E-learning Software Contributing to Development of Networking Competition

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Abstract. This paper deals with the e-learning software tool Packet Tracer and how it helps in the development of a complex skill-based assessment for a network competition. As networking systems continue to evolve in complexity Packet Tracer gives a new opportunity for simulation of a real environment with real equipment. This allows to be created a really challenging skill-based assessment which tests wide range of students' knowledge for designing, configuring, troubleshooting computer networks and their hands-on experience.

Keywords: enhanced learning software, networking, constructing, education, simulation

1 Introduction

The national competition in computer networks was held in the Faculty of Mathematics and Informatics at Sofia University for the sixth year in a row. It is designed for students in networking academies in the country that study networking technologies in schools or people who simply are interested in computer networks.

The competition is held in two stages - a theoretical test for all students across the country and a skill-based assessment for those with the best results of the test.

The first part of the competition tests students' Networking/IT learning.

The second part - skill-based assessment, tests students' knowledge to design, configure, and troubleshoot computer networks and hands-on experience with real environment.

2 Beginning of the competition

A practical test has been created for the first few editions of the competition for a real networking environment, which requires finding enough equipment, recruiting and including more staff and ensuring labs. An evaluation of the tests was made by qualified instructors. At the same time there was a limitation regarding the number of devices per student and the complexity of configurations. This is the reason for choosing another option and decision to use the software simulating the real environment.

3 New solution

Packet Tracer is an integrated simulation, visualization, collaboration, and assessment environment. Packet Tracer supports instructor creation of simulations, visualizations, and animations of networking phenomena and developing networking skills. Similar to all simulations, Packet Tracer relies on a simplified model of networking devices and protocols.

Using Packet tracer, absolutely free, in the creation of the competition case overcomes the lack of access to equipment and bandwidth. This powerful network simulation program allows reaching complexity of the test as well.

Advantages:

- No need of real equipment
- More devices for configuring
- More complexity
- Automatic evaluation of test
- Formative assessment, need of wider scope of student's knowledge
- Activity wizard, which allows the authoring of answer networks to which students can compare their progress.
- Multi-user feature, whereby different instances of Packet Tracer can be used to create a "virtual Internet" on a real network.

4 Conclusions

Developing of cases for the purpose of a competition is a very difficult problem. While searching for a solution, we found a useful tool which provides authoring of complex assessments (tasks, labs) in the simulated realistic network with real problems.

Acknowledgments. We would like to thank of University Computer Center and Faculty of Mathematics and Informatics, St. Kl. Ohridski University of Sofia for providing necessary equipment.

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