Business Intelligence Systems Development

M.Sc. Diploma Exam – Sample Topics

1. The architecture of the 4GL language - the implicit loop, DATA steps and PROC steps.

2. The macro facility in the SAS System and its relation with other ingredients of the 4GL language.

3. What does it mean "fact", "dimension" and "measure" in the data warehouse terminology?

4. Describe the data models used in data warehouse.

5. Methods of comparison and testing of business data analysis.

6. What is the difference between data mart and data warehouse?

7. Characterize processes realized within ETL.

8. Describe the types of data errors that may occur in the transactional systems and have to be corrected while ETL process to assure the high data quality.

9. What is "slowly changing dimension" and what are its types?

10. Present the example of IT tool that allows you to perform the ETL process.

11. Algorithms complexity.

12. Algorithm design paradigms (dynamic programming, divide and conquer, etc.).

13. Polynomial-time approximation scheme.

14. Basic data structures

    a) list, queue, b) heap, c) priority queues.

15. Trees

    a) binary trees, b) balanced trees (e.g. AVL), c) B-trees.

16. Sorting algorithms.

17. Travelling salesman problem – definition, solution algorithms.

18. Algorithms for finding the shortest path in a graph.

19. Deterministic and non-deterministic Turing machine.

20. Regular expressions, finite automata, regular languages.

21. Context free grammars, push down automata, context free languages.

22. Nondeterministic finite automaton.

23. Chomsky hierarchy.

24. Parallel processes synchronization methods

    a) deadlock, b) starving.

25. Distributed programming. Discuss one of the following algorithms: creating the global time, choosing coordinator, termination of the computation, deadlock avoiding.

26. Interpolation and its applications.

27. Methods for solving systems of linear equations.

28. Methods for finding zeros of functions of one variable.

29. Numerical integration methods.

30. Colour models in computer graphics.

31. Raster image processing methods (contrast enhancement, histogram based operations, spatial image filtration).

32. Relational databases

    a) normal forms, b) data structures.

33. Basic features of object-oriented languages.

34. Generic programming (idea, generic programming in object-oriented languages).

35. What is UML?

36. Design patterns in object-oriented programming.

37. Software developing models.

38. Goals and methods of software testing.

39. Heuristic search methods.