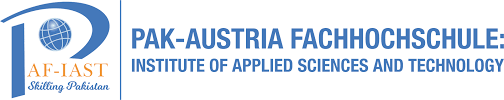
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**Lab Report: 9**

**Course Title:** Introduction to ICT  
**Lab Title:** Analyzing Network Performance Metrics in Excel  
**Instructor:** Qandil Fatima  
**Lab Engineer:** Umer Farooq  
**Institution:** Pak - Austria Fachhochschule Institute of Applied Sciences and Technology  
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**Student Name:** Hidayat Ullah  
**Registration No:** B24F0050AI099

**LAB TASK #9**

**Analyzing Network Performance Metrics in Excel**

**SCENARIO:**

We manage a small-scale communication network with 10 devices. Our goal is to analyze the network's performance over the last 12 months using the following metrics:

* **Data Usage (in GB):** Data transmitted by each device.
* **Signal Strength (in dBm):** Average monthly signal quality of each device.
* **Latency (in ms):** Average response time for each device.
* **Packet Loss (%):** Percentage of packets lost during transmission.

**TASK OBJECTIVES:**

1. Calculate network statistics using advanced formulas.
2. Visualize performance trends using charts.
3. Use conditional formatting for performance insights.

**TOOLS/SOFTWARE REQUIRED:**

* Microsoft Excel (any version)
* Sample research excel sheet (that holds the data to work on)
* Internet access

**INTRODUCTION:**

In this report we are making a network Performance metrics that have 4 rows filled with data of 12 months and we have applied various formulas to perform the given task

**TASK STEPS:**

**STEP 1:** Open the Excel File

1. I downloaded and opened the **"Network Performance Metrics.xlsx**" file.
2. I reviewed the dataset, which included the following columns:

a. Device ID

b. Month

c. Data Usage (GB)

d. Signal Strength (dBm)

e. Latency (ms)

f. Packet Loss (%)

**STEP 2**: Calculate Monthly Data Usage

1. I inserted a new row below the data table for **Monthly Total Data Usage.**
2. I used the SUMIF formula to calculate the total data usage for each month:

a. In a blank cell, I entered:  
**=SUMIF (B: B, 1, C:C)**  
(I replaced 1 with the month number, e.g., 2 for February).

1. I dragged the formula down for all 12 months.

**STEP 3**: Find The Worst Performing Device

1. I created a new cell labeled "**Worst Performing Device** (Packet Loss)."
2. I used the INDEX and MATCH formulas to find the device with the highest packet loss: a. In the formula cell, I entered:  
   **=INDEX (A: A, MATCH (MAX (F: F), F: F, 0)).**

**STEP 4:** Calculate Overall Average Metrics

1. I inserted cells labeled "**Average Signal Strength**," "**Average Latency**," and “**Average Packet Loss.”**
2. I used the **AVERAGE** formula:

a. For Signal Strength, I entered:  
**=AVERAGE(D:D)**b. For Latency, I entered:  
**=AVERAGE (E: E)**  
c. For Packet Loss, I entered:  
=**AVERAGE (F: F)**

**STEP 5:** Evaluate Monthly Performance

1. I added a new column titled "**Performance Rating**" at the end of the dataset.
2. I used a nested IF formula to assign performance ratings: a. In the first row of the new column, I entered:  
   **=IF (AND (E2<20, D2>-40, F2<1), "Excellent", IF (AND (E2<50, D2>-50, F2<3), "Good", "Poor"))**  
   b. I dragged the formula down for all rows.

**STEP 6:** Create Visualizations

1. **Monthly Trends:**

a. I highlighted the "**Month**," "**Data Usage (GB)"** and "**Latency (ms)**" columns.  
b. I inserted a **Line Chart**  
c. I added a secondary axis to compare **Data Usage** and **Latency** in the same chart.

1. **Device Analysis:** a. I highlighted the "**Device ID**" and "**Packet Loss (%)**" columns.  
   b. I inserted a **Bar Chart** to display **packet loss by device.**

**STEP 7:** Apply Conditional Formatting

1. I highlighted the "**Signal Strength (dBm)**" column:  
   a. I went to Home → Conditional Formatting → New Rule.  
   b. I selected "Format cells that contain" → Set "**Less than -50**."  
   c. I applied a Red Fill.
2. I highlighted the "**Packet Loss (%)**" column:  
   a. I used Conditional Formatting → Highlight cells where "**greater than 3%."**  
   b. I applied for a Yellow Fill.

**STEP 8:** Use Goal Seek

1. I selected a specific device.
2. I calculated the average data usage for that device:  
   a. I used:  
   **=AVERAGE (C2:C13)**
3. I used Goal Seek to decide the data usage needed to achieve an average of 40 GB:  
   a. I went to Data → What-If Analysis → Goal Seek.  
   b. I set the average formula cell to **40** by changing one month’s data usage.