FOUNDATION LESSON

WEEK 5 · LESSON 12

Correlation and a decision-ready evidence pack

A correlation summarises paired linear association; an evidence pack preserves how the result was produced.

THE MENTAL MODEL

MENTAL MODEL

The mental model

A correlation summarises paired linear association; an evidence pack preserves how the result was produced.

A SIMPLE PAIRED CORRELATION

CODE WALKTHROUGH W05-L12-S03

```
01  import pandas as pd
02  d=pd.DataFrame({"hours":[1,2,3,4],"units":[2,4,6,8]})
03  print("Pairs:",len(d.dropna()))
04  print("Pearson r:",d["hours"].corr(d["units"]))
```

WHAT TO TRACK

A simple paired correlation

PREDICT THE RESULT

Predict the output.
Explain each operation.
Pause before continuing.

A SIMPLE PAIRED CORRELATION · RESULT

CODE WALKTHROUGH W05-L12-S04

```
01  import pandas as pd
02  d=pd.DataFrame({"hours":[1,2,3,4],"units":[2,4,6,8]})
03  print("Pairs:",len(d.dropna()))
04  print("Pearson r:",d["hours"].corr(d["units"]))
```

WHAT TO TRACK

A simple paired correlation

VALIDATE THE RESULT

```
Pairs: 4
Pearson r: 1.0
```

A CONCISE EVIDENCE PACK

CODE WALKTHROUGH W05-L12-S05

```
01  import pandas as pd
02  from pathlib import Path
03  d=pd.DataFrame({"branch":["A","B"],"revenue_eur":[120,80]})
04  out=Path("outputs");out.mkdir(exist_ok=True)
05  d.to_csv(out/"summary.csv",index=False,encoding="utf-8")
06  finding="March: A recorded EUR 120 and B EUR 80. Costs unavaila
↪   ble."
07  (out/"findings.txt").write_text(finding,encoding="utf-8")
08  print(finding)
09  print("Rows:",len(d),"Total EUR:",d["revenue_eur"].sum())
```

WHAT TO TRACK

A concise evidence pack

PREDICT THE RESULT

Predict the output.
Explain each operation.
Pause before continuing.

A CONCISE EVIDENCE PACK · RESULT

CODE WALKTHROUGH W05-L12-S06

```
01  import pandas as pd
02  from pathlib import Path
03  d=pd.DataFrame({"branch":["A","B"],"revenue_eur":[120,80]})
04  out=Path("outputs");out.mkdir(exist_ok=True)
05  d.to_csv(out/"summary.csv",index=False,encoding="utf-8")
06  finding="March: A recorded EUR 120 and B EUR 80. Costs unavaila
↪   ble."
07  (out/"findings.txt").write_text(finding,encoding="utf-8")
08  print(finding)
09  print("Rows:",len(d),"Total EUR:",d["revenue_eur"].sum())
```

WHAT TO TRACK

A concise evidence pack

VALIDATE THE RESULT

```
March: A recorded EUR 120
and B EUR 80. Costs
unavailable.
Rows: 2 Total EUR: 200
```

A CURVED RELATIONSHIP WITH ZERO CORRELATION

CODE WALKTHROUGH W05-L12-S07

```
01  import pandas as pd
02  x=pd.Series([-2,-1,0,1,2],dtype="float64")
03  y=x*x
04  print("Pearson r:",round(x.corr(y),6))
05  print("Pairs:",list(zip(x.tolist(),y.tolist())))
```

WHAT TO TRACK

A curved relationship with zero correlation

PREDICT THE RESULT

Predict the output.
Explain each operation.
Pause before continuing.

A CURVED RELATIONSHIP WITH ZERO CORRELATION · RESULT

CODE WALKTHROUGH W05-L12-S08

```
01  import pandas as pd
02  x=pd.Series([-2,-1,0,1,2],dtype="float64")
03  y=x*x
04  print("Pearson r:",round(x.corr(y),6))
05  print("Pairs:",list(zip(x.tolist(),y.tolist())))
```

WHAT TO TRACK

A curved relationship with zero correlation

VALIDATE THE RESULT

```
Pearson r: 0.0
Pairs: [(-2.0, 4.0), (-1.0,
1.0), (0.0, 0.0), (1.0,
1.0), (2.0, 4.0)]
```

GUIDED PRACTICE

LEARNER PRACTICE

Guided practice

Calculate correlation for pairs (1,3), (2,6), (3,9). State the paired count and one causal limitation.

PREDICT · MODIFY · RUN

01 Restate the supplied rules.

02 Predict the result.

03 Modify and run the code.

04 Compare actual output.

05 Explain any difference.

INDEPENDENT PRACTICE

LEARNER PRACTICE

Independent practice

Create a summary for branches X/Y with revenue 90/60 EUR, save it as UTF-8 CSV, and write a finding limited to revenue.

PREDICT · MODIFY · RUN

01 Restate the supplied rules.

02 Predict the result.

03 Modify and run the code.

04 Compare actual output.

05 Explain any difference.

CHECK YOUR UNDERSTANDING

MENTAL MODEL

Check your understanding

Diagnostic: Does zero Pearson correlation prove no relationship? No. A curved relationship can have zero linear correlation.

RECAP AND NEXT STEP

Recap and next step

Preserve paired observations and inspect their shape. Deliver rules, counts, tables, charts and evidence-backed findings with limitations.

UNDERSTAND APPLY VALIDATE EXPLAIN