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18AI71

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Advanced Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Differentiate between the following :
- i) Fully observable Vs. Partially observable
 - ii) Single agent Vs. Multiagent
 - iii) Deterministic Vs. Stochastic
 - iv) Episodic Vs. Sequential
 - v) Static Vs. dynamic
- (10 Marks)
- b. Differentiate between :
- i) Simple reflex agents
 - ii) Model – based reflex agents
 - iii) Goal-based agents ; and
 - iv) Utility- based agents
- (10 Marks)

OR

- 2 a. Solve the below problem using Alpha Beta Pruning technique, show all the necessary steps.

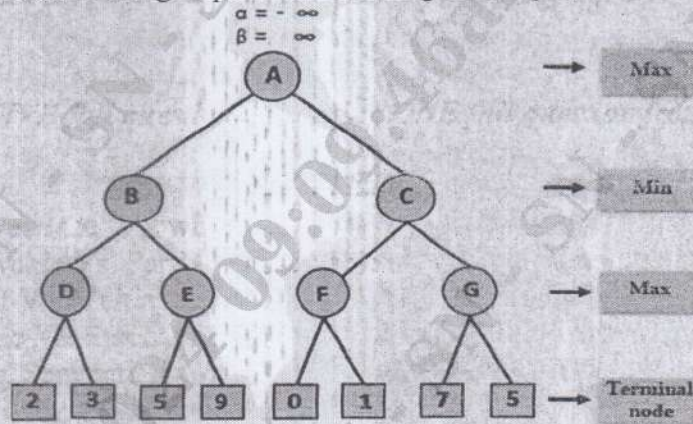


Fig Q2(a)

- b. Explain Minimax algorithm with an example.
- (10 Marks)

Module-2

- 3 a. Given the full joint distribution shown in Table Q3(a), calculate following :
- i) P(toothache) ii) P(Cavity) iii) P(Toothache | Cavity) iv) P (Cavity | toothache V catch)

	Toothache		¬ toothache	
	catch	¬ catch	Catch	¬ catch
cavity	0.108	0.012	0.072	0.008
¬cavity	0.016	0.064	0.144	0.576

A full joint distribution for the Toothache, Cavity, Catch world

- b. Discuss on Wumpus World Problem with neat diagram.
- (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 4 a. Consider the set of all possible five-card poker hands dealt fairly from a standard deck of fifty-two cards.
- How many atomic events are there in the joint probability distribution (i.e., how many five-card hands are there)?
 - What is the probability of each atomic event?
 - What is the probability of being dealt a royal straight flush? Four of a kind? (10 Marks)
- b. Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1 : 2 : 4. The probabilities that A, B and C can introduce change to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C. (10 Marks)

Module-3

- 5 a. Differentiate between Direct Sampling, Rejection Sampling and Likelihood sampling with pseudo code. (10 Marks)
- b. What is exact inference in Bayesian network? Explain inference by enumeration with pseudo code. (10 Marks)

OR

- 6 a. Explain the semantics of Bayesian networks with a neat diagram. (10 Marks)
- b. Construct a simple Bayesian network in which Weather is independent of the other three variables and Toothache and Catch are conditionally independent, given cavity. (10 Marks)

Module-4

- 7 a. Write short notes on :
- Texture
 - Color
 - Lighting and Shading
 - Binocular stereopsis
- b. Briefly explain the object recognition from structural information. (10 Marks)

OR

- 8 a. How do you use vision for controlling movement by providing the required information by the user? Explain with an example. (10 Marks)
- b. Consider a picture of a white sphere floating in front of a black backdrop. The image curve separating white pixels from black pixels is sometimes called the "outline" of the sphere. Show that the outline of sphere, viewed in a perspective camera, can be an ellipse, why do spheres not look like ellipses to you? (10 Marks)

Module-5

- 9 a. Construct the surface structure and Deep structure for the following sentences :
- The police will catch snatchers
 - She saw stars in the sky
- b. Consider the following Corpus of three sentences:
- There is a big garden
 - Children play in a garden
 - The play inside beautiful garden
- Calculate P for the sentence "They play in a big Garden" assuming a bi-gram language model. (10 Marks)

OR

- 10 a. List and explain the components of Transformation grammar. (10 Marks)
- b. Explain Binding theory with an example. (10 Marks)
