3D computer drawing competition CADrina

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Abstract. CADrina is IT-festival, where takes place 3D computer drawing competition, which has been organized for 9 years by Kadrina Secondary School. In this competition AutoCAD program is used. Participants will create 3D objects in AutoCAD during a given period according to the specifications that will be provided. They will be judged on accuracy and speed. The competition took place in several rounds - the preliminary round and the final round. The event provides opportunities to showcase students’ knowledge and skills as well as to be a role model and inspiration for the future choice of young people. 3D computer drawing competition is a good chance to develop team-working skills under pressure among students.

1. Introduction

No one is born as an engineer [1]. Future engineer must learn. But for study, the topic of interest is also necessary. How to raise interest in engineering? Already in childhood games are the foundation of future engineers.

What language engineers interact – English, Russian, Chinese…? Drawing is a language of engineering - it is understandable for all different nationalities. Although engineering graphics are initially hard to understand for students, the subject can be animated with a variety of games and humor [2].

Technical drawing should already start in schools. A good example is the Kadrina Secondary School [3], which was created 1902 in Estonia. There are long traditions in this school to teach technical drawing. Since 2010, there are computer graphics competitions named CADrina organized in Kadrina Secondary School. The CADrina is a technology, IT and smart technologies festival, aimed to promote engineering studies among secondary school students. It ends up with a final show, where under the eyes of the spectators, a thematic engineering project - skateboard, bridge, song arch, etc. - is designed using AutoCAD software. Nearly a whole school will take part of the final show, and the evening will always end with a concert.
2. 3D computer drawing competition CADrina

This article focuses on the competition that took place on 23 November 2018 [4]. Every competition has a specific theme. This time the theme was "On the Way to the Future" and the task was to draw a space shuttle (Figure 1).

![Space shuttle](image1.png)

**Figure 1.** Space shuttle – CADrina 2018 competition task.

2.1. The prelude

The prelude, which starts at 10 a.m., consists of three tasks. There is a maximum of 40 minutes to solve one task. In the preliminary stage, the team consisted of three members will solve tasks together. Each team member is once behind the computer, while the other two can guide and advise while sitting next to each other (Figure 2).

![Team working](image2.png)

**Figure 2.** Team is working.

Competitors will receive a tutorial (Figure 3) and a source file (Figure 4) to store the solution.
Good knowledge of the following commands was helpful in solving tasks: align, arc, arraypolar, circle, copy, ellipse, explode, extrude, extend, help, insert, layout, line, loft, move, osnap, pagesetup, pedit, pellipse, planesurf, pline, purge, revolve, rotate, rotate3d, save, saveas, scale, subtract, surftrim, trim, ucs, union.

2.2. The final
The final starts at 6 p.m. and there turns out who are the four teams to participate. In the final each member will solve the task independently. Solving takes place in front of the audience, where the solution can be monitored on the screens (Figure 5). At the same time, other teams and members are interviewed by the host (Figure 6).
All contestants will receive the task on paper (Figure 7) one hour before, during which they will be able to discuss with each other and consult with the supervisor. There is only 10 minutes to solve one task. The source file already contains some basic data that would make task solving faster and more enjoyable for the audience (Figure 8). Before solving, participants will see an accelerated video of the task solution. It provides useful hints for quick and correct solution of the task [5].
2.5. Supporters and sponsors
The event was supported by the European Regional Development Fund as well as local businesses and public authorities. The number of supporters is impressive, with nearly 20 who believe in the sustainability of the event.

3. Conclusion
3D computer drawing competition CADrina introduces exciting and youthful way technical education, educates young people with technical intelligence and entrepreneurial spirit [7]. The competition will develop and test students’ engineering graphics skills as well as 3D computer skills. The competition tasks have been complex enough from year to year to provide challenges to competitors.

This time, 8 teams were participating, of which 3 from secondary schools, 3 teams from universities and 2 from vocational schools from Estonia. In the future, the aim is to give the event an international dimension and participants from outside Estonia are welcome. Hopefully there will be enough enthusiastic teachers who teach and guide students to orient themselves in the 3D world.

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