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eetbs/HARVARD UNIVERSITY</b><br/>str/><i>Faculty of Arts and Sciences</i><br/>br/>Department of Arts and Sciences

Instructor: Prof. Hanspeter Pfister | Date: 2024-12-15

# Final Examination - Data Visualization and Interactive Systems

Duration: 3 hours | Total Points: 100

This examination covers fundamental concepts in data visualization, interaction design, and visual analytics systems.

#### **INSTRUCTIONS:**

- Read each question carefully and completely before answering
- For multiple choice questions, select the best answer
- Write clearly and legibly for all written responses
- Show all work for calculation problems where applicable
- Review your answers before submitting
- Ask the instructor if you have any questions

#### **Additional Notes:**

Please ensure all visualizations are clearly labeled and include proper citations for data sources.

<b>Student Full Name:</b>	 
Student ID/Number:	
Date:	
Signature:	

**Question 1. (5 points)** 

Which of the following best describes the purpose of data visualization in exploratory data analysis?

- **A.** To create aesthetically pleasing graphics for presentations
- **B.** To reveal patterns, trends, and relationships that might not be apparent in raw data
- C. To reduce the amount of data that needs to be processed
- **D.** To replace statistical analysis entirely

### Question 2. (3 points)

The principle of proportional ink states that the size of graphical elements should be proportional to the data values they represent.

- A. True
- B. False

# Question 3. (8 points)

In the context of interaction design for visualizations, what does "brushing and linking" refer to?

- **A.** A technique for cleaning messy datasets
- **B.** Selecting data points in one view to highlight corresponding points in other views
- C. A method for creating smooth animations between different chart types
- **D.** The process of connecting multiple databases for visualization

## **Question 4. (12 points)**

Explain the difference between diverging and sequential color scales, and provide an example of when you would use each.

Answer:			

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Question 5. (20 points)	
Discuss the challenges of visualizing high-dimensional data and describe can be used to address these challenges. Include specific examples of whether the challenges is the challenges of the challenges.	
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Question 6. (4 points)
The grammar of graphics provides a systematic approach to creating visualizations by
mapping data variables to visual properties.
Answer:
Question 7. (6 points)
(o points)
Which visualization type is most appropriate for showing the relationship between three continuous
variables?
A. Bar chart
B. Scatter plot matrix
C. Bubble chart
<b>D.</b> Parallel coordinates

Question 8. (10 points)
What are the key considerations when designing visualizations for mobile devices versus desktop displays?
Answer:
Question 9. (3 points)
Color should never be the only method used to convey important information in a visualization.
A. True B. False
Question 10. (29 points)
Analyze the ethical implications of data visualization design choices. How can visualization designers ensure their work promotes understanding rather than misleading audiences? Provide specific examples of both responsible and irresponsible visualization practices.
Answer: (Use the space below for your complete response)

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