School of Analytics 101

Key Concepts

1. BCG matrix
2. SWOT analysis
3. Pareto analysis
4. INVEST concept
5. Kano analysis
6. Pugh matrix
7. Flowchart
8. 100-point method
9. GAP analysis
10. Diagrams: BPMN, SIPOC, UML, Gantt
11. Fish Model vs. V Model

Business Analyst Work Experience

12. What is the role of a business analyst in an organisation?
13. What, according to you, are the core competencies of a business analyst?
14. List some of the skills and tools used by business analysts
15. Explain the business analysis process flow
16. What is the difference between a data analyst and a business analyst?
17. Describe your process when researching a company or industry
18. Why do you like a career as a business analyst?

Quantitative Methods and Econometrics

19. Measures of central tendency: population mean, sample mean, arithmetic mean, geometric mean, harmonic mean
20. Measures of location and dispersion: quantile, mean absolute deviation, sample variance and standard deviation
21. Skewness, kurtosis, and correlation
22. Expected value, variance and covariance
23. Confidence interval
24. Normal distribution. Standard normal distribution. Lognormal distribution
25. Student’s t-distribution
26. Chi-square distribution
27. Monte Carlo simulation
28. Probability sampling methods: systematic sampling, stratified random sampling, cluster sampling
29. Central limit theorem
30. Hypothesis tests: null vs. alternative hypothesis, one-tail vs. two-tail hypothesis test
31. Type I and Type II errors
32. Statistical significance and interpretation. P-value
33. t-test, z-test and chi-square test
34. Simple linear regression model: sum of squared errors (SSE), slope coefficient interpretation
35. Homoskedasticity vs. heteroskedasticity
36. Standard error of estimate (SEE), coefficient of determination (R-square), F-statistics
37. Multiple linear regression model. Adjusted R-square, Dummy variables
38. Time-series analysis: linear and log-linear trend models
39. Autocorrelations and autoregressive time-series models (AR)
40. Unit root test of nonstationarity
41. Moving-average time-series models (MA)
42. Seasonality in time-series models
43. Autoregressive moving-average models (ARMA) and autoregressive conditional heteroskedasticity models (ARCH)

Probability Theory

44. Basic probability definitions and set operations: outcome, sample space / probability space, event, mutually exclusive, exhaustive events, random variable
45. Combinatorial analysis: permutations, combination, binomial theorem, Inclusion-Exclusion Principle
46. Unconditional and conditional probability. Joint probability
47. Law of total probability
48. Bayes' formula
49. Discrete and continuous distributions: common function of random variables, discrete random variables, continuous random variables

SQL

50. What are basic SQL skills?
51. What is the difference between SQL and MySQL?
52. What is PostgreSQL?
53. What are the different subsets of SQL?
54. What are joins in SQL?
55. What are SQL comments?
56. What are Tables and Fields?
57. What is a Unique key?
58. What is an Index?
59. What is a View?
60. What is ETL?
61. What is DWH?
62. Explain different types of Normalization
63. What is the SELECT statement?
64. What is the difference between UNION and UNION ALL commands?
65. What is the difference between DELETE and TRUNCATE statements?
66. What is a UNIQUE constraint?

Python

67. Python as an object-oriented programming language. Functions isinstance( ), type( )
68. Python basic data types: numbers, strings, booleans, tuples, lists, dictionaries, sets. Basic methods and properties of basic data structures: iterable, ordered, mutable, hashable, etc.
69. Loops: for loop and while loop. Why using loops in Python might not be the best idea?
70. List, set, dictionary comprehensions. Iterators and generators
71. Functions in Python. Function as an object. Lambda functions
72. Basic principles of OOP: encapsulation, polymorphism, inheritance. Magical methods.
73. O(n) notation. Search / insert / delete arrays in Python. Hash tables.

Machine Learning

74. Supervised vs. unsupervised learning
75. Deep learning and reinforcement learning
76. Evaluating ML algorithm performance: generalization and overfitting
77. Penalized regression
78. Support vector machine
79. K-nearest neighbor (KNN)
80. Classification and regression tree (CART)
81. Clustering: K-mean, hierarchical, agglomerative, divisive
82. Neural networks

Economics and Finance

83. Breakeven analysis and shutdown point
84. Elasticity of demand: price, income, cross-price
85. Aggregate demand and supply
86. Business cycles: expansion, peak, recession and trough
87. Market structures: perfect competition, monopolistic competition, oligopoly, monopoly
88. Market concentration measures: N-firm concentration ratio, Herfindahl-Hirschman Index, Gini coefficient
89. Examples of financial metrics
90. Walk me through a typical unit economics

Market Sizing

91. How many grocery stores are there in Moscow?
92. How many tennis balls can you stuff inside an airplane?
93. How much Earl Grey is drunk in the United Kingdom each year?
94. How many iPhones does Apple sell in the U.S. each year?

Problem Solving[1]

95. Company's online sales were below expectations. What solutions do you suggest to analyse how to recover the lost revenue?
96. A company is operating at a loss despite its revenues being high. What solutions do you suggest to analyse the possible reasons for this situation?
97. How to analyse whether we should enter a new market?
98. How to analyse whether we should exit an existing market?
99. How to analyse how to price our product?
100. How to analyse whether we should launch a new product?
101. A client of a company is a hotel located in New York. Their primary customer base is made up of mostly foreign tourists. What are some factors that these customers would seek out in a hotel? What influences may affect their decision to stay at the client's hotel?

[1] For each of the Problem Solving questions clarify input data and metrics required to make a recommendation.