Coding Challenge: IT Help Desk Ticket Analysis

Scenario

The IT department is struggling with a high volume of support requests. It feels like they're always putting out fires but never getting ahead of recurring issues. The IT Director wants to understand what's really going on behind the scenes. They've given you a dataset of 150 past help desk tickets and asked you to analyze it. Your analysis will help them identify bottlenecks, prioritize staffing, and proactively address common problems.

Task

Your main goal is to conduct a comprehensive analysis of the help desk ticket data. You must use a programming language (like Python with pandas) to perform the analysis and then present your findings clearly.

Data Description

You will be working with a CSV file named help_desk_tickets.csv. The dataset contains the following columns:

- **ticket_id**: A unique identifier for each ticket.
- **submission_date**: The date and time the user submitted the ticket.
- **resolution_date**: The date and time the IT analyst resolved the ticket.
- **category**: The type of issue (e.g., 'Network', 'Software', 'Hardware', 'Access').
- **assigned_analyst**: The name of the IT team member who handled the ticket.
- **description**: A short text description of the problem provided by the user.
- **priority**: The urgency level of the ticket, from 'Low' to 'Critical'.

Required Insights & Analysis

Your report should answer these key questions. Think of them as the core parts of your analysis.

1. **Ticket Volume Trends**: How has the number of tickets changed over time? Are there specific days of the week, months, or hours of the day that see a higher volume of tickets?
2. **Resolution Time Metrics**: What is the **average resolution time** for all tickets? How does this time vary based on category and priority?

3. **Top Problems & Root Causes**: Based on the description column, what are the most frequently mentioned keywords? Can you identify any recurring themes that might point to a systemic issue?
4. **Analyst Performance**: Is there a significant difference in the average resolution time among different assigned_analyst? Who are the top performers, and who might need additional support or training?

Deliverables

You must submit the following:

- **Excel Workbook (.xlsx)**: A single, well-organized Excel file with multiple sheets. This workbook will serve as your final report.
    - **Sheet 1: "Summary Dashboard"**: A dashboard-style sheet that summarizes your key findings using a few **pivot tables, charts, and key metrics**. This is the first thing the IT Director will see. It should be visually clear and concise.
    - **Sheet 2: "Data & Calculations"**: A sheet containing your raw data along with any new columns you've created for your analysis, such as **"Resolution Time (in hours)"**, "Day of Week", or "Month". This shows your work.
    - **Sheet 3: "Detailed Analysis"**: A series of **additional tables and charts** that provide more in-depth detail for each of the required insights. This sheet should support the findings in the "Summary Dashboard".
    - **Sheet 4: "Recommendations"**: A final sheet with a clear, bulleted list of your **actionable recommendations** for the IT Director. For example: "Implement an automated password reset tool to reduce the volume of 'Access' tickets."

Good luck, and have fun!