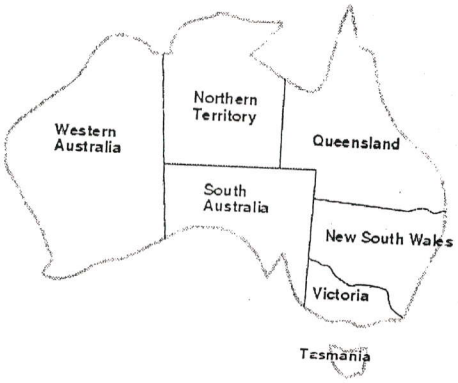
	Toothache	¬Toothache
Cavity	0.04	0.06
¬Cavity	0.01	0.89

Calculate

1. P(Toothache) 2. P(Toothache v Cavity) 3. P(Cavity|Toothache) 4. P(Toothache|Cavity)

5) b) For the map of Australia, we are trying to color it with three colors: red, green, and blue

i. Formulate the CSP, and sketch the constraint graph.
ii. Solve the problem using Cycle Cutset



c) For each of the following, Choose the best alternative from i, ii, iii and iv

I. If agent's sensors give it access to the complete state of the environment, the environment is called ...
i. Observable ii. Deterministic iii. Episodic iv. Static

II. A plate on the fire,you thought it is hot, so you carry it with a thick glove,you are .....
i. Turing Test ii. Rational iii. omniscient iv. autonomous

III. In the learning agent, ... is responsible for making improvements.
i. learning element ii. performance element iii. Critic iv. problem generator

IV. The root of the search tree is a search node corresponding to the....
i. Initial ii. Goal iii. Cost iv. Depth

V. The main problem in A* search is ..... problem.
i. depth ii. Optimality iii. Space iv. expanding

مايو ٢٠٠٨ د/ طاهر توفيق حمزة

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Answer the following questions:

1)a) Write the algorithm of simulated annealing

b) A data warehouse is any centralized data repository which can be queried for business.
- i.List Characteristics of a Data Warehouse
- ii.Draw Data warehouse Architecture
- iii.List steps of Data Warehousing Processes
- iv.Compare between Data Warehousing & OLTP

c) What are the four Types of agent program, Discuss two of them.

2) a) Define the following terms
i. agent ii. CSP iii. Boolean CSP. iv. Types of Constraints

b) Discuss the informed search strategy A*, apply it using example. Prove that A* is optimal, assuming that h is admissible for Tree-Search or consistent for Graph-Search.

c) define XOR problem, and show how it can be solved using MLP neural network.

3)a) There are three tower A,B,C .we found three different type of vicious circle (small, medium, large) in order from above in tower A. We want to move the three vicious circles from A to C but it must be in the same order in A and you can use tower B as bridge. Notice: you can't put larger circle above a smaller one (Don't put large above medium or small. Don't put medium above small)

b) Specify the PEAS and ODESA description for the following agents :
- a. Robot soccer player
- b. Internet Book Shopping
- c. mathematics theorem – Providing Assistance

c) For each of the following, Choose the best alternative from a, b, c and d

i. In Turing Test, the computer would need ... capability to store information provided before.
- a. natural language processing b. knowledge representation
- c. automated reasoning d. machine learning

ii. A plate on the fire, you thought it is hot, so you carry it with a thick glove, you are .....
a. Turing Test b. Rational c. omniscient d. autonomous

iii. In the mobile agent, ... property is common to all agents.
a. Proactive b. Continuons c. Mobile d. Adaptive

iv. Utility-based agent is the best choice if you have ...
a. a reflex b. a model c. condition-action rules d. conflicting goals

4) a) Define what is meant by CNF, and then convert the following sentences to CNF

i. $B_{1,1} \Leftrightarrow (P_{1,2} \vee P_{2,1})$ ii. $\forall x\,[\forall y\ \mathit{Animal}(y) \Rightarrow \mathit{Loves}(x,y)] \Rightarrow [\exists y\ \mathit{Loves}(y,x)]$

b) Consider the following Joint table

	Toothache	¬Toothache
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Calculate

1. P(Toothache)
2. P(Toothache v Cavity)
3. P(Cavity Toothache)
4. P(Toothache|Cavity)

c) For each of the following, determine whether true or false

i. Chinese Room problem tells us that Turing test is not necessary to prove intelligence
ii. A problem-solving agent is a kind of goal-based agent.
iii. air line travel problem is an example of route finding.
iv. robot navigation is generalization of CSP.

5) a) Define the following terms, with illustrative examples if possible

i. Prior Probability ii. Posterior Probability iii. Conditional Probability
iv. Joint Probability v. Bayes rule

b) Give problem formulation for the following problems :

i. Vacuum World ii. 8-puzzle iii. 8-queens iv. Airline travel problem

c) For each of the following, Choose the best alternative from a, b, c and d

I. The parent of Mario game is .... problem

a. 8-puzzle b. Wumpus c. Robot arm d. dragon

ii. In the learning agent, ... is responsible for making improvements.

a. learning element b. performance element c. Critic d. problem generator

iii. Breadth-first search works in a .... manner

a. FIFO b. FILO c. LILO d. LIFO

iv. Step cost of taking action *a* to go from state *x* to state *y*, is denoted ....

a. c(*a*, *x*, *y*) b. c(*a*, *y*, *x*) c. c(*x*, *a*, *y*) d. c(*y*, *a*, *x*)

V. The root of the search tree is a search node corresponding to the....

i. Initial ii. Goal iii. Cost iv. Depth