

DATA101 COMPREHENSIVE LONG QUIZ - SET A

50-Point Assessment Document



Name: \_\_\_\_\_ ID: \_\_\_\_\_ Date: \_\_\_\_\_

Instructions: Complete all questions. Use only one answer per matching item. Keep responses legible.

1) MCQ (2 pts)

You receive the request: "Show if faculty performance dropped after policy change and identify who was helped." Which should be the first action before any chart is selected?

A) Ask if the audience prefers a donut chart and then scale bars to that aspect ratio.  
B) Convert the request into explicit tasks and data requirements (output, action, constraints, audience).  
C) Normalize all metrics first and then choose a comparison template.  
D) Select a network view in case performance relationships need to be inferred.

2) Matching (1 pt)

Match each statement to the abstraction error it most directly warns against.

1. "A line chart of attendance and satisfaction is shown without stating that one is per-capita and the other is raw count."  
2. "A dashboard chooses a small-multiples layout for only 5 unique categories."  
3. "A pie chart is proposed first, then variables are forced into three mutually exclusive slices."

Errors:

A) Baseline mismatch and untracked granularity.  
B) Overengineering first-pass layout without task evidence.  
C) Chart-first trap.

----- 1) \_\_\_\_\_  
----- 2) \_\_\_\_\_  
----- 3) \_\_\_\_\_

3) Multiple answers (2 pts)

Select all valid reasons to choose a dataset re-shape (tidy vs wide) before visualization.

A) A single task asks for comparisons across regions and dates.  
B) A distribution task includes outliers that must be grouped by cohort and period.  
C) A dashboard will only show one value card and no interactions.  
D) A spatial overlay will join regions from different source systems.  
E) A line chart is requested and data are stored already in one JSON blob per entity.

A)  
B)  
C)  
D)  
E)

4) Ranking (2 pts)

Rank the best first three steps for a high-stakes comparison question from most important (1) to least important (4):

A) Choose chart type.  
B) Write the task statement (action, target, constraints, output).  
C) Resolve attribute scales (units, rate vs count, missingness, temporal unit).  
D) Choose color palette.

1)  
2)  
3)  
4)

5) Short answer (2 pts)

Rewrite this vague request into a defensible task statement template: "Compare city performance and detect anomalies in monthly support fulfillment."

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) MCQ (2 pts)

Which mapping is least appropriate for precise magnitude comparison?

A) Position on a shared baseline  
B) Length along aligned axes

- C) Hue hue-shading differences
- D) Ordered bar endpoints

7) Multiple answers (2 pts)

Choose all that are valid responses to the chart-reading rule "if attention is limited, reduce cognitive load."

A) Keep one strong visual hierarchy and limit color categories in first view.  
B) Add dual-axis to expose hidden patterns in one panel.  
C) Use direct labels where possible instead of dense legend hunting.  
D) Add six new decorative icons for storytelling emphasis.  
E) Group related marks with proximity and shared space.

A)  
B)  
C)  
D)  
E)

8) MCQ (2 pts)

A chart displays a diverging political preference with a meaningful midpoint near zero. Which palette type is correct?

A) Qualitative palette.  
B) Sequential low-to-high palette.  
C) Diverging palette anchored at midpoint.  
D) Binary red/green pair for all classes.

9) Ranking (1 pt)

Order the perceptual pitfalls from highest to lowest impact on trust in a report:

1. Truncated y-axis, 2) inconsistent unit labels, 3) rainbow color ramp, 4) tiny legend.

1)  
2)  
3)  
4)

10) Short answer (1 pt)

List one reliability check for color interpretation in a map/chart report.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11) MCQ (2 pts)

You have 6 groups across 24 months with irregular missing dates and campaign interventions. The question is who improved most and who regressed fastest. Best approach?

A) Single multi-line with all series and arbitrary interpolation.  
B) Slope or indexed mini-trend comparison after harmonized time grid and normalization.  
C) Two pie charts: before and after.  
D) Boxplot per month and ignore campaign dates.

12) Multiple answers (2 pts)

For distribution comparison across groups, select all valid methods.

A) Match binning strategy across groups before first-pass visual claims.  
B) Use median-only charts when tails are central to interpretation.  
C) Report n and scale choices in interpretation notes.  
D) Prefer violin over histogram by default for small n.  
E) Use log or Box-Cox transforms when skew is severe and interpretation remains documented.

A)  
B)  
C)  
D)  
E)

13) Matching (1 pt)

Match each goal to the first table-based view choice.

1. Detect group medians and trend shifts over time.

2. Detect heavy-tailed spread shifts.

3. Detect rank changes only for top 5 entities.
- i) Small multiples + trend/quantile panel.

ii) Distribution glyph (violin/box with CI or whiskers).

iii) Focused slope/ranker chart after top-k filtering.

1)

2)

3)

14) Short answer (2 pts)

A stakeholder asks for "fastest changing cohorts" using a dataset with huge within-group variance. What single preprocessing guard should precede your chart choice?

15) Ranking (1 pt)

Rank these tasks by the degree of information loss if forced into a single chart from most to least harmful:

- A) Compare two cohorts’ medians by month.

B) Show outlier bursts for each cohort.

C) Compare within-cohort variance and spread change.

D) Identify the fastest-growing and fastest-declining entities.

1)

2)

3)

4)

16) MCQ (2 pts)

An ops room needs shared state and role-specific views. Best first-pass composition?

- A) Duplicate full dashboard for each role.

B) Keep only one global chart with all controls open.

C) Overview strip + diagnostic modules + action lane, with progressive disclosure.

D) Separate pages and no shared interactions.

17) Multiple answers (1 pt)

Which changes reduce dashboard ambiguity?

- A) Centralized scale registry for metric semantics.

B) One state store shared across coordinated views.

C) Hide infrequent actions under advanced controls.

D) Separate unrelated filters per view by default.

E) Reuse a single tooltip format across every module.

A)

B)

C)

D)

E)

18) Matching (1 pt)

Match each pattern to intended outcome.

1. Overview then decision lanes.

2. Hide/show controls by intent.

3. Operative cockpit with synchronized interactions.
- i) reduce cognitive split between context and action.

ii) preserve shared analytical continuity.

iii) reduce visual noise and protect first load speed.

1)

2)

3)

19) Short answer (2 pts)

A dashboard has 5 KPIs, 4 actions, and 8 filters but users complain about fatigue. Specify default visibility versus hidden controls.

20) MCQ (1 pt)

You need community structure + bridge detection on 25k sparse nodes for executives. Best pairing?

- A) Node-link only, no edge weight.

B) Matrix only, no ordering.

C) Hybrid node-link overview + matrix for dense clusters.

D) Treemap of degree counts only.

21) Multiple answers (1 pt)

Select all valid reasons to add a matrix view alongside node-link.

- A) Dense/near-complete regions create entangled edge crossings.

B) Need to inspect block structure and co-membership.

C) Need intuitive path tracing at first pass for stakeholders.

D) Need to inspect asymmetry and edge direction.

E) Need to keep node labels always visible without hover.

A)

B)

C)

D)

E)

22) Short answer (2 pts)

For directed-signed graphs, which fields are required and how should polarity and strength be separated in encoding?

23) Matching (1 pt)

Match task and graph layout.

1. Report allocation share by branch.

2. Highlight bridge nodes and cut-edges.

3. Inspect dense community blocks quickly.
- A) Node-link primary + matrix secondary.

B) Treemap primary + node-link secondary.

C) Matrix primary + node-link secondary.

1)

2)

3)

24) Ranking (1 pt)

Order interaction priorities for a live graph brief from highest to lowest: 1) Community toggle, 2) Degree filter slider, 3) Link strength legend, 4) Animated force transition.

1)

2)

3)

4)

25) MCQ (1 pt)

You compare incidence in uneven counties with many low-population areas. Best baseline choice?

- A) Raw counts in choropleth classes.

B) Per-capita rates with explicit normalization and binning rationale.

C) Bubble map only.

D) Equal-area projection with no distance claims.

26) Multiple answers (2 pts)

Which are high-risk pitfalls in spatial interpretation?

- A) MAUP from boundary changes.

B) Ecological inference.

C) Ignoring symbol overlap scaling in overlays.

D) Using CVD-safe colors only.

E) Ignoring projection distortion when discussing distance.

A)

B)

C)

D)

E)

27) Short answer (2 pts)

You publish a choropleth plus symbol map on the same indicator. State one essential pre-publish validation.

28) MCQ (2 pts)

For publication-quality vector slides and precise labels in a PDF workflow, which default output is usually strongest?

- A) PNG only.
- B) GIF animations.
- C) SVG exports from charts that support it.
- D) Screenshot-only outputs.

29) Multiple answers (1 pt)

Select all that are valid reasons to prefer HTML over raster outputs.

- A) Need built-in hover tooltips and interaction.
- B) Need lightweight, fully static printing at 300 DPI.
- C) Need lightweight sharing in a browser and scriptable interactions.
- D) Team has inconsistent browsers and no JS support.
- E) Need crisp scaling of text and paths in web reports.

- A)
- B)
- C)
- D)
- E)

30) Matching (1 pt)

Match the phrase to its primary implication.

1. "Inputs → function → outputs" in app design.
2. "Good defaults" in interactive charts.
3. "Visible state reset".
- i) Core callback architecture.
- ii) Interaction should work before hovering.
- iii) Undoable state prevents misinterpretation.

1)

2)

3)

31) MCQ (1 pt)

A chart interaction works only on hover and fails when captured for review. What is the most defensible redesign?

- A) Keep hover logic and hide issue from static view.
- B) Remove interactivity completely.
- C) Add persistent labels/default callouts + non-hover fallback while preserving hover detail-on-demand.
- D) Increase tooltip font size only.

32) Multiple answers (1 pt)

When building cross-module dashboards with interaction, choose all required guardrails.

- A) Central interaction bus for filters and highlight state.
- B) Fixed scales across module switches.
- C) Independent legend meaning per module.
- D) Clear export/readiness checks per output format.
- E) One global data cache only for static screenshots.

- A)
- B)
- C)
- D)
- E)

33) Integrative scenario (1 pt)

You must build one page with: (i) abstraction-first pipeline, (ii) tabular trend, (iii) dashboard interaction, (iv) graph module, (v) spatial overlay, and (vi) web-app export. In one sentence, propose a defensible sequence of implementation checkpoints.

34) MCQ (1 pt)

For a new long-form course module, which sequence should come first in a tight instruction flow?

- A) Proofs first, visuals second, case studies last.
- B) Plan and outcomes first, then practical design sequence.
- C) Interactivity demos first, then abstraction.
- D) Spatial maps first, then all other visualization types.