



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Seventh Semester

COMPUTER SCIENCE AND ENGINEERING

U18CSE0002: Data Visualization

COURSE OUTCOMES

CO1: Outline the theoretical foundations of information visualization and use it for better understanding of data.

CO2: Interpret the information available with network visualization, web-based visual displays and maps using appropriate tools.

CO3: Examine methods to acquire knowledge to visualize big data content.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Illustrate the types of information that can be represented in protein sequence visualizations. | CO3 | [K ₂] |
| 2. Why is normalization important when creating choropleth maps? | CO2 | [K ₂] |
| 3. Differentiate between visualizing discrete and continuous data. | CO1 | [K ₂] |
| 4. How does deep visualization differ from traditional data visualization methods? | CO2 | [K ₂] |
| 5. Describe one advantage of using a scatter plot in data visualization. | CO1 | [K ₂] |
| 6. What are network visualizations, and how are they used in data representation? | CO2 | [K ₂] |
| 7. What is the primary purpose of a heat map in data analysis? | CO2 | [K ₂] |
| 8. List the challenges associated with visualizing large volumes of data in a comprehensible manner. | CO3 | [K ₁] |
| 9. Why is storytelling an important aspect of data visualization? | CO3 | [K ₂] |
| 10. Explain the concept of interactivity in data visualization. | CO3 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

- | | | | |
|--|---|-----|-------------------|
| 11. a) Compare and contrast two common types of information visualization and apply their differences in specific use cases. | 8 | CO1 | [K ₃] |
| b) Explain the seven stages of the information visualization pipeline with examples. | 8 | CO1 | [K ₂] |

12. a) As a marketing manager for a leading e-commerce platform, you are tasked with analyzing user behavior and website performance to optimize the user experience and increase conversions. Using your own sample dataset fields like page views, clicks, bounce rates, traffic sources, conversion rates, etc., Explain the use of data visualizations to understand user interactions, website traffic, and conversion funnels. Provide specific examples of charts and visualizations that can effectively convey the data insights. Illustrate how these visualizations can help in identifying user drop-off points, analyzing traffic sources, and improving the overall website design to enhance user engagement and boost conversion rates. 10 CO1 [K₃]
- b) The university is looking to improve its admissions process by considering the category (e.g., general, reserved, or other categories) of applicants. To accomplish this, you have been tasked with identifying the most suitable type of Tableau visualization and justifying your choice to optimize the admission process. 6 CO2 [K₃]
13. a) Explain different map types in data visualization with an example. 10 CO2 [K₃]
- b) How does D3 enable developers to create dynamic and interactive data visualizations on the web? 6 CO2 [K₁]
14. Outline the steps involved in visualizing the different choropleth maps with applying Normalization and Classification for the given COVID-19 data set in India. 16 CO2 [K₃]
- | Date | State | Cases | Recoveries | Deaths |
|------------|-------------|-------|------------|--------|
| 2022-01-01 | Delhi | 100 | 90 | 2 |
| 2022-01-01 | Maharashtra | 200 | 180 | 5 |
| 2022-01-01 | Tamil Nadu | 150 | 140 | 3 |
| 2022-01-02 | Delhi | 120 | 110 | 2 |
| 2022-01-02 | Maharashtra | 210 | 200 | 6 |
| 2022-01-02 | Tamil Nadu | 160 | 150 | 4 |
| 2022-01-03 | Delhi | 130 | 120 | 3 |
| 2022-01-03 | Maharashtra | 220 | 210 | 7 |
| 2022-01-03 | Tamil Nadu | 170 | 160 | 4 |
15. As a data analyst for a retail store, you have been assigned the responsibility of utilizing forecasting techniques in Tableau to predict future sales. Your primary 16 CO2 [K₃]

objective is to assist the retail store in making data-driven decisions concerning inventory management, staffing levels, and marketing strategies. This will be accomplished by creating accurate sales forecasts based on the historical sales data provided in the table below.

Date	Monthly Sales
January 2020	13000
February 2020	14000
March 2020	15000
April 2020	16000
May 2020	17000
June 2020	19000
July 2020	20000
August 2020	21000
September 2020	20000
October 2020	19000
November 2020	18000
December 2020	23000
January 2021	14000
February 2021	15000
March 2021	16000
April 2021	17000
May 2021	18000
June 2021	20000
July 2021	21000
August 2021	22000
September 2021	21000
October 2021	20000
November 2021	19000
December 2021	24000

16. a) Select a specific domain or industry (e.g., healthcare, finance, transportation) and discuss how the visualization of big data has been utilized to gain actionable insights in that domain. Provide examples of the types of visualizations employed and the impact they had on decision-making or problem-solving. 8 CO3 [K₃]
- b) Explain the challenges and methods involved in acquiring and preprocessing data for the purpose of visualizing large-scale datasets, commonly referred to as big data. 8 CO3 [K₂]
