1. **What is data cleaning, and why is it important in data analysis?**
    - **What are the potential consequences of analyzing unclean or messy data?**
    - **Explain the common steps involved in cleaning and organizing data.**

Ans: **Data cleaning** is the process of identifying and correcting errors, inconsistencies, and inaccuracies in a dataset.
It ensures the data is accurate, complete, consistent, and ready for analysis.

**Data cleaning is important because**:

- Clean data ensures that the results, insights, or predictions are correct.
- Messy data can mislead the analysis.
- Well-organized data makes analysis faster and easier.

**If we analyze dirty data, these issues may occur:**

- Missing data or wrong values can produce misleading conclusions.
- Decisions based on wrong data can lead to financial loss.
- Duplicate rows can inflate counts or averages.

**Common Steps in Data Cleaning & Organizing:**

- Step 1: Remove or handle missing data - Identify missing values (blank cells, nulls)
- Step 2: Remove duplicates - Identify repeated values or records
- Step 3: Fix inconsistent data formats – ex - Dates in different formats (DD/MM vs MM/DD)
- Step 4: Correct spelling errors & typos – ex - “Kolkatta”, “Kolkata”, “Calcutta” → should be standardized.
- Step 5: Standardize units - Currency: INR vs USD
- Step 6: Validate data types – ex - Numbers are stored as numeric
- Step 7: Organize and structure the dataset .

**2.How would you sort the following dataset first by "Department" (A-Z) and then by "Salary" (Largest to Smallest)? Write a step-by-step approach.**

| **Employee** | **Department** | **Salary** |
|---|---|---|
| Sonu | IT | 4000 |
| Pranav | HR | 5000 |
| Rahul | IT | 2500 |

Ans -> **For sorting the Department column (A–Z)**, first go to Data, then click Sort A–Z. When the pop-up appears, select Continue with the current selection, and then click Sort.

**For sorting Salary from Largest to Smallest**, first select the Salary column, then go to the **Data** tab and click **Sort**. When the pop-up appears, choose **Continue with the current selection** and click **Sort**. In the Sort dialog box, select **Sort by: Salary** and choose **Order: Largest to Smallest**, then click **OK**.

**3. Explain the use of text functions such as TRIM , LEFT, RIGHT, MID, and CONCAT in data cleaning.**

- **TRIM():** Removes unwanted extra spaces from text.
- **LEFT():** Extracts a specific number of characters from the left of a text string.
- **RIGHT():** Extracts characters from the right side of text.
- **MID():** Extracts text from the middle, starting at a specific position.
- **CONCAT():** Combines (joins) text from different cells into one.

**4. What is the role of date functions like TODAY in managing datasets?**

**Ans:** The TODAY() function returns the current date, and because it updates automatically every day, it helps to create dynamic, self-updating datasets.

**5. Apply Data Validation to restrict Quantity values to only whole numbers between 1 and 10.**

- **Configure an input message that appears when a user selects a cell in the "Quantity" column explaining: "Please enter a whole number between 1 and 10."**
- **Set up an error alert message that triggers if the user enters a number less than 1 or greater than 10, showing: "Invalid input! The quantity must be a whole number between 1 and 10."**

**Ans:**

1. Select the Quantity column.
2. Open Data Validation
   - Go to Data tab
   - Click Data Validation
   - A dialog box will open.

3. Set the Validation Rule

   In the Settings tab:Allow: *Whole number* -> Data: *between* ->Minimum: 1-> Maximum: 10

4. Add an Input Message

   Click the Input Message tab:

- Title: *Quantity Input*

  Input message: "Please enter a whole number between 1 and 10."

5. Add an Error Alert

Go to the Error Alert tab:

- Style: *Stop*
- Title: *Invalid input!*

- Error message: "Invalid input! The quantity must be a whole number between 1 and 10."

**6. Understand and apply fundamental text functions like LEFT, RIGHT, MID, and LEN.**

- **Extract the first 5 characters from the string "ExcelTipsAreGreat" using the LEFT function.**
- **Extract the last 4 characters from "DataAnalysis.xlsx" using the RIGHT function.**
- **Extract the substring "Tips" from "ExcelTipsAreGreat" using the MID function.**
- **Count the total number of characters in the string "Hello World!" using the LEN function.**
- **Create a formula to extract the middle 6 characters from "12345-67890-ABCDE".**

**Ans:**

1. Extract the first 5 characters using LEFT : =LEFT("ExcelTipsAreGreat", 5)
   Result: Excel
2. Extract the last 4 characters using RIGHT : =RIGHT("DataAnalysis.xlsx", 4)
   Result: xlsx
3. Extract “Tips” using MID : =MID("ExcelTipsAreGreat", 6, 4)
   Result: Tips
4. Count total characters using LEN: =LEN("Hello World!")
   Result: 12
5. Extract the middle 6 characters from "12345-67890-ABCDE"
   =MID("12345-67890-ABCDE", 7, 6)

   Result: 67890-

**7. Understand how to combine text using CONCAT, TEXTJOIN, and the & operator.**

- **Use CONCAT to combine "Hello" and "World" with a space in between.**

- **Combine "Apple", "Banana", and "Cherry" into a single string separated by commas using TEXTJOIN.**
- **Use the & operator to create the string "2025: Excel Functions" by combining "2025", ": ", and "Excel Functions".**
- **Create a comma-separated list from the range A1:A5 using TEXTJOIN**
- **Combine first names in column A with last names in column B to create full names in column C.**

**Ans:**

**CONCAT –** Combine “Hello” and “World” with a space: =CONCAT("Hello", " ", "World")

Result -> Hello World

**TEXTJOIN** – Combine “Apple”, “Banana”, “Cherry” separated by commas: =TEXTJOIN(", ", TRUE, "Apple", "Banana", "Cherry")

Result -> Apple, Banana, Cherry

**& Operator** – Create “2025: Excel Functions”: ="2025" & ": " & "Excel Functions"

Result-> 2025: Excel Functions

Create a comma-separated list from range A1:A5 : =TEXTJOIN(", ", TRUE, A1:A5)

Combine first name (Column A) + last name (Column B) into full name (Column C): =A2 & " " & B2

If A2 = John and B2 = Doe
C2 = John Doe

**8. Understanding TODAY() and NOW()**

**a. What is the difference between TODAY() and NOW() in Excel? Provide an example of when you would use each function.**

**b. If cell A1 contains the date 2025-06-10, write a formula using TODAY() to determine how many days are left until that date**

**c. Write an Excel formula using NOW() to display the current date and time in the format MM/DD/YYYY HH:MM AM/PM. ´**

**d. If a cell contains =TODAY(), what will happen when the worksheet is reopened the next day? Explain**

**e. You want to store a static date (today’s date) in a cell without it changing every day. What keyboard shortcut should you use?**

Ans: **a. Difference between TODAY() and NOW()**

**TODAY()**

- Returns **current date only**
- No time included
- Example: 2025-11-17

**NOW()**

- Returns **current date AND time**
- Example: 2025-11-17 10:45 AM

**When to use them**

- **Use TODAY()** when calculating due dates, age, number of days remaining, etc.
- **Use NOW()** when you need timestamps, log times, or track time-sensitive activities.

b. Days left until date in A1 (A1 = 2025-06-10)

Formula:

=A1 - TODAY()

Result (as of today: 2025-11-17)

This date is **already passed**, so we get a **negative value**:

= 2025-06-10 – 2025-11-17
= -160 days
c. Use NOW() to display current date and time in format MM/DD/YYYY HH:MM AM/PM
=TEXT(NOW(), "mm/dd/yyyy hh:mm AM/PM")

d. The date will update automatically to the new current date.
Excel recalculates TODAY() every time the file is opened.
Example:

- Today: shows 2025-11-17
- Tomorrow: shows 2025-11-18

e. CTRL + ; (Control + Semicolon)
This enters today's date as a fixed value, not a formula → it will NOT change tomorrow.