1. BUSINESS USE CASE

A buyer issues a **Purchase Order (PO)** to a vendor. The vendor sends **multiple invoices** that may reference the same PO.
The system must **match PO lines with invoice lines**, detect discrepancies, and produce a **Reconciliation Report** showing:

- Matching quantities

- Matching amounts

- Variances and reasons

- Items in invoice not found in PO

- Items in PO not found in invoice

This is a common scenario in AP (Accounts Payable) automation.

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2. ASSESSMENT DESCRIPTION

Candidate Task:
Build a program (in the language of your choice) that:

1. **Reads PO data** from an Excel file

2. **Reads multiple invoices** from another Excel file

3. Performs a **1-to-many matching** between PO lines and invoice lines

4. Generates a **Reconciliation Report** as an Excel file

5. Follows the matching logic and discrepancy rules provided

The candidate must implement:

- Data ingestion

- Line-level matching

- Summarization

- Variance calculation

- Exception reporting

- Excel output

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3. FILE 1: SAMPLE PURCHASE ORDER (PO.xlsx)

PO Number	PO Line	Item Code	Description	Ordered Qty	Unit Price	Total Amount
PO-1001	1	ITM-001	Laptop 15"	10	800	8000
PO-1001	2	ITM-002	Mouse	20	15	300
PO-1001	3	ITM-003	Keyboard	15	25	375
PO-1001	4	ITM-004	Docking Stn	5	150	750

4. FILE 2: SAMPLE INVOICES (Invoices.xlsx)

Invoice 1

Invoice Number	PO Number	Item Code	Description	Invoiced Qty	Unit Price	Total Amount
INV-501	PO-1001	ITM-001	Laptop 15"	7	800	5600
INV-501	PO-1001	ITM-002	Mouse	15	15	225

Invoice 2

Invoice Number	PO Number	Item Code	Description	Invoiced Qty	Unit Price	Total Amount
INV-502	PO-1001	ITM-001	Laptop 15"	3	800	2400
INV-502	PO-1001	ITM-003	Keyboard	12	25	300

Invoice 3 – with discrepancies

Invoice Number	PO Number	Item Code	Description	Invoiced Qty	Unit Price	Total Amount
INV-503	PO-1001	ITM-004	Docking Stn	6	150	900
INV-503	PO-1001	ITM-999	USB Hub	10	20	200

5. MATCHING LOGIC

5.1 Line Matching

Match invoice lines to PO lines using:

PO Number + Item Code

5.2 Aggregation Rules

Since it is **1 PO → many invoices**, you must aggregate invoice quantities and amounts:

Total Invoiced Qty = Sum(invoice lines for item)

Total Invoiced Amount = Sum(amounts)

5.3 Variance Calculation

1. **Qty Variance**

Qty Variance = Invoiced Qty – Ordered Qty

2. **Amount Variance**

Amount Variance = Invoiced Amount – PO Amount

3. **Overbilling/Underbilling Conditions**

- Qty variance > 0 → Over-received / Overbilled

- Qty variance < 0 → Under-received

- Item exists only in invoice → "Item not found in PO"

- Item exists only in PO → "Not yet invoiced"

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6. EXPECTED OUTPUT: RECONCILIATION REPORT (Reconciliation.xlsx)

PO Number	Item Code	Ordered Qty	Invoiced Qty	Qty Variance	PO Amount	Invoiced Amount	Amount Variance	Status / Comments
PO-100 1	ITM-0 01	10	10	0	8000	8000	0	Fully matched
PO-100 1	ITM-0 02	20	15	-5	300	225	-75	Under-invoiced
PO-100 1	ITM-0 03	15	12	-3	375	300	-75	Under-invoiced
PO-100 1	ITM-0 04	5	6	+1	750	900	+150	Over-invoiced
PO-100 1	ITM-9 99	—	10	—	—	200	—	Item not in PO
PO-100 1	ITM-0 03	15	12	-3	375	300	-75	Under-invoiced

PO Number	Item Code	Ordered Qty	Invoiced Qty	Qty Variance	PO Amount	Invoiced Amount	Amount Variance	Status / Comments
PO-100 1	ITM-0 02	20	15	-5	300	225	-75	Partially invoiced
PO-100 1	ITM-0 04	5	6	+1	750	900	+150	Over-invoiced

Summary Exceptions:

- **Invoice contains 1 item not in PO: ITM-999**

- **PO contains 0 items not invoiced** (except under-invoiced ones)

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7. FUNCTIONAL REQUIREMENTS

7.1 Input Processing

- System must read **two Excel files**:
    - PO.xlsx (single PO, multiple lines- simulated data for alteast 50 rows)
    - Invoices.xlsx (multiple invoices- Distribute the 50 into multiple invoices – Minimum 3)
- Validate column headers
- Normalize data types (numbers, text)

7.2 Data Matching Rules

- Match by PO Number + Item Code
- Sum across invoices
- Detect missing items

7.3 Output Requirements

Produce an Excel file with:

Sheet 1 – Summary

- Total PO amount
- Total invoiced amount
- Total variance
- Count of mismatches

Sheet 2 – Line-Level Reconciliation

(As shown above)

Sheet 3 – Items Not in PO

Invoice lines where item does not exist in PO

Sheet 4 – Items Not Invoiced

PO lines where no invoice lines exist

Sheet 5 – Raw Combined Data

For audit trail

✅ Required Documents (High-Level)

The candidate must produce the following **supporting documents**:

1. High-Level System Design Document (HLD)

- Overall architecture

- Data flow (import → match → report)

- Components/modules at high level

2. Data Model / Entity Definition

- Tables or fields for PO, Invoice, and Reconciliation

- High-level relationships (PO → Invoices)

3. Unit Test Summary / Results

- Evidence that core logic was tested

- Pass/fail summary (no deep detail required)

4. Source Code Submission

- Clean, readable code implementing the matching logic

- Folder structure and explanation

5. Final Reconciliation Report

- The generated Excel output file

- Input samples