

Presentation of a Competition in Informatics and IT

Name of the Competition: Computer Networks

Area: Information Technologies (IT)

Style of the Competition:

- A. Outline of the competition: A combination of Test exam with multiple-choice answers and practice exam – solving real network problem.
- B. Individual competition.
- C. Financial conditions: free of charge for each competitor
- D. There is a restricted (two hours) time limit for filling the test, and one hour and a half time limit for solving the problem.
- E. Style of competition: Presence needed (attendance of the participants at an appointed time and place for filling the test and solving the practice problem)
- F. Method of evaluation: by grading system with postponed evaluation – tests are graded depending on the number of the correct answers, practice problem is graded depending on the number of solved tasks, and final score is made by the summing of the scores from the test and from the problem solving.
- G. The size of the Competition Jury is usually between 7 and 9 experts, appointed by the Minister of the Education and Science. The task of the Jury is to prepare the test and the practical problem to be solved, to manage the competition, to grade students and to prepare the final classifying. The Competition Jury is using a special Web site for the organization of the competition (publishing all the relevant information, registering the participants and constant dialogue and communication with all participants via special competition forums, as well as publishing the final results).
- H. The final stage is organized with the help of the Local Organizing committee (providing hotel and subsistence for all participants, and providing all the needed technical infrastructure – rooms, networking equipment, etc.)
- I. The Networking competition is first announced by the Ministry of Education and Science (MES) as a part of all National Competitions supported by MES. After that most of the information regarding the competition is announced by the special Web site available to support all school competitions in Information Technologies in Bulgaria. Usually Cisco Systems Bulgaria and Bulgarian Association of Networking Academies play big role in the marketing and organization of the competition.
- J. All competition results, tasks, competitor's works and lots of other information is published on the special Web site.
- K. The competition is organized in one age group: students at age older than 14 years.
- L. The winners received special certificates from the MES and lots of awards provided by companies - sponsors of the competition, like financial support, free Internet connection, and lots of material awards (network equipment components and accessories, etc.)
- M. The competition is organized in two consecutive days. During the first day students are solving a test, and the first 15 from the test are moving to the second day competition – solving a practice problem.

Target Group: All Bulgarian students can participate depending on their age – it is open for everyone.

Age of Participants: One age group: 15-19 years.

School level of Participants: Secondary schools and High schools.

Number of Participants and the number of editions of the competition in the Last 3 Years:

The average number of participants during the last three years is 160 per year.

History of Competition: The Networking competition started as a joint initiative of the MES, University of Sofia and Cisco Systems Bulgaria in 2004. They together with newly established Bulgarian Association of Networking Academies are the main organizers of this competition.

Financial Basis of the competition: The Olympiad is supported financially by the Ministry of Education and Science, with the help of many additional sponsors.

Competition themes:

1. Computer systems. Main computer components. Basic computer operations. Basic network interfaces and standards. LAN cards and modems.
2. Computer programs (software) – definition, main functions, classifications, development and implementation.
3. Main rules for working with computer systems and programs –start, stop, diagnose, problem detection, testing and maintenance. Main tools for testing and diagnosing network problems (ping, telnet, lookup, tracer, ipconfig, etc.)
4. Data communications – methods, mediums and channels, main functions. Information measuring. Binary computations. Computations in different numbering systems.
5. Operating systems – concepts, main tasks and functions, classification. Network layer. Network operating systems. Network commands and services.
6. Computer Networks. Types of networks – local, wide, metropolitan, storage, virtual, etc. Main topologies. Intranets and Extranets.
7. OSI Model architecture.
8. Network protocols. Internet protocol suite TCP/IP.
9. Local Area Networks – concepts, types, topology, standards, basic devices.
10. Ethernet technology. Main standards and protocols. Operations.
11. Wide area networks – concepts, connections, addressing, basic services. Users and access to resources.
12. Internet – history, definition, technical aspects. *IP addresses, domains, DNS services.* Main services and protocols – HTTP, FTP, POP3, SMTP.
13. Internet connection types – dial-up, ISDN, LAN, DSL/ADSL, Wi-Fi.
14. Electronic communication. Email clients, servers and protocols. Real-time communication – IRC, ICQ, Skype. Main functions and protocols.
15. IP address classes. Networks and subnets. Classless addressing. Internet Protocols IPv4, IPv6, ICMP.
16. Routing. Main routing protocols and algorithms. Basic routing devices.
17. Dynamic addressing protocols (DHCP, BOOTP, ARP, RARP). Static and dynamic address translation (NAT)..
18. Information security and protection. Coding methods and algorithms. Symetric algorithms – DES, 3DES.
19. Asymetric algorithmes (using public and private key) – RSA, DSA. Hashing algorithms – SHA-1, MD5.
20. Electronic signature. Digital sertificates. Virtual private networks.

Contact Address of the Organizers, E-mail, Web page(s):

Web site: <http://edusoft.fmi.uni-sofia.bg/>

Contact email address: edusoft@fmi.uni-sofia.bg

Head of the National Jury: Assoc. Prof. Dr. Krassen Stefanov, krassen@fmi.uni-sofia.bg, GSM: (+359-889)101919

Photo Gallery:



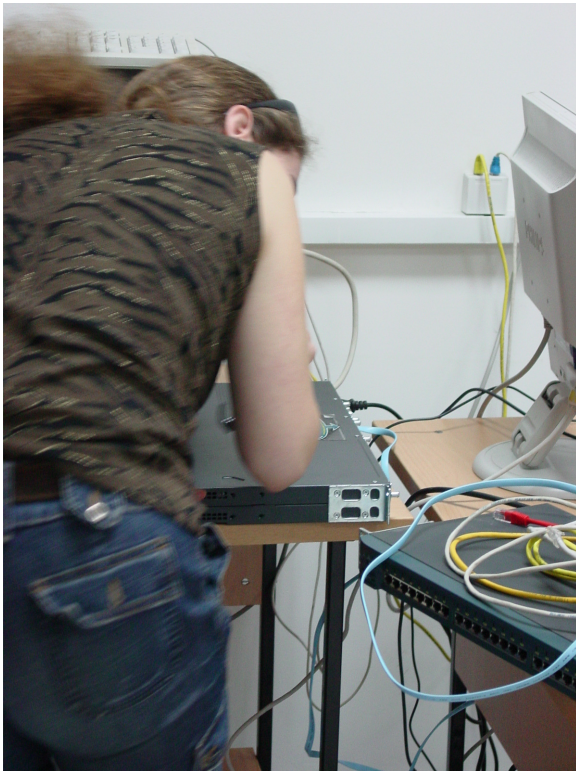
Students registration



Solving the test



Solving practice problem



Solving practice problem



Competition jury in action



Award ceremony



Winners

Example test questions:

1. What is not an OSI layer?
 - a. Session
 - b. Translation
 - c. Physical
 - d. Network
 - e. Data link
 - f. Application
 - g. Presentation
2. Transport layer has the following functions:
 - a. Data translation, conversion, coding, decoding, compression, decompression;
 - b. End-to-end control of process communication at different hosts;
 - c. Access control to the communication medium; frames sending and reception;
 - d. Signals coding.
3. The IEEE 802.3 standard is for:
 - a. Ethernet;
 - b. Token-Ring;
 - c. FDDI;
 - d. ATM;
 - e. Frame Relay;
 - f. X.25;
4. PPP (Point-to-Point) communication can be done:
 - a. Only over the IP protocol;
 - b. Only over the IPX protocol;
 - c. Only over the Apple Talk protocol;
 - d. Only over the NetBEUI protocol;
 - e. Over the all stated above protocols.
5. Which of the following is a class C address?
 - a. 255.255.255.0
 - b. 255.0.0.0
 - c. 191.168.0.0
 - d. 193.15.49.3
 - e. 195.255.256.0
 - f. 223.254.254.0
 - g. 224.100.0.0
6. What is the default class A network mask?
 - a. 0.0.0.0
 - b. 128.0.0.0
 - c. 255.0.0.0
 - d. 256.0.0.0
 - e. 255.128.0.0
 - f. 256.128.0.0