An example of Row Loss in pandas pivot_table for missing value

car_name	shop_visit	VMRS	DTC	trigger_count
AAA	2025-03-10	TRANSMISSION	P0700	6
AAA	2025-03-10	TRANSMISSION	P0720	4
BBB	2025-04-25	COOLANT	P0128	11
CCC	2025-03-17		P0300	7
CCC	2025-04-13	EXHAUST	P0420	9

- **Car C has 2 shop visits with one VMRS missing**.
- **Car A has 1 shop visit**

For each unique car visit, how many of each diagnostic trouble codes (DTCs) were triggered per vehicle system (VMRS)?

```python
Pivot_col_index = ["car_name", "shop_visit", "VMRS"]
pivot_fault_details = df.pivot_table(index=pivot_col_index, columns="DTC",
                                     values="trigger_count", aggfunc='sum',
                                     fill_value=0).reset_index()
pivot_fault_details['total_count'] =
pivot_fault_details.drop(columns=pivot_index_cols).sum(axis=1)
```

car_name	shop_visit	VMRS	P0128	P0420	P0700	P0720	total_count
AAA	2025-03-10	TRANSMISSION	0	0	6	4	10
BBB	2025-04-25	COOLANT	11	0	0	0	11
CCC	2025-04-13	EXHAUST	0	9	0	0	9

⚠️ Car **C**'s shop visit on **2025-03-17** was dropped from the pivot because the missing **VMRS** value wasn't addressed

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✅ **To resolve:** Fill missing values in the VMRS column: A simple but essential step to **prevent data loss** during grouping or pivot operations.

```python
df["VMRS"] = df{"VMRS"}.fillna("MISSING VMRS")
Pivot_col_index = ["car_name", "shop_visit", "VMRS"]
pivot_fault_details = df.pivot_table(index=pivot_col_index, columns="DTC",
                                     values="trigger_count", aggfunc='sum',
                                     fill_value=0).reset_index()
pivot_fault_details['total_count'] =
pivot_fault_details.drop(columns=pivot_index_cols).sum(axis=1)
```

car_name	shop_visit	VMRS	P0128	P0300	P0420	P0700	P0720	total_count
AAA	2025-03-10	TRANSMISSION	0	0	0	6	4	10
BBB	2025-04-25	COOLANT	11	0	0	0	0	11
CCC	2025-03-17	MISSING VMRS	0	7	0	0	0	7
CCC	2025-04-13	EXHAUST	0	0	9	0	0	9

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