

## VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-31

Department of Computer Science and Engineering

Name of the Course: **Natural Language Processing**

## Quiz - I

Name of the Faculty: Dr. K.Srinivas  
 Class: B.E 4/4  
 Section: A & B  
 Sem: VII  
 Academic Year: 2024-2025

Date: 5-09-2024

Time: 10:40am – 11:40am

Note: Answer all the Questions (20 Marks)

| Q. No. | Description of the question                                                                                                                                                | Marks | BTL               | Mapped |       |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------|--------|-------|
|        |                                                                                                                                                                            |       | (1/2/3/4<br>/5/6) | CO     | PO    |
| 1.     | Is 'wc' utility of UNIX a data processing application or language processing application?                                                                                  | 1     | 2                 | 1      | 1,2   |
| 2.     | Give a UNIX command line for tokenizing the input text.                                                                                                                    | 1     | 2                 | 1      | 1,2   |
| 3.     | What is the minimum edit distance between the words 'am' and 'aim'?                                                                                                        | 1     | 2                 | 1      | 1,2   |
| 4.     | What is Markov assumption?                                                                                                                                                 | 1     | 2                 | 1      | 1,2   |
| 5.     | How to address the issue of floating point underflow that arises in computing $P(W_{1:n})$ in bigram language model?                                                       | 1     | 2                 | 1      | 1,2   |
| 6.     | How to compute $P(W_n W_{1:n-1})$ in bigram language model?                                                                                                                | 1     | 2                 | 1      | 1,2   |
| 7.     | Compute the Minimum Edit Distance between the strings 'Sunday' and 'Saturday'.                                                                                             | 3     | 2                 | 1      | 1,2   |
| 8.     | "Developing an NLP application may involve resolving ambiguities". Explain the above statement.                                                                            | 3     | 3                 | 1      | 1,2,3 |
| 9.     | Write and explain an algorithm for tokenization using Byte-Pair encoding. How are unknown words dealt with in this algorithm?                                              | 4     | 2                 | 1      | 1,2,3 |
| 10.    | Write a Python program to build an n-gram language model to compute probability of a given word sequence appearing in a language. Use Brown corpus for training the model. | 4     | 3                 | 1      | 1,2,3 |

By  
31/9/24

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**IBRAHIMBAGH, HYDERABAD-31**  
**Department of Computer Science and Engineering**  
**·BE (CSE) -VII SEMESTER I-INTERNAL EXAMINATION**

Name of the Course: **Natural Language Processing (UI21PE714CS)**

Max Marks:30

Date : 04.10.2024

Time : 11.00 AM to 12.30PM

Note: Answer **ALL** questions

| S.No | Question | Ma<br>rks | BTL<br>(1/2/3/4/5/6) |    | Mapped |    |
|------|----------|-----------|----------------------|----|--------|----|
|      |          |           | CO                   | PO | CO     | PO |

**Part A ( 6 x 1 = 6 marks):**

|   |                                                                                                                                   |   |   |   |     |
|---|-----------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----|
| 1 | What is the reason in using log probabilities in bigram language model though normal probabilities are mathematically sufficient? | 1 | 2 | 1 | 1,2 |
| 2 | Find the minimum edit distance between the strings "cat" and "bat".                                                               | 1 | 2 | 1 | 1,2 |
| 3 | Write a regular expression to extract hyphenated words such as check-in, editor-in-chief in a given textual corpus.               | 1 | 2 | 1 | 1,2 |
| 4 | What is Named-Entity recognition problem?                                                                                         | 1 | 1 | 1 | 1,2 |
| 5 | What is Markov assumption?                                                                                                        | 1 | 1 | 2 | 1,2 |
| 6 | What is POS tagging?                                                                                                              | 1 | 1 | 2 | 1,2 |

**Part B: (4 x 3 = 12 marks)**

| 7    | State add-1 smoothing and its disadvantage. How it is addressed in add-k smoothing? Explain the other two techniques namely back-off and interpolation to address the zero frequency n-grams?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3       | 2      | 1      | 1,2,<br>3 |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|--------|-----------|------|-----|------|-------|------|------|----|-------|------|------|-------|----|-----|---|--------|---|----|-------|------|------|-------|------|-----|--------|-------|--------|--|---|------|----|------|----|---|-------|---|--------|----|---|---|-----|---|----|---|---------|---|--------|------|-----|---|---|---|---|---|---|-----|
| 8    | Which UNIX tools are used for word tokenization? Explain, with the help of various command lines, how the word tokenization can be performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3       | 3      | 1      | 1,2,<br>3 |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| 9    | State various assumptions made in building Hidden Markov Model (HMM). Build the HMM?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3       | 2      | 2      | 1,2,<br>3 |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| 10   | Consider the HMM given below to solve the sequence labeling problem of POS tagging. With the HMM, calculate the probability that the sequence of words "I want to race" will be assigned the parts of speech sequence "PPSS VB TO VB"..<br><br><table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th>VB</th> <th>TO</th> <th>NN</th> <th>PPSS</th> </tr> <tr> <td>&lt;s&gt;</td> <td>.019</td> <td>.0043</td> <td>.041</td> <td>.067</td> </tr> <tr> <td>VB</td> <td>.0038</td> <td>.035</td> <td>.047</td> <td>.0070</td> </tr> <tr> <td>TO</td> <td>.83</td> <td>0</td> <td>.00047</td> <td>0</td> </tr> <tr> <td>NN</td> <td>.0040</td> <td>.016</td> <td>.087</td> <td>.0045</td> </tr> <tr> <td>PPSS</td> <td>.23</td> <td>.00079</td> <td>.0012</td> <td>.00014</td> </tr> </table><br><table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th>I</th> <th>want</th> <th>to</th> <th>race</th> </tr> <tr> <td>VB</td> <td>0</td> <td>.0093</td> <td>0</td> <td>.00012</td> </tr> <tr> <td>TO</td> <td>0</td> <td>0</td> <td>.99</td> <td>0</td> </tr> <tr> <td>NN</td> <td>0</td> <td>.000054</td> <td>0</td> <td>.00057</td> </tr> <tr> <td>PPSS</td> <td>.37</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table> |         | VB     | TO     | NN        | PPSS | <s> | .019 | .0043 | .041 | .067 | VB | .0038 | .035 | .047 | .0070 | TO | .83 | 0 | .00047 | 0 | NN | .0040 | .016 | .087 | .0045 | PPSS | .23 | .00079 | .0012 | .00014 |  | I | want | to | race | VB | 0 | .0093 | 0 | .00012 | TO | 0 | 0 | .99 | 0 | NN | 0 | .000054 | 0 | .00057 | PPSS | .37 | 0 | 0 | 0 | 3 | 3 | 2 | 1,2 |
|      | VB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TO      | NN     | PPSS   |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| <s>  | .019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | .0043   | .041   | .067   |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| VB   | .0038                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | .035    | .047   | .0070  |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| TO   | .83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0       | .00047 | 0      |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| NN   | .0040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | .016    | .087   | .0045  |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| PPSS | .23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | .00079  | .0012  | .00014 |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
|      | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | want    | to     | race   |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| VB   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | .0093   | 0      | .00012 |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| TO   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0       | .99    | 0      |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| NN   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | .000054 | 0      | .00057 |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |
| PPSS | .37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0       | 0      | 0      |           |      |     |      |       |      |      |    |       |      |      |       |    |     |   |        |   |    |       |      |      |       |      |     |        |       |        |  |   |      |    |      |    |   |       |   |        |    |   |   |     |   |    |   |         |   |        |      |     |   |   |   |   |   |   |     |

**Part C (2 x 6 = 12 marks)**

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |           |     |     |     |     |     |     |     |   |   |   |           |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|-----|-----|-----|-----|-----|-----|-----|---|---|---|-----------|
| 11  | <p>(a) Give number of interpretations of the following English sentence given in bold face to show that the task of NLP is majorly to resolve ambiguity.</p> <p><b>I made her duck.</b></p> <p>(b) Find the minimum edit distance between the strings "Wednesday" and "Thursday".</p>                                                                                                                                                                                                                                                                            | 3   | 1         | 1   | 1,2 |     |     |     |     |     |   |   |   |           |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3   | 2         | 1   | 1,2 |     |     |     |     |     |   |   |   |           |
| 12  | <p>(a) Derive a formula for finding tf-idf metric.</p> <p>(b) Once a day (e.g. at noon), the weather is observed as one of state-1:Rainy, state-2:Cloudy, state-3:Sunny. The state transition probabilities are</p> <table border="1"> <tr> <td>0.4</td><td>0.3</td><td>0.3</td></tr> <tr> <td>0.2</td><td>0.6</td><td>0.2</td></tr> <tr> <td>0.1</td><td>0.1</td><td>0.8</td></tr> </table> <p>Given that the weather on day-1 is 'Sunny' (state 3), what is the probability that the weather for the next 7 days will be sun-sun-rain-rain-sun-cloudy-sun?</p> | 0.4 | 0.3       | 0.3 | 0.2 | 0.6 | 0.2 | 0.1 | 0.1 | 0.8 | 3 | 3 | 2 | 1,2<br>,3 |
| 0.4 | 0.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.3 |           |     |     |     |     |     |     |     |   |   |   |           |
| 0.2 | 0.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.2 |           |     |     |     |     |     |     |     |   |   |   |           |
| 0.1 | 0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.8 |           |     |     |     |     |     |     |     |   |   |   |           |
| 3   | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2   | 1,2<br>,3 |     |     |     |     |     |     |     |   |   |   |           |

Summary of the percentage for each of the criteria BTL (Blooms Taxonomy Level) from the questions framed.

1. Fundamental knowledge from Level-1 (Remember) : 20%
2. Fundamental knowledge from Level-2 (Understand) : 40%
3. Knowledge on application and analysis from Level-3(Apply) & 4 (Analyze) : 40%

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-31

Department of Computer Science and Engineering

Name of the Course: **Cryptography and Network Security**

Quiz – I

Name of the Faculty: Dr. K.Srinivas

Date: 04-09-2024

Class:

B.E 4/4

Time: 10:40am – 11:40am

Section:

A

Sem:

VII

Academic Year: 2024-25

Note: Answer all the Questions (20 Marks)

| Q. No. | Description of the question                                                                                                                                                                      | Marks | BTL<br>(1/2/3/4<br>/5/6) |    | Mapped |       |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------|----|--------|-------|
|        |                                                                                                                                                                                                  |       | CO                       | PO |        |       |
| 1.     | Differentiate between symmetric and asymmetric encryption methods.                                                                                                                               | 1     | 1                        | 1  | 1      | 1,2   |
| 2.     | Obtain the Cipher text for the following plain text using Caesar Cipher.<br>'Vasavi College of Engineering, Hyderabad'                                                                           | 1     | 2                        | 1  | 1      | 1,2   |
| 3.     | What is the weakness of mono-alphabetic Cipher?                                                                                                                                                  | 1     | 2                        | 1  | 1      | 1,2   |
| 4.     | What is Cryptanalysis?                                                                                                                                                                           | 1     | 2                        | 1  | 1      | 1,2   |
| 5.     | What is non-repudiation?                                                                                                                                                                         | 1     | 2                        | 1  | 1      | 1,2   |
| 6.     | Give a list of various security attacks?                                                                                                                                                         | 1     | 2                        | 1  | 1      | 1,2   |
| 7.     | Explain the Symmetric Cipher model. What are its requirements?                                                                                                                                   | 3     | 2                        | 1  | 1      | 1,2   |
| 8.     | How to compute $a^b \text{ mod } n$ efficiently? What is the worst case number of iterations, if the exponent is 30000?                                                                          | 3     | 3                        | 1  | 1      | 1,2,3 |
| 9.     | Write a Python program to encrypt a plain text using DES algorithm. Verify the correctness of the encryption by decrypting the cipher text and comparing it with the original message.           | 4     | 3                        | 1  | 1      | 1,2,3 |
| 10.    | What is SQL injection? Give the attacker's SQL code injections in login and password fields to gain an unauthorized access to an application. What is the solution to this SQL injection attack? | 4     | 3                        | 1  | 1      | 1,2,3 |

By  
3/2/24

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

**IBRAHIMBAGH, HYDERABAD-31**

**Department of Computer Science and Engineering**

**BE (CSE) -VII SEMESTER I-INTERNAL EXAMINATION**

Name of the Course: **Cryptography and Network Security (UI21PE720CS)**

Max Marks:30

Date :

01.10.2024

Time :11.00 AM to 12.30PM

Note: Answer **ALL** questions

| S.No | Question | Mar<br>ks | BTL<br>(1/2/3/4/<br>5/6) | Mapped |    |
|------|----------|-----------|--------------------------|--------|----|
|      |          |           |                          | CO     | PO |

**Part A ( 6 x 1 = 6 marks):**

|   |                                                                                                                                                                                                                      |   |   |   |     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----|
| 1 | Give a list of various security attacks?                                                                                                                                                                             | 1 | 1 | 1 | 1,2 |
| 2 | Obtain the Cipher text for the following plain text using Caesar Cipher.<br>‘Vasavi College of Engineering, Hyderabad’                                                                                               | 1 | 2 | 1 | 1,2 |
| 3 | What is mono-alphabetic Cipher?                                                                                                                                                                                      | 1 | 1 | 1 | 1,2 |
| 4 | Obtain cipher text for the following plain text using mono-alphabetic cipher.<br>Plain Text: ‘Hyderabad’                                                                                                             | 1 | 2 | 2 | 1,2 |
| 5 | What is meant by man-in-the-middle attack?                                                                                                                                                                           | 1 | 1 | 2 | 1,2 |
| 6 | Consider the following operations in a public key crypto system at sender and receiver sides respectively.<br>$C=E(M, P_{RA})$<br>$M=D(C, P_{UA})$<br>What is the security service provided by the above operations? | 1 | 2 | 2 | 1,2 |

**Part B: (4 x 3 = 12 marks)**

|    |                                                                                                                                                                                |   |   |   |       |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-------|
| 7  | With the help of a neat diagram, explain Symmetric Cipher model. What are the requirements of Symmetric Cipher model?                                                          | 3 | 2 | 1 | 1,2,3 |
| 8  | Encrypt the message “DONE” using Hill Cipher given a key $\{\{5,8\}, \{17,3\}\}$ .                                                                                             | 3 | 3 | 1 | 1,2,3 |
| 9  | Explain the steps of RSA algorithm                                                                                                                                             | 3 | 2 | 2 | 1,2,3 |
| 10 | Encrypt the message $M=3$ using RSA algorithm given $P=3$ , $Q=5$ and the public key of receiver is $e=7$ . Also decrypt the cipher text and verify with the original message. | 3 | 3 | 2 | 1,2   |

**Part C (2 x 6 = 12 marks)**

|    |                                                                                                                                                                                                      |   |   |   |       |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-------|
|    | (a) Give a list of substitution techniques for encryption.                                                                                                                                           | 3 | 1 | 1 | 1,2   |
| 11 | (b) What is SQL injection? Give the attacker's SQL code injections in login and password fields to gain an unauthorized access to an application. What is the solution to this SQL injection attack? | 3 | 3 | 1 | 1,2   |
| 12 | (a) Explain the steps, with the help of a block diagram, at sender and receiver sides for exchanging a key using Diffie Hellman key exchange algorithm.                                              | 3 | 2 | 2 | 1,2,3 |
|    | (b) Show that the key computed by both the sender and the receiver produce the same value in Diffie Hellman key exchange algorithm.                                                                  | 3 | 3 | 2 | 1,2,3 |

Summary of the percentage for each of the criteria BTL (Blooms Taxonomy Level) from the questions framed.

1. Fundamental knowledge from Level-1 (Remember) : 20%
2. Fundamental knowledge from Level-2 (Understand) : 40%
3. Knowledge on application and analysis from Level-3(Apply) & 4 (Analyze) : 40%

## DM CSE-A Quiz-1.doc



Name of the Faculty: D.Laxmiprasanna

Date :

03/09/2024

Class: B.E. 4/4 -A

Sem: VII

| Q.no    | Description of the question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Marks           | Blooms Taxonomy |                 | Mapped |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|--------|------|-----|-------|------|-------|------|-------|------|--------|------|-----|----|----|-----|----|----|----|------|------|------|------|------|------|------|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|-----|--|
|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | CO              | PO              |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 1       | Consider the following two document vectors and find the similarity using Cosine measure<br>d1 = 6 2 0 0 6 0 0 3 0 0<br>d2 = 3 0 0 2 0 5 0 1 0 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1               | 3               |                 | 1      | 1,2  |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 2       | Find the variance and standard deviation for the data given below 6, 3, 8, 5, 3,7,2,9,1,2,4,2,7,9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 3       | <table border="1"> <thead> <tr> <th>age</th> <th>frequency</th> </tr> </thead> <tbody> <tr> <td>1-5</td> <td>200</td> </tr> <tr> <td>6-15</td> <td>450</td> </tr> <tr> <td>16-20</td> <td>300</td> </tr> <tr> <td>21-50</td> <td>1500</td> </tr> <tr> <td>51-80</td> <td>700</td> </tr> <tr> <td>81-110</td> <td>44</td> </tr> </tbody> </table> <p>Compute approximation median value for group 6-15</p>                                                                                                                                                                                                                                                                                                                      | age             | frequency       | 1-5             | 200    | 6-15 | 450 | 16-20 | 300  | 21-50 | 1500 | 51-80 | 700  | 81-110 | 44   | 1   | 3  | 1  | 1,2 |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| age     | frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 1-5     | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 6-15    | 450                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 16-20   | 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 21-50   | 1500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 51-80   | 700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 81-110  | 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 4       | Compute the Jaccard Coefficient for the following binary objects<br>O1=(1,1,0,0,0,1,0,0,1,0) O2=(0,1,0,0,0,1,0,1,0,0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 5       | Draw a Boxplot for the data given as 85,92,78,88,90,88,89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 6       | <table border="1"> <thead> <tr> <th></th> <th>K1</th> <th>K2</th> <th>K3</th> <th>K4</th> <th>K5</th> <th>K6</th> <th>K7</th> </tr> </thead> <tbody> <tr> <td>D1</td> <td>5</td> <td>0</td> <td>3</td> <td>0</td> <td>2</td> <td>0</td> <td>0</td> </tr> <tr> <td>D2</td> <td>3</td> <td>0</td> <td>2</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>D3</td> <td>0</td> <td>7</td> <td>0</td> <td>2</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>D4</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> </tbody> </table> <p>Compute the cosine similarity between document1, document2 and document2, document4</p>                                            |                 | K1              | K2              | K3     | K4   | K5  | K6    | K7   | D1    | 5    | 0     | 3    | 0      | 2    | 0   | 0  | D2 | 3   | 0  | 2  | 0  | 1    | 1    | 0    | D3   | 0    | 7    | 0    | 2 | 1 | 0 | 0 | D4 | 0 | 1 | 0 | 0 | 1 | 2 | 3 | 1 | 3 | 1 | 1,2 |  |
|         | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | K2              | K3              | K4              | K5     | K6   | K7  |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| D1      | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0               | 3               | 0               | 2      | 0    | 0   |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| D2      | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0               | 2               | 0               | 1      | 1    | 0   |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| D3      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7               | 0               | 2               | 1      | 0    | 0   |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| D4      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1               | 0               | 0               | 1      | 2    | 3   |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 7       | Suppose your midterm test score is 83 and your final exam score is 95. Using weights of 40% for the midterm and 60% for the final exam, compute The weighted average of your scores.<br>If the minimum average for an A is 90, will you earn an A?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 8       | Consider the attributes Age (X) and Glucose Level (Y) as given in the table. Find the relation between X and Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
|         | <table border="1"> <thead> <tr> <th>SUBJECT</th> <th>AGE X</th> <th>GLUCOSE LEVEL Y</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>43</td> <td>99</td> </tr> <tr> <td>2</td> <td>21</td> <td>65</td> </tr> <tr> <td>3</td> <td>25</td> <td>79</td> </tr> <tr> <td>4</td> <td>42</td> <td>75</td> </tr> <tr> <td>5</td> <td>57</td> <td>87</td> </tr> <tr> <td>6</td> <td>59</td> <td>81</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                      | SUBJECT         | AGE X           | GLUCOSE LEVEL Y | 1      | 43   | 99  | 2     | 21   | 65    | 3    | 25    | 79   | 4      | 42   | 75  | 5  | 57 | 87  | 6  | 59 | 81 |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| SUBJECT | AGE X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GLUCOSE LEVEL Y |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 1       | 43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 99              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 2       | 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 65              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 3       | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 79              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 4       | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 75              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 5       | 57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 87              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 6       | 59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81              |                 |                 |        |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 9       | Suppose that a hospital tested the age and body fat data for 18 randomly selected adults with the following results:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
|         | <table border="1"> <thead> <tr> <th>age</th> <th>23</th> <th>23</th> <th>27</th> <th>39</th> <th>41</th> <th>47</th> </tr> </thead> <tbody> <tr> <td>%fat</td> <td>9.5</td> <td>26.5</td> <td>7.8</td> <td>17.8</td> <td>31.4</td> <td>25.9</td> </tr> </tbody> </table><br><table border="1"> <thead> <tr> <th>age</th> <th>49</th> <th>52</th> <th>54</th> <th>54</th> <th>56</th> <th>58</th> </tr> </thead> <tbody> <tr> <td>%fat</td> <td>27.2</td> <td>34.6</td> <td>42.5</td> <td>28.8</td> <td>30.2</td> <td>34.1</td> </tr> </tbody> </table> <p>(a) Calculate the mean, median, and standard deviation of age and %fat.<br/>(b) Draw the boxplots for age and %fat.<br/>(c) Draw a scatter plot and a q-q plot based on these two variables.</p> | age             | 23              | 23              | 27     | 39   | 41  | 47    | %fat | 9.5   | 26.5 | 7.8   | 17.8 | 31.4   | 25.9 | age | 49 | 52 | 54  | 54 | 56 | 58 | %fat | 27.2 | 34.6 | 42.5 | 28.8 | 30.2 | 34.1 |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| age     | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 23              | 27              | 39              | 41     | 47   |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| %fat    | 9.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26.5            | 7.8             | 17.8            | 31.4   | 25.9 |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| age     | 49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 52              | 54              | 54              | 56     | 58   |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| %fat    | 27.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 34.6            | 42.5            | 28.8            | 30.2   | 34.1 |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |
| 10      | Normalize the age attribute values 3,15,16,19,20,21,22,22,25,25,25,25,30,33,33,35,35,35,35,36,40,45,52,70 using Min-Max Normalization (New min=0, New max=1) and Z-Score normalization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4               | 3               | 1               | 1,2    |      |     |       |      |       |      |       |      |        |      |     |    |    |     |    |    |    |      |      |      |      |      |      |      |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |     |  |

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD-31

**Department of Computer Science and Engineering**

**Name of the Course:** Data Mining

Quiz - II

Name of the Faculty: D.Laxmiprasanna

Class: B.E. 4/4 CSE A

Sem: VII

Academic Year: 2024-25

| Q.<br>No | Questions                                                                                                                                                                                                                                                                                                                                                                                                   | Mark<br>s       | Blooms<br>Taxono<br>my | Mapped          |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|-----------------|-------|----|----|---|----|----|---|----|----|---|----|----|---|----|----|--|--|--|--|
|          |                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                        | CO              | PO    |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 1.       | Consider the following values of the attribute age and perform smoothing by bin median and boundaries. Let number of bins be 3.<br>54,8,10,23,43,19,27,32,52,15,28,25,38,46,11,9                                                                                                                                                                                                                            | 1               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 2.       | Differentiate between OLTP and OLAP.                                                                                                                                                                                                                                                                                                                                                                        | 1               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 3.       | Consider three item sets: Draw the lattice of cuboids, making up 3-D data cube for time, item, and location.                                                                                                                                                                                                                                                                                                | 1               | 3                      | 2               | 1,2,3 |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 4        | Suppose that a data warehouse consists of the three dimensions time, doctor, and patient, and the two measures count and charge, where charge is the fee that a doctor charges a patient for a visit.<br>a) Enumerate three classes of schemas that are popularly used for modeling data warehouses.<br>b) Draw a schema diagram for the above data warehouse using one of the schema classes listed in (a) | 1               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 5.       | Propose an algorithm, in pseudo code or in your favorite programming language, for the following:<br>a) The automatic generation of a concept hierarchy for nominal data based on the number of distinct values of attributes in the given schema.<br>b) The automatic generation of a concept hierarchy for numeric data based on the equal-width partitioning rule.                                       | 1               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 6.       | What is the need of data preprocessing? Explain Major tasks in data preprocessing.                                                                                                                                                                                                                                                                                                                          | 1               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 7.       | Suppose the data for analysis of age attribute includes following values 13, 15, 16, 19, 20, 21, 22, 25, 30, 33, 35<br>normalize 13, 16, 19, 33, 35<br>Using Z-Score normalization for this data                                                                                                                                                                                                            | 3               | 3                      | 2               | 1,2,3 |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 8.       | Consider the attributes Age (X) and Glucose Level (Y) as given in the table. Find the relation between X and Y using correlation coefficient.                                                                                                                                                                                                                                                               | 3               | 3                      | 2               | 1,2   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
|          | <table border="1"> <thead> <tr> <th>Subject</th> <th>Age X</th> <th>Glucose Level Y</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>43</td> <td>99</td> </tr> <tr> <td>2</td> <td>21</td> <td>65</td> </tr> <tr> <td>3</td> <td>25</td> <td>79</td> </tr> <tr> <td>4</td> <td>42</td> <td>75</td> </tr> <tr> <td>5</td> <td>57</td> <td>87</td> </tr> </tbody> </table>                                     | Subject         | Age X                  | Glucose Level Y | 1     | 43 | 99 | 2 | 21 | 65 | 3 | 25 | 79 | 4 | 42 | 75 | 5 | 57 | 87 |  |  |  |  |
| Subject  | Age X                                                                                                                                                                                                                                                                                                                                                                                                       | Glucose Level Y |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 1        | 43                                                                                                                                                                                                                                                                                                                                                                                                          | 99              |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 2        | 21                                                                                                                                                                                                                                                                                                                                                                                                          | 65              |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 3        | 25                                                                                                                                                                                                                                                                                                                                                                                                          | 79              |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 4        | 42                                                                                                                                                                                                                                                                                                                                                                                                          | 75              |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |
| 5        | 57                                                                                                                                                                                                                                                                                                                                                                                                          | 87              |                        |                 |       |    |    |   |    |    |   |    |    |   |    |    |   |    |    |  |  |  |  |

$$\frac{(\sum xy)^2 - (\sum x^2)(\sum y^2)}{\sqrt{\sum x^2 - (\bar{x})^2} \sqrt{\sum y^2 - (\bar{y})^2}}$$

$$\sqrt{\sum x^2 - (\bar{x})^2} \sqrt{\sum y^2 - (\bar{y})^2}$$

|                | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 59     | 81   |        |     |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|--------|-----|------------|-----|-----|-----|----------------|-----|-----|-----|-----|-----|-----|------|---|---|---|-----|--|--|
| 9.             | In data warehouse technology, a multiple dimensional view can be implemented by a relational database technique (ROLAP), by a multidimensional database technique (MOLAP), or by a hybrid database technique (HOLAP)<br>(a) Briefly describe each implementation technique.<br>(b) For each technique, explain how each of the following functions may be implemented:<br>i. The generation of a data warehouse (including aggregation)<br>ii. Roll-up<br>iii. Drill-down    | 4      | 3    | 2      | 1,2 |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |
| 10.            | <table border="1"> <thead> <tr> <th></th> <th>Male</th> <th>Female</th> <th>Sum</th> </tr> </thead> <tbody> <tr> <td>Like chess</td> <td>600</td> <td>250</td> <td>850</td> </tr> <tr> <td>Not like chess</td> <td>300</td> <td>550</td> <td>850</td> </tr> <tr> <td>Sum</td> <td>900</td> <td>800</td> <td>1700</td> </tr> </tbody> </table> <p>Based on the given data , what kind of correlation relationship exists between the two Attributes using chi-square test</p> |        | Male | Female | Sum | Like chess | 600 | 250 | 850 | Not like chess | 300 | 550 | 850 | Sum | 900 | 800 | 1700 | 4 | 3 | 2 | 1,2 |  |  |
|                | Male                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Female | Sum  |        |     |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |
| Like chess     | 600                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 250    | 850  |        |     |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |
| Not like chess | 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 550    | 850  |        |     |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |
| Sum            | 900                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 800    | 1700 |        |     |            |     |     |     |                |     |     |     |     |     |     |      |   |   |   |     |  |  |

$$\epsilon(\text{like chess}, \text{Male}) = \frac{850 \times 900}{1700} = 3825 \text{ O}$$

$$(\text{Like chess}, \text{Fe}) = \frac{1700}{450}$$

$$\epsilon(\text{Not like}, \text{Male}) = \frac{850 \times 500}{1700} = 400$$

$$\epsilon(\text{Not like}, \text{Fe}) = \frac{850 \times 900}{1700} = 450$$

$$\frac{850 \times 800}{1700} = 400$$

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD-31

**Department of Computer Science and Engineering**

**Name of the Course:** Data Mining

Quiz - III

Section: CSE A

Name of the Faculty: D.Laxmiprasanna

Sem: VII

Academic Year: 2024-25

| Q.<br>No       | Questions                                                                                                                                                                                                                                                                                                                                                                                              | Marks       | Blooms<br>Taxonom<br>y |        | Mapped       |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|--------|--------------|------------|-----|-----|------|----------------|------|------|------|--------------|------|------|-------|---|-----|---|-----|--|
|                |                                                                                                                                                                                                                                                                                                                                                                                                        |             | CO                     | PO     | CO           | PO         |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 1.             | In a data set D there are 15 tuples belongs to class A and 10 tuples belongs to class B calculate the info(D)                                                                                                                                                                                                                                                                                          | 1           | 3                      | 4      | 1,2          |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 2.             | Compute Sensitivity and specificity for the following confusion Matrix                                                                                                                                                                                                                                                                                                                                 | 1           | 3                      | 4      | 1,2,3        |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
|                | <table border="1"> <thead> <tr> <th>Classes</th><th>yes</th><th>no</th><th><math>\Sigma</math> row</th></tr> </thead> <tbody> <tr> <td>yes</td><td>90</td><td>210</td><td>300</td></tr> <tr> <td>no</td><td>140</td><td>9560</td><td>9700</td></tr> <tr> <td><math>\Sigma</math> col</td><td>230</td><td>9770</td><td>10000</td></tr> </tbody> </table>                                                | Classes     | yes                    | no     | $\Sigma$ row | yes        | 90  | 210 | 300  | no             | 140  | 9560 | 9700 | $\Sigma$ col | 230  | 9770 | 10000 |   |     |   |     |  |
| Classes        | yes                                                                                                                                                                                                                                                                                                                                                                                                    | no          | $\Sigma$ row           |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| yes            | 90                                                                                                                                                                                                                                                                                                                                                                                                     | 210         | 300                    |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| no             | 140                                                                                                                                                                                                                                                                                                                                                                                                    | 9560        | 9700                   |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| $\Sigma$ col   | 230                                                                                                                                                                                                                                                                                                                                                                                                    | 9770        | 10000                  |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 3.             | Consider three item sets:<br>I1={milk, sugar, bread}<br>I2={milk, sugar}<br>I3={milk} Find the support, confidence of milk->Sugar                                                                                                                                                                                                                                                                      | 1           | 3                      | 3      | 1,2,3        |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 4.             | <table border="1"> <thead> <tr> <th>Transaction</th><th>Items</th></tr> </thead> <tbody> <tr> <td>T1</td><td>ACDE</td></tr> <tr> <td>T2</td><td>BCE</td></tr> <tr> <td>T3</td><td>ABCE</td></tr> <tr> <td>F4</td><td>BCDE</td></tr> <tr> <td>F5</td><td>ABCE</td></tr> <tr> <td>F6</td><td>ABCD</td></tr> </tbody> </table><br>Find the confidence of association rules A->C and A->BC                 | Transaction | Items                  | T1     | ACDE         | T2         | BCE | T3  | ABCE | F4             | BCDE | F5   | ABCE | F6           | ABCD | 1    | 3     | 3 | 1,2 |   |     |  |
| Transaction    | Items                                                                                                                                                                                                                                                                                                                                                                                                  |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| T1             | ACDE                                                                                                                                                                                                                                                                                                                                                                                                   |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| T2             | BCE                                                                                                                                                                                                                                                                                                                                                                                                    |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| T3             | ABCE                                                                                                                                                                                                                                                                                                                                                                                                   |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| F4             | BCDE                                                                                                                                                                                                                                                                                                                                                                                                   |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| F5             | ABCE                                                                                                                                                                                                                                                                                                                                                                                                   |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| F6             | ABCD                                                                                                                                                                                                                                                                                                                                                                                                   |             |                        |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 5.             | Justify how Apriori principle improve the efficiency of Apriori algorithm                                                                                                                                                                                                                                                                                                                              | 1           | 3                      | 3      | 1,2          |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| 6.             | <table border="1"> <thead> <tr> <th></th><th>Male</th><th>Female</th><th>Sum</th></tr> </thead> <tbody> <tr> <td>Like chess</td><td>600</td><td>250</td><td>850</td></tr> <tr> <td>Not like chess</td><td>300</td><td>550</td><td>850</td></tr> <tr> <td>Sum</td><td>900</td><td>800</td><td>1700</td></tr> </tbody> </table><br>Based on the given data, what kind of correlation relationship exists |             | Male                   | Female | Sum          | Like chess | 600 | 250 | 850  | Not like chess | 300  | 550  | 850  | Sum          | 900  | 800  | 1700  | 1 | 3   | 3 | 1,2 |  |
|                | Male                                                                                                                                                                                                                                                                                                                                                                                                   | Female      | Sum                    |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| Like chess     | 600                                                                                                                                                                                                                                                                                                                                                                                                    | 250         | 850                    |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| Not like chess | 300                                                                                                                                                                                                                                                                                                                                                                                                    | 550         | 850                    |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |
| Sum            | 900                                                                                                                                                                                                                                                                                                                                                                                                    | 800         | 1700                   |        |              |            |     |     |      |                |      |      |      |              |      |      |       |   |     |   |     |  |

26/11/24

|                                                                            |                                                                                |                |                               |          |       |   |   |       |  |  |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------|-------------------------------|----------|-------|---|---|-------|--|--|
|                                                                            | between the two Attributes                                                     |                |                               |          |       |   |   |       |  |  |
| 7                                                                          | C_ID                                                                           | TID            | BasketContent                 |          | 4     | 3 | 3 | 1,2,3 |  |  |
|                                                                            | 1                                                                              | T100           | {Aspirin, Panadol}            |          |       |   |   |       |  |  |
|                                                                            | 1                                                                              | T200           | {Aspirin, Sudafed}            |          |       |   |   |       |  |  |
|                                                                            | 2                                                                              | T300           | {Tylenol, Cepacol}            |          |       |   |   |       |  |  |
|                                                                            | 2                                                                              | T400           | {Aspirin, Vitamin C, Sudafed} |          |       |   |   |       |  |  |
|                                                                            | 3                                                                              | T500           | {Tylenol, Cepacol}            |          |       |   |   |       |  |  |
|                                                                            | 3                                                                              | T600           | {Aspirin, Cepacol}            |          |       |   |   |       |  |  |
|                                                                            | 4                                                                              | T700           | {Aspirin, Vitamin C}          |          |       |   |   |       |  |  |
|                                                                            | 4                                                                              | T800           | {Aspirin, Ibuprofen, Panadol} |          |       |   |   |       |  |  |
|                                                                            | 5                                                                              | T900           | {Panadol, Vitamin C}          |          |       |   |   |       |  |  |
|                                                                            | 5                                                                              | T1000          | {Tylenol, Cepacol, Ibuprofen} |          |       |   |   |       |  |  |
|                                                                            | 6                                                                              | T1100          | {Tylenol, Panadol, Cepacol}   |          |       |   |   |       |  |  |
|                                                                            | 6                                                                              | T1200          | {Panadol, Sudafed, Ibuprofen} |          |       |   |   |       |  |  |
| List all the frequent itemsets if the support count threshold min_sup = 3. |                                                                                |                |                               |          |       |   |   |       |  |  |
| 8                                                                          | TID                                                                            | Item an bought |                               |          | 4     | 3 | 3 | 1,2   |  |  |
|                                                                            | 100                                                                            | {M,O,N,K,E,Y}  |                               |          |       |   |   |       |  |  |
|                                                                            | 101                                                                            | {D,O,N,K,E,Y}  |                               |          |       |   |   |       |  |  |
|                                                                            | 102                                                                            | {M,A,K,E}      |                               |          |       |   |   |       |  |  |
|                                                                            | 103                                                                            | {M,U,C,K,Y}    |                               |          |       |   |   |       |  |  |
|                                                                            | 103                                                                            | {C,O,O,K,I,E}  |                               |          |       |   |   |       |  |  |
| Find all frequent itemsets using FP-growth, respectively                   |                                                                                |                |                               |          |       |   |   |       |  |  |
| 9                                                                          | Explain weighted KNN and assign class label to tuple(1,0,0) using weighted KNN |                |                               |          |       | 3 | 3 | 4     |  |  |
|                                                                            | A                                                                              | B              | C                             | TARGET   |       |   |   |       |  |  |
|                                                                            | 1                                                                              | 1              | 1                             | YES      |       |   |   |       |  |  |
|                                                                            | 1                                                                              | 1              | 0                             | NO       |       |   |   |       |  |  |
|                                                                            | 1                                                                              | 0              | 1                             | YES      |       |   |   |       |  |  |
|                                                                            | 0                                                                              | 1              | 1                             | YES      |       |   |   |       |  |  |
|                                                                            | 0                                                                              | 1              | 0                             | NO       |       |   |   |       |  |  |
| 10                                                                         | Construct rule-based classification for given data set                         |                |                               |          |       | 3 | 3 | 5     |  |  |
|                                                                            | Example                                                                        | Density        | Grain                         | Hardness | Class |   |   | 1,2   |  |  |
|                                                                            | Example #1                                                                     | Heavy          | Small                         | Hard     | Oak   |   |   |       |  |  |
|                                                                            | Example #2                                                                     | Heavy          | Large                         | Hard     | Oak   |   |   |       |  |  |
|                                                                            | Example #3                                                                     | Heavy          | Small                         | Hard     | Oak   |   |   |       |  |  |
|                                                                            | Example #4                                                                     | Light          | Large                         | Soft     | Oak   |   |   |       |  |  |
|                                                                            | Example #5                                                                     | Light          | Large                         | Hard     | Pine  |   |   |       |  |  |
|                                                                            | Example #6                                                                     | Heavy          | Small                         | Soft     | Pine  |   |   |       |  |  |
|                                                                            | Example #7                                                                     | Heavy          | Large                         | Soft     | Pine  |   |   |       |  |  |
|                                                                            | Example #8                                                                     | Heavy          | Small                         | Soft     | Pine  |   |   |       |  |  |

20

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**IBRAHIMBAGH, HYDERABAD-31**

**Department of Computer Science and Engineering**

BE-VII SEMESTER I-Internal Examination

Name of the COURSE: Data Mining

Subject Reference Code: UI21PC720CS

Max Marks: 30

Date: 28/09/2024

Time: 2:30PM to 4:00PM

**Note: Answer all questions**

| Q.<br>No.                                          | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ma<br>rks | BTL               | Mapped  |         |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|---------|---------|---------|-------|-----|------|-------|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|--|--|---|-----|
|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | (1/2/3/4<br>/5/6) | CO      | PO      |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| <b>PART-A (Marks: 6X1=6) answer all questions</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                   |         |         |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 1.                                                 | A research team is studying the relationship between daily exercise (in minutes) and cholesterol levels (in mg/dL) among a group of individuals. They collect the following data:<br><ul style="list-style-type: none"> <li>• Daily Exercise (minutes): 30, 45, 60, 75, 90</li> <li>• Cholesterol Levels (mg/dL): 220, 210, 200, 190, 180</li> </ul> Find the relationship between daily exercise and cholesterol levels.                                                                                                                                                                                                 | 1         | 3                 | 1       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 2.                                                 | A researcher collects data on Monthly Income. (in \$1000s) of a Sample of 20 Individuals as shown below:<br><ul style="list-style-type: none"> <li>• Monthly Income (\$1000s): 1.5, 2.0, 2.5, 2.8, 3.0, 3.1, 3.5, 4.0, 4.2, 4.5, 5.0, 5.2, 5.5, 6.0, 6.2, 7.0, 8.0, 10.0, 15.0, 20.0</li> </ul> Calculate Descriptive Statistics and comment on the distribution of data.                                                                                                                                                                                                                                                 | 1         | 1                 | 1       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 3.                                                 | Given the following binary data for five objects defined in terms of symmetric binary attributes. Find the most similar two objects. <ul style="list-style-type: none"> <li>• Object 1: (1, 0, 1, 1, 0)</li> <li>• Object 2: (0, 1, 1, 0, 1)</li> <li>• Object 3: (1, 1, 0, 1, 1)</li> <li>• Object 4: (0, 0, 1, 1, 1)</li> <li>• Object 5: (1, 1, 1, 0, 0)</li> </ul>                                                                                                                                                                                                                                                    | 1         | 3                 | 1       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 4.                                                 | You have collected data on the daily temperatures (in degrees Celsius) for a city over a month. The dataset contains the following temperature readings:<br><ul style="list-style-type: none"> <li>• Daily Temperatures (°C): 15, 16, 15, 20, 22, 21, 18, 30, 25, 23, 17, 19, 22, 27, 29, 18, 20, 21, 24, 22, 16, 17, 26, 31, 28, 30, 32, 33, 28, 24</li> </ul> Apply equal width binning. Smooth the noise by bin means and boundaries.                                                                                                                                                                                  | 1         | 3                 | 2       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 5.                                                 | Compare ROLAP, MOLAP and HOLAP Data warehouse server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1         | 1                 | 2       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 6.                                                 | You have a dataset with the following values for a feature representing the number of units sold by a store over a week:<br><ul style="list-style-type: none"> <li>• Units Sold: 10, 15, 25, 30, 45</li> </ul> Apply min-max normalization to scale these values to the range [0, 1].                                                                                                                                                                                                                                                                                                                                     | 1         | 1                 | 2       | 1,2     |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| <b>PART B (Marks: 3X4=12) answer all questions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                   |         |         |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| 7.                                                 | In the document-term matrix, each row represents a document, and each column represents a term from the vocabulary. The values in the matrix are the term frequencies in each document.                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3         | 1                 |         |         |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
|                                                    | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Document</th> <th>apple</th> <th>banana</th> <th>fruit</th> <th>vitamin</th> <th>healthy</th> <th>juice</th> <th>eat</th> <th>diet</th> </tr> </thead> <tbody> <tr> <td>Doc 1</td> <td>2</td> <td>1</td> <td>3</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Doc 2</td> <td>0</td> <td>2</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>2</td> <td>1</td> </tr> <tr> <td>Doc 3</td> <td>1</td> <td>0</td> <td>2</td> <td>1</td> <td>2</td> <td>1</td> <td>0</td> <td>1</td> </tr> </tbody> </table> | Document  | apple             | banana  | fruit   | vitamin | healthy | juice | eat | diet | Doc 1 | 2 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | Doc 2 | 0 | 2 | 1 | 1 | 0 | 1 | 2 | 1 | Doc 3 | 1 | 0 | 2 | 1 | 2 | 1 | 0 | 1 |  |  | 1 | 1,2 |
| Document                                           | apple                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | banana    | fruit             | vitamin | healthy | juice   | eat     | diet  |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| Doc 1                                              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1         | 3                 | 0       | 1       | 0       | 1       | 0     |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| Doc 2                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2         | 1                 | 1       | 0       | 1       | 2       | 1     |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
| Doc 3                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0         | 2                 | 1       | 2       | 1       | 0       | 1     |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |
|                                                    | Apply Cosine similarity to find the similarity matrix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                   |         |         |         |         |       |     |      |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |  |  |   |     |

You have a dataset with attributes: Customer ID, Name, Age, Gender, and Purchase History.

Customer ID

1

2

3

4

5

6

Fill the missing values:

- Method A
- Method B
- Implementation C
- Implementation D

Sum  
que

1

| 8      | Consider a retail dataset containing customer transactions. Each transaction record includes attributes such as Customer ID, Transaction ID, Product, Quantity, Price, and Date. Explain different data mining functionalities that can be applied on the retail dataset given above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3             | 3       | 1             | 1,2   |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------|---------------|-------|--------------|-------|----|-----|--------|-----|-------|----|-------|----|-----|-------|---|-----|---|-----|-------|---|-----|---|-----|-------|---|-----|---|-----|-------|---|-----|---|-----|-------|---|-----|---|-----|-------|---|-----|---|-----|---|---|---|-----|
| 9      | A survey to examine the relationship between gender and preference for a type of exercise (Yoga vs. Weightlifting). The survey results are summarized in the following contingency table:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3             | 3       | 2             | 1,2   |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
|        | <table border="1"> <thead> <tr> <th></th> <th>Yoga</th> <th>Weightlifting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Male</td> <td>30</td> <td>10</td> <td>40</td> </tr> <tr> <td>Female</td> <td>20</td> <td>30</td> <td>50</td> </tr> <tr> <td>Total</td> <td>50</td> <td>40</td> <td>90</td> </tr> </tbody> </table> <p>Apply the chi-square test for independence to determine if there is a significant association between two categorical variables gender and preference for a type of exercise.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               | Yoga    | Weightlifting | Total | Male         | 30    | 10 | 40  | Female | 20  | 30    | 50 | Total | 50 | 40  | 90    |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
|        | Yoga                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Weightlifting | Total   |               |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| Male   | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10            | 40      |               |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| Female | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 30            | 50      |               |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| Total  | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40            | 90      |               |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| 10     | <p>You have a sales data cube with the following dimensions and measures:</p> <ul style="list-style-type: none"> <li><b>Dimensions:</b> Region, Product, Month, Day</li> <li><b>Measures:</b> Sales Amount</li> </ul> <p>Consider the following data:</p> <table border="1"> <thead> <tr> <th>Region</th> <th>Product</th> <th>Month</th> <th>Day</th> <th>Sales Amount</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>A</td> <td>Jan</td> <td>1</td> <td>200</td> </tr> <tr> <td>North</td> <td>A</td> <td>Jan</td> <td>2</td> <td>150</td> </tr> <tr> <td>North</td> <td>B</td> <td>Jan</td> <td>1</td> <td>180</td> </tr> <tr> <td>North</td> <td>B</td> <td>Jan</td> <td>2</td> <td>220</td> </tr> <tr> <td>South</td> <td>A</td> <td>Jan</td> <td>1</td> <td>210</td> </tr> <tr> <td>South</td> <td>A</td> <td>Jan</td> <td>2</td> <td>160</td> </tr> <tr> <td>South</td> <td>B</td> <td>Jan</td> <td>1</td> <td>190</td> </tr> <tr> <td>South</td> <td>B</td> <td>Jan</td> <td>2</td> <td>230</td> </tr> </tbody> </table> <ol style="list-style-type: none"> <li>Roll-Up the data from the day level to the month level, aggregating sales by region and product for the month of January.</li> <li>Extract the data for the "North" region for all products and months.</li> <li>Extract the data for "Product A" and "Feb" across all regions.</li> </ol> | Region        | Product | Month         | Day   | Sales Amount | North | A  | Jan | 1      | 200 | North | A  | Jan   | 2  | 150 | North | B | Jan | 1 | 180 | North | B | Jan | 2 | 220 | South | A | Jan | 1 | 210 | South | A | Jan | 2 | 160 | South | B | Jan | 1 | 190 | South | B | Jan | 2 | 230 | 3 | 3 | 2 | 1,2 |
| Region | Product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Month         | Day     | Sales Amount  |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| North  | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 1       | 200           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| North  | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 2       | 150           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| North  | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 1       | 180           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| North  | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 2       | 220           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| South  | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 1       | 210           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| South  | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 2       | 160           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| South  | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 1       | 190           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |
| South  | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan           | 2       | 230           |       |              |       |    |     |        |     |       |    |       |    |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |       |   |     |   |     |   |   |   |     |

### PART-C (Marks: 2X6=12) answer all questions

|      |                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----|
| 11.a | You have sales data for a particular item from two different outlets over a 12-month period. The sales figures (in units sold) are as follows: <ul style="list-style-type: none"> <li><b>Outlet A Sales:</b> [200, 220, 250, 240, 210, 230, 260, 270, 250, 240, 230, 220]</li> <li><b>Outlet B Sales:</b> [180, 190, 220, 210, 200, 210, 240, 250, 230, 220, 210, 200]</li> </ul> | 3 | 3 | 1 | 1,2 |
| 11.b | Generate Q-Q plots comparing the sales data of Outlet A and Outlet B.                                                                                                                                                                                                                                                                                                             |   |   |   |     |
| 12.a | In a retail company, you are tasked with implementing a data mining project to analyze customer purchasing behavior. The dataset includes transaction records, customer demographics, and product details. Explain different issues that need to be considered while implementing the data mining project.                                                                        | 3 | 2 | 1 | 1,2 |
| 12.a | Explain the following Data reduction techniques in detail. <ol style="list-style-type: none"> <li>Parametric based numerosity reduction</li> <li>Non-parametric based numerosity reduction</li> </ol>                                                                                                                                                                             | 3 | 2 | 2 | 1,2 |

|             | You have a dataset of customer transaction records with the following attributes: Customer ID, Transaction Amount, and Purchase Date. The dataset is shown below with some missing values:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|---------------|---|-----|------------|---|-----|------------|---|-----|------------|---|-----|-----|---|-----|------------|---|-----|------------|---|---|---|-----|
| 12.b        | <table border="1"> <thead> <tr> <th>Customer ID</th> <th>Transaction Amount</th> <th>Purchase Date</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>150</td> <td>2024-01-15</td> </tr> <tr> <td>2</td> <td>NaN</td> <td>2024-01-16</td> </tr> <tr> <td>3</td> <td>200</td> <td>2024-01-17</td> </tr> <tr> <td>4</td> <td>175</td> <td>NaN</td> </tr> <tr> <td>5</td> <td>NaN</td> <td>2024-01-19</td> </tr> <tr> <td>6</td> <td>220</td> <td>2024-01-20</td> </tr> </tbody> </table> <p>Fill the missing values by using</p> <ul style="list-style-type: none"> <li>i. Mean</li> <li>ii. Median</li> <li>iii. Interpolation</li> <li>iv. Most recent value (categorical attribute)</li> </ul> | Customer ID   | Transaction Amount | Purchase Date | 1 | 150 | 2024-01-15 | 2 | NaN | 2024-01-16 | 3 | 200 | 2024-01-17 | 4 | 175 | NaN | 5 | NaN | 2024-01-19 | 6 | 220 | 2024-01-20 | 3 | 3 | 2 | 1,2 |
| Customer ID | Transaction Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Purchase Date |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 1           | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2024-01-15    |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 2           | NaN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2024-01-16    |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 3           | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2024-01-17    |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 4           | 175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NaN           |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 5           | NaN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2024-01-19    |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |
| 6           | 220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2024-01-20    |                    |               |   |     |            |   |     |            |   |     |            |   |     |     |   |     |            |   |     |            |   |   |   |     |

Summary of the percentage for each of the criteria BTL (Blooms Taxonomy Level) from the questions framed.

1. Fundamental knowledge from Level-1 (Remember) : 20%
2. Fundamental knowledge from Level-2 (Understand) : 30%
3. Knowledge on application and analysis from Level-3(Apply) & 4 (Analyze) : 50%

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-31

Department of Computer Science and Engineering

Name of the Course: Distributed Systems and Cloud Computing

**Quiz – 1**

Name of the Faculty: Dr.P.Kalpana  
Class: 4/4 B,E  
Section: CSE-A

Date: 02/09/2024  
Academic Year: 2024-25  
Semester: VII

**Note: Answer all the Questions (20 Marks)**

| Q. No | Questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Marks | BT<br>L<br>(1/2<br>/3/4<br>) | CO | PO |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------|----|----|
| 1.    | <p>GlobalTech Innovations, a leading firm, is working with two distinct clients who have different computational needs. The first client is a pharmaceutical company conducting drug discovery and testing, which requires extensive parallel processing of complex simulations. The second client is an environmental research institute analyzing vast datasets from climate models and simulations across numerous locations.</p> <p>For each client, determine which system among High Throughput Computing (HTC) and High-Performance Computing (HPC) systems would be more suitable and explain why.</p> | 1     | 3                            | 1  | 1  |
| 2.    | <p>A small e-commerce company is experiencing rapid growth and is considering moving their website to the cloud to handle the increased traffic. The website currently runs on a single dedicated server, and the company's IT team is not experienced in cloud computing.</p> <p>Based on above scenario, which cloud computing deployment model would be most appropriate for hosting the online shopping platform, and why? Justify your answer.</p>                                                                                                                                                        | 1     | 3                            | 1  | 1  |
| 3.    | <p>There are many studies on optimizing resource management for cloud computing. Such optimizations are as resource allocation, provisioning, consolidation, scheduling, migration, etc.</p> <p>However, What metrics are being used by researchers to evaluate their solutions, especially for resource provisioning issue? Justify your answer.</p>                                                                                                                                                                                                                                                          | 1     | 3                            | 1  | 1  |
| 4.    | <p>Tech Innovations Inc., a technology consulting firm, is advising a diverse group of clients on the most suitable computing paradigms for their specific needs. The clients include a financial services company, a scientific research lab, a social media platform, and a startup developing a mobile app.</p> <p>For each of the following clients, identify and describe the most appropriate computing paradigm (e.g., cloud computing, grid computing, edge computing, quantum computing, etc.) that would best suit their needs.</p>                                                                  | 1     | 3                            | 1  | 1  |

128  
23/8/24

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |   |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |   |
| 5.  | <p>As a lead architect at Tech Innovations Inc., you are preparing a strategic report on the role of distributed systems within cloud computing environments. Your goal is to:</p> <ul style="list-style-type: none"> <li>a) Analyze the significance of distributed systems in the context of cloud computing.</li> <li>b) Discuss how distributed systems enhance the functionality, scalability, and reliability of cloud-based services.</li> </ul>                                                                                                                                                                                              | 1 | 3 | 1 | 1 |
| 6.  | <p>As part of a client briefing on cloud computing, you need to provide a concise overview of two key cloud service categories and identify prominent providers for each category.</p> <p>Describe the main characteristics and benefits of Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) in cloud computing and for each service category, list two major cloud providers.</p>                                                                                                                                                                                                                                                | 1 | 3 | 1 | 1 |
| 7.  | <p>ABC Corporation, a rapidly growing company, recently transitioned its IT infrastructure to a cloud-based system.</p> <p>As an IT consultant hired to assess ABC Corporation's situation, you have been asked to provide a comprehensive analysis of the cloud computing challenges and risks they are experiencing.</p> <ul style="list-style-type: none"> <li>a) Identify and describe the key challenges and risks associated with the cloud computing system that ABC Corporation might be facing.</li> <li>b) Propose strategies to address and mitigate these risks effectively.</li> </ul>                                                  | 3 | 3 | 1 | 1 |
| 8.  | <p>FutureTech Solutions, a leading technology company, is planning a comprehensive presentation for its stakeholders on the evolution of cloud computing. As a technology analyst at FutureTech Solutions, you are tasked to</p> <ul style="list-style-type: none"> <li>a) Identify and describe at least three major technological advancements that have converged to enable the rise of cloud computing.</li> <li>b) Provide a real-world example of how these converging technologies have been applied in a cloud computing scenario.</li> </ul>                                                                                                | 3 | 3 | 1 | 1 |
| 9.  | <p>XYZ Research Institute is evaluating different computing models to support its diverse research projects. The institute is considering both cloud computing and grid computing solutions. As a computing consultant, you need to analyze the following :</p> <ul style="list-style-type: none"> <li>a) Distinguish between cloud computing and grid computing by describing their fundamental differences in terms of architecture, resource management, and typical use cases.</li> <li>b) Provide a detailed example of a scenario or application where cloud computing would be more suitable than grid computing, and explain why.</li> </ul> | 4 | 3 | 1 | 1 |
| 10. | <p>A prominent cloud consulting firm, is preparing a comprehensive guide for its clients to help them choose the most suitable cloud deployment model based on their specific needs.</p> <ul style="list-style-type: none"> <li>a) For each of the following cloud deployment models, analyze the key advantages and challenges associated with their use: Public Cloud, Private Cloud and Hybrid Cloud.</li> <li>b) Provide a real-time use case for each cloud deployment model. Describe the scenario, how the cloud model is applied, and the benefits realized from using that particular model.</li> </ul>                                     | 4 | 3 | 1 | 1 |

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**IBRAHIMBAGH, HYDERABAD-31**  
**Department of Computer Science and Engineering**  
**Name of the Course: Distributed Systems and Cloud Computing**  
**Quiz - 2**

Name of the Faculty: Dr.P.Kalpana  
 Class: 4/4 B.E  
 Section: CSE-A

Date: 23/09/2024  
 Academic Year: 2024-25  
 Semester:VII

**Note: Answer all the Questions (20 Marks)**

| Q. No | Questions                                                                                                                                                                                                                                                                                                                                                           | Marks | BTL<br>(1/2/3<br>/4/5) |    | Mapped |  |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|----|--------|--|
|       |                                                                                                                                                                                                                                                                                                                                                                     |       | CO                     | PO |        |  |
| 1     | A company is adopting cloud computing services and they need to understand the role of Service Level Agreements (SLAs). Explain the importance of having an SLA in cloud computing environments, and how does it impact service delivery and expectations?                                                                                                          | 1     | 3                      | 1  | 1,2    |  |
| 2     | "XYZ" company is looking to deploy a virtualization solution directly on physical hardware for optimal performance and they are considering different hypervisors. Identify two examples of hypervisors that support bare metal virtualization and explain how these hypervisors facilitate direct deployment on physical machines.                                 | 1     | 3                      | 2  | 1,2    |  |
| 3     | In a scenario where a company is evaluating ways to improve system efficiency, they are considering the adoption of virtualization technology. How does virtualization contribute to enhanced system efficiency, and what specific benefits justify its implementation?                                                                                             | 1     | 3                      | 2  | 1,2    |  |
| 4     | "ABC" company is exploring technologies to enhance their server infrastructure and they are interested in understanding CPU virtualization. Provide a brief description of CPU virtualization and offer a real-time example of an architecture that supports this technology and discuss how does this architecture benefit the company's virtualization strategy?  | 1     | 3                      | 2  | 1,2    |  |
| 5     | In a case study where a company is deciding between implementing physical clusters and virtual clusters for their data center, how do physical clusters differ from virtual clusters? What are the advantages and disadvantages of each approach in the context of the company's specific needs and goals?                                                          | 1     | 3                      | 2  | 1,2    |  |
| 6     | Explain the concept of memory virtualization and provide a clear diagram to illustrate how it works.                                                                                                                                                                                                                                                                | 1     | 2                      | 2  | 1,2    |  |
| 7     | Company named "ABC corporation" is transitioning to cloud services and they need to understand the intricacies of managing Service Level Agreements (SLAs). How should the company approach SLA management in the cloud to ensure effective service delivery and meet their operational requirements? What detailed aspects of SLA management should they consider? | 3     | 3                      | 1  | 1,2    |  |
| 8     | In a scenario where a company is considering the adoption of virtualization to optimize their IT infrastructure, they need a clear understanding of what virtualization is and how it can be implemented at different levels. How would you explain virtualization and its various implementation levels to the                                                     | 3     | 3                      | 2  | 1,2    |  |

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|    |                                                                                                                                                                                                                                                                                                                         |   |   |   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
|    | company, and what should a diagram include to effectively illustrate these concepts for their decision-making process?                                                                                                                                                                                                  |   |   |   |
| 9  | Suppose a company is planning to migrate a virtual machine (VM) from one host to another. Discuss what are the essential steps required for a successful migration and how should these steps be illustrated in a diagram to clearly depict the migration process?                                                      | 4 | 3 | 2 |
| 10 | "BBQ" company is evaluating different virtualization techniques and they need to distinguish between paravirtualization and full virtualization. Explain how do paravirtualization and full virtualization differ? Additionally, illustrate the architecture of a paravirtualized VM with a clear and detailed diagram. | 4 | 3 | 2 |

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
**IBRAHIMBAGH, HYDERABAD-500031**  
**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  
 Name of the Course: **Distributed Systems & Cloud Computing**

**Quiz - 3**

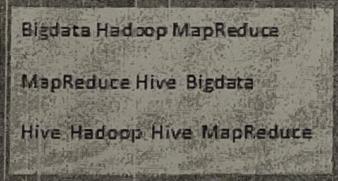
Name of the Faculty: Dr.P.Kalpana  
 Class : B.E. 4/4  
 Section: A  
 Sem: VII  
 Academic Year : 2024-25

Date: 18-11-2024

Note: Answer ALL Questions

| S.N<br>o. | Question                                                                                                                                                                                                                                                                                               | Mark<br>s | BTL | CO | PO  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|----|-----|
| 1         | What factors contribute to the increasing prevalence of NoSQL databases over traditional SQL databases, and how do these factors impact the choice of database technology in modern applications?                                                                                                      | 1         | 3   | 3  | 1,2 |
| 2         | Containerization is better than Virtualization. State whether this statement is correct or not and justify your answer.                                                                                                                                                                                | 1         | 3   | 3  | 1,2 |
| 3         | In a scenario where a tech company is contemplating the adoption of Kubernetes for managing its containerized applications, what key benefits should they expect to gain, and how might these advantages specifically support a startup's efforts to scale its application infrastructure efficiently? | 1         | 2   | 3  | 1,2 |
| 4         | For a cloud architecture team, is it possible to effectively launch multiple EC2 instances from a single Amazon Machine Image (AMI)?<br><br>If yes, What steps and considerations should they take into account during the process?                                                                    | 1         | 3   | 4  | 1,2 |
| 5         | Single GFS master could be the performance bottleneck and single point of failure.<br><br>How Google mitigates this? Justify your answer.                                                                                                                                                              | 1         | 3   | 4  | 1,2 |
| 6         | Write about the HDFS mechanism in which data in a node is backed up in other nodes to prevent the data loss?                                                                                                                                                                                           | 1         | 3   | 4  | 1,2 |
| 7         | AWS Lambda provides better functionality than Azure functions. Justify whether this statement is true or not and discuss the key differences between AWS Lamda and Azure functions.                                                                                                                    | 3         | 3   | 3  | 1,2 |
| 8         | You have a directory ProjectPro that has the following files:<br>HadoopTraining.txt,<br>SparkTraining.txt,<br>#DataScienceTraining.txt,                                                                                                                                                                | 3         | 3   | 4  | 1,2 |

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|    |                                                                                                                                                                                                                                                                                                                                |   |   |   |     |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----|
|    | .SalesforceTraining.txt.<br><br>If you pass the ProjectPro directory to the Hadoop MapReduce jobs, how many files are likely to be processed? Explain your analysis in detail.                                                                                                                                                 |   |   |   |     |
| 9  | In a scenario where a development team is tasked with deploying a Node.js application using Docker, how would they define a Docker image and a Docker image registry?<br><br>Additionally, what are the specific steps they need to follow to successfully deploy the application in a Docker container?                       | 4 | 3 | 3 | 1,2 |
| 10 | Discuss about mapreduce framework and solve the given problem using mapreduce approach.<br><br>Given problem consists of 3 statements, apply map reduce considering the content of all the 3 statements and produce the final result.<br><br> | 4 | 3 | 4 | 1,2 |

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

**IBRAHIMBAGH, HYDERABAD-31**

**BE-VII SEMESTER I-INTERNAL EXAMINATION**

**Name of the Course: Distributed Systems and Cloud Computing**

**Course Code: UI21PC710CS & UII21PC710CS**

**(Common to CSE & AIML)**

Max Marks: 30

Date: 28/09/2024

Time: 11:00 Am – 12:30 Noon

| Question No.                                        | Description of the question                                                                                                                                                                                                                                         | Marks allotted | Bloom's Taxonomy Level (1/2/3/4/5/6) | CO/PO     |           |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|-----------|-----------|
|                                                     |                                                                                                                                                                                                                                                                     |                | 1/2/3/4/5/6                          | Mapped CO | Mapped PO |
| <b>Part-A(6x 1 Marks: 06) Answer all questions</b>  |                                                                                                                                                                                                                                                                     |                |                                      |           |           |
| 1.                                                  | Analyze the significance of distributed systems in the context of cloud computing and discuss how distributed systems enhance the functionality, scalability, and reliability of cloud-based services.                                                              | 1              | 3                                    | 1         | 1, 2      |
| 2.                                                  | Distinguish High Throughput Computing (HTC) and High-Performance Computing (HPC) systems and suggest an real time environment which is suitable for each of them.                                                                                                   | 1              | 2                                    | 1         | 1         |
| 3.                                                  | As part of a client briefing on cloud computing, you need to provide a concise overview of two key cloud service categories Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) and identify prominent providers for each category.                 | 1              | 1                                    | 1         | 1, 2      |
| 4.                                                  | How do the mechanisms and use cases of full virtualization differ from those of paravirtualization in terms of performance and system compatibility?                                                                                                                | 1              | 2                                    | 2         | 1, 2      |
| 5.                                                  | In a scenario where a tech company is deciding between implementing a physical cluster versus a virtual cluster for their data processing needs, what factors should they consider regarding the differences in scalability, resource allocation, and maintenance?. | 1              | 1                                    | 2         | 1, 2      |
| 6.                                                  | Discuss the key benefits and challenges of virtualization technology in modern computing environments                                                                                                                                                               | 1              | 1                                    | 2         | 1, 2      |
| <b>Part-B (4x 3 Marks: 12) Answer all questions</b> |                                                                                                                                                                                                                                                                     |                |                                      |           |           |
| 7.                                                  | Identify and describe at least three major technological advancements that have converged to enable the rise of cloud computing. And also provide a real-world example of how these converging technologies have been applied in a cloud computing scenario.        | 3              | 3                                    | 1         | 1, 2      |
| 8.                                                  | Discuss the need of SLA and explain in detail the five phases of SLA life cycle.                                                                                                                                                                                    | 3              | 2                                    | 1         | 1, 2      |
| 9.                                                  | Illustrate the different levels of virtualization implementation with a neat diagram and discuss what                                                                                                                                                               | 3              | 2                                    | 2         | 1, 2      |

|                                                     |                                                                                                                                                                                                                                                                                                                             |   |   |   |      |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|------|
|                                                     | specific advantages does each level offer in terms of resource management and deployment.                                                                                                                                                                                                                                   |   |   |   |      |
| 10.                                                 | Analyze the need for Live migration process of a VM and describe the step by step procedure of live migration from one host to another with a neat diagram.                                                                                                                                                                 | 3 | 3 | 2 | 1, 2 |
| <b>Part-C (2x 6 Marks: 12) Answer all questions</b> |                                                                                                                                                                                                                                                                                                                             |   |   |   |      |
| 11(a).                                              | Distinguish cloud computing and grid computing by describing their fundamental differences in terms of architecture, resource management, and typical use cases. And also provide a detailed example of a scenario or application where cloud computing would be more suitable than grid computing and justify your answer. | 3 | 3 | 1 | 1, 2 |
| 11(b).                                              | Explain about two types of SLAs from the perspective of application hosting in brief and give a practical example of service-level guarantees offered by infrastructure providers in a dedicated hosting environment [Mention at least five key contractual elements by assuming own values].                               | 3 | 2 | 1 | 1, 2 |
| 12(a).                                              | Discuss about Hypervisor and Xen Architecture.                                                                                                                                                                                                                                                                              | 3 | 1 | 2 | 1, 2 |
| 12(b).                                              | Given a scenario where a data center experiences increased demand for resource allocation and scalability, how would you apply virtualization technologies to optimize server usage and reduce hardware costs? Provide specific examples of virtual machine (VM) management and resource allocation strategies.             | 3 | 3 | 2 | 1, 2 |

Summary of the percentage for each of the criteria BTL (Blooms Taxonomy Level) from the questions framed.

1. Fundamental knowledge from Level-1 (Remember): 20%
2. Knowledge on application and analysis from Level-2 (Understand): 36.5 %
3. Critical thinking and ability to design from Level-3(Apply) & Level-4 (Analyze):43.5 %