Questions for the final examination – Business Informatics BSc (2017)

Informatics and Natural Science

1. Tasks and components of database management systems. Relational data model (relation and its properties, schemas, constraint types, concepts of super key, key, primary key, foreign key). Relational query language: relational algebra.

2. Entity-relationship (ER) model. Classification of relationships. Atomic, composite, single-valued, multi-valued, derived attributes. ER diagrams and their transformations into relations. Redundancy, decomposition, functional dependency. Normal forms. SQL statements.

3. Data-centered activities in software development life cycle (SDLC). Database administration and monitoring. Tasks of database administrators. Metadata and data quality management.

4. Method of least squares: modelling of measurements, estimation of parameters with the help of normal equations, resolvability of normal equations, meaning and handling of possible singularities. Interpolation: Lagrange interpolation, theorem about resolvability, Newton form of the Lagrange polynomial.

5. Numerical solution of non-linear equations: bisection, Regular Fails, Newton's and secant method, fixed point iteration. Numerical solution of systems of non-linear equations: Newton's method, fixed point iteration.

6. Fundamentals of hypothesis testing. Parametric tests for a single sample and for two samples. Small and large sample non-parametric tests. Tests for several independent samples.

7. Simple linear regression, the method of least squares. Parameter estimation and testing hypotheses in regression models. Non-linear regression models. Multiple linear regression. Fundamentals of time series analysis, trend estimation, estimation of seasonal variation.

8. Concept of computer security, main security objectives. Physical, human, technical threats and their countermeasures. Administrative control.

9. Algorithmic control: encryptions, digital signatures, hash functions. AES and RSA algorithms. Public Key Infrastructure, certificate authorities.

10. Fundamentals of procedural programming. Data types, constants, variables. Expressions and statements - like declaration, assignment, operands and operators, precedence. Control structures, two-way decision, multiple-way decision. Loops. Subprograms (functions and procedures). Evaluation of parameters, parameter passing methods. I / O, file management. Exception handling.

11. Fundamentals of Object-oriented programming. Class, object, encapsulation, data members, methods. Hierarchy tree, (multiple) inheritance. Polymorphism.

12. Tasks of an operating system. Classification of the operating systems. The main components of a modern operating system: process management (scheduling, synchronization, IPC), memory management, file systems, file management. Operating systems network management. Security. Virtualization.

Human and Economic Knowledge

13. Present value of money, basics of present value calculations. Annuities, perpetuities, internal rate of return, bonds and basics of bond pricing.

14. Stocks and basics of stock pricing. Classes of financial ratios based on the financial reports (liquidity, leverage, efficiency, profitability, market ratios).

15. Accounting and reporting under International Financial Reporting Standards (IFRS), the structure of IFRS Foundation. The contents of financial statements, statement of financial position, statement of profit or loss and other comprehensive income. Statement of changes in equity, notes to the financial statements. Recognition and measurement of the elements of financial statements under IFRS.

16. Product policy, pricing.

17. Promotion, distribution.

18. The definition of leadership. Characterization of the theories of leadership.

19. The key elements of organizational structures. Common organization designs, and new design options. Factors, influencing organizational design.

20. European Integration. EU Institutions and decision making.

21. The nature of management control systems. Boundaries of management control. Goal congruence. Behaviour in organizations, and the main tasks of controlling.

22. The main features of responsibility centers. Engineered and discretionary expense centers. Profit centers and measuring its profitability.