SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

M.Tech DATA SCIENCE

II SEMESTER

DS3262–ADVANCED DATA VISUALIZATION TECHNIQUES

Regulation – 2023

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Prepared by

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SUBJECT:DS3262 – ADVANCED DATA VISUALIZATION TECHNIQUES

SEM / YEAR: II Semester/ I Year

	UNIT I INTRODUCTION		
	Information visualization – effective data analysis – traits of meaningful data – visual perception –making abstract data visible – building blocks of information visualization – analytical interaction – analytical navigation – optimal quantitative scales – reference lines and regions – trellises and crosstabs – multiple concurrent views – focus and context – details on demand – over-plotting reduction – analytical patterns – pattern examples.		
	PART – A		
Q. No.	Questions	BT Level	Competence
1	What is Information Visualization?	BTL1	Remembering
2	Why is information visualization important?	BTL1	Remembering
3	How do you analyze data effectively?	BTL1	Remembering
4	List out the 3 data analysis steps?	BTL1	Remembering
5	Define the key objective of data analysis.	BTL1	Remembering
6	What are the traits of meaningful data?	BTL1	Remembering
7	Illustrate the 3 visual perceptions.	BTL2	Understanding
8	What is mean by visual perception ?	BTL2	Understanding
9	State abstract data in data visualization.	BTL2	Understanding
10	Point out the four stages of visualization.	BTL2	Understanding
11	What is task abstraction?	BTL3	Applying
12	State reference line.	BTL3	Applying
13	How do you label a reference line?	BTL3	Applying
14	What are multiple views?	BTL4	Analyzing
15	What is multiple coordinated views?	BTL4	Analyzing
16	List out the 4 types of graphs that we use to analyze data.	BTL4	Analyzing
17	Define over plotting.	BTL5	Evaluating
18	What are the five common types of data patterns?	BTL5	Evaluating
19	Examine interactive data visualization.	BTL6	Creating
20	What are 3 common methods of visualizing data?	BTL6	Creating
21	What do you mean by Amplify Cognition.	BTL1	Remembering
22	List the traits of Data Analyst.	BTL2	Understanding
23	What is visual perception?	BTL2	Understanding
24	What are the building blocks of Information visualization?	BTL4	Analyzing
	PART – B		
Q. No.	Questions	Marks	BT Level	Competence
1	(i) What are the various types of Information Visualization Techniques (ii) What are the applications of information visualization	(07) (06)	BTL1	Remembering
2	Explain the methods involved in effective data analysis in detailed	(13)	BTL1	Remembering
3	(i) What are the seven aspects of data quality What is Meaningful data? How it is measure	(06) (07)	BTL1	Remembering
4	What is Visual Perception and explain the types in detailed	13	BTL1	Remembering
5	(i) Illustrate the challenges of Visual perception	7	BTL1	Remembering

	(ii) List out the top 5 traits of a good data analyst	6		
6	Examine the principles of good visualization design and also explain the two basic types of data visualization	13	BTL2	Understanding
7	What is information Visualization? Explain the building blocks of data visualization	13	BTL2	Understanding
8	Explain the types of Analytical Interaction and Navigation with its Example	13	BTL2	Understanding
9	(i) What are the 4 levels of scale measurement in quantitative research? (ii) What type of measurement scale is used for each of the variables?	6 7	BTL3	Applying
10	How to Display a Reference Line in a Graph Visualization and how to choose right data visualization	13	BTL3	Applying
11	Illustrate the guidelines for using multiple views in information visualization	13	BTL4	Analyzing
12	(i) Explain the data types and measurement scales in detail (ii) Discuss about the Data visualization for human perception	7 6	BTL4	Analyzing
13	(i) Define the concept of Interactive visualization of abstract data (ii) List out the seven stages of visualizing data	6 7	BTL4	Analyzing
14	Explain Overplotting? What are all the types of overplotting and also explain the remedies of Overplotting	13	BTL5	Evaluating
15	What are all the strategic steps for how to analyze data and also explain the data analysis techniques	13	BTL6	Creating
16	(i) How to design an information visualization (ii) Explain why the data visualization is most important	7 6	BTL6	Creating
17	Define Crosstab and explain the crosstab with two variables and more than two variable?	13	BTL6	Creating

	UNIT II -TIME-SERIES, RANKING, AND DEVIATION ANALYSIS		
	Time-series analysis – time-series patterns – time-series displays – time-series best practices – part-to-whole and ranking patterns – part-to-whole and ranking displays – best practices – deviation analysis – deviation analysis displays – deviation analysis best practices.		
	PART – A		
Q. No.	Questions	BT Level	Competence
1	Mention simplest types of analysis.		
2	What is part to whole and ranking analysis?		
3	What is meant by part - to- whole and ranking patterns?		
4	How is the part to whole relationships displayed?		
5	How part to whole and ranking displays?		
6	What is the use of dot plots?		
7	Illustrate dot plot with an example.		
8	List the best practices of part to whole and ranking techniques.		
9	Illustrate the part to whole and ranking techniques with an example.		
10	List four techniques and best practices for part to whole and ranking analysis.		
11	What is pareto charts with percentile scales?		
12	What is the use of pareto charts?		
13	List re expression types.		
14	Define deviation analysis.		
15	Give an example for deviation analysis.		
16	List the best graphs for displaying deviations.		
17	What are the two best graphs for displaying deviations ?		
18	What are the two practical techniques for squeezing the most from deviation analysis?		
19	What is the advantage of viewing deviations as percentage?		

20	List deviation analysis techniques and the best practices used.		
21	What is square root re-expression?		
22	What is logarithmic re-expression?		
23	What is inverse re-expression?		
24	Compare bar graph and line graph.		

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PART – B

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1	Write in detail about part to whole and ranking analysis with an example.		
2	Explain in detail about part - to- whole and ranking patterns.		
3	Explain in detail about part to whole and ranking displays with an example.		
4	Explain in detail about dot plots with an example.		
5	Illustrate the best practices of part to whole and ranking techniques with an example.		
6	Illustrate the part to whole and ranking techniques with an example.		
7	Detail about pareto charts with percentile scales.		
8	Explain in detail about deviation analysis with an example.		
9	Explain all the best graphs for displaying deviations with an example.		
10	Explain in detail about the two best graphs for displaying deviations with an example.		
11	Discuss the two practical techniques for squeezing the most from deviation analysis and explain in detail.		
12	Explain deviation analysis techniques and best practices in detail.		
13	Describe in detail about bar graph with an example.		
14	Describe in detail about line graph with an example.		
15	Describe in detail expressing deviations as percentages with an example.		
16	Explain in detail grouping categorical items in an ad hoc manner.		
17	Explain in detail use of pareto charts with percentile scales.		

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UNIT – III   DISTRIBUTION, CORRELATION, AND MULTIVARIATE ANALYSIS

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Distribution analysis – describing distributions – distribution patterns – distribution displays – distribution analysis best practices – correlation analysis – describing correlations – correlation patterns – correlation displays – correlation analysis techniques and best practices – multivariate analysis – multivariate patterns – multivariate displays – multivariate analysis techniques and best practices.

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PART – A

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Q. No.	Questions	BT Level	Competence
1	What is distribution in data visualization?	BTL1	Remembering
2	Explain the role of histogram in distribution	BTL2	Understanding
3	Define Boxplots.	BTL2	Understanding
4	Define Quick Plots.	BTL2	Understanding
5	What is the best data visualization for distribution.	BTL5	Evaluating
6	List out the characteristics of describing distribution.	BTL1	Remembering
7	List some of the properties of distribution.	BTL1	Remembering
8	Writeabout stem and leaf display?	BTL1	Remembering
9	What are the patterns of data distribution?	BTL1	Remembering
10	What is the best way to display distribution?	BTL1	Remembering
11	Write the importance of distribution dispalys?	BTL1	Remembering
12	List out the methods of analyzing data.	BTL1	Remembering
13	Outline the five basic components of a pattern.	BTL2	Understanding
14	What is correlation analysis.	BTL1	Remembering
15	What is the difference between distribution and multivariate analysis?	BTL1	Remembering

16	What is correlation in a multivariate distribution?	BTL1	Remembering	
17	Whatisunivariate distribution?	BTL1	Remembering	
18	Definemultivariate distribution.	BTL1	Remembering	
19	Define Distribution.	BTL1	Remembering	
20	Define correlation.	BTL1	Remembering	
21	Difference between Univariate and Multivariate distribution.	BTL1	Remembering	
22	What data visualization is used to show correlation?	BTL1	Remembering	
23	How is correlation data presented?	BTL1	Remembering	
24	Write an example of data correlation?	BTL1	Remembering	

	PART – B			
1	What is the role of correlation in multivariate normal distribution?	(13)	BTL2	Understanding
2	Discuss in detail how to describe distributions?	(13)	BTL6	Creating
3	Explore the importance of distributions with tables and graphs.	(13)	BTL5	Evaluating
4	Discuss about frequency polygons with example	(13)	BTL6	Creating
5	Analyze the characteristics of distributions in detail	(13)	BTL4	Analyzing
6	What is the most appropriate purpose of creating a Visualisation to analyze the distribution?	(13)	BTL4	Analyzing
7	Discuss on how to describe the shapes of distribution.	(13)	BTL6	Creating
8	(i)How to decide which chart type to use in data visualization? Explain in detail? (ii)Explain some of the tips to improve data visualization?	(7)		
9	Discuss how Design Patterns is used to find Greater Meaning in Your data?	(6)	BTL5	Evaluating
10	Explain in detail about the methods of analyzing data with an example.	(13)	BTL6	Creating
11	Elaborate on data correlation with visualization?	(13)	BTL5	Evaluating
12	Why do we conduct multivariate Analysis? Explain?.	(13)	BTL6	Creating
13	Examine Univariate, Bivariate & Multivariate Analysis in Data.	(13)	BTL1	Remembering
14	Examine the MultiVariate Analysis Techniques for exploring data.	(13)	BTL4	Analyzing
15	Briefly describe how to visualize multivariate data.			
16	Explain the importance Geometric Visualization?	(13)	BTL4	Analyzing
17	Compare multiple linear regression and multiple logistic regression?	(13)	BTL1	Remembering

	UNIT -IV INTERACTIVE DATA VISUALIZATION		
	Information dashboard – Introduction– dashboard design issues and assessment of needs – Considerations for designing dashboard-visual perception – Achieving eloquence. Advantages of Graphics _Library of Graphs – Designing Bullet Graphs – Designing Sparklines – Dashboard Display Media –Critical Design Practices – Putting it all together- Unveiling the dashboard.		
	PART – A		
Q.	Questions	BT Level	Competence

No.			
1	What is an interactive data visualization?	BTL1	Remembering
2	What is a Data Dashboard?	BTL1	Remembering
3	What's a Dashboard Visualization?	BTL1	Remembering
4	What are the Benefits of Using Data Dashboards	BTL1	Remembering
5	How do Data Dashboards Work?	BTL1	Remembering
6	What are 4 Types of Data Dashboards	BTL1	Remembering
7	What is a business intelligence dashboard?	BTL2	Understanding
8	What are the advantages of graphic design?	BTL2	Understanding
9	What is data visualization?	BTL2	Understanding
10	Which concept is used in data visualization?	BTL2	Understanding
11	List the benefits of data visualization.	BTL3	Applying
12	Why big data visualization is important?	BTL3	Applying
13	What is use of Matplotlib?	BTL3	Applying
14	What is contour plot ?	BTL4	Analyzing
15	Why is data visualization effective?	BTL4	Analyzing
16	What is subplots?	BTL4	Analyzing
17	What is use of tick?	BTL5	Evaluating
18	What advantages can data visualization offer?	BTL5	Evaluating
19	What is Seaborn?	BTL6	Creating
20	What is a Bullet Chart?	BTL6	Creating
21	What are the two sparkline types?	BTL1	Remembering
22	What is a dashboard display?	BTL1	Remembering
23	What are the two types of data visualization?	BTL1	Remembering
24	What are the data visualization field's key objectives?	BTL2	Understanding
	PART – B		
1	How can information dashboards revolutionize decision-making processes within organizations, and what are the potential impacts on operational efficiency and strategic planning?	BTL1	Remembering
2	What methodologies and tools can organizations employ to ensure that their information dashboards are tailored to the diverse needs and preferences of end-users across different departments and roles?	BTL1	Remembering
3	How can visual perception principles be leveraged to design intuitive and visually compelling dashboards that facilitate rapid comprehension and actionable insights?	BTL1	Remembering
4	What strategies can organizations adopt to elevate the eloquence of their information dashboards, fostering user engagement and encouraging exploration of data-driven narratives?	BTL1	Remembering
5	What are the primary advantages and challenges associated with leveraging graphics libraries for creating dynamic and customizable graphs within information dashboards?	BTL2	Understanding
6	In what contexts are bullet graphs and sparklines most effective, and how can organizations integrate these specialized visualizations to convey nuanced information concisely and effectively?	BTL2	Understanding
7	How do the characteristics of different display media, such as web-based interfaces, mobile apps, and interactive dashboards, impact user accessibility, usability, and engagement?	BTL2	Understanding
8	What are the key steps involved in integrating disparate design elements, data sources, and user feedback to develop a cohesive information dashboard solution, and how can organizations effectively deploy these dashboards to maximize user adoption and impact?	BTL3	Applying
9	How can organizations ensure that dashboard designs are tailored to the specific needs and preferences of their users?	BTL3	Applying
10	What are the essential design principles and best practices that	BTL3	Applying

	organizations must adhere to when designing information dashboards to ensure data accuracy, accessibility, and usability?		
11	What methods can be employed to gather user feedback and incorporate it into the dashboard design process?	BTL4	Analyzing
12	How do user personas and user journey mapping contribute to the design of user-centric dashboards?	BTL4	Analyzing
13	What are some key considerations for selecting appropriate data visualization techniques for displaying different types of data?	BTL5	Evaluating
14	How can the principles of visual hierarchy and information architecture be applied to improve the clarity and effectiveness of dashboard designs?	BTL6	Creating
15	In what ways can color, typography, and layout be optimized to enhance data interpretation and user experience?	BTL4	Analyzing
16	What role does interactivity play in enhancing user engagement with dashboards, and how can interactive elements be integrated effectively?	BTL6	Creating
17	How can storytelling techniques be incorporated into dashboard designs to create engaging narratives and facilitate data-driven decision-making?	BTL4	Analyzing

	UNIT V SECURITY		
	Port scan visualization - Vulnerability assessment and exploitation - Firewall log visualization - Intrusion detection log visualization -Attacking and defending visualization systems – Creating Security visualization system.		
	PART – A		
Q. No.	Questions	BT Level	Competence
1	Define Port Scan?	BTL1	Remembering
2	what are the various Intrusion Detection System Types	BTL1	Remembering
3	What is a vulnerability assessment?	BTL2	Understanding
4	Give the Importance of vulnerability assessments	BTL1	Remembering
5	What is Vulnerability exploitation and define Exploitation time	BTL3	Applying
6	Give the steps in firewall visualization process	BTL1	Remembering
7	What is firewall log analysis	BTL3	Applying
8	Draw the intrusion detection System within a network structure.	BTL2	Understanding
9	Differentiate Host based and Cloud based IDS.	BTL4	Analyzing
10	Give few Attacks that target the visualization system	BTL1	Remembering
11	Discuss about Visualization for Security	BTL3	Applying
12	Write the Key features of Security visualization	BTL1	Remembering
13	Give few tools for network security visualization	BTL2	Understanding
14	What is network security visualization	BTL2	Understanding
15	What is Attacking the Visualization	BTL4	Analyzing
16	Give few examples of attacking the visualization.	BTL6	Creating
17	Difference between Vulnerability assessments vs. penetration tests	BTL5	Evaluating
18	Draw the diagram to show the six steps of penetration testing	BTL5	Evaluating
19	Write down the two different types of detection methods (NIDS)	BTL6	Creating
20	Write down the NIDS(network intrusion detection system) log record	BTL4	Analyzing
21	What is refining plots?	BTL1	Remembering
22	Define ordinal scale.	BTL3	Applying
23	What is choropleth?	BTL2	Understanding
24	Define trellis plot.	BTL2	Understanding
	PART – B		
1	Narrate about drawing with data in interactive data visualization. (13)	BTL1	Remembering

2	(i) Explain in detail about normalization. (7) (ii) Explain in detail about scaling and scatter plot. (6)		BTL1	Remembering
3	Illustrate Refining plots? Explain in detail. (13)		BTL1	Remembering
4	(i) Discuss about Axes. (7) (ii) Discuss in detail about setting axes. (6)		BTL1	Remembering
5	(i) Narrate about Ordinal scales. (7). (ii) Explain in detail about Range function. (6)		BTL2	Understanding
6	Explain in detail about transition function to visualize the data. (13)		BTL2	Understanding
7	Demonstrate on updating Axes in detail. (13)		BTL2	Understanding
8	Explain in detail about D3 layouts. (13)		BTL3	Applying
9	Explain in detail about Path and Projection in detail.(13)		BTL3	Applying
10	(i) Define with example about Choropleth. (7) (ii) Explain about acquiring and parsing geodata. (6)		BTL4	Analyzing
11	Define the updation available along with motion in interactive data visualization. (13)		BTL4	Analyzing
12	With relevant examples describe about multiple box plot and trellis plot. (13)		BTL4	Analyzing
13	How will you visualize the scales available in interactive data visualization? (13)		BTL5	Evaluating
14	Explain in detail about the Geomapping with interactive data visualization. (13)		BTL6	Creating
15	Explain in detail about drawing with data. (15)		BTL6	Creating
16	Examine the different features available in update and transition functions. (15)		BTL6	Creating
17	Illustrate the framework of large high dimensional interactive visualization.(15)		BTL5	Evaluating