FOUNDATION LESSON

WEEK 5 · LESSON 8

Line charts and bar charts

Lines show ordered observations; bars compare separate categories.

THE MENTAL MODEL

MENTAL MODEL

The mental model

Lines show ordered observations; bars compare separate categories.

ORDERED MONTHLY OBSERVATIONS

CODE WALKTHROUGH W05-L08-S03

```
01  import matplotlib
02  matplotlib.use("Agg")
03  import matplotlib.pyplot as plt
04  plt.rcParams.update({"font.size": 16})
05  fig, ax = plt.subplots(figsize=(12,6.75))
06  ax.plot(["Jan","Feb","Mar"],[100,120,110],marker="o")
07  ax.set(title="Monthly revenue · 2025 Q1",
08         xlabel="Month",ylabel="Revenue (EUR)")
09  fig.tight_layout()
10  fig.savefig("figure.png", dpi=320)
11  plt.close(fig)
12  print("Saved figure.png: 3840 x 2160")
```

WHAT TO TRACK

Ordered monthly observations

PREDICT THE RESULT

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

ORDERED MONTHLY OBSERVATIONS · RESULT

CODE WALKTHROUGH W05-L08-S04

```
01 import matplotlib
02 matplotlib.use("Agg")
03 import matplotlib.pyplot as plt
04 plt.rcParams.update({"font.size": 16})
05 fig, ax = plt.subplots(figsize=(12,6.75))
06 ax.plot(["Jan","Feb","Mar"],[100,120,110],marker="o")
07 ax.set(title="Monthly revenue · 2025 Q1",
08        xlabel="Month",ylabel="Revenue (EUR)")
09 fig.tight_layout()
10 fig.savefig("figure.png", dpi=320)
11 plt.close(fig)
12 print("Saved figure.png: 3840 x 2160")
```

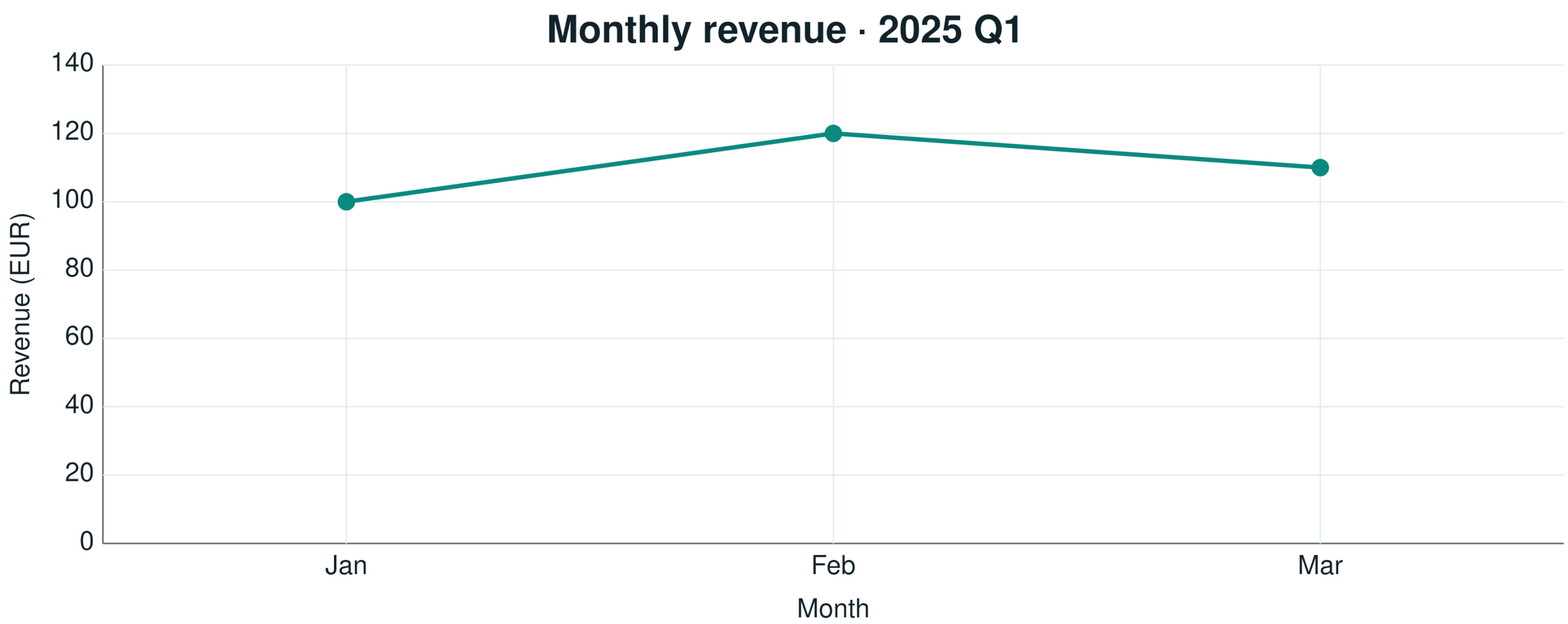
WHAT TO TRACK

Ordered monthly observations

VALIDATE THE RESULT

```
Saved figure.png: 3840 x
2160
```

VISIBLE CHART RESULT



SEPARATE BRANCH CATEGORIES

CODE WALKTHROUGH W05-L08-S06

```
01 import matplotlib
02 matplotlib.use("Agg")
03 import matplotlib.pyplot as plt
04 plt.rcParams.update({"font.size": 16})
05 fig, ax = plt.subplots(figsize=(12,6.75))
06 ax.bar(["East","West"],[120,80])
07 ax.set_ylim(bottom=0)
08 ax.set(title="Branch revenue · March",
09        xlabel="Branch",ylabel="Revenue (EUR)")
10 fig.tight_layout()
11 fig.savefig("figure.png", dpi=320)
12 plt.close(fig)
13 print("Saved figure.png: 3840 x 2160")
```

WHAT TO TRACK

Separate branch categories

PREDICT THE RESULT

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

SEPARATE BRANCH CATEGORIES · RESULT

CODE WALKTHROUGH W05-L08-S07

```
01 import matplotlib
02 matplotlib.use("Agg")
03 import matplotlib.pyplot as plt
04 plt.rcParams.update({"font.size": 16})
05 fig, ax = plt.subplots(figsize=(12,6.75))
06 ax.bar(["East","West"],[120,80])
07 ax.set_ylim(bottom=0)
08 ax.set(title="Branch revenue · March",
09        xlabel="Branch",ylabel="Revenue (EUR)")
10 fig.tight_layout()
11 fig.savefig("figure.png", dpi=320)
12 plt.close(fig)
13 print("Saved figure.png: 3840 x 2160")
```

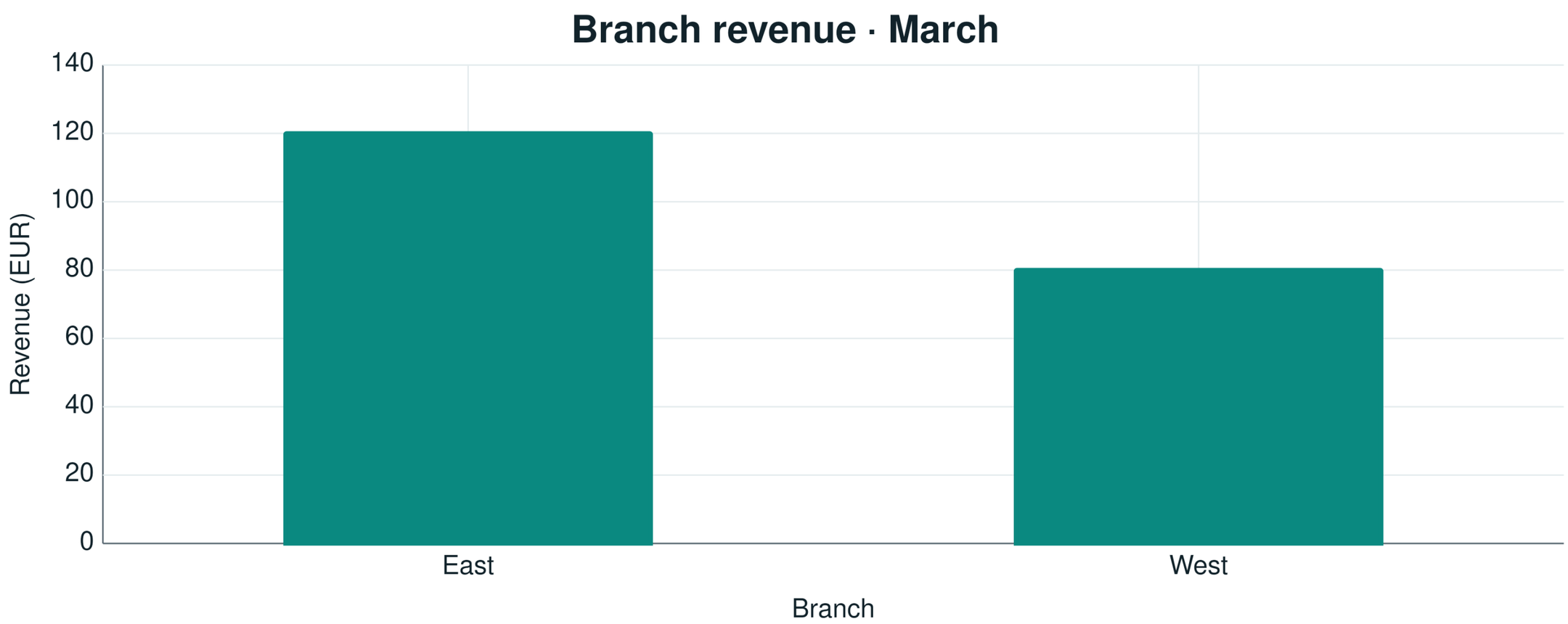
WHAT TO TRACK

Separate branch categories

VALIDATE THE RESULT

```
Saved figure.png: 3840 x
2160
```

VISIBLE CHART RESULT



LEXICAL ORDER IS NOT CALENDAR ORDER

CODE WALKTHROUGH W05-L08-S09

```
01  months = ["Mar", "Jan", "Feb"]
02  order = {"Jan": 1, "Feb": 2, "Mar": 3}
03  print("Alphabetical:", sorted(months))
04  print("Calendar:", sorted(months, key=order.get))
```

WHAT TO TRACK

Lexical order is not calendar order

PREDICT THE RESULT

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

LEXICAL ORDER IS NOT CALENDAR ORDER · RESULT

CODE WALKTHROUGH W05-L08-S10

```
01 months = ["Mar", "Jan", "Feb"]
02 order = {"Jan": 1, "Feb": 2, "Mar": 3}
03 print("Alphabetical:", sorted(months))
04 print("Calendar:", sorted(months, key=order.get))
```

WHAT TO TRACK

Lexical order is not calendar order

VALIDATE THE RESULT

```
Alphabetical: ['Feb', 'Jan',
'Mar']
Calendar: ['Jan', 'Feb',
'Mar']
```

GUIDED PRACTICE

LEARNER PRACTICE

Guided practice

Plot chronological months Jan, Feb, Mar with units 3, 7, 5. Use markers and a units label.

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

Draw a bar chart for products A and B with counts 10 and 20. Preserve a zero baseline.

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: Should East and West be connected to suggest a monthly trend? No. They are distinct categories in this question.

RECAP AND NEXT STEP

Recap and next step

Sort time before connecting observations. Use bars for categories, markers for observations, and clearly labelled scales.

UNDERSTAND APPLY VALIDATE EXPLAIN