IQ Measurement

- Introductory Remarks
- Diagnostic Methodology
- Measuring Subjective Perceptions
- Objective/Quantitative Metrics
- Wrap-up
Three Commonly Asked Questions

- Question 1
  - How good is the quality of information in my database/company?

- Question 2
  - How does the quality of my information compare with others in my industry?

- Question 3
  - Is there a single aggregate IQ measure?
Types of IQ Metrics

- Measures of Subjective Perceptions

- Objective Measures
  - Task(Context)-independent Measures
  - Task(Context)-dependent Measures
Diagnostic Methodology

Subjective Assessment Survey → Dataset in Use → Objective Assessment Metrics

Subjective Assessment Results & Objective Assessment Results → Comparative Analysis

Discrepancies → Determine Root Causes of Discrepancies

→ Actions for Improving Data Quality
Subjective Perceptions

- Assess the perceptions of stakeholders
- Survey based on multiple dimensions of data quality
- Sample questions
Objective Metrics

- Independent of specific organizational context or specific application
  - Example: Measure conformance to relational database data integrity rules
    - Codd integrity rules
Measure IQ Using Integrity Rules

- Codd proposed five types of integrity rules:
  - Domain Integrity
  - Column Integrity
  - Entity Integrity
  - Referential Integrity
  - User-Defined Integrity
Domain and Column Integrity

- All the values of a field must be of the same domain
  - Domain - all permissible values that can be assigned to a field

- Restrict values in a column to a set of permissible values
  - The permissible set is a subset of a domain
Entity Integrity

- No component of a primary key is allowed to have a missing value of any type.
Referential Integrity

- For each distinct foreign key in a relational database, there must exist in the database an equal value of a primary key from the same domain.
Objective Metrics

Some Examples

◆ Completeness
◆ Consistency
◆ Timeliness
◆ Accessibility
Objective Metrics – Some Functional Forms

- Simple Ratio
- Min or Max operation
- Weighted Average
Implementation Approaches

- IQ Assessment Survey
- Integrity Analyzer
  - Context Independent
  - User-defined
- In-house automated instruments
Recommendations

- Measure Subjective Perceptions
- Measure Context Independent and Dependent Metrics
- Compare Results
- Take Action