DON STATE TECHNICAL UNIVERSITY

DEPARTMENT OF DIGITAL EDUCATIONAL TECHNOLOGIES

Department of «Natural Sciences»

PREPARATION FOR THE FINAL CERTIFICATION IN COMPUTER SCIENCE

Tutorial for foreign additional general education programs

Authors
Morenko B.N.
Babakova L.D.

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CONTENT

ANNOTATION

Contains a list of theoretical questions and practical tasks included in exam tickets, additional questions on all topics of the computer science course, models of answers to questions of exam tickets, assessment criteria and recommended literature. It is an addition to the work program and the fund of evaluation tools for computer science.

Recommended for independent work of foreign students of additional general education programs in preparation for the final certification in computer science.

Authors:

Morenko B.N.   - Ph.D., Associate Professor
                 of the Department
                 «Natural Sciences»

Babakova L.D. - Art. lecturer of the department
                 «Russian as a foreign language»

FOREWORD

The training manual was compiled in accordance with the Order of the Ministry of Education and Science of Russia dated 03.10.2014 No. 1304 "On approval of the requirements for the development of additional general educational programs that ensure the preparation of foreign citizens and stateless persons for the development of professional educational programs in the Russian language".

The manual includes the material of the work program of the discipline and the fund of assessment tools in informatics, which must be mastered in preparation for the final certification (exam). Contains a list of theoretical questions and practical tasks that are included in the exam tickets.

To optimize the independent work of foreign students in preparation for exams, the entire educational material of the computer science course is divided into separate topics, each of which contains a list of additional questions. Students should know and explain the answers to these questions in Russian. Each topic has a list of references and Internet sources, which are recommended to be used in preparation for the final certification.

1. GOALS AND OBJECTIVES OF STUDYING INFORMATICS

The purpose of mastering the discipline "Informatics" at the stage of pre-university training is to form the level of education in the field of information technology among foreign students of additional general education programs (foreign students), which is necessary and sufficient for continuing education in higher educational institutions of the Russian Federation in selected specialties.

The study of the discipline "Informatics" is aimed at achieving the following goals by foreign students:

- mastering the system of basic knowledge, reflecting the contribution of informatics to the formation of a modern scientific picture of the world and the role of information processes in it;

- mastering the skills to work with various types of information using computer technology;

- development of creative abilities and cognitive interests in the study of technical, technological and natural science disciplines.

The study of the discipline "Informatics" by foreign students is aimed at the implementation of the following tasks:

- mastering the skills to develop, build and analyze information models of real objects and processes, using the capabilities of information technology;

- gaining experience in the use of information technology in educational activities.

An important goal of studying the course "Informatics" is also to provide foreign students of pre-university training with the subject and subject-speech skills and skills in the field of informatics and information technology necessary to continue their studies at a Russian university.

2. REQUIREMENTS FOR THE LEVEL OF TRAINING
FOREIGN LISTENERS, COMPLETED INFORMATICS COURSE

2.1. Foreign listeners must have a representative indolence:

- about informatics and its place in future professional activities;
- about the basic concepts of informatics;
- about the device and basic capabilities of the computer;
- about the classification and capabilities of the software;
- on the methods of processing information using a computer.

2.2. Based on the results of mastering an additional general education program in computer science, students should know:

- object, subject of informatics;
- definitions (descriptions) of the basic concepts of informatics that are significant for vocational education;
- the name and functional purpose of the main devices and peripherals of the computer;
- safety rules when working on a PC;
- principles of storing information in a computer;
- the concept of encoding and decoding information; types of number systems;
- OS;
- the structure of the file system for storing information; file types;
- methods of entering information from the keyboard;
- the main types of software and their purpose;
- basic objects in a text editor and techniques for their processing;
- the main objects in a graphical editor and techniques for their processing;
- the main objects in spreadsheets, techniques for their processing;
- the main types of algorithms;

- the stages of solving computational and functional tasks using a computer;

- elements of algorithmic methods necessary for solving the simplest tasks of information processing;

- elements of the programming language (program and its structure: variable, function, basic operators);

- elements of programming methods necessary for solving the simplest problems.

2.3. Based on the results of mastering an additional general education program in computer science, students should be able to:

- characterize informatics as a science;

- use the terminology and symbolism of information matics;

- to formulate the definitions of the studied basic concepts of informatics;

- explain the functional purpose of the main devices and peripherals of the computer;

- navigate the main operating systems and the file storage system;

- operate at an elementary level with files and directories of the operating system;

- use the computer keyboard;

- navigate the main types of software (text editor, graphics editor, spreadsheets, presentations, etc.);

- use a text editor; simple graphic editor; spreadsheets;

- to solve the problems of information processing of an integrative nature;

- draw up an information model and an algorithm for solving the problem;

- to interact with a computer at the level necessary for solving the simplest tasks of information processing;

- to program the simplest computational tasks in an integrated high-level language environment.

2.4. Foreign students must have the skills:

- the use of computer technology in professional activities;

- formulation and solution of the simplest applied problems using computer technology.

3. QUESTIONS ON TOPICS FINAL CONTROL

Study Questions	What you need to know
TOPIC 1. Information. Information processes. Information. Information concept. Types of information. Information properties. Human perception of information. Information processes. Receiving, processing, storing, transmitting and using information. Computer science. Informatics subject. ¬ Development of computer technology. Computer generations.	Know the definition of information, its properties, types of information processes, basic concepts of informatics.
TOPIC 2. Number systems. Presentation of information in a computer. Number systems. Positional and non-positional number systems. Decimal number system. Binary number system. Binary arithmetic. Octal and hexadecimal number systems. Translation of numbers from one number system to another. Measurement of information. Information units.	Know the principles of storing and processing information in a computer, the number systems used in this case. Know the units of measurement of information.

TOPIC 3. Computer device. The device of a personal computer. Computer peripherals. Information input and output devices. Preparing the computer for work. The order of turning on and off the computer. Safety instructions for working on a computer.	Know the enlarged composition of the computer and the purpose of its main components, the technology of working on the computer, security measures.
TOPIC 4. Software. Software. Software classification. System programs. OS. Purpose and types of operating systems. Shell programs, drivers, utilities, antivirus programs. Application programs. Text editors. Electronic tables. Graphic editor. Database. File system for storing information. File types.	Know the types of software, its classification, the procedure for using it to solve practical problems. Know the storage file system and the main file types.
TOPIC 5. Algorithmizing. Algorithms. The concept of an algorithm. Algorithm properties. Methods for describing algorithms. Graphic description of algorithms. Block diagrams of algorithms. Designations in block diagrams. Types of algorithms. Linear algorithms (following). Forking algorithms (branching). Cyclic Algo-Rhythms.	Know the purpose of algorithms, their types, methods of description. Have the skills to compose the simplest graphical algorithms for solving educational and applied problems.

TOPIC 6. Turbo Pascal Programming Language. Algorithmic language Turbo Pascal. The main features of the Turbo Pascal language. Turbo Pascal alphabet. Writing arithmetic expressions and numbers. Turbo Pascal program structure. Data types. Turbo Pascal interface. Set, debug and run programs for execution. Operators of input and output of information. Forking programs (branching). Case ... of selection operator. Cyclic programs. Loops with precondition, postcondition, parameter. Arrays in Turbo Pascal. Description of arrays. Stages of solving problems using a computer.	Know the alphabet, structure and capabilities of the Turbo Pascal programming language. Have the skills to compose programs for solving the simplest educational and applied problems
TOPIC 7. Processing technology text information. Text processing technology. Text editors. Basic objects in a text editor. Entering text from the keyboard. Editing and formatting of text. Operations with text. Creation and work with tables. Working with graphics.	Know the capabilities of text editors and their use for the preparation of text documents, including the use of graphic objects.

TOPIC 8. Processing technology numerical information. Spreadsheets. The structure of electronic tables. Built-in functions. Addressing in spreadsheets. Use of spreadsheets for solving problems in the field of technical and natural sciences. Using spreadsheets to build graphs and charts.	Know the possibilities spreadsheets. Possess the basic methods of using them to solve applied problems.
TOPIC 9. Technology of processing graphic information. Graphic editor. The main objects in the graphics editor. Computer presentations. Development of computer presentations. Requirements for computer presentations.	Know the capabilities of graphic editors. Master the basic methods of developing presentations.
TOPIC 10. Communication technologies Communication technology. Computer networks. Classification of computer networks. Local and global computer networks. Internet. Finding information on the Internet.	Know the types of computer networks, types of search engines and methods of searching for information on the Internet.

4. QUESTIONS FOR SELF-TEST
ON THE TOPICS OF THE COURSE

Topic 1. Information. Information processes

- What is information?
- What types of information do you know?
- What can you do with the information?
- What properties of information do you know?
- How does a person perceive information?
- What is text information? Give examples.
- What is graphic information? Give examples.

- What is numerical information? Give examples.
- What is audio information? Give examples.
- What is video information? Give examples.
- What are information processes?
- What is informatics? What does computer science study?
- Why do you need to measure information?
- What is the name of the minimum unit of information?
- What is the name of the unit for measuring the amount of information?
- What is the relationship between byte and bit?
- What other units of measurement of information do you know?

Topic 2. Number systems
- What is a number system?
- What types of number systems do you know?
- What is the difference between a positional number system and a non-positional one?
- How do you read numbers in the binary system?
- What is the base of the number system? What does it show?
- What numbers are used in binary, octal and hexadecimal notation systems to write numbers?
- How to convert a decimal number to binary, octal and hexadecimal number systems?
- How to convert binary, octal and hexadecimal numbers to decimal notation?
- How is the addition of binary numbers performed?
- How is the multiplication of binary numbers performed?

Topic 3. Computer device
- What is included in a personal computer?
- What components are located in the system unit?
- What is the monitor for?

- How is the size of the monitor measured?
- What types of monitors do you know?
- What is the keyboard for?
- What key groups do you know?
- What input devices do you know?
- What output devices do you know?
- What storage devices do you know?

Topic 4. Software

- What is a program?
- What is software?
- What software groups do you know?
- What are system programs for?
- What is included in the system programs?
- What functions does the operating system perform?
- What are anti-virus programs for?
- What are the application programs for?
- What is included in the application programs?
- What are text editors for?
- What are instrumental programs for?
- What functions do spreadsheets perform?
- What is a file?
- What types of information can a file contain?
- What operations can be performed with files?
- What are the requirements for a file name in MS-DOS?
- What functions does the file system perform
  computer?
- What is the structure of the computer's file system?
- What is a "full file name"?

Topic 5. Algorithmizing

- What is an algorithm?
- What properties of algorithms do you know?
- What is the "discreteness" of the algorithm?
- What is the "certainty" of an algorithm?
- What ways of describing algorithms do you know?
- What is a graphical way to describe algorithms?
- What blocks are used in the graphical description of algorithms?
- What kinds of algorithms do you know?
- What algorithm is called linear?
- What algorithm is called branching?
- What algorithm is called cyclic?

Topic 6. Turbo Pascal programming language

- What is the alphabet of a programming language?
- What is included in the Turbo Pascal alphabet?
- What arithmetic signs are used in Turbo Pascal?
- What is a linear program?
- What is a Forking Program?
- What are real and whole numbers?
- What are the rules for writing numbers in Turbo Pascal?
- What arithmetic functions do you know?
- How to write a number in exponential form?

Topic 7. Technology of processing text information

- What are text editors for?
- What kind of software is it?
  text editors?
- What programs do you know for creating text documents?
- What is the keyboard for?
- What is text editing?
- What is text formatting?
- What structural elements of the text do you know?
- What text editors are included with Microsoft Windows?

- What extensions do text files have
documents?

Topic 8. Technology of processing numerical information
- What are spreadsheets for?
- What programs for working with electronic
tables do you know?
- What kind of software are spreadsheets?
- What are rows and columns in a spreadsheet?
- How are rows and columns labeled in spreadsheets?
- What is the basic object of a spreadsheet?
- What is a cell?
- What is an active cell?
- How is the cell address recorded in electronic
tables?
- What is the shape of the cursor in spreadsheets?
- How to write a formula into a cell?
- What types of information can a cell contain?
- What standard spreadsheet functions do you know?
- What extension do spreadsheet files have?

Topic 9. Technology of processing graphic information
- What are graphic editors for?
- What graphic editors do you know?
- What features does Paint have?
- How to get started with the Paint graphic editor?
- What is a computer presentation?
- What programs are designed to create
presentations?
- What kind of software is it?
software for creating presentations?
- What are PowerPoint templates for?
- What is a slide in a computer presentation?
- What do you know the requirements for computer
presentations?

- What is the difference between a presentation and a demonstration?
- What extension do presentation files have?

Topic 10. Communication technologies
- What types of computer networks do you know?
- What is the topology of computer networks?
- What is the difference between a local computer network and global network?
- Which communication line has a high data transfer rate?
- What is the modem for?
- What is the Internet?
- What is the address of the computer when working on the network Internet?
- What is hypertext?
- What is the name of the hypertext page viewer?
- What programs are used to find information on the Internet?

5. LIST OF THEORETICAL ISSUES, INCLUDED IN THE EXAMINATION TICKETS

1. Information. Types of information. Information processes.
2. Number systems. Binary number system.
3. Binary arithmetic.
4. Octal and hexadecimal number systems.
5. Measurement of information.
6. Encoding and decoding of information.
7. The device of a personal computer.
8. Input devices and information output devices.
9. Devices for storing information.
10. Classification of software (software).
11. Purpose of the operating system of a personal computer.
12. Software classification. System programs.
13. Software classification. Application programs.

14. File system of information storage. Types files.
15. Types of algorithms. Graphic description of the algorithm.
16. Linear algorithms (follow-up).
17. Forking algorithms (branching).
18. Cyclic algorithms.
19. Alphabet of the Turbo Pascal programming language.
20. The structure of the program in the Turbo Pascal language.
21. Linear programs in Turbo Pascal.
22. Forking programs in Turbo Pascal.
23. Loop programs in Turbo Pascal.
24. Operator of choice.
25. Arrays in Turbo Pascal.
26. Stages of solving problems using a computer.
27. Graphic editors. Purpose and main features.
28. Text editors. Editing and formatting text.
29. Spreadsheets. Purpose and main features.
30. Computer networks. Classification of computer networks.

6. METHODOLOGICAL RECOMMENDATIONS
PREPARATION OF ANSWER ON THEORETICAL QUESTIONS

Topic 1. Information. Information processes.

The exam tickets include a question:

1. Information. Types of information. Information processes.
When preparing to answer this question on your exam ticket, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Моренко Б.Н. Информатика. Вводный курс: учеб. пособие для иностранных граждан и лиц без гражданства. [Электрон. ресурс]. / Б.Н. Моренко, Л.Д. Бабакова, О.М. Воскерчьян. – Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

3. Угринович Н.Д. Информатика и информационные технологии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. –

М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал на с. 12-15.

4. Шауцукова Л.З. Информатика. Теория (с задачами и решениями). Учить материал: Гл. 1, пп. 1.1-1.4, 1.6-1.8. [Электрон. ресурс]. – Режим доступа:
http://book.kbsu.ru/theory/chapter1/1_1_0.html

5. Моренко Б.Н. Электронный курс по дисциплине «Информатика и информационно-коммуникационные технологии» для иностранных слушателей дополнительных образовательных программ [Электрон. ресурс] / Б.Н. Моренко, Т.А. Тюрина. – Режим доступа: http://test.skif.donstu.ru

Topic 2. Number systems
The exam tickets include questions:
1. Number systems. Binary number system.
2. Binary arithmetic.
3. Octal and hexadecimal number systems.
4. Measurement of information.
5. Encoding and decoding of information.

When preparing to answer these questions on your exam card, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Моренко Б.Н. Системы счисления: учеб. пособие по дисциплине «Информатика» для иностранных слушателей дополнительных общеобразовательных программ. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова. – Режим доступа: https://de.donstu.ru/elect/divisions/620/courses
Рег. номер 5236 от 29.01.2019.

3. Моренко Б.Н. Системы счисления. Задания для самоконтроля по информатике для иностранных студентов предвузовской подготовки. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

4. Угринович Н.Д. Информатика и информационные техно-логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал на с. 74-80, 82-103.

5. Шауцукова Л.З. Информатика. Теория (с задачами и решениями). Учить материал: гл. 1, п. 1.5; гл. 4, пп. 4.1–4.10. [Электрон. ресурс]. – Режим доступа: http://book.kbsu.ru/theory/index.html

6. Моренко Б.Н. Электронный курс по дисциплине «Инфор-матика и информационно-коммуникационные технологии» для иностранных слушателей дополнительных образовательных про-грамм. [Электрон. ресурс] / Б.Н. Моренко, Т.А. Тюрина, 2019. Ре-жим доступа: http://test.skif.donstu.ru

Topic 3. The device of a personal computer

The exam tickets include questions:

1. The device of a personal computer. PC peripherals.

2. Input devices and information output devices.

3. Devices for storing information.

When preparing to answer these questions on your exam card, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные техно-логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал на с. 23-37.

3. Шауцукова Л.З. Информатика. Теория (с задачами и ре-шениями). [Электрон. ресурс] / Л.З. Шауцукова. Учить материал: гл. 2, пп. 2.1-2.2, 2.7, 2.10, 2.13, 2.15, 2.17, 2.19-2.20. – Режим доступа: http://book.kbsu.ru/theory/index.html

4. Моренко Б.Н. Устройство персонального компьютера. Мультимедийное пособие по информатике для иностранных студентов предвузовской подготовки. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

5. Моренко Б.Н. Электронный курс по дисциплине «Информатика и информационно-коммуникационные технологии» для иностранных слушателей дополнительных образовательных программ. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова. – Режим доступа: http://test.skif.donstu.ru

Topic 4. Software

The exam tickets include questions:

    1. Classification of software (software).

    2. Purpose of the operating system of a personal computer

    3. Software classification. System programs.

    4. Software classification. Application programs.

    5. File system of information storage. File types.

When preparing to answer these questions on your exam card, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные технологии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал на с. 37-39, 51-52.

3. Шауцукова Л.З. Информатика. Теория (с задачами и решениями). [Электрон. ресурс] / Л.З. Шауцукова. Учить материал: гл. 6 «Программное обеспечение компьютера», пп. 6.1-6.5, 6.8, 6.11-6.14, 6.16-6.17. – Режим доступа:

http://book.kbsu.ru/theory/index.html

4. Моренко Б.Н. Информатика. Файлы и файловая система компьютера: учеб.-метод. пособие по дисциплине «Информатика» для иностранных слушателей дополнительных общеобразовательных программ [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

5. Моренко Б.Н. Электронный курс по дисциплине «Информатика и информационно-коммуникационные техноло-гии» для иностранных слушателей дополнительных образова-тельных программ [Электрон. ресурс] / Б.Н. Моренко, Т.А. Тюрина. – Режим доступа: http://test.skif.donstu.ru

Topic 5. Algorithms

The exam tickets include questions:

1. Types of algorithms. Graphic description of algorithms.
2. Linear algorithms (follow-up).
3. Forking algorithms (branching).
4. Cyclic algorithms.

When preparing to answer these questions on your exam card, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные техно-логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить матери-ал на с. 146-156.

3. Шауцукова Л.З. Информатика. Теория (с задачами и ре-шениями) [Электрон. ресурс] / Л.З. Шауцукова. Учить материал: гл. 7, пп. 7.1, 7.3-7.6, 7.8.

Режим доступа: http://book.kbsu.ru/theory/index.html

4. Моренко Б.Н. Информатика. Алгоритмы и алгоритми-зация: учеб.-метод. пособие для иностранных слушателей

дополнительных общеобразовательных программ. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

5. Моренко Б.Н. Электронный курс по дисциплине «Информатика и информационно-коммуникационные технологии» для иностранных слушателей дополнительных образовательных программ [Электрон. ресурс] / Б.Н. Моренко, Т.А. Тюрина. – Режим доступа: http://test.skif.donstu.ru

Topic 6. Turbo Pascal programming language

The exam tickets include questions:

1. Alphabet of the Turbo Pascal programming language.
2. The structure of the program in the Turbo Pascal language.
3. Linear programs (follow) in Turbo Pascal.
4. Forking programs (branches) in Turbo Pascal.
5. Cyclic programs in Turbo Pascal.
6. Stages of solving problems using a computer.

When preparing to answer these questions on your exam card, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Моренко Б.Н. Линейные программы в Turbo Pascal: метод. указания к лабораторно-практическим работам для иностранных студентов предвузовской подготовки. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

3. Моренко Б.Н. Ветвления в Turbo Pascal: метод. указания для практических работ по языку программирования Turbo Pascal для иностранных студентов предвузовской подготовки. [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.

Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

4. Моренко Б.Н. Информатика. Циклические программы в Turbo Pascal: учеб.-метод. пособие для иностранных слушателей дополнительных общеобразовательных программ [Электрон. ресурс] / Б.Н. Моренко, Л.Д. Бабакова.
Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

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Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

Topic 7. Technology of processing text information

The exam tickets include the question:

1. Text editors. Editing and formatting of text.

When preparing to answer this question on your exam ticket, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные технологии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал: гл. 9, с. 337-354.

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Режим доступа: https://de.donstu.ru/elect/divisions/620/courses

Topic 8. Technology of processing numerical information

The exam tickets include the question:

1. Spreadsheets. Performing mathematical calculations.

When preparing to answer this question on your exam ticket, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные техно-логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить матери-ал: гл. 10, с. 361-377.

Topic 9. Technology of processing graphic information

The exam tickets include the question:

1. Graphic editors. Purpose and main features.

When preparing to answer this question on your exam ticket, use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные техно-логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.: БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить мате-риал: гл. 7, с. 304-318, 323-336.

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Topic 10. Communication technologies

The exam tickets include the question:

1. Computer networks. Classification of computer networks.

When preparing to answer this question on your exam ticket,
use the following literature and online sources:

1. Рабочая тетрадь по информатике.

2. Угринович Н.Д. Информатика и информационные техно-
логии: учеб. для 10-11 классов / Н.Д. Угринович. – 3-е изд. – М.:
БИНОМ. Лаборатория знаний, 2006. – 511 с. Учить материал:
гл. 7, с. 304-318, 323-336.

7. LIST OF PRACTICAL TASKS,
INCLUDED IN THE EXAMINATION TICKETS

Draw up a block diagram of the algorithm and write a program
for calculating functions:

1. $y = \begin{cases} x - 2, & при\ x > 10 \\ 5x + 1 & \text{- в остальных случаях} \end{cases}$

2. $y = \begin{cases} 4x + 7, & при\ x \le 20 \\ x + 2 & \text{- в остальных случаях} \end{cases}$

3. $y = \begin{cases} x + 10, & при\ x > 5 \\ x^2 + 2 & \text{- в остальных случаях} \end{cases}$

4. $y = \begin{cases} a + 5b, & при\ a > 10\ u\ b < 15 \\ a + b & \text{- в остальных случаях} \end{cases}$

5. $y = \begin{cases} 10a + b, & при\ a > 5\ u\ b < 20 \\ 6ab & \text{- в остальных случаях} \end{cases}$

6. $y = \begin{cases} a + bc, & при\ a > 0,\ b < 10\ u\ c = 2 \\ ab + c & \text{- в остальных случаях} \end{cases}$

7. $y = \begin{cases} x^2, & \text{при } x < 0 \\ x^3 - 1, & \text{при } x > 3 \\ 2x - 3 & \text{- в остальных случаях} \end{cases}$

8. $y = \begin{cases} x + 3, & \text{при } x < 10 \\ x - 8, & \text{при } 10 \le x \le 20 \\ x^2 + 1, & \text{при } x > 20 \end{cases}$

9. $y = \begin{cases} 2x, & \text{при } x < 0 \\ x - 8, & \text{при } 0 \le x \le 20 \\ 5x + 2, & \text{при } x > 20 \end{cases}$

10. $y = \begin{cases} 13 + 10x, & \text{при } x < 10 \\ 18 + 5x, & \text{при } 10 \le x \le 50 \\ x^2 + 3, & \text{при } x > 50 \end{cases}$

11. $y = \begin{cases} 3 - x, & \text{при } x < 5 \\ 1 + 2x, & \text{при } 5 \le x \le 10 \\ x + 3, & \text{при } x > 10 \end{cases}$

12. $y = \begin{cases} x^3 + 5, & \text{при } x < \text{-5} \\ \sqrt{x} - 1, & \text{при } x > 20 \\ 2x, & \text{при } \text{-5} \le x \le 20 \end{cases}$

13. $y = \begin{cases} 2x, & \text{при } x > 20 \\ x - 1, & \text{при } x < 5 \\ x + 5 & \text{- в остальных случаях} \end{cases}$

14. $y = \begin{cases} 2x - 1, & \text{при } x > 200 \\ 3x, & \text{при } x < 5 \\ \sqrt{x}, & \text{при } 5 \le x \le 200 \end{cases}$

15. $y = \begin{cases} x+2, & при\ x < 3 \\ x^2 - 8, & при\ x > 10 \\ 2x+1, & при\ 3 \le x \le 10 \end{cases}$

16. $y = \begin{cases} 5 + \sin x, & при\ x > 15 \\ x^2 - 3, & при\ x < 0 \\ 8x+1, & при\ 0 \le x \le 15 \end{cases}$

17. $y = \begin{cases} |a|+1, & при\ a < 2 \\ 2a^2, & при\ a \ge 5 \\ a-1, & \text{- в остальных случаях} \end{cases}$

18. $y = \begin{cases} \cos 2x + 1, & при\ x \ge 50 \\ 4x+7, & при\ x \le 10 \\ x+2 & \text{- в остальных случаях} \end{cases}$

19. $y = \begin{cases} 2x+1, & при\ x \ge 10 \\ 2x+10 & при\ x \le 0 \\ x+5 & \text{- в остальных случаях} \end{cases}$

20. $y = \begin{cases} 2x, & при\ 0 \le x \le 20 \\ x^2 + 2x, & при\ 21 \le x \le 50 \\ x+5, & при\ 51 \le x \le 70 \\ x, & при\ 71 \le x \le 90 \end{cases}$

21. Составить программу расчёта синусов углов от 0 до 180° с шагом 15°.

22. Составить программу расчёта тангенсов углов от 30° до 60° с шагом 5°.

23. Составить программу расчёта суммы целого ряда чисел от 10 до 20.

24. Составить программу расчёта суммы натурального ряда чисел от 1 до 50.

25. Составить программу вывода на экран монитора последовательного ряда целых чисел от 10 до 50 с шагом 5.

26. Составить программу вывода на экран монитора последовательного ряда целых чисел от 10 до 50 с использованием оператора цикла с предусловием.

27. Составить программу вывода на экран монитора последовательного ряда целых чисел от 0 до 20 с использованием оператора цикла с постусловием.
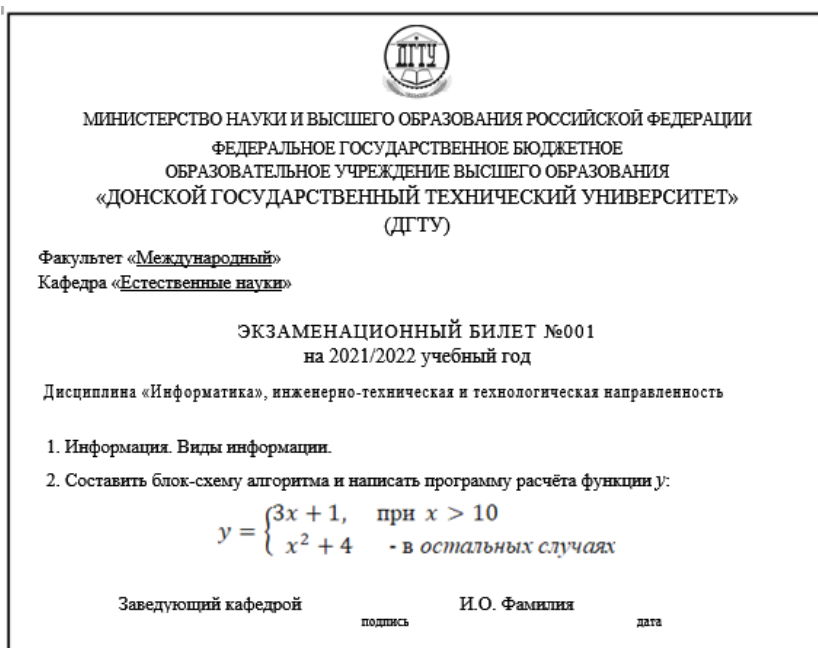
28. Составить программу вывода на экран монитора последовательного ряда чисел от − 2 до + 2 с шагом 0,5 с использованием оператора цикла с параметром.

29. Составить программу вывода на экран монитора последовательного ряда целых чисел от − 10 до + 10 с шагом 2 с использованием оператора цикла с параметром.

30. Составить блок-схему алгоритма и написать программу расчёта площади и периметра треугольника, размеры сторон которого равны a, b, c. Выполнить расчёты для a=30, b=20,5 и c=40,2.

8. ORGANIZATION OF FINAL CONTROL

The final certification in computer science is carried out at the end of the academic year in the form of an exam. The computer science exam ticket (Fig. 1) consists of a theoretical question and a practical assignment. The student must answer the theoretical question of the exam ticket, build a flowchart of the algorithm for solving the proposed problem (example), write on the computer a program for solving this problem (example) in the Turbo Pascal language and test it.

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ «ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ» (ДГТУ)

Факультет «Международный»
Кафедра «Естественные науки»

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №001
на 2021/2022 учебный год

Дисциплина «Информатика», инженерно-техническая и технологическая направленность

1. Информация. Виды информации.

2. Составить блок-схему алгоритма и написать программу расчёта функции y:

$$y = \begin{cases} 3x + 1, & \text{при } x > 10 \\ x^2 + 4 & \text{- в остальных случаях} \end{cases}$$

Заведующий кафедрой   И.О. Фамилия

подпись   дата

Figure 1. An example of a computer science exam ticket

When answering the first (theoretical) question of the exam ticket, the student must give a short answer to it. When answering the second question of the exam ticket (practical task), it is necessary to build on paper a block diagram of the algorithm for solving the problem and, on its basis, write a program in the Turbo Pascal pro-

gramming language.

When debugging and testing the program, the student must independently select several values of x and calculate the function y on the computer. Then you should carry out similar calculations, for example, on a calculator, and check the correctness of the obtained values of the function y. If the calculation results coincide, it is concluded that there are no errors in the program.

A short answer to the theoretical question of the ticket is shown as a model: "Information. Types of information" (see fig. 1). When answering, the student must show knowledge of the theoretical part of the computer science course. To do this, he must give a short answer in Russian to the ticket question.

Model for answering a theoretical question
examination card

Information is information about the world around us and its properties. A person receives information through the senses: sight, hearing, smell, touch and taste.

Types of information: text information (letter, document, book, newspaper); graphic information (photography, diagram, graph, drawing, painting, drawing); numerical information (date, time, point coordinates, temperature, body weight); sound information (call to the lesson, phone call, music); combined information or video information (for example, karaoke is sound and text information; a mathematics textbook contains text, numerical and graphic information).

Practice response model
examination card

When answering the second question of the exam ticket, you need to build a block diagram of the algorithm for solving it, according to the given conditions of the problem (example), write, debug and test the program (check the correctness of its operation).

As a sample (model), the answer is given to the second question of the examination card (see Fig. 1).

Task. Draw up a block diagram of the algorithm (Fig. 2) and write a program for calculating the function Y:

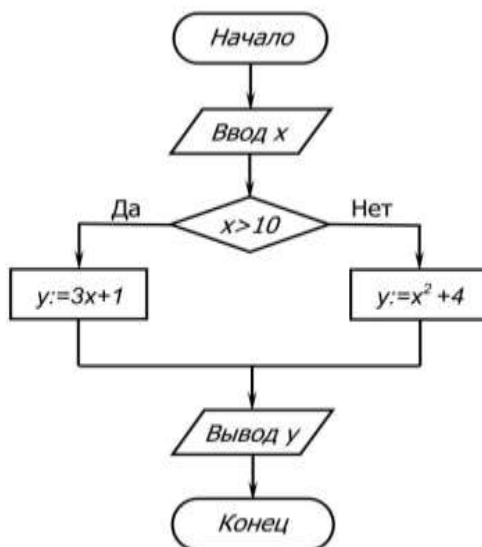$$y = \begin{cases} 3x+1, & \text{при } x > 10 \\ x^2+4 & \text{- в остальных случаях} \end{cases}$$

Figure 2. Block diagram of the algorithm for solving the problem

The program for calculating the function y needs to be written on paper, typed, debugged and tested on a personal computer. Calculate the function y for the given values of x:

```
program BranchProg_01;
var
      x, y: integer;
begin
      write ('Введите значение x,  x=');
```

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```
readln (x);
    if x>10
        then y:=3*x+1
        else y:=x*x+4;
writeln ('При x=', x, ' значение функции y=', y);
readln;
end.
```

Debugging and Testing the Program

When debugging and testing a program on a computer, the student independently chooses several values of x and calculates the function y. Then you should carry out similar calculations, for example, on a calculator, and check the correctness of the y values obtained. If the results of the calculations coincide, it is concluded that there are no errors in the program. Below, as an example, the results of calculating the function y on a computer for some values of x are given.

№ п/п	Значение x	Значение функции y
1.	5	29
2.	20	61
3.	10	104
4.	−200	40004
5.	0	4

Final Evaluation Criteria

The exam is a form of the final assessment of the quality of mastering by foreign students of the entire volume of educational material in the course of computer science. According to the results of the exam, which is carried out orally, the students are given marks "excellent", "good", "satisfactory" or "unsatisfactory".

The mark "excellent" is given to the student if:

- the student knows, understands the main provisions of the computer science course, demonstrates the ability to apply them to complete a task in which there are no explicitly specified solutions;

- the student analyzes the elements, establishes connections between them, brings them into a single system, is able to put forward an idea, design and present his solution to the task, problem;

- the student's answer on the theoretical and practical material contained in the examination card questions is complete and meets the requirements of the discipline program;

- the student has demonstrated fluency in the conceptual and conceptual apparatus, scientific style of speech and terminology of the relevant discipline;

- the foreign student gave the correct answers to additional questions of the teacher;

- the student correctly compiled a block diagram of the algorithm for solving the proposed problem, wrote a program in a programming language and performed calculations on a computer.

The mark "good" is given to a student if:

- the student knows and understands the main provisions of the discipline, demonstrates the ability to apply them to complete a task in which there are no explicitly indicated ways of solving; analyzes elements, establishes connections between them;

- the answer to the theoretical material contained in the questions of the examination card is complete or partially complete and meets the requirements of the program, but an accurate, confident and reasoned presentation of the material is not always given;

- the student gave correct answers to additional questions of the teacher;

- the student has demonstrated proficiency in the terminology used in the computer science course;

- the student correctly drew up a block diagram of the algorithm for solving the proposed problem, wrote a program in a programming language and performed calculations on a computer, independently correcting errors made when writing the text of the program.

The mark "satisfactory" is given to a student if:

- the student knows and reproduces the main provisions of the discipline in accordance with the assignment, applies them to perform a typical assignment, in which the solution is obvious;

- the student has demonstrated basic knowledge of the most important sections of the discipline and the content of the lecture course;

- the student has difficulties in using the scientific and conceptual apparatus in the terminology of the course;

- despite the lack of knowledge, the student has a formed desire to logically clearly construct an answer, which indicates the possibility of further training;

- the student with errors drew up a block diagram of the algorithm for solving the proposed problem, wrote a program in a programming language and performed calculations on a computer; with the help of the teacher, I corrected the mistakes made when writing the text of the program.

The mark "unsatisfactory" is given to a student if:

- the student has an idea of the content of the discipline, but does not know the main provisions (topic, section, etc.) to which the task belongs, is not able to complete the task with an obvious solution, does not have the skills of oral and written communication in the field of information technology in Russian language;

- does not possess the skills of using computer technology for educational purposes, the skills of setting and solving elementary applied problems using computer technology;

- the student has significant gaps in knowledge of the basic material on the discipline;

- in the process of answering the theoretical question contained in the examination card, fundamental mistakes were made in the presentation of the material;

- in the process of preparing the answer to the practical question contained in the questions of the examination card, the student was unable to develop a flowchart of algorithms for solving the problem and was unable to write the program text in the programming language.

Intermediate certification

Interim certification of foreign students based on the results of the first half of the year is carried out in the form of testing. Students are offered a test containing questions on all the studied sections of the computer science course. According to the results of the answers to the test questions, the mark "passed" or "not passed" is given.

Interim certification issues

1. Information. Types of information. Information processes.
2. Number systems. Binary number system.
3. Binary arithmetic.
4. Octal and Hexadecimal Systems reckoning.
5. Measurement of information.
6. Encoding and decoding of information.
7. The device of a personal computer.
8. Input devices and information output devices.
9. Devices for storing information.
10. Classification of software.
11. Purpose of the operating system of a personal computer.
12. Software. System programs.
13. Software. Application programs.
14. File system of information storage. Types files.
15. Types of algorithms. Graphic Description algorithms.
16. Linear algorithms (followings).
17. Forking algorithms (branching).
18. Cyclic algorithms.

The mid-term assessment test contains 30 questions, each of which has only one correct answer. The control-training test, which is given below, is similar in structure to the master test. We recommend that you complete it and assess the degree of your readiness for the test. For each correct answer to a test question, the student receives 1 point. For each wrong answer, the student receives 0 points. The mark "passed" is given to the student if he scored 13 points or more during the test. The mark "not passed" is given to the student if he scored 12 points or less.

9. CONTROL AND TRAINING TEST

Perform the suggested practice test. The correct answers to the questions are given at the end of the test.

1. Drawings, diagrams, graphs, photographs can:
    1) process and store information;
    2) transfer and process information;
    3) store and transmit information;
    4) all answers are correct.

2. Example of graphic information:
    1) a map of the city of Rostov;
    2) a call to the lesson;
    3) multiplication table;
    4) a letter to a friend.

3. The process of storing information includes:
    1) reading books;
    2) photographing;
    3) conversation of friends;
    4) watching movies.

4. A person receives the largest amount of information with the help of:
    1) hearing;
    2) touch;
    3) sense of smell;
    4) vision.

5. The decimal number 101_{10} in the binary system is written as:
    1) 1110100_2;
    2) 1100101_2;
    3) 1010011_2;
    4) 1000110_2.

6. The binary number 1011100_2 in the decimal number system is written as:
    1) 92_{10};
    2) 73_{10};
    3) 48_{10};
    4) 63_{10}.

7. The octal number 124_8 in the decimal system is written as:
   1) 52_{10};
   2) 106_{10};
   3) 93_{10};
   4) 84_{10}.

8. Hexadecimal decimal number 105 is written as:
   1) 92_{16};
   2) $1B2_{16}$;
   3) 69_{16};
   4) 73_{16}.

9. The sum of binary numbers 111_2 and 110_2 is:
   1) 1000_2;
   2) 1101_2;
   3) 1110_2;
   4) 1011_2.

10. The product of binary numbers 11_2 and 110_2 is equal to:
   1) 10010_2;
   2) 10101_2;
   3) 11101_2;
   4) 11110_2.

11. How many bits are there in 64 bytes?
   1) 1024;
   2) 640;
   3) 512;
   4) 256.

12. How many bytes are there in 1 KB?
   1) 1536;
   2) 512;
   3) 1000;
   4) 1024.

13. Manipulator "mouse" is a device:
   1) to display information on the monitor screen;
   2) to enter information into a computer;
   3) to read information;
   4) to scan information.

14. The system unit of the computer includes:
   1) mouse;
   2) printer;
   3) keyboard;
   4) motherboard.

15. The system unit of the computer does not include:
   1) manipulator "mouse";
   2) motherboard;
   3) power supply unit;
   4) hard disk and CD-ROM drive.

16. Monitor screen size measure:
   1) vertically;
   2) horizontally;
   3) diagonally;
   4) in height.

17. An operating system is:
   1) a program for entering information into a computer;
   2) a program for controlling the operation of a computer;
   3) a complex of applied and instrumental programs;
   4) components of the system unit, which are connected by a bus.

18. The program is:
   1) programming system;
   2) the way the user interacts with the computer;
   3) the sequence of solving the problem in a language
      understandable for a computer;
   4) a graphical description of the method for solving the problem.

19. The operating system is included in:
   1) system programs;
   2) applied programs;
   3) instrumental programs;
   4) programming systems.

20. Computer operation is controlled by:
   1) utility;
   2) text editor;
   3) programming language;
   4) operating system.

21. Spreadsheets are part of:
    1) instrumental programs;
    2) system programs;
    3) application programs;
    4) operating systems.
22. To determine the type of information that is contained in the file, you need to know:
    1) file size;
    2) main file name;
    3) the date the file was created;
    4) file name extension.
23. As a file name in MS-DOS, you can use call:
    1) aud_538.txt;
    2) MF-faculty.txt;
    3) txt.computer;
    4) group. 11.txt.
24. The path to the file C: \ DOC \ science.txt is specified. What is the name of the file?
    1) C: \ DOC \ science.txt;
    2) DOC \ science.txt;
    3) DOC \ science;
    4) science.txt.
25. The file name consists of two parts, which indicate:
    1) file type and size;
    2) file name and type;
    3) file name and size;
    4) file name and creation date.
26. The algorithm is:
    1) a description of the sequence for solving the problem;
    2) a set of commands for a personal computer;
    3) rules for displaying block diagrams of algorithms;
    4) a graphical description of the solution to the problem.
27. The choice of action depending on some conditions is described by the structure:
    1) cycle;
    2) following;
    3) branching;
    4) correct answers numbered 1 and 2.

28. To describe the repeated repetition of any actions use:
    1) only linear and branching algorithms;
    2) cyclic algorithms;
    3) branching algorithms (branching);
    4) linear algorithms (follow-up).

29. In which block should the command "Output y" be written?
    1)
    2)
    3)
    4)

30. Which element of the block diagram is indicated by the figure

    1) process;
    2) input, output;
    3) decision;
    4) beginning, end.

Answers to test questions:

1-3, 2-1, 3-2, 4-4, 5-2, 6-1, 7-4, 8-3, 9-2, 10-1, 11-3, 12-4, 13-2,
14-4, 15-1, 16-3, 17-2, 18-3, 19-1, 20-4, 21-3, 22-4, 23-1,
24-4, 25-2, 26-1, 27-3, 28-2, 29-4, 30-1.

10. LITERATURE AND INTERNET SOURCES

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