

The University of Windsor COMPUTER SCIENCE SOCIETY

Monthly Newsletter

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INTRODUCING: HACKATHONS

by Calder Johnson

Let's face it: while computer science classes provide valuable knowledge and insights into the field, they often fall short when it comes to practical software development skills. But fear not! There's an exciting, accessible, and incredibly fun way to kickstart your coding journey: hackathons.

Picture this: the world's best sleepover, except you're in a buzzing convention hall, fueled by copious amounts of caffeine, devouring free pizza, and collaborating on a thrilling coding project with an amazing team. A hackathon is a timed programming competition, typically lasting 24 hours, where you and your team craft an innovative solution to a given problem. Best of all, hackathons are usually sponsored events, which means they're entirely free, and participants of all skill levels are welcome.



At a hackathon, you have the perfect opportunity to unleash your creativity, learn new skills on the fly, and tackle real-world challenges. Seasoned mentors are always available to guide you through any roadblocks you encounter. Additionally, hackathons provide an incredible platform for networking, with tech companies often in attendance. Plus, there are fantastic prizes up for grabs! Even if you don't clinch a victory, you'll return home with an abundance of swag, stickers, and unforgettable memories.

I can personally attest to the immense value I've gained from the hackathons I've attended. Not only have I learned a great deal, but I've also had the pleasure of meeting extraordinary individuals and had some truly great experiences. I totally recommend giving hackathons a try! And guess what? The University of Windsor hosts its very own hackathon every year. I'm eagerly looking forward to seeing you there!

SAT SOLVER SORcery

by Ben Chittle

If you're like me, you frequently find yourself in the horribly embarrassing situation of not knowing how to satisfy your Boolean expressions. You try different techniques, plug things into different places, but nothing seems to work. What you need is a tool designed to get the job done: a SAT Solver!

Innuendos aside, Satisfiability Solvers (SAT Solvers for short) are a type of computer program that are really good at solving one deceptively difficult problem: given a big Boolean expression, how can you assign True or False to all of the variables to make the whole expression evaluate to True, or prove that no such assignment exists. If you're not familiar with Boolean expressions (or Well Formed Formulas if you're in COMP2310), they're like math expressions but for logic, where the only "numbers" you can assign to variables are 1 and 0 (True and False) and, instead of math operations like plus and minus, we use logic operations like AND, OR, and NOT.

For expressions with only a handful of variables, any Computer Science student

worth their Key Concepts will know how to solve the so-called "Boolean Satisfiability Problem" by drawing a Truth Table: just look for the rows where the final column has a T. However, throw more than 6 variables in the mix and you'll be drawing Truth Tables with hundreds of rows. Not fun.

The problem here is that the Boolean Satisfiability Problem is part of a class of problems known as NP-Complete; basically, it's really freaking hard. So how do SAT Solvers solve these problems efficiently, you ask? Well I don't know. It's probably voodoo magic, or maybe there's a very clever gnome that lives in the unused disc drive of your computer (do people even have disc drive's anymore?). If you're really interested in the inner workings of a SAT Solver, be prepared to do a lot of reading. As with most things in the world of software though, you don't need to know how it works, you just need to know how and when to use it.

First and foremost, you need to make sure your problem warrants the use of a really freaking hard problem solver. Otherwise, you might end up with a very overcomplicated or roundabout solution. The next consideration is to think about how you can transform your problem into a Boolean one, if it isn't already (and it often won't be). For example, SAT solvers have been used to solve Sudoku puzzles quickly, but you can't simply feed a picture of a Sudoku puzzle into a SAT solver.

You have to come up with some way of encoding the numbers, their positions, and the rules/constraints of a Sudoku puzzle into Boolean logic. Of course, you must also have a way to decode the solution. Essentially, if you can convert a problem into a finite set of constraints, it might be fit for a SAT solver. There's a lot more to the world of SAT Solvers. If you're interested, take a look at what research your professors are doing: some of them may be using SAT solvers, and you might be able to start a research assistantship if you reach out.



IMPORTANCE OF ATTENDING OFFICE HOURS

by Ahmad Munim

There are more reasons to attend office hours than just asking for help with a class and what's on the exam. One of the most important things you must do to excel in your professional career is to network with people. Nowadays, the computer science market has become really saturated and it's more difficult than ever to stand out from the large crowd. Because of this, it has become difficult to gain experience in this field. Recently, more and more people are starting to get offers due to referrals from their network.

One great way to get yourself in the field is to network with professors via office hours. Office hours aren't just for getting help for a class. It allows you to build a personal relationship with your professor. Establishing this connection can be really valuable when you need letters of recommendation, hands-on experience, or even a referral. If you're interested in research, a strong relationship with a professor can open doors to research assistant positions and

collaboration on research projects. Even if the professor doesn't have an open position, they might be able to direct you to another faculty or professor doing similar research. This is a great way to gain hands-on experience and in-demand skills which can be added to your resume.

Some professors also have large networks in their respective fields. By building a relationship with them, you may have the chance to connect with other professors, alumni, or graduate students who can provide insights, job leads, or internship opportunities. Therefore, connecting with a professor is a great way to kickstart your network which opens many opportunities in your career.

Going to office hours is one of the pieces of advice that is most often given, but rarely taken. There are several benefits to going in and seeing your professor even if you aren't struggling in their course. So, take advantage of the time they give you and go see them!



UNRAVELING CYBERSECURITY'S NEW ERA: PROGRESS AND CHALLENGES

by Dante Masciotra

In today's hyper-connected world, cybersecurity's role has shifted into overdrive. Recent trends reflect a constant duel between emerging threats and innovative defense tactics.

Artificial Intelligence (AI) and Machine Learning (ML) have seized the spotlight, powering both attacks and defenses. AI's predictive abilities help identify risks in real-time, but cybercriminals are also leveraging AI for more sophisticated strikes, reshaping the digital battlefield. The explosion of the Internet of Things (IoT) presents a fresh battleground. With smart devices embedded in every facet of life, safeguarding them has morphed into a multidimensional challenge. It's not just about fortifying the devices themselves; secure coding practices, standardized protocols, and vigilant oversight throughout their lifecycle are essential.

The traditional security model has undergone a radical transformation with the rise of zero-trust architecture. The idea of a secure perimeter is being replaced by a model that assumes threats can come from anywhere.



This approach demands constant verification, strict access controls, and perpetual monitoring, ushering in a new era of proactive cybersecurity. Global cooperation and cyber agreements have also gained traction. Recognizing the collective nature of the threat, nations are pooling resources, sharing insights, and establishing ethical guidelines for cyber activities. While enforcement remains a challenge, the collaborative spirit is a positive step forward.

Yet, amid these advancements, a dark cloud looms. Ransomware attacks have surged, targeting everything from critical infrastructure to corporations. By encrypting data and demanding ransoms, cybercriminals have unleashed chaos. These incidents underscore the need for robust defenses and swift response strategies. In the dynamic realm of cybersecurity, change is the only constant. The AI arms race, the IoT challenge, and the evolution towards zero-trust frameworks define this new landscape. While international cooperation paints a hopeful picture, the menace of ransomware keeps us grounded.

As technology continues to evolve, so does the complexity of cyber threats. A united front is essential to secure our digital future. With adaptability and awareness, we can navigate these treacherous waters, for in the world of cybersecurity, resilience is key.

