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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

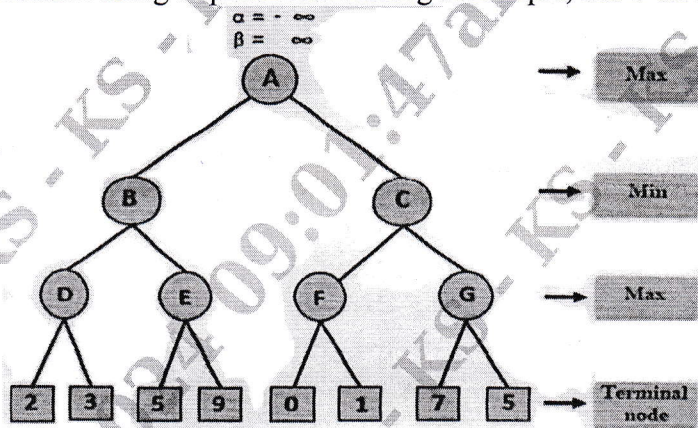2   a.   Solve the below problem using Alpha Beta Pruning technique, show all the necessary steps.

Fig Q2(a)   (10 Marks)

    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

(10 Marks)

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

OR

4 a. Consider the set of all possible five-card poker hands dealt fairly from a standard deck of fifty- two cards.
    i) How many atomic events are there in the joint probability distribution (i.e.,how many five-card hands are there)?
    ii) What is the probability of each atomic event?
    iii) 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 :
   i) Texture   ii) Color   iii) Lighting and Shading   iv) Binocular stereopsis **(10 Marks)**
   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 :
   i) The police will catch snatchers
   ii) She saw stars in the sky **(10 Marks)**
   b. Consider the following Corpus of three sentences:
   i) There is a big garden
   ii) Children play in a garden
   iii) 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)**

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Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Advanced Machine Learning

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1	a.	Explain the steps for building machine learning models.	(10 Marks)
	b.	Explain Ridge Regression, LASSO Regression and Elastic Net Regression.	(10 Marks)

OR

2	a.	Briefly explain Auto-Regressive (AR) models with respect to forecasting.	(10 Marks)
	b.	Discuss how Dicky-Fuller Test and differencing helps to find out if a time series is stationary in ARIMA model.	(10 Marks)

Module-2

3	a.	Show that how evaluation problem and learning problem issues are addressed by Hidden Markov Model.	(10 Marks)
	b.	For the given set of points, apply the clusters using agglomerative algorithm clustering : average link, use Euclidian distance and draw final cluster formed.	

Data object		
Points	A	B
P1	1	1
P2	1.5	1.5
P3	5	5
P4	3	4
P5	4	4
P6	3	3.5

(10 Marks)

OR

4	a.	Explain the steps involved in K means clustering algorithm along with its advantages and disadvantages.	(10 Marks)
	b.	Using K-Medoids Algorithm solve the problem for the following dataset of 6 objects as shown in the table below into clusters, for K = 2.	

Data object		
Sample	Points	
X1	2	6
X2	3	4
X3	3	8
X4	4	2
X5	6	2
X6	6	4

Note : Randomly select 2 medoids cluster centers.

(10 Marks)

Module-3

5 a. Discuss association rule mining and explain how each rule is measured with a set of metrics.
(10 Marks)

  b. With an example, explain the steps involved in user-based similarity algorithm. (10 Marks)

OR

6 a. Explain Count Vector Model helps to identify the importance of words in a BoW model.
(10 Marks)

  b. Build a classification model using the TF-IDF vectors and
     i) Create the confusion matrix
     ii) Find out the precision and recall for positive sentiment cases. (10 Marks)

Module-4

7 a. With a neat diagram explain types of neural network architecture. (07 Marks)
  b. With a diagram briefly explain different types of learning process involved in the neural network. (06 Marks)
  c. Solve ANDNOT function using McCulloch-Pitts neuron. (07 Marks)

OR

8 a. What are the appropriate types of problems in which artificial neural networks can be applied? (06 Marks)
  b. Briefly explain the following with respect to back propagation :
     i) Representational Power of Feedforward Networks
     ii) Generalization, Overfitting and Stopping Criterion. (08 Marks)
  c. Describe prototypical genetic algorithm with an example. (06 Marks)

Module-5

9 a. Explain central limit theorem with respect to general approach for deriving confidence intervals. (10 Marks)
  b. Briefly explain the two techniques required in Comparing learning algorithms. (10 Marks)

OR

10 a. Explain the distance-weighted nearest neighbor algorithm. (10 Marks)
   b. Briefly explain how reinforcement learning problem differs from other function approximation tasks. (10 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Blockchain Technology

Time: 3 hrs.   Max. Marks: 100

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

Module-1

| 1 | a. | Explain the benefits of Blockchain. | (10 Marks) |
| | b. | Explain how blockchain accumulates blocks. | (10 Marks) |

OR

| 2 | a. | Discuss distributed ledgers type of blockchain. | (10 Marks) |
| | b. | Explain distributed database Byzantine General's problem. | (10 Marks) |

Module-2

| 3 | a. | With a neat diagram, explain stream ciphers. | (10 Marks) |
| | b. | With a neat diagram, explain block ciphers. | (10 Marks) |

OR

| 4 | a. | How is RSA key pair generated? | (10 Marks) |
| | b. | With a neat diagram, explain point addition in ECC. | (10 Marks) |

Module-3

| 5 | a. | What are the three services provided by name coin and explain merged mining in name coin. | (10 Marks) |
| | b. | What are the parameters used by the scrypt to generate derived key in Litecoin. | (10 Marks) |

OR

| 6 | a. | Explain the steps that describe the transaction life cycle. | (10 Marks) |
| | b. | How is the transaction fee calculated? Explain. | (10 Marks) |

Module-4

| 7 | a. | Explain Ricardian contract with its properties. | (10 Marks) |
| | b. | Explain Ethereum blockchain. | (10 Marks) |

OR

| 8 | a. | Explain Externally Owned Accounts (EOAs) and Contract Account (CAs) types of accounts in Ethereum. | (10 Marks) |
| | b. | With a neat diagram, explain execution environment in ethereum. | (10 Marks) |

Module-5

| 9 | a. | Explain consensus protocol process in ripple. | (10 Marks) |
| | b. | Discuss Kadena's consensus mechanism. | (10 Marks) |

OR

| 10 | a. | Explain the application of blockchain in border control by government. | (10 Marks) |
| | b. | With a neat diagram, explain layered model of IOT. | (10 Marks) |

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Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Python Application Programming

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a. Distinguish between :
        i) Interpreter and complier
        ii) Syntax, logic and Semantic errors.   **(08 Marks)**
    b. Define variable and keyword. List the keywords and rules followed to use variable names with an example.   **(06 Marks)**
    c. Write a note on :
        i) Accepting input from keyboard
        ii) Choosing mnemonic variable names.   **(06 Marks)**

OR

2   a. Demonstrate the conditional, alternative, chained and nested execution statements with syntax, flowchart and example.   **(12 Marks)**
    b. Develop a student grading program that takes score with value between 0.0 to, 1.0 as its parameter and returns a grade as string. If score is out of range/string, then print appropriate error message using try and except concept.

Score	Grade
>= 0.9	A
>= 0.8	B
>= 0.7	C
>= 0.6	D
< 0.6	F

                                                                      (08 Marks)

Module-2

3   a. Explain definite and indefinite loops with suitable examples. **(05 Marks)**
    b. Develop a program which repeatedly reads numbers until the user enters "done". Once "done" is entered, print total, count, average, maximum and minimum of numbers. Use try and except to print appropriate error message and skip to next number input.   **(10 Marks)**
    c. List out the string handling methods with syntax and examples. **(05 Marks)**

OR

4   a. Describe the concept of parsing Strings and Format operators with suitable examples.
                                                                      (04 Marks)
    b. Demonstrate the open, read, write, search and close file methods with syntax and examples.
                                                                      (12 Marks)
    c. Develop a program to create a string made of first, middle and last character of a user specified string. (Ex : Input, : James, Output : Jms).   **(04 Marks)**

Module-3

5   a.   Illustrate 8 list handling methods in python.   (08 Marks)
    b.   Bring out the relationship between list and functions with suitable examples.   (06 Marks)
    c.   Development a program to turn every item of a list 1 into its square and place it into list 2.
         Print both lists.   (06 Marks)

OR

6   a.   Develop a program to read through a word file, find out the frequency of words in a file by
         ignoring the punctuation and alphabet case using dictionary. Print error if file does not exist.
                                                                                                           (08 Marks)
    b.   Describe tuple assignment with examples.   (06 Marks)
    c.   Illustrate searching and extracting operational methods using regular expression.   (06 Marks)

Module-4

7   a.   Define instantiation. Explain the shallow and deep copy concept with examples.   (08 Marks)
    b.   Demonstrate the concept of sameness between instances and use of instances as arguments
         and return values.   (12 Marks)

OR

8   a.   Illustrate the concept of pure functions and modifiers.   (05 Marks)
    b.   Develop a program with initialization method and optional arguments.   (10 Marks)
    c.   Demonstrate operator overloading and polymorphism feature with sample code.   (05 Marks)

Module-5

9   a.   Develop a program that represent World's simplest web browser. Also draw a conceptual
         diagram.   (07 Marks)
    b.   Develop a program that can read any size file without using up all the memory in computer.
                                                                                                           (06 Marks)
    c.   Demonstrate the XML and JSON formats for data exchange across the web.   (07 Marks)

OR

10 a.   Write a note on Google geo-coding API web service.   (08 Marks)
    b.   Demonstrate the use of CREATE, INSERT, SELECT, UPDATE and DELETE SQL
         commands in python.   (12 Marks)

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