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\f0\fs24 \cf0 -- Proposed Business Question: What are the top 3 cities with the fewest total alerts?\
SELECT h.city, COUNT(a.alert_id) AS TotalAlerts\
FROM homes h\
LEFT JOIN devices d \
    ON h.home_id = d.home_id\
LEFT JOIN alerts a \
    ON a.device_id = d.device_id\
GROUP BY h.city\
ORDER BY TotalAlerts ASC\
LIMIT 3;\
\
-- Analytical Question 1: Which device types generate the highest number of alerts?\
SELECT d.device_type, COUNT(a.alert_id) AS NumAlerts\
FROM devices AS d\
LEFT JOIN alerts AS a on a.device_id = d.device_id\
GROUP BY d.device_type\
ORDER BY NumAlerts DESC;\
\
-- Analytical Question 2: What does the average daily temperature profile look like hour by hour?\
SELECT strftime('%H', reading_datetime) AS hour, AVG(value_numeric) AS AvgTemp\
FROM sensor_readings\
WHERE metric_type = 'temperature'\
GROUP BY hour\
ORDER BY hour;\
\
-- Analytical Question 3: Which homes have the highest proportion of offline or failing devices?\
SELECT h.home_id, COUNT(d.device_id) as NumDevices,\
          SUM(d.status = 'offline') AS OfflineDevices, SUM(d.status = 'offline') *1.0 / COUNT(d.device_id) AS OfflineProportion\
FROM homes as h\
LEFT JOIN devices as d ON h.home_id = d.home_id\
GROUP BY h.home_id\
ORDER BY OfflineProportion DESC;\
\
-- Analytical Question 4: When do nighttime intrusion alerts spike the most?\
SELECT strftime('%H', alert_datetime) AS hour, COUNT(*) AS alert_count\
FROM alerts\
WHERE alert_type = 'intrusion' AND (\
          CAST(strftime('%H', alert_datetime) AS INTEGER) BETWEEN 20 AND 23\
          OR CAST(strftime('%H', alert_datetime) AS INTEGER)BETWEEN 0 AND 3)\
GROUP BY hour\
ORDER BY alert_count DESC;\
\
-- Analytical Question 5: How do motion readings correlate with temperature changes?\
WITH hourly AS (\
  SELECT strftime('%Y-%m-%d %H', reading_datetime) AS hour,\
  AVG(value_numeric) FILTER (WHERE metric_type = 'temperature') AS AvgTemp,\
  COUNT(value_numeric) FILTER (WHERE metric_type = 'motion') AS NumMotion\
  FROM sensor_readings\
  GROUP BY hour),\
TempRanges (Label, MinTemp, MaxTemp) AS (\
  VALUES\
  ('<15\'b0C', NULL, 15),\
  ('15\'9619\'b0C', 15, 20),\
  ('20\'9624\'b0C', 20, 25),\
  ('25\'b0C+', 25, NULL)\
)\
SELECT tr.Label AS TempRange,SUM(h.NumMotion) AS TotalMotionReadings\
FROM TempRanges as tr\
JOIN hourly AS h\
  ON (tr.MinTemp IS NULL OR h.AvgTemp >= tr.MinTemp)\
 AND (tr.MaxTemp IS NULL OR h.AvgTemp < tr.MaxTemp)\
GROUP BY TempRange\
ORDER BY TotalMotionReadings DESC;\
\
-- Window Function - Question 6: What is the most recent reading recorded for each device?\
SELECT \
    device_id, \
    reading_datetime, \
    metric_type, \
    value_numeric, \
    value_text\
FROM (\
    SELECT \
        *,\
        ROW_NUMBER() OVER (\
            PARTITION BY device_id \
            ORDER BY reading_datetime DESC\
        ) as rn\
    FROM sensor_readings\
```

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) sub\
WHERE rn = 1;\
\
-- Window Function - Question 7: What is the rolling 3-day average temperature for each home?\
WITH\
  DailyTemps AS (\
    SELECT\
      d.home_id,\
      DATE(s.reading_datetime) AS reading_date,\
      AVG(s.value_numeric) AS daily_avg_temp\
    FROM\
      sensor_readings s\
      JOIN devices d ON s.device_id = d.device_id\
    WHERE\
      s.metric_type = 'temperature'\
    GROUP BY\
      d.home_id,\
      DATE(s.reading_datetime)\
  )\
  \
SELECT\
  home_id,\
  reading_date,\
  daily_avg_temp,\
  AVG(daily_avg_temp) OVER (\
    PARTITION BY\
      home_id\
    ORDER BY\
      reading_date ROWS BETWEEN 2 PRECEDING\
      AND CURRENT ROW\
  ) AS rolling_3day_avg\
FROM\
  DailyTemps\
ORDER BY\
  home_id,\
  reading_date;\
}
```