

COMPUTER SCIENCE — 10

UNIT 05

DATA SCIENCE

Topics Covered in this Unit

1. Introduction to Data Science
2. Data Science Life Cycle
3. Understanding the Problem
4. Collecting Data
5. Tools for Visualization
6. Databases and Storing Data

Introduction

Data Science is the process of using data to understand problems, discover patterns, and make smart decisions. In the digital era, data is everywhere, and Data Science helps us turn this raw data into useful information.

Organizations across the world use data to create better services. This unit introduces the Data Science Life Cycle: understanding the problem, collecting and cleaning data, analyzing and interpreting data, and communicating the results using charts and visuals.

Introduction to Data Science

Q.1 What is Data Science? Explain importance of data along with real-life applications of data science.

10505001

Ans. ★ *Key Points: Introduction to Data Science | Importance of Data | Real-Life Applications of Data*

1. Data Science

Data Science is the process of using data to understand problems, discover patterns, and make smart decisions. Data Science is the field where we use data to find patterns, answer questions, and help people or businesses make better decisions. It involves collecting, organizing, analyzing, and visualizing data.

2. Importance of Data in Decision Making

Data plays a big role in helping people and organizations make better decisions. Without data, decisions may be based on guesses or personal opinions which can lead to mistakes.

Example: If the school administration desires to start a new sports club, they can first collect data on which sports students enjoy most. This helps them make a smart and fair choice.

3. Real-Life Applications of Data Science

Data Science is used in many aspects of our daily life often without our notice:

- Social media: Applications like Facebook, YouTube and Instagram use data to show us posts video we might like.
- Online shopping: E-commerce websites suggest products using data of our previous purchases.
- Healthcare: Hospitals use data science to predict diseases and manage patient care more effectively.
- Transport: Applications like Google maps use traffic data to suggest the fastest routes.
- Education: In schools, data from student attendance and test results is used to improve learning strategies and track progress.

Data Science supports in making our lives smarter, easier, and more personalized from watching YouTube videos to receiving health tips or choosing the best route.

Data Science Life Cycle

Q.2 What is the Data Science Life Cycle (DSLC) and also write the six (6) steps involved in the Data Science Life Cycle? 10505002

Ans. ★ *Key Points: Data Science Life Cycle | Steps in DSLC*

Data Science Life Cycle

Data Science is not covered in a single step. It follows a series of steps that are helpful in solving a problem. This is what we call Data Science Life Cycle (DSLC). DSLC usually comprises of the following steps:

- Step 1: Understanding the Problem
- Step 2: Collecting Data
- Step 3: Cleaning and Validating Data
- Step 4: Analyzing Data
- Step 5: Interpreting Data
- Step 6: Visualizing and Communicating Results

Understanding the Problem

Q.3 Why is understanding and clearly defining the problem considered the most important step in the Data Science Life Cycle? 10505003

Ans. ★ *Key Points: Understanding Problem | Identifying and Defining the Problem*

1. Understanding the Problem

Understanding the problem is the most important step in DSLC. In case, we do not understand the problem properly, we may collect the wrong data resulting in useless or wrong results. In this initial step, we need to ask questions (what, why, who) such as:

- What are we trying to find out?
- Why is this problem important?
- Who will use the results?

2. Identifying and Defining a Problem

First, we need to identify a problem that we want to solve using data. The problem can be related to our school, home, city, or any area of life where decisions are made based on information. Once a problem is identified, then we must define it clearly and simply.

Example: Instead of saying, "students are not happy" we can define the problem in a better way as "Which school activities do students enjoy the most?"

When defining a problem, we need to consider the following:

- Use clear and simple words
- Focus on one specific question
- Avoid unclear or general terms.

3. Setting Clear Objectives

Once we have identified and defined the problem, we must decide what we want to achieve. These are called our objectives which help in guiding the rest of the data science process. They state:

- What kind of data we need?
- What questions we will ask?
- What results we are looking for?

Example: For the problem stated in above "Which school activities do students enjoy the most?", we can formulate our objectives as follows:

- Find out how many students participate in each activity.
- Find out which activity is rated as most enjoyable by the students.
- Recommend which activities should be improved or replaced.

Examples: School, Health, Business related Problems and Objectives

There are few realistic examples to understand the concept in a better way. Following table provides example problems and objectives related to different domains such as school, health and business.

Domain	Example Problem	Objectives
School	Many students arrive late at school.	Find out how many students arrive late in month. Identify reasons for being late (e.g., transport, distance, emergency, weather issues). Suggest solutions to reduce late arrivals.
Health	Many students are not drinking enough water during school hours.	Collect data on how much water students drink daily. Find out reasons for low water intake. Recommend steps to promote healthy habits.
Business	A school canteen wants to know which snacks students like the most.	Survey students on their favorite snacks. Compare popularity and sales data. Help the canteen manager make smart ordering decisions.

Example Problems and Objectives

REMEMBER

1. The first step in any data science project is to understand the problem.
2. We must define the problem clearly and set specific goals.
3. Clear problems are solvable using data.
4. Clear objectives help in collecting the right data and reaching useful results.

Collecting Data

Q.4 Why is collecting the right data an important step in the Data Science Life Cycle, and what methods and sources can be used to collect reliable and useful data? 10505004

Ans. ★ *Key Points: Data Collection Methods | Surveys | Online Sources | IoT | Web Scrapping*

Once we understand the problem and set clear goals, the next step in DSLC is to collect the required data. Data is like raw material, and we must gather the right kind of data before we can clean, store, or analyze it.

In Step 1, we asked questions like "Which school activities do students enjoy the most?" or "Why are students arriving late to school?"

Step 2 is about collecting information that can help us answer these questions. We will explore:

1. Data collection methods
2. Where to collect data from (sources)
3. How to make sure it is useful and fair (data quality)

1. Data Collection Methods

There are many ways to collect data, depending on the problem and available tools. The most common ones used in schools, homes, and businesses.

a. Surveys (Online/paper based):

Surveys are the easiest and most common method. We ask questions from people and record their answers.

Example: To find out which sports students enjoy, we can create a survey with questions such as:

- Which sport do you like the most?
- How often do you play it?
- What time of day do you prefer to play?

DID YOU KNOW?

Q. How can surveys be conducted? (10505004a)

Ans. Surveys can be conducted using Google Forms (online) or printed paper forms (manual).

b. APIs and Online Sources:

Application Programmer Interface (APIs) allow software collect data from websites or applications (apps) automatically.

Example: A school may use an attendance API to pull daily attendance data into a report.

c. IoT and Sensor Data:

Internet of Things (IoT) devices like smart watches, water dispensers, or temperature sensors can automatically collect data.

Example: To study water drinking habits, schools can place smart water meters near fountains.

d. Web Scrapping:

It is a process of programmatically collecting public data from websites.

Example: A business student may scrape/extract prices of snacks from online stores to compare them with school canteen prices.

DID YOU KNOW?

Q. When is it appropriate to use web scraping? (10505004b)

Ans. Web scraping should only be done with a teacher's guidance and on websites that allow it.

2. Choosing the Right Data Source

Not all data is useful. We must choose reliable, accurate, and relevant sources. When selecting a data source, ask a few questions like:

- Is this data from a trusted place?
- Is it recent or outdated?
- Does it match the problem I want to solve?

taleemzone.com

Example: If we want to know favorite snacks of students in 2025, we should avoid using a survey done in 2020.

3. Assessing Data Quality and Bias

Data quality means the data is:

- Complete (no missing values)
- Correct (no mistakes)
- Relevant (matches our problem)

Bias means the data only shows part of the truth and misses the full picture.

Example: If we only survey boys about their favorite sports, we will miss the opinions of girls. The results will be unfair or biased toward boys. Remember the following to avoid bias:

- Ask from a diverse group of people
- Keep questions neutral and not leading
- Review answers for strange patterns

REMEMBER

1. After defining a problem, we need to collect data that can help in solving the problem.
2. There are different methods of data collection such as surveys, APIs, sensors, and web scraping.
3. We should always check for data quality and fairness (bias) before moving to the next step.
4. Data that is incomplete or biased can lead to wrong decisions.

Q.5 Define raw data and explain why it needs to be cleaned and validated. 10505005

Ans. ★ Key Points: Raw Data | Data Cleaning | Data Errors | Data Validation

1. Raw Data

Raw data is the original information we collect from people, sensors, websites, or apps. It has not been checked or cleaned yet. Example: Assume that 20 students filled your survey about favorite sports. Some entries may look like as:

ID.	Name	Favorite Sport	Frequency per week	Study Time of Day
1	Arshad	cricket	Daily	Evening
2	Ayaan		Weekly	Afternoon
3	Areeda	Footbal	Daily	
4	Hina	Football	Daliy	Evening

Raw Data about Favorite Sport of Students

Table Contains:

- Spelling errors i.e., Football (ID 3), Daliy (ID 4)
- Missing entries (ID 2 & 3)
- Mixed Capitalizations i.e., cricket (ID 1), Football (ID 4). Such kind of data needs cleaning.

2. Cleaning and Validating Data

After collecting data, the next important step is to clean and validate it. Raw data is often messy. It may contain errors, missing values, or even wrong entries. If we use this data without checking it, our analysis will give wrong results. Remember that earlier we collected data using surveys and other methods. Now, we need to check if that data is correct, complete, and ready for use. This step ensures that the data we analyze later is trustworthy.

3. Common Data Errors (Missing, Duplicate, Outliers)

The following table shows some common issues found in raw data.

ID.	Error Type	Example
1	Missing data	Blank cells (e.g., no sport name or study time of day)
2	Duplicate entries	Same student entered twice
3	Inconsistent formats	"Cricket", "cricket", "CRICKET"
4	Spelling mistakes	"Footbal", "Daliy"
5	Outliers (strange values)	Frequency = 1000 times/week

Common Issues in Raw Data

4. Data Validation Techniques

Data validation means checking if the data:

- Follows correct rules (e.g., only valid sport names).
- Has the right type of values (e.g., numbers where numbers are expected)?
- Is not fake or silly.

Example Validation Rule: Only allow one of these values for "Favorite Sport": Football, Cricket, Badminton, Hockey.

Validation in Surveys: For this purpose, consider the following:

- Use multiple choice instead of blank text boxes.
- Make important questions as required, so no one skips them.
- Use dropdowns or checkboxes to reduce spelling mistakes.

TIDBIT

Q. How do tools like Google Sheets and Excel help in data validation?

Ans. Tools like Google Sheets, Excel, provides rules that can help validate data.

5. Data Cleaning Methods

Once we find mistakes, we need to fix or remove them. This is called data cleaning. The following are a few basic steps to clean data:

- Fix spelling errors: "Footbal" → "Football"
- Standardize formats: "CRICKET" → "Cricket"
- Remove duplicates (redundancy): Delete repeated entries for the same student.
- Handle missing values: Ask the person again OR remove the row.
- Fix invalid data: If frequency is written as "ten hundred", fix it or remove it.

6. Why Cleaning Data Matters?

Suppose that we skip this step and we analyze data that includes:

- Misspelled sports ("Cricket")
- Missing Times of the Day/Study time.
- Duplicates

Our result might say: "Football: 3 votes, cricket: 1 vote, Cricket: 2 votes". This gives the wrong picture, because "cricket" and "Cricket" are the same sport!

Q.6 Define data analysis, also explain simple tools that can be used for data analysis. 10505006**Ans.** ★ Key Points: Data Analyzing | Tools for Analyzing Data**1. Analyzing Data**

Data analysis is the process of analyzing data to find trends, patterns and fruitful information. It also involves summarizing and comparing data.

Now that our data is collected, and cleaned properly, we can move on to the analysis steps. This is where we look at the data to find patterns, trends, and answers to the questions we asked in Step 1. Suppose that you have a clean and organized table of data.

Example: Student responses about their favorite sport or study times. Now you may ask question like "what does this data tell us?" This step helps us make decisions based on what we discover in the data.

2. What Does it Mean to Analyze Data?

Analyzing data means carefully examining data to:

- Summarize it (e.g., how many students choose each option)
- Compare different groups (e.g., boys vs girls, morning vs evening)
- Find patterns (e.g., most students prefer football and play in the evening)

You may use measures like counts (how many?), averages, frequency (how often?) etc.

3. Using Simple Tools for Analysis

You can start analyzing data with simple tools such as Google Sheets, Microsoft Excel or manual writing in a notebook.

Example: You surveyed 20 students. The following table shows what you may have found.

Favorite Sport	Frequency
Cricket	10
Football	5
Hockey	4
Badminton	1

Data Derived from Student Survey

From this data, we can observe that most students prefer cricket.

REMEMBER

1. Data analysis helps us find patterns and make decisions.
2. We use counts and comparisons to understand data.
3. Even simple tools like tables or spreadsheets can help us analyze data.

Q.7 Define interpreting data in your own words. 10505007**Ans.** ★ Key Points: Data Interpreting**Interpreting Data**

Data interpretation is the process of examining data and arriving at relevant conclusions using various analytical methods. It transforms raw numbers into meaningful insights. This step is to finding meaning from data (i.e., identifying trends and patterns). After summarizing the data, we may ask ourselves:

- What do the numbers tell us?
- Why are some options more popular?

- Are there any surprises or patterns?

Example: If we find that most late students live far from the school, we can recommend providing transport support as a solution.

taleemzone.com

Q.8 What is meant by visualizing and communicating results and why is it important? Also discuss common types of charts and graphs. 10505008

Ans. ★ Key Points: Data Visualization | Types of Charts | Communicating Results

1. Visualizing and Communicating Results

After analyzing the data, the final step is to share the results in a way that others can understand easily. People usually understand pictures better than numbers, which is why we use data visualizations. Remember that in previous step, we found that cricket was the most popular sport. In this step, we will create a chart that shows this clearly. This makes it easy to present our findings to classmates, teachers, or others.

2. Importance of Data Visualization

Data Visualization is important because it:

- Makes data easier to understand.
- Shows patterns at a glance.
- Helps share ideas clearly in presentations or reports.

Example: Instead of saying "10 students like cricket," we can show it in a bar chart.

3. Common Types of Charts and Graphs

Always choose a chart that matches your data. The following table shows the commonly used types of charts, its use case with examples.

Chart Type	Use / Purpose	Example	Key Features
Bar Chart	Compare groups or categories	Number of students who like Cricket, Football, Hockey	Vertical or horizontal bars; easy to compare quantities between categories
Pie Chart	Show parts of a whole (percentage or proportion)	Percentage of students' favorite snacks	Circular chart; each slice represents a part of total; good for proportions
Line Chart	Show changes over time or trends	Number of students arriving late each week	Points connected with lines; shows trend or growth; useful for time-series data

Common Types of Charts

SMART TIPS

Keep your chart simple, clean and properly labeled.

4. Communicating Results

Once the chart is ready, explain your findings. You can write 2-3 lines: "Most students (10) like cricket, followed by football (6). Very few students like badminton (1)."

REMEMBER

1. Visualizing data means using charts or graphs to show findings.
2. It makes data easier to understand and share.
3. Use the right chart for your data type.
4. Always label and explain your visuals.

Tools for Visualization

Q.9 Why are software tools important for data visualization and describe the steps involved in creating a chart in Excel/Google Sheets. 10505009

Ans. ★ *Key Points: Visualization Tools | Charts in Spreadsheets | Organizing Data*

1. Tools for Visualization

Once you know which type of chart to use, the next step is to create it using tools. In Step 5, charts make it easier to understand and present data.

2. Creating Charts in Spreadsheets (Excel / Google Sheets)

Google Sheets and Microsoft Excel are simple yet powerful tool to create charts and graphs from tables.

Steps to Create a Chart in Google Sheets:

- Enter your data into rows and columns.
- Select the data range.
- Click on the "Insert" menu → choose "Chart."
- Pick the chart type (bar, pie, line).
- Customize the chart with a title, label, and color.

Example: Assume that you have data (refer to table) in Google Sheets. You are encouraged to use these steps to turn table data into a bar chart. We make use of spreadsheets because they are:

- Easy to use.
- No installation needed (for Google Sheets).
- Good for small to medium-sized projects.

Favorite Sport	Frequency or No. of Students
Cricket	8
Football	7
Hockey	6
Badminton	2

Bar Chart — Favorite Sport of Students (illustrative values)

REMEMBER

1. Google Sheets and Excel are easy tools for creating charts.
2. A dashboard shows multiple visuals in one place to tell a clear data story.

Note: The standard DSLC consists of six (6) main steps, however, in some real-world applications/scenarios, some additional steps may be added. One such step can be Storing and Organizing Data, especially in large projects or team settings where databases and structured storage are important. These are usually managed through systems like DBMS and SQL.

Databases and Storing Data

Q.10 Name and explain two methods of storing structured data. 10505010

Ans. ★ Key Points: *Structured Data | Spreadsheets | Databases*

After cleaning a messy survey table, there is a need to store the cleaned data in a proper format (either in a spreadsheet or a database), so that it is organized, searchable, and ready to analyze. There are two main ways to store structured data:

- Spreadsheets
- Databases

Difference between Spreadsheets and Databases is provided in table.

Method	Description	Example Tool
Spreadsheets	A grid of rows and columns for small datasets	Excel, Google Sheets
Databases	A structured system to store and manage large data in tables	MySQL, SQLite

Spreadsheets vs Databases

DID YOU KNOW?

Q. When should you use spreadsheets and when are databases more suitable?

Ans. Spreadsheets are good for small projects. Databases are better for big or multi-user data systems.

Q.11 What is Database? Explain DBMS and SQL Queries in detail. 10505011

Ans. ★ Key Points: *Database | DBMS | SQL Queries*

A Database is an organized collection of data. It stores data in the form of tables. Each table is like a mini spreadsheet with rows and columns. Databases help in storing, retrieving, and updating data efficiently. The following table breaks down database related terms.

Term	Meaning	Example
Table	A group of related data	Sports Survey
Record	A single entry (row) in the table	Ali's full row of data
Field	A specific piece of information	Name, Sport, Frequency

Database Terms: Meaning and Examples

A Database Management System (DBMS) is software used to create, manage, and interact with databases. Examples include MySQL, SQLite, and Microsoft Access. To work with data in a database, we use a language called Structured Query Language (SQL). SQL helps us to add, update, delete, or retrieve data using simple commands. Some basic SQL queries are as follows:

1. **SELECT * FROM Sports:** This simple query shows all the data from the table named Sports.
2. **SELECT Name FROM Sports WHERE Favorite_Sport = 'Cricket':** This query shows names of students present in Sports table who like Cricket.
3. **INSERT INTO Sports (Name, Favorite_Sport) VALUES ('Ali', 'Football'):** This query adds a new entry.

These basic SQL statements help in managing and retrieving specific data from large databases efficiently.

REMEMBER

1. Data should be stored in a structured way for easy access and analysis.

2. Spreadsheets are useful for small datasets.
3. Databases are used for bigger and more complex data.
4. A table stores data using records (rows) and fields (columns).
5. Organized data reduces errors and makes analysis easier.

taleemzone.com

TOPIC WISE SHORT QUESTIONS (ADDITIONAL)

Introduction to Data Science

Q.1 What is Data Science? 10505012

Ans. Data Science is the process of using data to understand problems, discover patterns, and make smart decisions. It involves collecting, organizing, analyzing, and visualizing data.

Q.2 How is Data Science useful in today's data-driven world? 10505013

Ans. Data Science helps people and organizations find patterns, answer questions, and make better decisions instead of relying on guesses or personal opinions.

Q.3 Why is data important in decision-making? 10505014

Ans. Data helps make smart and fair decisions. Without data, decisions may be based on guesses, which can lead to mistakes.

Q.4 Write an example of using data in schools for decision-making. 10505015

Ans. If a school wants to start a new sports club, it can collect data on which sports students enjoy most to make a fair choice.

Q.5 Name some real-life applications of Data Science. 10505016

Ans. Social media: Facebook, YouTube, Instagram suggest posts or videos. Online shopping: E-commerce sites suggest products based on previous purchases. Healthcare: Predicting diseases and managing patient care. Transport: Google Maps uses traffic data to suggest fastest routes. Education: Using attendance and test results to improve learning strategies.

Q.6 How does Data Science make our lives smarter and easier? 10505017

Ans. It personalizes experiences like recommending YouTube videos, giving health tips, or suggesting the best travel routes, making life easier and more efficient.

Overview of the Data Science Life Cycle

Q.7 How many main steps are there in the standard DSLC? 10505018

Ans. The standard DSLC consists of 6 main steps. These steps guide the process of collecting, analyzing, and visualizing data. However, additional steps may be added in real-world scenarios depending on project needs.

Q.8 What is meant by visualizing and communicating results? 10505019

Ans. Visualizing and communicating results means sharing the findings after the data has been analyzed. It involves using charts, graphs, and simple explanations to present the information. This helps others understand the results easily and clearly.

Q.9 Why do people understand visualizations better than numbers? 10505020

Ans. People usually understand pictures better than numbers, which is why data visualizations are used. Charts and graphs make information clearer and more meaningful. This helps viewers understand the data quickly.

Q.10 Why is data visualization important? 10505021

Ans. Data visualization is important because it makes data easier to understand and shows patterns at a glance. It also helps share ideas clearly in presentations or reports. This makes communication more effective.

Q.11 What is the final step after analyzing the data? 10505022

Ans. After analyzing the data, the final step is to share the results in a way that others can understand easily. This is done by using charts and visual representations. Explaining the findings is also an important part of this step.

Q.12 How does a chart help in presenting findings? 10505023

Ans. A chart helps present findings clearly by showing the results visually. It makes the information easier to understand for classmates, teachers, and others. Charts help communicate results in a simple and effective way.

Q.13 Why should we choose the right chart for our data? 10505024

Ans. We should always choose a chart that matches our data. Different types of charts are used for different purposes, such as comparing groups or showing changes over time. Choosing the correct chart makes the data clearer and more meaningful.

Q.14 What is a bar chart? 10505025

Ans. A bar chart is used for comparing groups. It helps us easily see differences between categories. For example, it can show the number of students who like each sport.

Q.15 What is a pie chart? 10505026

Ans. A pie chart is used for showing parts of a whole. It is useful when we want to display percentages or proportions. For example, it can show the percentage of favorite snacks.

Q.16 What is a line chart used for? 10505027

Ans. A line chart is used for showing changes over time. It helps track trends and progress clearly. For example, it can show the number of students arriving late each week.

Q.17 Why is it important to explain findings after making a chart? 10505028

Ans. After preparing a chart, it is important to explain the findings so others understand the message.

Q.18 How does visualization help in sharing ideas clearly? 10505029

Ans. Visualization helps share ideas clearly because it presents information in a visual form. Charts and graphs make the data more understandable than plain numbers. This is especially helpful in presentations and reports.

Q.19 What should we always remember while using visuals? 10505030

Ans. We should always label and explain our visuals. Visualizing data means using charts or graphs to show findings, and using the right chart makes data easier to understand and share.

Q.20 How does data visualization show patterns? 10505031

Ans. Data visualization shows patterns by presenting data in the form of charts and graphs. This allows us to see trends and differences at a glance. As a result, the data becomes easier to understand.

Q.21 Why is showing data through charts better than only using statements? 10505032

Ans. Showing data through charts is better because it makes the information clearer and easier to understand. Instead of just saying "10 students like cricket," showing it in a bar chart is more effective. This helps communicate findings more clearly.

Tools for Visualization

Q.22 What is the next step after choosing the type of chart? 10505033

Ans. Once you know which type of chart to use, the next step is to create it using tools. This involves using software to turn your data into a visual chart. Creating the chart allows you to present data clearly and effectively.

Q.24 What is the first step to create a chart in Google Sheets? 10505035

Ans. The first step is to enter your data into rows and columns. Organizing data in a table makes it ready for visualization. Properly structured data ensures the chart is accurate and meaningful.

Q.26 How can you insert a chart in Google Sheets? 10505037

Ans. To insert a chart, click on the "Insert" menu and choose "Chart." This allows the software to generate a visual representation of your data.

Q.28 How can a chart be customized? 10505039

Ans. A chart can be customized with a title, labels, and colors. Customization makes the chart more readable and visually appealing. It also helps highlight the key information in the data.

Q.30 What is the purpose of a dashboard? 10505041

Ans. A dashboard shows multiple visuals in one place to tell a clear data story. It allows viewers to understand data quickly by seeing different charts together.

Q.32 Which systems are used to manage structured data in large projects? 10505043

Ans. Databases and systems like DBMS and SQL are usually used to manage structured data. They help store large amounts of information efficiently.

Q.34 Why are Google Sheets and Excel suitable for beginners? 10505045

Ans. Google Sheets and Excel are suitable for beginners because they are easy to use and provide simple tools for creating charts. They do not require advanced technical skills.

Q.23 Which software tools are recommended for creating charts from tables? 10505034

Ans. Google Sheets and Microsoft Excel are simple yet powerful tools to create charts and graphs from tables. They are beginner-friendly and allow users to quickly visualize data.

Q.25 How do you select data for creating a chart? 10505036

Ans. You select the data range that you want to include in the chart. Highlighting the correct range ensures that only relevant information is visualized.

Q.27 What should you do after inserting a chart? 10505038

Ans. After inserting a chart, you should pick the chart type such as bar, pie, or line. Choosing the correct type depends on the data and the story you want to tell.

Q.29 Why are spreadsheets like Google Sheets and Excel widely used? 10505040

Ans. Spreadsheets are easy to use and do not require installation (for Google Sheets). They are suitable for small to medium-sized projects.

Q.31 Why is storing and organizing data important in large projects? 10505042

Ans. Storing and organizing data is important for managing large datasets and team projects. It ensures that data is structured and easy to access when needed.

Q.33 Why is it important to follow steps when creating a chart? 10505044

Ans. Following steps ensures that the chart accurately represents the data. Proper steps include: entering data, selecting range, inserting chart, and customizing it.

Databases and Storing Data

Q.35 Why do we need to store cleaned data properly?

10505046

Ans. After cleaning a messy survey table, it is important to store the cleaned data in a proper format. Proper storage ensures that the data is organized, searchable, and ready for analysis.

Q.37 What is a spreadsheet, and which tools are commonly used?

10505048

Ans. A spreadsheet is a grid of rows and columns used to store small datasets. Common tools for spreadsheets include Excel and Google Sheets.

Q.39 How is data organized in a database?

10505050

Ans. Data in a database is organized into tables, with each table acting like a mini spreadsheet. Tables contain records as rows and fields as columns.

Q.41 What is a field in a database?

10505052

Ans. A field is a specific piece of information stored in a column of a database table. Each field represents a type of data, such as Name, Sport, or Frequency.

Q.43 What is SQL, and why is it important?

10505054

Ans. SQL stands for Structured Query Language and is used to work with databases. It helps add, update, delete, or retrieve data using simple commands. SQL ensures efficient management of large datasets.

Q.45 How can SQL be used to retrieve specific data?

10505056

Ans. SQL can retrieve specific data using conditions. For example, `SELECT Name FROM Sports WHERE Favorite_Sport = 'Cricket'` shows the names of students who like Cricket.

Q.47 When should spreadsheets be used for storing data?

10505058

Ans. Spreadsheets are useful for small datasets. They provide a simple and easy way to store, organize, and manage data. They are ideal for beginner users or small projects.

Q.49 Why is storing data in an organized way important?

10505060

Ans. Organized data reduces duplication errors and makes analysis easier. It ensures that data is searchable and ready for use.

Q.36 What are the two main methods to store structured data?

10505047

Ans. The two main ways to store structured data are spreadsheets and databases. Spreadsheets are suitable for small datasets, while databases handle larger and more complex datasets.

Q.38 What is a database, and why is it used?

10505049

Ans. A database is an organized collection of data stored in the form of tables. It helps in storing, retrieving, and updating data efficiently. Databases are used for larger and more complex datasets where structured access is needed.

Q.40 What is a record in a database?

10505051

Ans. A record is a single entry or row in a database table. Each record contains all the fields related to that entry. For example, one student's data in a sports survey table is a record.

Q.42 What is a Database Management System (DBMS)?

10505053

Ans. A DBMS is software used to create, manage, and interact with databases. It allows users to store, retrieve, and update data efficiently. Examples of DBMS include: MySQL, SQLite, and Microsoft Access.

Q.44 Write an example of a basic SQL query to show all data from a table.

10505055

Ans. The SQL query `SELECT * FROM Sports` shows all the data from the table named Sports. This query retrieves the entire table for review or analysis.

Q.46 How can SQL add a new entry to a database?

10505057

Ans. SQL can add new entries using the `INSERT` command. For example, `INSERT INTO Sports (Name, Favorite_Sport) VALUES ('Ali', 'Football')` adds a new record to the table.

Q.48 When should databases be used for storing data?

10505059

Ans. Databases are used for bigger and more complex data. They allow structured storage, efficient retrieval, and management of large datasets. Databases are ideal for collaborative or large-scale projects.

TOPIC WISE MULTIPLE CHOICE QUESTIONS (ADDITIONAL)

Introduction to Data Science

1. What does Data Science help us do with data? 10505061

- (a) Play
- (b) Ignore
- (c) Understand
- (d) Delete

2. In the digital era, data is found: 10505062

- (a) Nowhere
- (b) Everywhere
- (c) Rarely
- (d) Offline

3. Which is the first step in the Data Science life cycle? 10505063

- (a) Visualizing
- (b) Cleaning
- (c) Understanding
- (d) Sharing

4. Data Science helps convert raw data into: 10505064

- (a) Noise
- (b) Information
- (c) Fun
- (d) Games

5. Why is data important for decision making? 10505065

- (a) Helping
- (b) Confusing
- (c) Guessing
- (d) Delaying

6. Which application uses data to suggest fastest routes? 10505066

- (a) YouTube
- (b) Facebook
- (c) Google maps
- (d) Instagram

7. How many main steps are in the standard DSLC? 10505067

- (a) 4
- (b) 5
- (c) 6
- (d) 8

8. Hospitals use data science mainly to: 10505068

- (a) Advertise
- (b) Predict
- (c) Entertain
- (d) Decorate

9. Online shopping websites suggest products using: 10505069

- (a) Colors
- (b) Guesses
- (c) Ads
- (d) Past data

10. Schools use data to improve: 10505070

- (a) Buildings
- (b) Learning
- (c) Uniforms
- (d) Holidays

11. Data science makes our lives more: 10505071

- (a) Boring
- (b) Slower
- (c) Smarter
- (d) Harder

Data Science Life Cycle

12. What is the final step after analyzing the data? 10505072

- (a) Collecting data
- (b) Cleaning data
- (c) Sharing the results
- (d) Storing data

13. Why do we use data visualizations? 10505073

- (a) People like games
- (b) Numbers are colorful
- (c) People understand pictures better than numbers
- (d) Charts are difficult

14. Why is a chart created in the example? 10505074

- (a) To decorate notebooks
- (b) To confuse others
- (c) To show the findings clearly
- (d) To waste time

15. Data visualization makes data: 10505075

- (a) Confusing
- (b) Harder
- (c) Useless
- (d) Easier to understand

16. Data visualization helps to show: 10505076

- (a) Colors
- (b) Pictures
- (c) Stories
- (d) Patterns at a glance

17. Data visualization is helpful in: 10505077

- (a) Games only
- (b) Cooking
- (c) Sleeping
- (d) Presentations or reports

18. Which chart is used for comparing groups? 10505078

- (a) Line chart
- (b) Pie chart
- (c) Bar chart
- (d) Circle chart

19. Which chart is used for showing parts of a whole? 10505079

- (a) Bar chart
- (b) Line chart
- (c) Table
- (d) Pie chart

20. Which chart is used for showing changes over time? 10505080

- (a) Bar chart
- (b) Pie chart
- (c) Picture
- (d) Line chart

21. What should you always choose according to your data? 10505081

- (a) Color
- (b) Picture
- (c) Design
- (d) The right chart

22. Which stage focuses on handling missing values and removing inconsistencies? 10505082

- (a) Data Collection
- (b) Data Cleaning
- (c) Data Modeling
- (d) Deployment

23. What should be done once the chart is ready? 10505083

- (a) Erase it
- (b) Ignore it
- (c) Hide it
- (d) Explain your findings

24. What should we always do with visuals? 10505084

- (a) Color them
- (b) Hide them
- (c) Decorate them
- (d) Label and explain them

Tools for Visualization

25. What is the next step after choosing the chart type?

10505085

- (a) Analyzing data
- (b) Create it using tools
- (c) Deleting data
- (d) Storing data

26. Which software is mentioned for creating charts from tables?

10505086

- (a) Photoshop
- (b) PowerPoint
- (c) Google Sheets and Microsoft Excel
- (d) Word

27. What is the first step to create a chart in Google Sheets?

10505087

- (a) Choose chart type
- (b) Customize chart
- (c) Click insert menu
- (d) Enter your data into rows and columns

28. How do you select the data for a chart?

10505088

- (a) Highlight rows
- (b) Type numbers
- (c) Select the data range
- (d) Click chart icon

29. Where do you find the option to insert a chart in Google Sheets?

10505089

- (a) File menu
- (b) Format menu
- (c) Tools menu
- (d) Insert menu

30. Which of the following is a step after inserting a chart?

10505090

- (a) Delete data
- (b) Copy text
- (c) Pick the chart type
- (d) Save as PDF

31. What can you customize in a chart?

10505091

- (a) Font only
- (b) Number of rows
- (c) Title, label, and color
- (d) Table layout

32. Why are spreadsheets used for making charts?

10505092

- (a) Complex to learn
- (b) Require installation
- (c) Only for experts
- (d) Easy to use, no installation needed, good for small to medium projects

33. Which of the following is primarily used as a data visualization tool in data science?

10505093

- (a) Tableau
- (b) Python
- (c) MySQL
- (d) Apache Hadoop

34. What does a dashboard show?

10505094

- (a) Only text
- (b) Only numbers
- (c) Single chart
- (d) Multiple visuals in one place to tell a clear data story

35. Which tool does not require installation?

10505095

- (a) Excel
- (b) Photoshop
- (c) Google Sheets
- (d) PowerPoint

36. Why is storing and organizing data important in large projects?

10505096

- (a) For databases and structured storage
- (b) To draw pictures
- (c) To create charts
- (d) For slides

37. What systems are usually used for storing data in large projects?

10505097

- (a) Excel only
- (b) Word
- (c) PowerPoint
- (d) DBMS and SQL

Databases and Storing Data

38. Why do we need to store cleaned data properly? 10505098

- (a) To delete it later
- (b) To make charts
- (c) To keep it organized, searchable, and ready to analyze
- (d) To confuse users

39. What are the two main methods of storing structured data? 10505099

- (a) Charts and Graphs
- (b) Reports and Slides
- (c) Notes and Files
- (d) Spreadsheets and Databases

40. What is a spreadsheet? 10505100

- (a) A type of database
- (b) A software language
- (c) A grid of rows and columns for small datasets
- (d) A visualization tool

41. Which tools are examples of spreadsheets? 10505101

- (a) MySQL and SQLite
- (b) PowerPoint and Word
- (c) Excel and Google Sheets
- (d) DBMS and SQL

42. What is a database? 10505102

- (a) An organized collection of data stored in tables
- (b) A type of chart
- (c) A small spreadsheet
- (d) A programming language

43. How does a database store data? 10505103

- (a) As pictures
- (b) As text files
- (c) In tables with rows and columns
- (d) In random order

44. What is a record in a database? 10505104

- (a) A chart
- (b) A single entry (row) in a table
- (c) A table
- (d) A column name

45. What is a field in a database? 10505105

- (a) A full table
- (b) A spreadsheet
- (c) A specific piece of information (column)
- (d) A software tool

46. What is DBMS used for? 10505106

- (a) Drawing charts
- (b) Playing games
- (c) Creating, managing, and interacting with databases
- (d) Writing reports

47. Which are examples of DBMS software? 10505107

- (a) Excel and Google Sheets
- (b) Python and Java
- (c) Word and PowerPoint
- (d) MySQL, SQLite, and Microsoft Access

48. What does SQL help us do? 10505108

- (a) Draw charts
- (b) Make slides
- (c) Add, update, delete, or retrieve data in databases
- (d) Organize spreadsheets

49. Which SQL command retrieves all data from a table? 10505109

- (a) INSERT INTO
- (b) UPDATE
- (c) DELETE
- (d) SELECT * FROM Sports

50. How can SQL retrieve specific data from a table? 10505110

- (a) By coloring cells
- (b) By adding formulas
- (c) Using a query with conditions, e.g., SELECT Name FROM Sports WHERE Favorite_Sport = 'Cricket'
- (d) By creating a new spreadsheet

51. When are spreadsheets more useful than databases? 10505111

- (a) For large datasets
- (b) For multi-user projects
- (c) For small datasets
- (d) For storing images

52. Why is storing data in an organized way important? 10505112

- (a) To make it colorful
- (b) To make charts

- (c) To delete faster
 (d) It reduces duplication errors and makes analysis easier

Answers

1	2	3	4	5	6	7	8
c	b	c	b	a	c	c	b
9	10	11	12	13	14	15	16
d	b	c	c	c	c	d	d
17	18	19	20	21	22	23	24
d	c	d	d	d	b	d	d
25	26	27	28	29	30	31	32
b	c	d	c	d	c	c	d
33	34	35	36	37	38	39	40
a	d	c	a	d	c	d	c
41	42	43	44	45	46	47	48
c	a	c	b	c	c	d	c
49	50	51	52				
d	c	c	d				

SOLVED EXERCISE

Multiple Choice Questions

1. What is the first step in the Data Science Life Cycle (DSLCL)? 10505113

- (a) Collecting Data
- (b) Visualizing Data
- (c) Understanding the Problem
- (d) Analyzing the Data

2. Which method is best for collecting opinions from many students? 10505114

- (a) IoT Devices
- (b) Survey
- (c) Web Scraping
- (d) Database

3. "Bias" in data means: 10505115

- (a) Very large data size
- (b) Unfair or one-sided data
- (c) Well-cleaned data
- (d) High-speed data

4. Which tool is ideal for beginners to create charts? 10505116

- (a) Tableau
- (b) Python
- (c) Google Sheets
- (d) Hadoop

5. A relational database store information in the form of: 10505117

- (a) Slides
- (b) Tables
- (c) Blocks
- (d) Layers

6. Which of the following charts is best for comparing groups? 10505118

- (a) Pie Chart
- (b) Bar Chart
- (c) Line Chart
- (d) Area Chart

7. What is the main goal of analyzing data? 10505119

- (a) Delete old data
- (b) Decorate data
- (c) Find patterns and make decisions
- (d) Upload to the internet

8. Which of the following tools is an advanced data visualization platform? 10505120

- (a) MS Paint
- (b) Google Data Studio
- (c) Notepad
- (d) WhatsApp

9. What should be done before storing data? 10505121

- (a) Add animations
- (b) Clean and validate it
- (c) Encrypt it
- (d) Translate it

10. Which one is an example of a data source? 10505122

- (a) YouTube
- (b) Survey Form
- (c) Whiteboard
- (d) Slide Show

Answers

1	2	3	4	5	6	7	8
c	b	b	c	b	b	c	b
9	10						
b	b						

Short Questions

Q.1 What is the importance of understanding a problem before collecting data? 10505123

Ans. Understanding a problem helps to know what data is needed. It ensures that data collected is relevant and useful. This prevents unnecessary data collection and saves time.

Q.3 What do we mean by "cleaning" data? 10505125

Ans. Cleaning data means identifying and correcting errors in data. This includes fixing spelling mistakes, filling missing values, and making formatting consistent. Clean data ensures accurate analysis.

Q.5 What is the purpose of visualizing data using charts? 10505127

Ans. Visualizing data helps to present information in a clear and easy-to-understand way. Charts show patterns and trends at a glance. They make communication of results effective.

Q.7 Write two steps you will follow to clean a messy survey. 10505129

Ans. 1. Correct spelling errors and ensure consistent formatting across all responses. 2. Fill in missing values logically and fairly.

Q.2 Name any two methods of collecting data and give one example of each. 10505124

Ans. Survey: Collecting opinions from students using a Google Form. Observation: Watching students' time activities to record their behavior.

Q.4 Why is it important to validate data before using it? 10505126

Ans. Validating data ensures that it is accurate, complete, and reliable. Incorrect or inconsistent data can lead to wrong conclusions. Validation improves the quality of analysis.

Q.6 How does bias in data affect results? 10505128

Ans. Bias in data leads to unfair or one-sided conclusions. Decisions made using biased data may be incorrect or misleading. Eliminating bias ensures results are accurate and fair.

Q.8 Name any two tools used for creating charts. 10505130

Ans. 1. Google Sheets 2. Microsoft Excel

Long Questions

Q.1 Explain the six (6) steps of the Data Science Life Cycle (DSLC) with one line each. 10505131

Ans. Six Steps of DSLC

- Understanding the Problem: Identify the question or problem that needs to be solved.
- Collecting Data: Gather relevant data from surveys, sensors, databases, or other sources.
- Cleaning Data: Correct errors, fill missing values, and make data consistent.
- Analyzing Data: Examine and process data to find patterns, trends, or insights.
- Visualizing Data: Present the data using charts, graphs, or dashboards for easy understanding.
- Communicating Results: Share findings through reports, presentations, or visuals for decision-making.

Q.2 Give a detailed comparison between Bar Chart, Pie Chart, and Line Chart with examples. 10505132

Ans.

Chart Type	Use / Purpose	Example	Key Features
Bar Chart	Compare groups or categories	Number of students who like Cricket, Football, Hockey	Vertical or horizontal bars; easy to compare quantities between categories
Pie Chart	Show parts of a whole (percentage or proportion)	Percentage of students' favorite snacks	Circular chart; each slice represents a part of total; good for proportions
Line Chart	Show changes over time or trends	Number of students arriving late each week	Points connected with lines; shows trend or growth; useful for time-series data

Q.3 Differentiate between DBMS and SQL. 10505133**Ans.**

Feature	DBMS (Database Management System)	SQL (Structured Query Language)
Definition	Software used to create, manage, and interact with databases	Language used to interact with databases to retrieve, add, update, or delete data
Purpose	Organizes and stores data efficiently	Performs operations on data stored in a database
Examples	MySQL, SQLite, Microsoft Access	SELECT, INSERT, UPDATE, DELETE
Functionality	Manages storage, indexing, and security	Queries and manipulates data
Type	Software	Language

Q.4 Write a Query in SQL to get all data of a student whose roll_number is 15 from the student table.

10505134

Ans.

```
SELECT *
FROM student
WHERE roll_number = 15;
```

Explanation

- SELECT * retrieves all columns of data.
- FROM student specifies the table.
- WHERE roll_number = 15 filters the row with roll number 15.

Student Table — roll_number	Name
12	Faisal Zia
15	Khalid
18	Umaima

Result — roll_number	Name
15	Khalid

SOLVED ACTIVITIES

Activity - 1: Designing a Simple Survey

Objective: Learn how to collect and store data by creating a short survey about free time habits of classmates.

Instructions:

1. Design Your Survey: Think of 3 to 5 questions to ask your classmates.
2. Prepare to Collect Responses: Choose a method (e.g., paper based or Google online form).
3. Collect Data: Ask at least 5 classmates to answer your survey and write down their responses clearly.
4. Store the Data: (i) If you are using paper, keep it neat and organized in columns. (ii) If using digital tools, save the file with a clear name like FreeTime_YourName.
5. Optionally: Show your teacher or classmates how you collected and stored the data.

Solution:**Step 1: Design Your Survey (3–5 Questions)**

1. What is your favorite sport to play?
2. How often do you play it in a week?
3. What time of day do you usually play?
4. Do you prefer indoor or outdoor activities?
5. Do you watch sports on TV?

Step 2: Prepare to Collect Responses

- Method: Google Form or Paper-based survey

Step 3: Collect Data (Responses from 5 classmates)

Sr. No.	Name	Favorite Sport	Frequency	Time of Day
1	Arshad	Cricket	Daily	Evening
2	Ayaan	Football	Weekly	Morning
3	Areeda	Badminton	Daily	Afternoon
4	Hina	Cricket	Weekly	Evening
5	Kiran	Hockey	Weekly	Morning

Step 4: Store the Data

- For paper: Neatly written in columns as shown above.
- For Google Form: Responses automatically saved in a spreadsheet.

Activity - 2: Data Cleaning

Objective: Learn how to identify and correct common data entry mistakes (such as spelling errors, missing values, and inconsistent formatting).

Instructions:

1. Review the Messy Table 5.5

ID	Name	Favorite Sport	Frequency	Time of Day
1	Sadiq	cricket	Daliy	Evening
2	Noor	Cricket	Weekly	
3	Maryam	Footbal		morning
4	Zara	Football	Daliy	Afternoon

Table 5.5: Raw Data about Favorite Sport of Students (with Messy Data)

2. Work in pairs: Sit with a partner and study the table together.

3. Spot and List Errors: Find at least 5 errors. These may include:

- Spelling mistakes (e.g., Cricket, Daily)
- Missing data (e.g., blank cells)
- Inconsistent formatting (e.g., Football vs football, morning not capitalized)

4. Correct the Errors: Discuss how to fix each error logically and fairly. Rewrite the cleaned table neatly in your notebook.

5. Class Sharing (optional): (i) Compare your cleaned table with another group. (ii) See if they found the same errors or different ones.

Solution:

Step 1: Spot Errors (at least 5)

1. "Daliy" should be "Daily" (Spelling mistake)
2. Missing Frequency for Maryam
3. Missing Time of Day for Noor
4. "morning" should be capitalized
5. Consistency: "Football" vs "football" (all capitalized)

Step 2: Corrected Table

Sr. No.	Name	Favorite Sport	Frequency	Time of Day
1	Sadiq	Cricket	Daily	Evening
2	Noor	Cricket	Weekly	Morning
3	Maryam	Football	Daily	Morning
4	Zara	Football	Daily	Afternoon

Activity - 3: Data Analysis

Objective: Learn how to analyze data by identifying trends and drawing basic conclusions from a frequency table.

Instructions:

- Use your own survey data (if available) or the sample data given in Table 5.6 below.
- Carefully read the table showing how many students like each sport.
- Identify: (i) The most popular sport, (ii) The least popular sport.
- Write one reason why each sport might be most or least popular in your class.
- Present your findings in your notebook using simple sentences.

Solution: Sample Table (Table 5.6)

Sport	Frequency or No. of Students
Cricket	7
Football	6
Hockey	5
Badminton	2

Step 1: Identify Trends

- Most popular sport: Cricket
- Least popular sport: Badminton

Step 2: Reason for Popularity

- Cricket: Many students like playing cricket during evening time and enjoy team games.
- Badminton: Fewer students like badminton because it requires indoor space and equipment.

Step 3: Findings (Simple Sentences)

- Cricket is the most popular sport in our class.
- Badminton is the least popular sport.
- Football and hockey have a moderate number of students playing them.

Activity - 4: Drawing a Bar Chart, Pie Chart and Line Chart from Survey Data

Objective: Learn how to convert a frequency table into visual charts to represent survey data (using Table 5.6).

Instructions:

- Use the sample data given in Table 5.6.
- Draw a bar chart, pie chart and line chart in your notebook.
- Present your findings in your notebook using simple sentences.

Solution: Drawing Bar Chart, Pie Chart, and Line Chart

Sport	Frequency
Cricket	7
Football	6
Hockey	5
Badminton	2

Step 1: Bar Chart

- Y-axis: Sport
- X-axis: Number of Students
- Bars: Cricket (7), Football (6), Hockey (5), Badminton (2)

Step 2: Pie Chart

Each slice represents the percentage of students liking each sport:

- Cricket: $7/20 = 35\%$
- Football: $6/20 = 30\%$
- Hockey: $5/20 = 25\%$
- Badminton: $2/20 = 10\%$

Step 3: Line Chart

- X-axis: Sport
- Y-axis: Frequency
- Plot points: Cricket (7), Football (6), Hockey (5), Badminton (2)
- Connect points with lines to show trend: Decreasing from Cricket to Badminton

Step 4: Findings (Notebook Sentences)

- Cricket has the highest number of students.
- Badminton has the lowest number.
- There is a clear decreasing trend from cricket to badminton.

Activity - 5: Data Organization

Objective: Learn how to organize cleaned data into a well-structured table using consistent formatting.

Instructions:

- Use the cleaned survey data you collected earlier.
- Create a table in your notebook with the following column headings: Roll No, Name, Favorite Sport, Time of Day, Frequency.
- Fill in at least 5 rows of data.
- Keep your data aligned properly in columns.
- Ensure all entries are spelled correctly, capitalized properly, and free from errors.

Solution:

Step 1: Collect Cleaned Data — make sure there are no spelling mistakes, no missing values, and proper capitalization (e.g., Football, Morning).

Step 2 & 3: Draw a Table with 5 Columns and Write Column Headings

- Roll No
- Name
- Favorite Sport
- Time of Day
- Frequency

Step 4: Fill in Data (At Least 5 Rows)

Roll No	Name	Favorite Sport	Time of Day	Frequency
1	Ali	Cricket	Morning	Daily
2	Sara	Football	Evening	Weekly
3	Ahmed	Badminton	Afternoon	Daily
4	Ayesha	Tennis	Morning	Monthly
5	Bilal	Cricket	Evening	Weekly

Step 5: Maintain Proper Alignment

- Keep all entries straight in columns
- Write neatly so data is easy to read
- Use equal spacing for each column

Step 6: Check Formatting Rules — ensure all words are correctly spelled, proper capitalization (e.g., Names start with capital letters), and no extra spaces or errors.

Step 7: Link to DBMS and SQL

- This table is similar to a database table in DBMS (Database Management System).
- Each row = Record, each column = Field.
- In SQL, such data is stored and managed using tables.

Example SQL table:

```
CREATE TABLE Survey (RollNo INT, Name VARCHAR(50), FavoriteSport VARCHAR(50), TimeOfDay VARCHAR(20), Frequency VARCHAR(20));
```