

Information technologies

1. The Von Neumann computer architecture. Central Processing Unit, memory types, peripherals. Principles of the function blocks and their relations.
2. Representation of data and instructions in computer.
3. Interrupt driven control of memory and peripherals.
4. Data protection and data redundancy. Coding of a logical, numeric and text information. Using primitive data type in creating complex data types.
5. Boolean algebra. Basic logic functions and their implementation using logic circuits. Analysis and synthesis of logic circuits. Applications of combinative and sequential circuit.
7. Informal definition of algorithm and structured approach. Means of graphic representation of algorithms.
8. General rules for algorithm and program creation. Principles of imperative programming languages.
9. Algorithmization. Data types, their classification and implementation in the C programming language.
10. Creating a program according to the rules of structured programming. Elementary control structures, dynamic data structures, variables.
11. Definition of an object. Class of objects, collection of objects. Relationships between objects. Polymorphism. Object computational model. Object-oriented programming languages.
12. Creating a program according to the rules of object programming. Elementary control structures, dynamic data structures, variables. Design patterns. Refactoring.
13. Queue, stack, tree and operations with them. Sorting and search algorithms and their implementation in structured and object languages.
14. Relational and object data model in databases and relationship between them.
15. Formal techniques of relational and object database design. Data normalization.
16. Query languages in relational and object database systems. Fundamentals of SQL and OQL languages.
17. Operating system as a manager of processes and resources. Types of operating systems. Organization of data on hard drives. File systems.
18. File systems in UNIX-like operating systems. Processes in UNIX-like operating systems.
19. Structured analysis method. Diagrams used in data modelling. Diagrams used in function modelling.
20. Information system life cycle. Life cycle phases. Life cycle types.

recommended reading:

1. Ambler S.: The elements of UML 2.0 style, 2005
2. Hall J.: Accounting Information Systems, Cengage Learning, 2010.
3. Date C.J., An Introduction to Database Systems, ISBN 0-321-19784-4
4. Edmonds. J.: How to Think about Algorithms, Cambridge Univesity Press: Cambridge, 2008, ISBN 978-521-61410-8
5. Peek J. et al.: Learning the Unix Operating System, Fifth Edition. O'Reilly 2002. ISBN 978-0596002619
6. Petersen R.: Linux - The Complete Reference, Sixth Edition. McGraw-Hill 2008. ISBN: 978-0071492478