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NAME*	SURNAME*	STUDENT ID

*written with capital letters

Range of the diploma examination APPLIED COMPUTER SCIENCE

1. Basic Digital Circuits: Logic Gates, Switches, Sequential Cirquites.
2. Binary Arithmetics, Boolean Functions, Karnaugh table
3. Structural programming - principles. Review of structural instructions.
4. Obiect-oriented programming - basic concepts, applications.
5. Basic operations on sets, functions and relations. Sentence calculus. Calculus of quantifiers.
6. Deterministic Finite State Automata ? definitione, applications.
7. Examples of computer architectures: von Neumana, Princeton, Harvard.
8. RISC and CISC processors - characteristics, differences.
9. Graphs. Spanning trees. Euler and Hamilton cycles. Cohesion. Graph traversal algorithms.
10. The concept of the algorithm. Sorting algorithms. Search algorithms.
11. Basics of algorithm analysis. Computational complexity.
12. The layered structure of operating system, the concept of the system kernel.
13. OSI layered model.
14. Data link layer protocols. Ethernet network. A stack of TCP / IP Internet protocols.
15. Application layer protocols.
16. Techniques for effective programming - examples.17. Memory management. Typical problems. Pointers.
18. Selection of programming paradigms to solve IT problems.
19. Functional programming vs imperative programming.
20. Abstract data types and their implementation in programming languages.
21. Algorithms for identifying static objects. Analytical and numerical optimization methods.
22. The specificity of the Internet of Things, application areas, solving problems with addressing a large number of devices, their dispersion and a very large amount of generated data.
23. Hardware solutions supporting communication and communication protocols used in embedded hardware and the Internet of Things
24. Database models. Relational database. Normalization. Transactions.
25. SQL language. Characteristic. Sublanguages.
26. Software life cycle models.
27. Software development processes.
28. The use of lists, collections and dictionaries in Python.
29. Differences and similarities of Java and Python languages.
30. Python Principles of parallel programming in the Python scripting language.
31. UML as the language of the project specification. Diagrams and their application.
32. Architectural and design patterns - classification, examples, applications.
33. Data protection methods.
34. Basic cryptographic algorithms.
35. Multidimensional data modeling (transactional and analytical data systems, types of multidimensional OLAP structures).
36. ETL process
37. Expressions and MDX directives.
38. Methods of knowledge processing in expert systems.
39. Inference in non-monotonic logic - a planning task.

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date, student's signature