Investigation

Data Analysis and Reporting Tools
Data Mining v. Data Analysis

- **Data mining** is the science of searching large volumes of data for patterns.
- **Data analysis** refers to any statistical process used to analyze data and draw conclusions from the findings.
- Often used interchangeably
Data Mining

- Data mining combines several different techniques essential to detecting fraud, including the streamlining of raw data into **understandable patterns**.
- Data mining is an effective way for fraud examiners to develop fraud targets for further investigation.
Data Analysis Process

- **Planning Phase**
  - Understand the data
  - Define examination objectives
  - Build a profile of potential frauds
  - Determine whether predication exists

- **Preparation Phase**
  - Identify the relevant data
  - Obtain the data
  - Verify the data
  - Cleanse and normalize the data

- **Testing and Interpretation Phase**

- **Post-Analysis Phase**
Planning Phase

- Proper planning is essential
- Must first understand the data
  - Know what data is available and how it is structured
- Helps to build workable tests to run on the data; also helps to identify additional areas for exploration
- Important to build a profile of potential frauds
Preparation Phase

- Identify the relevant data
- Cleansing and normalizing the data ensures that:
  - The data can be analyzed consistently.
  - The data is in a structured, standardized format.
  - Any known errors or inconsistencies in the data are addressed.
Data Analysis Software Functions

- Sorting
- Joining files
- Correlation analysis
- Compliance verification
- Gap tests
- Duplicate searches
Benford’s Law

- *Natural numbers* are those numbers that are not ordered in a particular numbering scheme and are not generated from a random number system.
- Benford’s Law provides that the distribution of digits in multi-digit natural numbers is not random; instead, it follows a predictable pattern.
Benford’s Law

Frequency of First Digit

- 1: 30%
- 2: 18%
- 3: 12%
- 4: 9%
- 5: 8%
- 6: 7%
- 7: 6%
- 8: 5%
- 9: 4%
Examples of Data Analysis Queries

- General ledger analysis
- Accounts payable
- Asset management
- Cash disbursement
- Payroll
Textual Analytics

- **Structured data**—typically found in a database, recognizable and predictable structures. Examples: sales records, payment or expense details, financial reports.

- **Unstructured data**—data not found in a traditional spreadsheet or database. Typically text-based.

- Software can categorize data to reveal patterns, sentiments, and relationships indicative of fraud.
Textual Analytics

- **Pressure**
  - deadline, quota, short, problem, and concern

- **Opportunity**
  - override, write off, recognize revenue, adjust, discount, and reserve/provision

- **Rationalization**
  - reasonable, deserve, and temporary
Visual Analytics

- **Link Analysis**
- Used to create visual representations (e.g., charts with lines showing connections) of data from multiple data sources to track the movement of money; demonstrate complex networks; and discover communications, patterns, trends, and relationships.
Jim REEGAN set up Halver Inc. $234,870

Rob JONES set up Glimer Holdings $342,900

Offshore account
0213-3921-93-192
wired US$ 850,000

Margaret REEGAN Account Holder
US account
0122-1921-82-198
Sample Prep Question

1. Alpha, a fraud examiner, believes that vendors may be submitting invoices twice in the hope that they will be paid multiple times. Which of the following data analysis functions would be the easiest way to identify such invoices?

A. Benford’s Law analysis
B. Textual analysis
C. Correlation analysis
D. Duplicate search
Correct Answer: D

- Duplicate testing is used to identify transactions with duplicate values in specified fields. A fraud examiner would expect fields such as check numbers, invoice numbers, and government identification numbers (e.g., Social Security numbers) to contain only unique values within a data set; searching for duplicates within these fields can help the fraud examiner find anomalies that merit further examination.
Sample Prep Question

2. Black, a fraud examiner, is conducting textual analytics on emails sent to and from specific employees that his client has identified as fraud suspects. He is using the fraud triangle to come up with a list of fraud keywords to use in his search. Which of the following words found in email text might indicate a fraudster is rationalizing his actions?

A. Deserve
B. Write off
C. Override
D. Quota
In conducting a textual analytics examination, the fraud examiner should come up with a list of fraud keywords that are likely to point to suspicious activity. The factors identified in the fraud triangle are helpful when coming up with a fraud keyword list. One of these factors is rationalization. Some keywords that might indicate a fraudster is rationalizing his actions include *reasonable*, *deserve*, and *temporary*.
Sample Prep Question

3. When conducting a data analysis engagement to detect fraud, it is important to build a profile of potential frauds before identifying, obtaining, and analyzing the data.

A. True
B. False
To maximize the potential success of detecting fraud through data analysis, the analysis performed should be based on an understanding of the entity’s existing fraud risks. To do so, the fraud examiner must first build a profile of potential frauds by identifying the organization’s risk areas, the types of frauds possible in those risk areas, and the resulting exposure to those frauds.
Investigation

Tracing Illicit Transactions
Tracing Funds

- **Tracing**—search for evidence regarding the identity and disposition of property

- Examples:
  - A victim of fraud who wants a tracing search to facilitate the recovery of criminal proceeds
  - A potential plaintiff who wants a tracing search to determine if the potential defendant can pay a court-ordered sum if a judgment is ordered
  - A judgment creditor who needs to identify the judgment debtor’s assets
Methods of Tracing Financial Transactions

- Direct method—analysis of specific financial transactions
- Indirect—employs circumstantial evidence
- Financial institutions—the most important resource
Tracing Financial Transactions—Banks

- **Personal accounts**
  - Usually have person’s name, address, identification number, amount of initial deposit, and security data

- **Business accounts**
  - Corporation and partnership accounts typically have resolutions/agreements attached that authorize drawers; may have articles of incorporation

- **Negotiated Checks**
  - Contain amounts, payees, endorsees
  - Back of check shows account number and bank deposited, names of institutions check traveled through
  - Tells if check was cashed through series of codes
  - Can be used to identify other accounts held by subject
Tracing Financial Transactions—Banks

- Wire transfer records (amount, date, name)
- Electronic payment records (assets and locations, loans, properties owned)
- Loan records:
  - Credit or loan file
    - The loan application, financial statements (BS, P&L), etc.
  - Unusual loan repayments (odd amounts, accelerated payments, large paydowns)
  - Tracing loan proceeds and payments can identify hidden assets or witnesses
Tracing Financial Transactions

- Credit card records
  - Show movements and habits
  - Document travel and who subject does business with
  - Charges might provide leads to identifying hidden assets (charges related to boats, planes, etc.)
Indirect Methods of Tracing

- Two methods: (1) net-worth and (2) bank deposit

Net-worth method

- Used to prove illicit income circumstantially by showing that a person’s assets/expenditures for a given period exceed that which can be accounted for from known sources
- Net Worth—the difference between assets and liabilities at a particular point in time
- By comparing the subject’s net worth at the beginning and end of a period, you can determine the increase or decrease in net worth
- Useful when assets or liabilities have changed—no financial records
Methods for Performing a Net-Worth Analysis

- **Asset method**
  - Used when the subject invests illegal funds to accumulate wealth/assets

- **Expenditures method**
  - Used when the subject spends illicit income on consumables that would not necessarily cause an increase in net worth
Asset Method

- Estimate funds from legitimate sources generously and expenses conservatively.
- Establish a starting point, generally the year before the target’s illegal activities begin (referred to as Year One).
- Compute the target’s net worth at the end of Year One. Identify all assets held by the target, valued at cost (not fair market value), including assets acquired earlier, and the amount of current liabilities.
- Calculate the difference between the value of the assets and the liabilities to determine the target’s net worth at Year One, or opening net worth.
Expenditures Method

- Comparison is made between suspect’s known expenditures and known sources of funds during a given period of time.

- Establish known expenditures for the relevant year:
  - Loan payments; monthly charges (utilities, telephone, etc.)

- The difference (or excess) between the amount of the subject’s expenditures and known income is the amount attributed to unknown sources.
Bank Deposit Analysis Method

- Based on the theory that if the subject receives money, it is either deposited or spent
- Recommended if most of the subject’s income is deposited and the subject’s books and records are unavailable, withheld, incomplete, or maintained on a cash basis
Locating Hidden Assets

- Tend to hide liquid assets more frequently than illiquid assets
- Characteristics they want:
  - Untraceable or difficult to trace
  - Secure and accessible
  - Liquid
- Common asset-hiding techniques
  - Hiding in someone else’s name
  - Pay down debt
  - Transfer to tax havens
  - Transfer to trusts
  - Insurance products
Locating Assets Stored Abroad

- Letters Rogatory—formal requests by one country’s court to another country’s court
- Mutual Legal Assistance Treaties (MLATs)
  - Exchange between United States and certain foreign countries of information relating to AML and other financial/narco crimes
Sample Prep Question

1. The records of a wire transfer identify the amount of the wire, where it was sent, and the date it was sent, but they do not identify who sent the wire.

A. True
B. False
Correct Answer: B

- The records of a wire transfer identify the amount of the wire, where it was sent, the date it was sent, the name of the sender, and its amount.
Sample Prep Question

2. Which of the following is the most accurate description of the net-worth (or comparative net-worth) method of analysis?

A. Proving illicit income by measuring and recording income as earned and recording expenses as incurred.

B. Assigning forecasted income and expenses to accounts, which will be compared to actual income and expense for analysis of variances.

C. Proving illicit income by showing that a person’s assets or expenditures for a given period exceed that which can be accounted for from known or legitimate sources.

D. Using a subject’s books and records to determine the subject’s financial condition and identify the receipt or disposition of funds.
Correct Answer: C

- The net-worth method (or comparative net-worth analysis) is used to prove illicit income circumstantially by showing that a person’s assets or expenditures for a given period exceed that which can be accounted for from known or admitted legitimate sources of income. Fraud examiners should use the net-worth method when several of the subject’s assets or liabilities have changed during the period under examination and when the target’s financial records are not available.
Sample Prep Question

3. Which of the following is something that might be revealed by analyzing a subject’s electronic payment records?

A. Assets the subject has purchased
B. The cities and countries in which the subject conducts business
C. Assets effectively controlled or held by the subject
D. All of the above
Correct Answer: D

- Electronic payments (or e-payments) refer to any type of noncash payment that does not involve a paper check, and electronic payment records can reveal, among other things:
  - Assets the subject has purchased
  - The locations of the subject’s assets
  - The locations of the subject’s residences and businesses
  - Loans the subject has obtained
  - Payments made to nonexistent employees with direct deposit
  - The cities and countries where the subject conducts business
  - Assets ostensibly owned by family members or close associates but effectively controlled, held, or gifted by the subject