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DEPARTMENT OF INFORMATION TECHNOLOGY

Academic Year: 2021-22 (Even Semester)
Course: Data Mining & Business Intelligence (1UITC601)
B.Tech. (Information Technology) – Semester VI

SAMPLE QUESTION BANK ON SYLLABUS

1. Explain Data Mining with an example.
2. With the help of a suitable diagram, explain the process of Knowledge Discovery from Databases.
3. Explain the kinds of data that can be mined.
4. Explain the kinds of patterns that can be mined.
5. Explain Data Warehousing.
6. Compare OLAP and OLTP.
7. Explain typical OLAP operations with an example.
8. Explain major issues in data mining.
9. List the multi-disciplines associated with data mining.
10. Enumerate 5 applications that can benefit from data mining.
11. Explain components of Web Mining framework.
12. Explain different types of attributes with examples.
13. Given any data, calculate mean, median, mode, and midrange.
14. Given any data, calculate variance and standard deviation.
15. Given any data, calculate Q1, Q3, Interquartile range.
16. Given any data, calculate the 5-number summary.
17. Given any data, sketch the boxplot.
18. Given any data, sketch the scatter plot.
19. Given any data, sketch the quantile plot analysis.
20. Given any data, sketch the quantile-quantile plot analysis.
21. List different types of graphical displays for statistical descriptions.
22. Examples of measuring similarity and dissimilarity between nominal data objects.
23. Examples of measuring similarity and dissimilarity between ordinal data objects.
24. Examples of measuring similarity and dissimilarity between binary data objects.
25. Examples of measuring similarity and dissimilarity between numeric data objects.
26. Examples of measuring similarity and dissimilarity between data objects with mixed attribute types.
27. Examples of measuring similarity and dissimilarity between textual data objects (cosine similarity).
28. Explain the need of data pre-processing.
29. Explain concept hierarchy for data mining.
30. Explain different steps involved in data pre-processing.
31. Explain different methods for handling missing data.
32. Explain different methods for handling noisy data.
33. Partition the given data into n bins using equal-depth / equal-width / equal-frequency binning.
34. Perform smoothing by bin means, bin median, and bin boundaries.
35. Explain various data reduction techniques.
36. Examples of eliminating redundancy during data integration: Chi-square method.

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37. Examples of eliminating redundancy during data integration: Pearson's coefficient.
38. Example on finding covariance in numeric data.
39. Examples of min-max normalization.
40. Examples of z-score normalization.
41. Examples of decimal scaling normalization.
42. Given any data, compute the Euclidean distance between the two objects.
43. Given any data, compute the Manhattan distance between the two objects.
44. Given any data, calculate the co-variance.
45. Define classification and list applications (examples) of classification.
46. Explain issues in classification.
47. Explain the process of classification.
48. State the assumption made by Naïve Bayes classifier.
49. Explain Naïve Bayes classifier with example.
50. Given a dataset with associated class labels, classify a tuple using Naïve Bayes classifier.
51. Explain decision tree classification with example.
52. Given a decision tree and test data, calculate accuracy, precision, recall, F1 score, etc.
53. Explain Gain Ratio as attribute selection measures used for inducing decision trees.
54. Given a dataset with associated class labels, find the root node of the decision tree.
55. Explain overfitting and underfitting.
56. Explain methods of tree pruning.
57. What is Regression? Explain linear regression with example.
58. Differentiate classification and prediction.
59. Explain different methods that can be used to compare and evaluate accuracy of different classification algorithms.
60. Explain k-fold cross-validation.
61. Explain holdout method and issues with it.
62. Explain the use of validation set.
63. Given a confusion matrix, calculate the Accuracy, True Positive Rate, False Negative Rate, False Positive Rate, True Negative Rate, Precision, Recall, Sensitivity, Specificity, F1 Score.
64. List various parameters for analysing and comparing performance of classification techniques.
65. Explain clustering using example.
66. Differentiate classification and clustering.
67. Differentiate supervised versus unsupervised learning.
68. Example of k-means clustering.
69. Example of k-medoids clustering.
70. Explain Agglomerative clustering / Example of Hierarchical clustering.
71. Explain outliers with example.
72. Explain outlier analysis.
73. Explain types of outliers.
74. Explain different methods that can be used for outlier detection.
75. Explain single link, complete link, average distance measures used to find distance between clusters.
76. Write short note on market basket analysis and use of it.
77. Define the terms with example: itemset, frequent itemset, closed item set.

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78. Explain Support in mining association with example.
79. Explain Confidence in mining association with example.
80. Explain the Apriori principle.
81. Example of Apriori algorithm to find strong association rules.
82. Find the acceptable k +1 itemsets from k itemsets in vertical data format.
83. Example of FP growth algorithm to find strong association rules.
84. Explain how FP growth algorithm improves Apriori algorithm.
85. Explain multilevel association rules with example.
86. Explain multidimensional association rules with example.
87. Explain rule interestingness.
88. Explain use of lift measure to evaluate the rules.
89. Define Business Intelligence and explain with example.
90. Explain the benefits of BI system.
91. Draw the architecture of Business Intelligence system.
92. Describe the key components of a BI system.
93. Explain Decision Support Systems.
94. Sketch the structure of Decision Support Systems and explain with example.
95. Explain the cycle of Business Intelligence analysis.
96. Describe phases of decision-making process.
97. Design a BI application which will provide retail chain company with features and performances that meet their objectives. Use the suitable data mining technique. Describe all steps of KDD from data collection to decision making clearly with respect to the stated application.
98. Design a BI application for fraud detection. Use the suitable data mining technique. Describe all steps of KDD from data collection to decision making clearly with respect to the stated application.
99. Design a BI application for telecom: A telecom company wants to analyze and improve its performance by introducing a series of innovative mobile payment plans. Use the suitable data mining technique. Describe all steps of KDD from data collection to decision making clearly with respect to the stated application.
100. Design a BI application for hotel: An international chain of hotels wants to analyze and improve its performance by using several performance indicators like quality of rooms, service facilities, check in facilities, breakfast, popular time of visits, duration of stay, etc. Use the suitable data mining technique. Describe all steps of KDD from data collection to decision making clearly with respect to the stated application.

Course Incharge:

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DEPARTMENT OF INFORMATION TECHNOLOGY

B. Tech. (Information Technology)
Academic Year 2021-22
Question Bank (ESE)

Class: TY IT   **Semester:VI**

Module 1: (CO1)

1. Describe Web Analytics, its importance and process
2. Explain clickstream analysis. State its benefits and drawbacks.
3. What metrics are used to define clickstream?
4. Describe the Optimal Strategy for Choosing Your Web Analytics tool
5. Discuss and compare between web 1.0, 2.0 and 3.0.
6. Define Semantic Web.
7. What are the components of Semantic web?
8. Sketch and illustrate the architecture of semantic web stack.
9. Describe the challenges in the semantic web
10. write the short note on SPARQL
11. Describe the Rule Interchange Format (RIF) in Semantic web. Explain Standard and Non-standard RIF Dialects.
12. N-Triples for storing and transmitting data
13. Web Ontology Language (OWL)
14. Turtle (Terse RDF Triple Language)
15. List and explain the measuring success factors.
16. Differentiate between the semantic web and Artificial Intelligence

Module 2: (CO2)

1. What is Typescript and its features?
2. Identify how JavaScript is different from typescript with example.
3. Typescript data types with example
4. Differentiate between var and let,
5. Typescript inheritance with example.
6. Function parameter in typescript with example
7. Program on functions
8. Arrow function with example
9. Typescript modules with example
10. How to declare variables in TypeScript?
11. Develop a pseudo code for inheritance in TS classes.

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12. Develop a pseudo code for any 2 types of inheritance.
13. Explain while loop and do while loop with one example of each type of loop.
14. Explain global scope, Local scope and class scope in Typescript with example.
15. Write a program for Fibonacci counter in typescript
16. Write a pseudo code for Login Page in typescript. Explain .ts file.

Module 3:(CO3)

1. What is Angular and features of it?
2. Difference in Angular and AngularJS
3. Hoe to create a workspace, initial application and run application in Angular.
4. List Steps for creating a component manually with syntax.
5. List Angular lifecycle hooks, Explain any five.
6. What is change detection lifecycle?
7. How to use lifecycle hooks?
8. How the encapsulation is applied on a per component basis with different modes.
9. the styling of components with different ViewEncapsulation modes
10. Explain parent to child or child to parent or with no relation Component interactions.
11. Explain the following directives in Angular with example.
    (a) ng-app (b) ng-init (c) ng-model (d) ng-bind (e) ng-show
12. Illustrate the use of expressions in Angular with suitable example.
13. State built in directives of angular. Explain with examples.
14. Create a simple Angular application to perform arithmetic operations. Draw UI of the output.
15. What is *Single-Page Applications?*
16. How to display and update properties with ngModel directive.
17. Create and Validate Forms in Angular. Give Directives used
18. How to Bind Event in Angular? Explain with object and steps.

Module 4: (CO4)

1. Advantages of MongoDB
2. Difference between RDBMS and MongoDB.
3. Describe the MongoDB data types.
4. Built in user roles in MongoDB.
5. Identify different Privilege Actions in MongoDB.
6. Write command for creating new user with example.
7. Apply create, modify, and delete users command within MongoDB with example.
8. Describe Inline password / passwordPrompt() method with example
9. Write command creating database, create collection and insert document with example
10. Features of MongoDB

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11. Differentiate between MySQL and MongoDB
12. List and Explain key components of MongoDB architecture
13. Write command for following with example and explanation.
    a. Display all databases
    b. Find current database
    c. Find all the collections in current database
    d. Find all the results of the given collections
    e. Show the result in pretty form
    f. Get only cayden data as an output
    g. Get only MongoDB data as an output with only name field
    h. Get only MongoDB data without _id field in it
    i. Set the filter to "no:41" and get only the first field with "no:32" value
14. Define Mongoose. Why use Mongoose?
15. What is the difference between the save and insert commands in MongoDB with example, and when do they act similarly?

Module 5: (CO5)

1. Features of Flask.
2. Difference between Django and Flask.
3. What is Web Framework? Write the basic Flask application to render message on browser.
4. App Routing with example.
5. URL Building with Example.
6. Explain add_url_rule() for URL binding.
7. Write a flask application to create login page with message on browser using GET method?
8. Write a flask application to create login page with message on browser using POST method?
9. Explain Flask request object with example.
10. Explain cookies in Flask.
11. File Uploading in Flask with example.
12. Create a flask application for weather updated.
13. Write a flask application to create feedback form.
14. Flask template with example

Module 6:(CO6)

1. Characteristic of rich internet application
2. Benefits of RIA and its tool
3. Identify difference between traditional web application and rich internet application.
4. Develop pseudo code for sending request to server using XMLHttpRequest with GET and POST.
5. Explain XMLHttpRequest object with method and properties.

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6. Sketch AJAX Web Application Mode and describe it.
7. Identify the features of Content Management System.
8. Describe Joomla, Drupal, and Django with features.
9. Differentiate between Joomla and Django.
10. What is AJAX? Explain steps required to process AJAX with example.
11. Explain important features of Django framework.
12. What is CMS?
13. Describe onreadystatechange Property in AJAX.

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Academic Year: 2021-22 (Even Semester)
Course: Wireless Technology (1UITC603)
B.Tech. (Information Technology)

Class: Third Year   Semester-VI

End Semester Examination
Sample Question Bank

Note : this is sample question bank, similar type of questions may be asked.

Module 01

1. Why can waves with a very low frequency follow the earth's surface? Why are they not used for data transmission in computer networks?

2.What are the main problems of signal propagation? Why do radio waves not always follow a straight line? Why is reflection both useful and harmful?

3. Define advanced frequency shift keying. Generate the MSK (minimum shift keying) using the following data string.1011010 (assume the low and high frequency for calculation)

4. What are the means to mitigate narrowband interference? What is the complexity of the different solutions?

5. What are the main benefits of a spread spectrum system? How can spreading be achieved?

6. Justify and explain the use of Frequency Hopping Spread Spectrum (FHSS) in mobile communication.

7. What are the main reasons for using cellular systems? How is SDM typically realized and combined with FDM?

8. Define CDM system? What happens to the transmission quality of connections if the load gets higher in a cell, i.e., how does an additional user influence the other users in the cell of CDM?

9. Calculate the numbers of times the cluster of size 4 have to be replicated in order to approximately cover the entire service area of 1765km2 with the adequate number of uniform-sized cells of 7km2 each.

10. why is the probability of collisions lower compared to classical Aloha? What are disadvantages of reservation schemes?

11. What are the advantages of a fixed TDM pattern compared to random, demand driven TDM?

12. Explain the term interference in the space, time, frequency, and code domain. What are countermeasures in SDMA, TDMA, FDMA, and CDMA systems?

13. What are benefits of reservation schemes? How are collisions avoided during data transmission?

14. Explain the concept of cell splitting with require figure

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15. Describe the Cell splitting with its limitations in detail.

16. Describe the natural phenomena that might affect the RF signal.

17. A Mobile communication system is allocated RF spectrum of 25MHz and uses RF Channel bandwidth of 25 KHz so that a total number of 1000 voice channels can be supported in the system.

   a) If the service area is divided into 20 cells with a frequency reuse factor of 4, calculate the system capacity.

   b) The Cell size is reduced to the extent that the service area is now covered with 100 cells. Compute the system capacity while keeping the frequency reuse factor 4.

   c) Consider the cell size is further reduced so that the same service area is now covered with 700 cells with the frequency reuse factor of 7. Calculate the system capacity. Comment on the result obtained.

Module 02

1. Name some key features of the GSM, What are the specific advantages of each feature?
2. Which types of different services does GSM offer? Give some examples and reasons.
3. Why are so many different identifiers/addresses (e.g., MSISDN, TMSI, IMSI) needed in GSM? Give reasons and distinguish between user-related and system related identifiers.
4. Name the main elements of the GSM system architecture and describe their functions. What are the advantages of specifying not only the radio interface but also all internal interfaces of the GSM system?
5. Describe the functions of the MS and SIM. Why does GSM separate the MS and SIM? How and where is user-related data represented/stored in the GSM system?
6. Looking at the HLR/VLR database approach used in GSM – how does this architecture limit the scalability in terms of users, especially moving users?
7. Why is a new infrastructure needed for GPRS? Which components are new and what is their purpose?
8. What are the limitations of a GSM cell in terms of diameter and capacity (voice, data) for the traditional GSM, GPRS? How can the capacity be increased?
9. Explain the types of Handover procedures. And justify the handover decisions for handover.
10. How is synchronization achieved in GSM? Who is responsible for synchronization and why is it so important?
11. Differentiate GSM, GPRS. Which components are new and what is their purpose?
12. How is localization, location update, roaming, etc. done in GSM and reflected in the data bases? What are typical roaming scenarios?
13. Mention the techniques to improve the capacity in cellular system and explain any one.

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14. With a proper diagram explain the time slot hierarchy of GSM system.
15. Write short note on : GSM time hierarchy.

16. Describe the GSM logical channel in brief.
17. With neat diagram explain : i) Intra cell handover ii) Inter cell handover
18. write a short note on EDGE.
19. Briefly describe hand-off strategies in cellular system.
20. Define Hand off.
21. What is meant by Hand off and explain different Hand off strategies?
22. How handoff operation is performed while mobile moves into a different cell while a conversation is in progress.

23. Discuss the cases for proper and improper handoff situations.
24. Define Handover. List and explain the types of handover.
25. consider a single high-power transmitter that can support 40 voice channels over an area of 140km2 with the available spectrum. if this area is equally divided into seven smalller areas (cells), each supported by lower power transmitters so that each cell supports 30%of the channels, then determine.

   a) coverage area of each cell
   b) total number of voice channels available in cellular system comment on the results obtained.

26. A total of 24 MHz of bandwidth is allocated to a particular FDD cellular system that uses two 30 KHz simplex channels to provide full duplex voice and control channels. Assume each cell phone user generates 0.1 Erlangs of traffic.

   (i) Find the number of channels in each cell for a four-cell reuses system.
   (ii) If each cell is to offer capacity that is 90% of perfect scheduling, find the maximum number of users that can be supported per cell.

Module 03

1. Discuss protocol stack and compare the IEEE 802.11a with IEEE 802.11b
2. Write advantages and disadvantages of Wi-Fi.
3. Describe WiMax in deatil.

4. Compare WiMax and Wi-Fi.

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5. Design WLAN using Lightweight Access point and Wireless LAN Controller. Discuss the   design issues.
6. What is the need of mobile IP. Describe the process of Discovery.
7. Create your own Wireless Network for mobility. Justify with merits & demerits.

8. State the advantage of WLAN.
9. Explain the difference between Ad-hoc Network and infrastructure based wireless networks.
10. Explain the protocol architecture of IEEE 802.11

Module 04

1. Compare the IEEE 802.15.1 with IEEE 802.15.4?
2. Illustrate Zigbee protocol stack.
3. Describe the overview of electrical vehicular ADHOC (E-VANET).
4. Write a Short note on: WSN
5. Compare ZigBee and Bluetooth with regard to their ad-hoc capabilities. Where is the focus of
   these technologies?
6. Differentiate between the MANET and WSN.
7. Compare the power saving mechanisms in Bluetooth. what are the trade-offs between power
   consumption and transmission QoS?
8. Explain WSN with its communication architecture.
9. What are advantages and problems of forwarding mechanisms in Bluetooth networks regarding power saving, and network stability?
10. Why is routing in multi-hop ad-hoc networks complicated, what are the special challenges?
11. Recall the distance vector and link state routing algorithms for fixed networks. Why are both
   difficult to use in multi-hop ad-hoc networks?
12. How does dynamic source routing handle routing? What is the motivation behind dynamic
   source routing compared to other routing algorithms from fixed networks?
13. Write a Short note on
      a) MANET
14. compare the Wi-MAX and LTE/3GPP
15. Explain the design issues of VANET and Justify the importance.
16. comparison between WPAN, WMAN and WMAN standards.

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17. Write down the advantages and limitations of wireless sensor networks.

Module 05

1. Describe the advantages of WPA over WEP.
2. Write a note on: REAP
3. Explain the Bluetooth protocol Architecture.
4. Describe the Security features of UMTS.
5. Describe Bluetooth Security architecture
6. Write short note on wireless LAN threats.
7. Explain the process of Mobile IP,
8. Describe WEP and WPA in detail.
9. What is a digital signature ? Explain to use providing messages integrity and message authenticity.
10. Explain the Authentication and Security in GSM.
11. Explain the Authentication algorithm A3 in GSM.
12. Explain the data encryption process using algorithm AB in GSM
13. Explain the data decryption process using algorithm A8 in GSM.
14. Explain the Access control and Authentication in GSM.

Module 06

1. Design Wireless Networks with Light weight access points and wireless LAN ontrollers.
2. Explain the elements Cisco UWN
3. Describe the design considerations for Outdoor Wireless Networks.
4. What is the difference between an autonomous AP and a lightweight AP?
5. Define the following WLC terms: Port, Interface, WLAN.
6. Explain the five typical steps in an RF site survey process.
7. What components comprise a Cisco wireless mesh network?
8. Write a note on: REAP
9. Write a note on: H-REAP

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DEPARTMENT OF INFORMATION TECHNOLOGY

Academic Year: 2021-22 (Even Semester)

Course: Artificial Intelligence and Data Science – I (1UITC604)

Class: TY IT   Semester VI

Question Bank

Module - 01

1. Define AI. Explain AI Approaches.

2. What is PEAS? Give example.

3. Explain AI application with Example.

4. Draw and explain Agent and environments. Explain Rational Agent.

5. Differentiate Fully observable and Partially Observable Environment.

6. Compare Episodic and sequential Environment.

7. Explain structure of agent. list types.

8. Draw and explain Simplex Reflex Agents.

9. Draw and explain Model based Reflex Agents.

10. Draw and explain Model based Goal Reflex Agents.

11. Draw and explain Model based utility Reflex Agents.

12. What is Learning Agents. How the components of agent Program Works.

13. Compare Model based agent and Utility based Agent.

14. Explain learning Agent with block diagram.

15. Give PEAS Description for Taxi Driver.

16. Explain PEAS Description for Part picking Robot and Medical Diagnosis System.

17. Differentiate between Programming with and without AI?

18. Give Advantages and Disadvantages of AI.

Module - 02

19. Which steps require to solve a problem. Explain components to formulate the problem.

20. Explain uninformed Search. List uninformed search techniques.

21. Explain informed Search. List informed search techniques.

22. Differentiate informed and uninformed search techniques.

23. Explain DFS with Example. Give advantages and disadvantages.

24. Explain BFS with Example. Give advantages and disadvantages.

25. Explain Uniform cost search with Example. Give advantages and disadvantages.

26. Explain Depth Limited Search algorithm with Example. Give advantages and disadvantages.

27. Explain iterative Deepening with Example. Give advantages and disadvantages.

28. Explain Bidirectional Search algorithm with Example. Give advantages and disadvantages.

29. Explain Best first search algorithm with Example. Give advantages and disadvantages.

30. Draw and explain Hill Climbing with example.

31. What is constraint satisfaction. Explain with example.

32. Solve using crypto-arithmetic - (SEND + MORE = MONEY)

33. Solve using crypto-arithmetic - (BASE + BALL = GAMES)

34. Explain Graph Colouring. Give one Example.

35. What is blind or uninformed search.

36. What is heuristic function?

37. State limitations of steepest-ascent hill climbing.

38. Define simulated annealing. Explain simulated annealing with suitable Example.

39. Explain A* Algorithm with an example.

40. Describe Water jug problem. Give a solution strategy.

41 Explain Minmax Procedure with suitable Example.
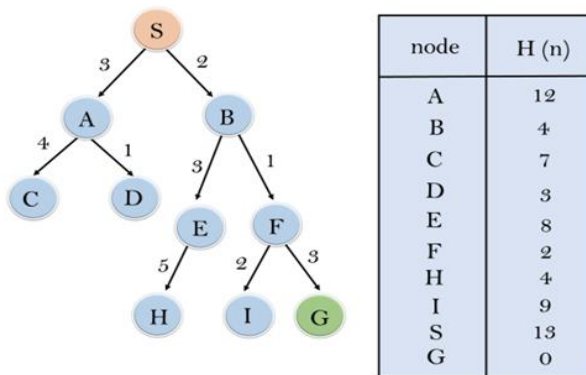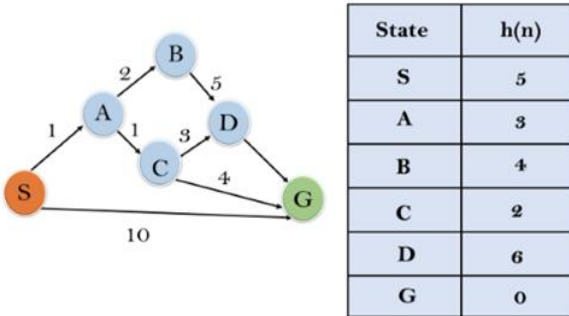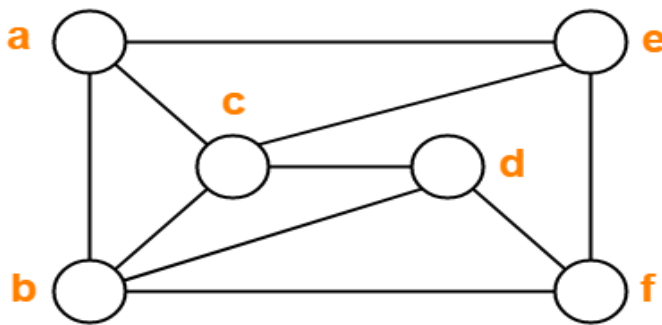
42. Solve using Min-Max Algorithm

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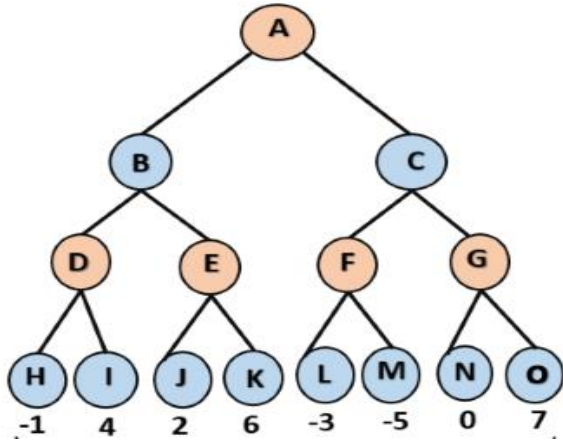
43. How AI technique is used to solve tic-tac-toe problem.

44. Differentiate Hill Climbing vs A* Algorithm.

45. Differentiate Unidirectional Search Method and Bidirectional Search.

46. E A T + T H A T = A P P L E

47.   S E N D + M O R E = M O N E Y

48.   C R O S S + R O A D S = D A N G E R

49. W R O N G + W R O N G =   R I G H T

50. Solve using Best first search algorithm.

| node	H (n)
A	12
B	4
C	7
D	3
E	8
F	2
H	4
I	9
S	13
G	0

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51. Solve using Best first search algorithm.

State	h(n)
S	5
A	3
B	4
C	2
D	6
G	0

52. Find chromatic number of following graph

53. Find chromatic number of following graph
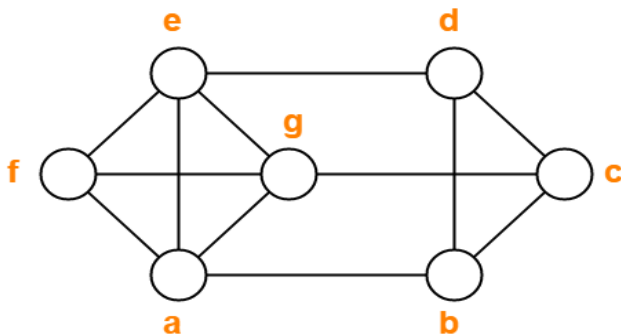
54. Find chromatic number of following graph

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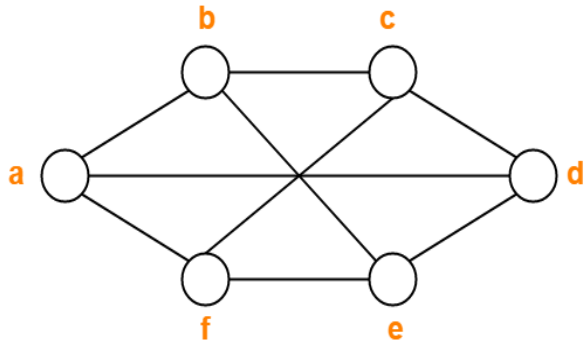
55. Find chromatic number of following graph
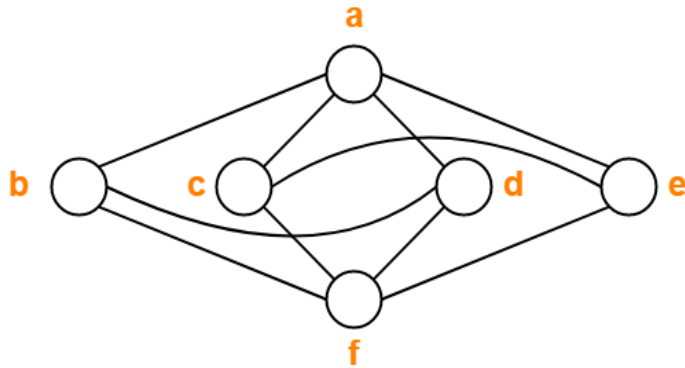
Module - 03

1. Explain Knowledge Based System.

2. Explain Role of Knowledge-Based Agent in Artificial intelligence.

3. Explain Mechanism of Knowledge-Based Agent in Artificial intelligence.

4. List the Rules in WUMPUS Game Environment. Explain Sensor Role.

5. Explain WUMPUS world Environment giving its PEAS Description. Explain how percept sequence is generated.

6. Write a short note on Properties of Agent Task Environment.

7. Explain forward chaining and backward chaining with example.

8. What are the characteristics of knowledge representation?

9. Explain properties of knowledge representation system.

10. Write short notes on properties of Agent Task Environment.

11. Explain basic operations of propositions.

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12. Define Tautologies and contradiction with example.

13. Show that p v ~ (p ^ q) is a tautology.

14. Verify that (p ^ ~ q) v (p ^ ~q) is a tautology.

15. Give advantages and disadvantages of propositional logic.

16. Show that (p ^ q) → (p v q) is a tautology.

17. Explain with example De Morgan Laws, Distributive Law and Associative Laws.

18. Define and explain First Order Logic.

19. Compare Propositional Logic Vs Predicate logic.

20. Comparison between Forward chaining and backward chaining.

21. Explain partial order planning.

Module - 04

1. Define Data Science with Example.

2. Compare Data Science Vs Business Analytics.

3. Compare Data Science vs Big Data.

4. Draw and Explain Life Cycle of Data Science.

5. Explain Role and importance of data analytics.

6. Give application of Data Science in various industries.

7. Define Machine Learning, Give example.

8. Gives Types of Machine Learning.

9. Explain Supervised Learning.

10. Draw and explain Logistic Regression.

11. Draw and Explain Support Vector Machine.

12. Discuss Issues in Machine learning

13. Explain various Application of Machine Learning.

14. Gives Steps in Developing a Machine Learning Application.

15. What are the key task of machine learning?

16. How Supervised learning is different from unsupervised learning.

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17. What are the key terminologies of SVM.

18. Illustrate SVM with neat labeled sketch.

Module - 05

1. Define Exploratory Data Analysis with example.

2. What is the significance of EDA?

3. Explain the importance of EDA?

4. What are the different Exploratory Data Analysis Tools?

5. What are the Different advantages of EDA?

6. Explain Role of EDA in Machine Learning.

7. Explain Typical Data Formats.

8. Explain Types of EDA.

9. Define Univariate Analysis (U.A).

10. Discuss Different methods of Univariate Distribution.

11. Compare Bar Chart Vs Histogram.

12. Write a short note on Frequency Polygon. Give steps how to construct frequency polygons with example.

13. Explain Pie-Chart. Give advantages and disadvantages. Give steps how to construct Pie-Chart with example.

14. Define Multivariate Analysis.

15. Discuss Different types of Multivariate Analysis.

16. Differentiate ANOVA vs MANOVA.

17. Discuss properties of correlation Coefficient.

18. Explain types of correlation.

19. The following data represent expenditure by a state government for Year 2020-21. Draw Pie-Diagram

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Items	Rural Development	Urban Development	Education	Others
Proposed Budget	8400	3000	2000	1000

Module - 06

1. Define CNN. Give Example.
2. Draw and Explain CNN Architecture.
3. What do you mean by Convolutional Neural Network?
4. Explain the different layers in CNN.
5. Why do we prefer Convolutional Neural networks (CNN) over Artificial Neural networks (ANN) for image data as input?
6. Explain the significance of the RELU Activation function in Convolution Neural Network.
7. Why do we use a Pooling Layer in a CNN?
8. What are the different types of Pooling? Explain their characteristics.
9. What is the role of the Fully Connected (FC) Layer in CNN?
10. Briefly explain the two major steps of CNN i.e, Feature Learning and Classification.
11. Explain the role of the Convolution Layer in CNN.
12. Explain the significance of "Parameter Sharing" and "Sparsity of connections" in CNN.
13. Can we use CNN to perform Dimensionality Reduction? If Yes, then which layer is responsible for dimensionality reduction particularly in CNN?
14. What are the problems associated with the Convolution operation and how can one resolve them?
15. Write a short note on GoogleNet?
16. Write a short note on ResNet.

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Question Bank

Subject: Big Data Analytics   **Class: TYIT**   **Sem: VI**

Chapter 1. Introduction to Big Data

Q.1) What is Big Data? Explain it with some example.

Q.2) How "Big" is Big Data? Explain the types of Big Data.

Q.3) What are the four characteristics of Big Data?

Q.4) How is Big Data Analysis useful for organization.

Q.5) Explain how big data analytics is beneficial in various domains?

Q.6) What is the difference between traditional and Big Data Approach?

Q.7) What are the advantages of Big Data Analytics?

Q.8) What are the technologies available for Big Data?

Q.9) What is required to explain the infrastructure for Big Data?

Q.10) What are the desired properties of Big Data System?

Q.11) What is Big Data? Give some examples of Big Data.

Q.12) What are 5 V's of Big Data? Explain two examples of big data case studies and indicate which
characteristics are satisfied by these cases.

Q.13) Write a short note on Big Data and its characteristics. How is analysis of Big Data being
useful for organization?

Q.14) What are the advantages of Big Data Analytics? Explain the real time applications of Big Data?

Q.15) List different types of data and hence explain structured, Semi Structured and Unstructured
data by giving example.

Q.16) Explain following terms with respect to Big Data Analytics:

   a) Characteristics

   b) Types

   c) Challenges

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Chapter 2. Big Data Frameworks

Q.17) What is Hadoop? Explain why Hadoop?

Q.18) What are the goals of Hadoop?

Q.19) What are Core Hadoop Components?

Q.20) Explain Hadoop Ecosystem in detail.

Q.21) What are the limitations of Hadoop.

Q.22) What is Job tracker and task tracker?

Q.23) What is HDFS and what are its features?

Q.24) What is Map Reduce? Explain how do "map" and "reduce" work?

Q.25) What is structured, semi-structured and unstructured data? Give an example and explain.

Q.26) Give a brief overview of Hadoop.

Q.27) What is NoSQL? What are the NoSQL Business Drivers?

Q.28) What are the NoSQL architectural Pattern? Explain it in detail with example.

Q.29) What is CAP theorem how it is different from ACID properties?

Q.30) List the various NoSQL Data stores? Explain any two with diagram.

Q.31) Explain HDFS architecture with diagram.

Q.32) Explain Hadoop Ecosystem with core components. Explain its physical Architecture. State the limitations of Hadoop.

Q.33) What a key-value store is? Explain the benefits of using a key-value store.

Q.34) Demonstrate NoSQL case studies.

Q.35) List the use cases of key-value store, Graph store and Document store and explain any one-use case of key-value store in detail.

Q.36) Illustrate Document store APIs along with example.

Q.37) Explain features of MongoDB database.

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Q.38) Distinguish between:

a) RDBMS and NOSQL

b) Column Store and Column Family.

Q.39) What are the different Architectural Patterns in NoSQL? Explain "Key-Value" store and

"Document" store pattern with relevant example.

Q.40) Explain the term NameNode and DataNode with respect to HDFS.

Q.41) What are JobTracker and TaskTracker? Explain the benefits of block Transfer.

Q.42) What is a secondary NameNode? Does it substitute a NameNode?

Q.43) Explain NoSQL data architecture patterns.

Q.44) Write a short note on:

a) Hadoop Architectural Model.

b) Hive and its architecture.

Q.45) List the applications of Apache Spark.

Chapter 3. Map Reduce Paradigm

Q.46) Explain Matrix-Vector Multiplication using Map Reduce.

Q.47) Explain word count using Map Reduce algorithm.

Q.48) What is shuffling in Map Reduce?

Q.49) What are combiners? When should one use a combiner in Map Reduce job?

Q.50) Show Map Reduce implementation for the following task using pseudocode

i) Multiplication of two matrices.

ii) Computing Grouping and aggregation.

Q.51) List Relational- Algebra Operations. Explain any two using Map Reduce.

Q.52) Explain MapReduce Programming Model.

Q.53) What is a Role of Combiner in MapReduce Framework? Explain with the help of one example.

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Q.54) How does NameNode Tackle DataNode Failures?

Q.55) Write a MapReduce Pseudo code to multiply two matrices. Illustrate with an example showing all the steps.

Q.56) Explain how Map Reduce Algorithm is used for processing relational data.

Q.57) Explain the responsibilities of MapReduce framework.

Q.58) What are the advantages of using MapReduce with Hadoop?

Q.59) Describe in brief Matrix Multiplication using MapReduce programming Module.

Q.60) What are combiners? Identify the situation when one use a combiner in Map Reduce job?

Q.61) Make use of real life example to explain concept of shuffling in Map reduce.

Q.62) Implement the concept of Map Reduce in Matrix Vector Multiplication.

Chapter 4. Mining Big Data Streams

Q.63) List issues and challenges faced in data stream processing.

Q.64) Clearly explain the concept of Bloom filter with example

Q.65) Suppose data stream consist of integers 4,8,5,7,3,6,2,5,1. Let hash function being used is h(x)=3x+2 mod 5. Show how Flajolet Martin will estimate number of distinct elements in this stream.

Q.66) Explain DGIM algorithm for counting ones in a stream with example.

Q.67) Explain the issues in Data Stream query processing.

Q.68) Suppose a stream consists of the integers 2,1,6,1,5,9,2,3,5. Let the Hash functions all be of the form

h(x) =ax+b mod 16 for some a and b. You should treat the result as a 4-bit binary integer. Determine the tail length for each stream element and the resulting estimate of the number of distinct element if the Hash function is:

a) h(x) = 2x +3 mod 16

b) h(x) = 4x+1 mod 16

c) h(x) = 5x mod 16

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Q.69) Define Bloom Filter. Explain the concept of Bloom Filter Algorithm with example.

Q.70) Give the updating bucket approach of DGIM algorithm.

Q.71) Explain Flajolet Martin algorithm with example.

Q.72) Suppose a data stream consists of the integers 1,3,2,1,2,3,4,3,1,2,3,1. Let the hash function being used is $h(x) = (6 x +1)$ mod5: estimate the number of distinct in this stream using Flajolet Martin algorithm.

Q.73) Give two applications for counting the number of 1's in along stream of binary values. Using a stream of binary digits. Illustrate how DGIM will find the number of 1's.

Chapter 5. Big Data Mining Algorithm

Q.74) Clearly with diagrams explain how PCY algorithm helps to perform frequent itemset mining on large datasets.

Q.75) Explain working of SON algorithm with MapReduce .

Q.76) Explain how CURE algorithm can be used to cluster Big data sets .

Q.77) Explain different distance measures for Big data.

• Find Jaccard distance {1,2,3,4} and {2,3,5,7}, {a,a,a,b} and {a,a,b,b,c}

• Find Hamming distance between 110011 and 010101, 110001 and 01011

• Compute cosines of angle between (3,-1,2) and (-2,3,1)

Q.78) Explain how parallel decision tree approach can be used to classify large data sets.

Q.79) Compute the Hamming distance between the following:

a) x=0101010001 and y = 0100011000

b) x= 111111100 and y= 000111111

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Q.80) Find edit distance between the following pair of string:

a)"abcdef" and "bcdesg"

b) "abcceghi" and "defghsi"

c)" aaaaaabc" and "bbbbbbef"

Q.81) Find the Jaccard distance between the following pairs of set:

a) {1,2,3,4} and {2,3,5,7}

b) {3,2,1} and {2,4,6}

c) {1,2,3,4} and {5,6,7,8}

Q.82) Give a formal definition of Nearest Neighbour Problem. Show how finding plagarism in document is

Nearest Neighbour Problem.

Q.83) Explain the application of Nearest Neighbour Search.

Q.84) Write a short note on Multistage Frequent itemset Mining Algorithm.

Q.85) Explain Park-Chen-Yu Algorithm? How memory mapping is done in PCY?

Q.86) Write a short note on:

a) PCY Algorithm.

b) CURE Algorithm.

Q.87) Imagine there are 100 baskets, numbered 1, 2......, 100 items similarly numbered. Item I is in

basket J if and only if I divides J evenly. For example, basket is 24 is the set of items {1, 2, 3, 4, 6,

8, 12, 24}. Describe association rules that have100% confidence.

Q.88) Explain PCY algorithm with suitable example.

Q.89) Explain clearly how the SON partition-based algorithm helps to perform frequent item set mining

for large data sets. How does this algorithm avoid false negative?

Q.90) Write a short note on: SON algorithm with MapReduce.

Q.91) Identify the use of market basket model in real life application.

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Chapter 6. Big Data Analytics Applications

Q.92) Explain PageRank algorithm with suitable example.

Using web graph shown below compute PageRank at every node at end of second iteration.
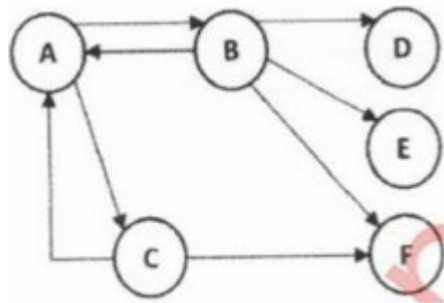
Use teleport factor=0.8

Q.93) Explain structure of Web with suitable example.

Q.94) Write note on steps for HITS algorithm.

Q.95) Explain techniques used for combatting link spam.

Q.96) Define collaborative Filtering. Using an example of ecommerce site like Flipkart or Amazon describe how it can be used to provide recommendation to users.

Q.97) What is the difference between user-based collaborative filtering and item -based collaborative filtering?

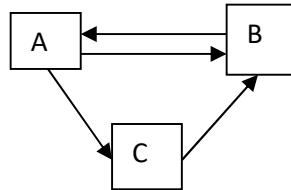Q.98) Give five applications for collaborative filtering.

Q.99) Explain collaborative filtering system. Analyze how it is different from content based System.

Q.100) What are the different recommender system. Explain it with example.

Q.101) Define Hub and Authority. Compute Hub and Authority Score for the following Web.
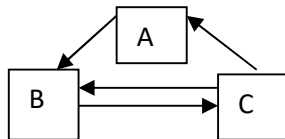
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Q.102) What is a role and effect of PageRank?

Q.103) Define Hub and Authority. Find and analyze the Hub and Authority Score for the following Web.

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Question Bank

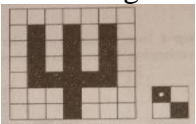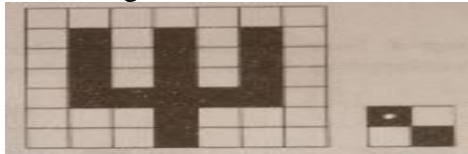**Semester: VI (IT) Even-2021-2022**

Subject: Image Processing   **Course code: 1UITDLC6053**

Sr.No	Questions
	UNIT-I
1	Compare sampling and quantization in image processing
2	Describe the fundamental concepts of image processing.
3	List Steps of Image Processing and explain any two.
4	Describe Image Sensing (Single imaging sensor and Array sensor).
5	Describe Image Sampling and Quantization in image processing.
6	List and explain Components of Image Processing.
7	Explain digital image acquisition process.
8	Describe different Interpolation methods.
9	Compare Bilinear and Bi-cubic interpolation methods
10	List Types of Image Interpolation methods and explain any two.
11	List and explain three types of adjacency between pixels.
12	Explain Convolution and Correlation
13	Compute the convolution where x(n)= (1,1,0,1,1) and h(n)=(1,-2,-3,4) using tabulation method.
14	Describe Convolution and Correlation in image processing
15	Describe Spatial and Intensity Resolution in image processing
16	Explain Adjacency between pixels.
17	List and explain types of adjacency between pixels.
18	Explain 4-adjacency and 8-adjacency between pixels
	UNIT-II
19	Describe spatial and frequency domain
20	Describe point processing method with example.
21	Explain Image Negative point processing with example.
22	Explain Contrast Stretching point processing with example.
23	Describe Bit Plane Slicing and Gray Level Slicing
24	Describe Clipping with example
25	List and explain Types of Clipping
26	Describe Line clipping (straight line segment) with example.
27	Describe Dynamic Range Compression(Log transformation)
28	Compute the median value of the marked pixel using a 3x3 mask.

	18 22 33 25 32 24 34 **128 24 172 26** 23 22 19 32 31 28 26
29	List the Benefit of Bit-plane slicing.
18	Describe Bit plane slicing point processing with example.
30	Compute the Neighbourhood Average Filter, Weighted Filter and Median Filter value of marked pixel using 3x3 mask. 23 25 30 35 30 25 30 35 37 40 45 40 **37** 43 45 38 40 43 42 46 35 40 42 45 47
31	Explain Weighted Filter with example.
32	Compare a) Average Filter b) Weighted Filter c)Median Filter
33	Demonstrate the histogram equalization of given table **Gray level:** 0, 1, 2, 3, 4, 5, 6, 7 **Number of Pixels:** 790,1023, 850, 656, 329, 245,122, 81
34	Demonstrate the histogram equalization of given table **Gray level:** 0, 1, 2, 3, 4, 5, 6, 7 **Number of Pixels:** 100,90,50,20,0,0,0,0
35	Explain histogram specification.
36	Explain histogram and histogram equalization with example.
	UNIT-III
	Describe Transform Pair 1-D and 2-D in Fourier Transform(FT)
37	Describe Transform Pair 1-D and 2-D in Discrete Fourier Transform(DFT)
38	Describe Fourier Transform(DFT).
39	Compare FT & DFT
40	Find the DFTof the given sequence and also find the inverse DFT of the result obtained, **x(n)={ 11, 21, 3, 4}** using matrix method or kernel.
41	List and explain DFT Properties for 1-D transform
42	Find the DFT of the given sequence using matrix method X[k]= {0,1,2,1}
43	Explain Linearity 1-D property of DFT.
44	Explain Periodicity 1-D property of DFT.
45	Explain 2D reparability Discrete Fourier Transform(DFT) property.
46	Find the DFT of the given signal and also find the inverse DFT of the result obtained x(n)= {11,21,3,4}
47	Demonstrate the **Linear DFT property for 1-D**
48	Find the inverse DFT of given image using matrix method X[k]= {4,-2,0,-2}
49	Find the DFT of the given image use the DFT along the rows and then along the columns. 0 1 2 1 2 3 4 3 1 2 3 2

50	Explain Low pass frequency domain filters.
	Explain High pass frequency domain filters.
51	Explain Homomorphic Filtering
52	Explain Discrete Cosine Transform(DCT) with mathematical model
53	Find the DCT of the following sequence: F(x)={1,2,4,7}
	Find the DCT of the give 4x4 image 2 4 4 2 4 6 8 3 2 8 10 4 3 8 6 2
54	Explain Walsh-Hadamard Transform
55	Compute the inverse Hadamard transform of the data sequence (1,2,0,3}
56	Compute the Hadamard transform of the given image 2 1 2 1 1 2 3 2 2 3 4 3 1 2 3 2
57	Explain Haar transform

Sr.No	Questions
	UNIT-IV
58	Explain Image Compression
59	Compare Lossy and lossless compression techniques
60	Differentiate entropy with other compression technique
61	Compare Coding redundancy with Inter pixel redundancy
62	Distinguish between Psychovisual redundancy with other redundancy
63	Differentiate between subjective and objective criteria
64	List and explain any one lossy compression method
65	List and explain any one lossless compression method with example
66	Analyze RLE on the following data:2 2 2 5 5 5 5 5 5 6 6 6 6
67	Analyze RLE on the following data:1 2 5 3 1 2
68	Analyze LZW on the following original data: 120,115,231,123,124,125,110,160,231,123,124,125
69	Analyze LZW on the following original data:123, 145, 201,4,119,89,243,245,59,11,206,145,201,4,243,245....
70	Compare Huffman coding with RLE technique
71	Analyze the Huffman code for given data set: 1,1,1,1,1,1,1, 2,2,2,2,2,2, ,3,3,3,3,3, 4,4,4,4, 5,5,5, 6,6, 7
72	Analyze the Huffman code for the following stream of data: {a, a, a, a, a, a, b, b, b, c, c, c, c, c, c, d, d, d, d, d, d, d, d, d, e, e, e, e, f, f}
73	Consider five symbol sequence {A, B, B, C, C} from three symbol source code to analyze the Arithmetic code for the same.

		UNIT-V
74		List and explain morphological operation
75		Compare Dilation and Erosion morphological operation
76		Apply Dilation Morphological operation on given input image and structuring element.
77		Apply Erosion Morphological operation on given input image and structuring element.
78		Compare opening and closing morphological operation
79		Apply opening and closing morphological operation on any image
80		Explain boundary extraction with example
81		Explain Skeletonization with example
82		List advanced Morphological methods and explain any two with example
83		Explain thinning and thickening advanced Morphological methods with examples.
84		Explain inner and outer boundary extraction with example
		UNIT-VI
85		List and explain image segmentation methods based on discontinuties.
86		Explain Point detection method with example.
		Explain Line detection method with example.
87		Explain Edge detection method with example.
88		Compare Point and Line detection in image segmentation
89		Compare Edge and Line detection in image segmentation
90		Compare Robert and Prewitts operations in image segmentation
91		Compare Sobel and Prewitts operations in image segmentation
92		Explain Hough transform
93		List region based segmentation methods and explain any two with example
94		Explain region growing segmentation with example
95		Explain region splitting and region merging segmentation with example

Subject: Incharge
Dr. Mansing Rathod