

Head Harnessing Skills and Fostering Innovation: The Role of Ethical Hacking CTF Competitions in Cybersecurity Education

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This presentation aims to explore the benefits, and educational impact of CTF competitions in the realm of cybersecurity and ethical hacking.

Cybersecurity encompasses the practices and technologies that protect digital systems, networks, and programs from digital attacks, data breaches, and other threats. Its significance has soared in our increasingly digital world, as individuals, companies, and governments strive to safeguard sensitive information against unauthorized access and cyber threats.

Capture The Flag (CTF) competitions have emerged as a cornerstone in the education and training of cybersecurity professionals. These competitions offer a unique and engaging platform for aspiring and established ethical hackers to hone their skills in a controlled and competitive environment. The Capture the Flag (CTF) competition varies in its design from year to year but always focuses on solving IT-related problems. Participants may need to identify program vulnerabilities, crack encryption, or search for information on social media accounts to uncover passwords.

On December 15, 2023, Capture the Flag hacking competition took place at Halmstad University. It was organised by students and faculty at the University. Students solved various IT-related challenges for a few hours to enhance their skills in countering cyber threats. This year's challenges were developed by students from the University's programmes in IT Forensics and Information Security and the Master's Programme in Network Forensics in collaboration with students from the Belgian university La Haute École de Namur-Liège-Luxembourg.

New this year was the collaboration with the EU-funded project, the European Cybercrime Training and Education Group (ECTEG), and the CTF had interdisciplinary elements and was scenario-based. In addition to technical challenges, participants were required to discuss communication strategies and make decisions based on laws and regulations.

CTF competition has seen an impressive turnout with 151 users registering for the challenge. These individuals connected from a combined total of 375 distinct IP addresses, showcasing a wide geographic spread and high level of interest. With a grand total of 6750 possible points to be won, the competition was fierce and the challenges many. Participants had 54 unique puzzles to solve, pushing their skills to the limit in various domains of cybersecurity.

Participating universities

- Halmstad University, Sweden
- La Haute École de Namur-Liège-Luxembourg, Belgium
- Franko National University of Lviv, Ukraine
- Université du Québec à Trois-Rivières, Canada
- Erasmus Brussels University of Applied Sciences, Belgium

- Politihøgskolen, Norway

Educational benefits of participating in CTFs includes practical skill development: from cryptography to network security; enhancing problem-solving and critical thinking abilities and encouraging teamwork and collaborative learning. Participating in the competition can be rewarding and beneficial for students, especially those interested in areas such as cybersecurity, programming and IT. Students get to test their theoretical knowledge in a practical way, think critically and creatively, and step outside the box. By working in groups, they practice developing their collaboration and communication skills, and in the competition, they are exposed to new techniques and methods that broaden their knowledge base. CTF competitions create opportunities for students to network with like-minded individuals from different countries and cultures. It adds valuable knowledge for the individual student but is also crucial for global perspectives on cybersecurity.

1. Halmstad University. *Hacking competition strengthens competence in cybersecurity* URL: <https://www.hh.se/english/about-the-university/schools/school-of-information-technology/news-from-ite/2023-12-27-hacking-competition-strengthens-competence-in-cybersecurity.html> (application date: 18.04.2024).