Achievable

CMA PART 1 DUMP SHEET

Technology and analytics

Information systems

- **AIS:** transforms raw financial data into information via collection, processing, analysis, reporting. Data = raw facts; information = processed insight
- **ERP:** an integrated system managing core processes across departments; a centralized database unifies financial + non-financial data for real-time decisions
- **Data storage:**
  - ODS: current, operational
  - Data warehouse: structured, historical; loaded via ETL
  - Data mart: a departmental subset
  - Data lake: raw, no schema
- **Data progression:** data → information → knowledge → insight (or wisdom) → action
- **Big Data (4 Vs):** volume, velocity, variety, veracity
- **System development life cycle (SDLC):** planning → analysis → design → development → testing → deployment → maintenance

Data governance

- **Data life cycle:** capture → maintenance → synthesis → usage → analytics → publication → archival → purging
- **Objectives:** availability, integrity, usability, security
- **Preprocessing:** consolidation, cleaning, transformation, reduction (sampling, aggregation, compression)

Data visualization

- **Business methods:** tables; bar, pie, line, and bubble charts
- **Statistical methods:** histogram, box plot (5-number summary, IQR), scatter plot, dot plot
- **Benefits:** simplifies data, aids decisions and communication. **Limits:** misleading scales, oversimplification, bias

Data analytics

- **Four types:**
  - Descriptive: "What happened?" (summarizes the past)
  - Diagnostic: "Why did it happen?" (root cause)
  - Predictive: "What is likely to happen?" (forecasts)
  - Prescriptive: "What should we do?" (recommends actions)
- **Clustering:** unsupervised; groups by similarity (no labels). **Classification:** supervised; assigns to known categories (labeled data)
- **Under/overfitting:** too simple misses patterns; too complex fails to generalize
- **Data mining:** extracts patterns from large datasets (statistical, ML); SQL for relational queries
- **Multiple regression:** $Y = a + b_1X_1 + b_2X_2 + \cdots + \varepsilon$
  - r (-1 to 1): the strength and direction of a linear relationship
  - R^2 (0 to 1): the variance explained
  - SEE: prediction error (lower is better)
- **Time-series patterns:** trend, cyclical, seasonal, irregular
- **Simulation:** varies many inputs via probability distributions (Monte Carlo). **Sensitivity analysis:** one input at a time. **Goal-seeking:** the reverse of sensitivity; finds the input needed for a target output
- **EDA:** the first step; summarizes characteristics, detects outliers, generates hypotheses

Automation & emerging applications

- **RPA:** software bots for repetitive, rule-based tasks (invoicing, reconciliation, payroll)
- **AI types:** narrow (task-specific), general (theoretical), super (hypothetical)
- **Cloud service models:** IaaS (infrastructure), PaaS (development platform), SaaS (subscription software)