



Roll No.

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)
B.E. / B. Tech (Full Time) - END SEMESTER EXAMINATIONS, MAY 2024

MINOR DEGREE ON DATA SCIENCE

(Bio Medical/ Bio Tech/Geo Informatics/ Manufacturing/Petroleum)

Sixth Semester

CSM509 DATA VISUALIZATION

(Regulation 2019)

Time: 3 hours

Max. Marks: 100

CO 1	To understand the fundamentals of data visualization
CO 2	To know the working principles of various information visualization tools
CO 3	To acquire knowledge about the issues in data representation.
CO 4	To visualize the Data using tools
CO 5	To gain skill in designing real time interactive information visualization system.

BL – Bloom's Taxonomy Levels

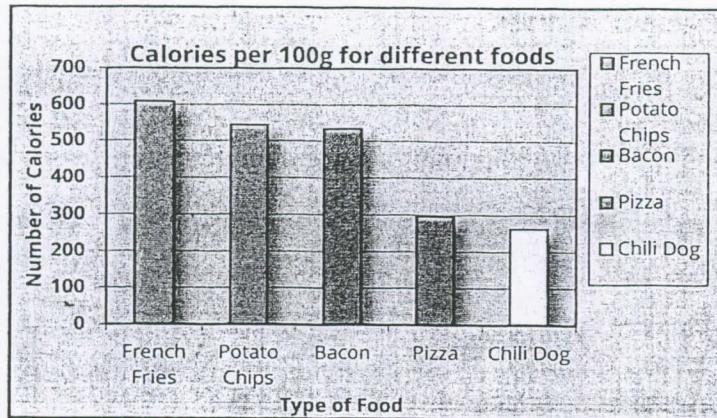
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	Write any two graph/chart to visualize univariate data	2	1	L1
2	What is the limitation of pie chart?	2	1	L2
3	Draw tree map for the following:	2	2	L3
	<pre> graph TD a16[a16] --> b3[b3] a16 --> c3[c3] b3 --> e1[e1] b3 --> f2[f2] c3 --> d10[d10] d10 --> g2[g2] d10 --> h4[h4] g2 --> j1[j1] g2 --> k1[k1] h4 --> l1[l1] h4 --> m1[m1] h4 --> n1[n1] l1 --> o1[o1] l1 --> p1[p1] </pre>			
4	Give an example for non-linear axis	2	3	L2
5	Write unique feature of following visualization tools: Powerbi, Wordcloud, Tableau, Googlechart	2	4	L4
6	Draw a rectangle using SVG tag	2	4	L1
7	What is the importance of projection in geomapping?	2	2	L4
8	What is the difference between SVG and raster images?	2	5	L2
9	Draw box chart for {76, 82, 70, 90, 68, 75, 80, 79, 83}	2	3	L3
10	What is the importance of port scanning visualization?	2	2	L3

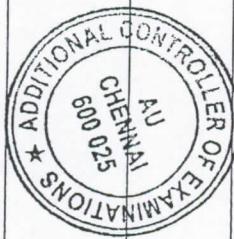
PART- B (5 x 13 = 65 Marks)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	List the Tufte's basic principles of data visualization and describe each with illustration	6	1	L1
(ii)	What is data ink ratio? How it is used to reduce graphical complexity? Reduce the data ink in the following graph by showing the graph reduction in each stage with reason.	7	2	L3



OR

11 (b) (i)	Describe Trend, cycle and Seasonal in a time series graph with illustration	6	1	L1
(ii)	<p>Draw the graphs for the following python script.</p> <pre>import matplotlib.pyplot as plt import numpy as np x = np.array(["A", "B", "C", "D"]) y = np.array([3, 8, 1, 10]) plt.bar(x, y) ** plt.show()</pre> <p>If the height=0.1, show the bar</p> <p>If plt.barh is replaced in place of plt.bar,</p> <pre>import matplotlib.pyplot as plt x =[1, 2, 3, 4, 5, 6, 7] y =[1, 2, 1, 2, 1, 2, 1] x_error = 0.3 plt.plot(x, y) plt.errorbar(x, y,xerr = x_error)</pre>	7	2	L3



12 (a)	<p>Plot the curve and smooth it by Moving average for the following data :</p> <table border="1"> <tr><td>Month</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>Temp in C</td><td>34</td><td>30</td><td>32</td><td>34</td><td>31</td><td>32</td><td>31</td><td>28</td><td>29</td><td>33</td></tr> </table> <p>Also find weighted moving average and exponential moving average and show all the three smoothed curves along with the plotted curve.</p>	Month	1	2	3	4	5	6	7	8	9	10	Temp in C	34	30	32	34	31	32	31	28	29	33	13	3,4	L3
Month	1	2	3	4	5	6	7	8	9	10																
Temp in C	34	30	32	34	31	32	31	28	29	33																
OR																										
12 (b)	How to visualize hierarchical data with networks & graphs? Describe various types of graphs/trees with illustration	13	3,4	L3																						
13 (a)	i) What are the features to be considered in visualising text? ii) How to extract text from an HTML file with p and h tags? iii) How to separate only the links from an HTML?	13	3	L3																						
OR																										
13 (b)	Explain the seven stages of data visualization by considering text visualization as case study	13	3	L3																						
14 (a)	Write a complete html, css & d3.js to draw pie chart & bar graph with an interactive feature of your choice	13	4	L4																						
OR																										
14 (b)	What is D3? Describe Coordinate System, scaling, Axis and data binding for an interactive visualisation in d3.js with illustration	13	4	L4																						
15 (a) (i)	What are the charts/graphs being used to represent the uncertainty data.	8	1	L5																						
(ii)	How the probability and estimation are best be described with suitable graph.	5	5	L2																						
OR																										
15 (b) (i)	Describe the suitable visualization techniques for network security data with illustration	8	1	L5																						
(ii)	Draw the bar chart for the probability distribution of the following: probability of sum of all possible outcomes when two fair dices are rolled	5	5	L2																						

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.i)	What is the suitable graph/chart for the following data with due justification * Name, rollno, civic & Marks in five subjects by HSC Board * Questionnaire contains 5 queries of which two are Boolean * Day wise Price of petrol for an year	7	2	5
ii)	Design a dashboard for a placement officer of a reputed institution. Consider all the attributes of students to be & already placed in the current and past years, similarly the attributes of companies. The dashboard must consists of at least 2 piechart, line chart, area chart, and any two special chart of your choice. Write necessary excel/python/js/html snippets to substantiate	8	5	6

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