



CONUHACKS VIII

HACKER'S MANUAL

2024

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INTRODUCTION

WELCOME TO CONUHACKS VIII

We are thrilled to return as the premiere hackathon in Quebec. This weekend, students, volunteers, and sponsors from across North America will converge to participate in a culture of sharing and learning.

This hackathon comes to life through the contributions of individuals like yourself – those who are dedicated to pushing boundaries and expanding their knowledge. It is fueled by your passion for learning and your commitment to shaping a better, more innovative world. We firmly believe that the most valuable reward a student can achieve is the realization that they possess the skills to craft remarkable creations from the fundamental building blocks of ones and zeros.

Welcome to ConUHacks VIII! Let's make the most of the next 24 hours and create something extraordinary!



TERRITORIAL ACKNOWLEDGEMENT

The image depicts a computer desktop environment with a light blue grid background. In the center is a window titled 'C:\User\Documents\' with a search bar labeled 'Search...'. The main content area of the window contains two paragraphs of text. The first paragraph reads: 'We would like to begin by acknowledging that Concordia University is located on unceded Indigenous lands. The Kanien'kehá:ka Nation is recognized as the custodians of the lands and waters on which we gather today. Tiohtià:ke/Montréal is historically known as a gathering place for many First Nations.' The second paragraph reads: 'Today, it is home to a diverse population of Indigenous and other peoples. We respect the continued connections with the past, present and future in our ongoing relationships with Indigenous and other peoples within the Montreal community.' The window has standard operating system controls (minimize, maximize, close) and scroll bars.

C:\User\Documents\

Search...

We would like to begin by acknowledging that Concordia University is located on unceded Indigenous lands. The Kanien'kehá:ka Nation is recognized as the custodians of the lands and waters on which we gather today. Tiohtià:ke/Montréal is historically known as a gathering place for many First Nations.

Today, it is home to a diverse population of Indigenous and other peoples. We respect the continued connections with the past, present and future in our ongoing relationships with Indigenous and other peoples within the Montreal community.

RULES OF HACKING

1. A team can be formed by no more than 4 people.
2. You must have started your project only as of Saturday, January 20th, 2024 at 11:00 am.
3. You must have completed your project before Sunday, January 21st, 2024 at 11:00am.
4. You must present your project and have a live demo of your work.
5. You must have linked your public Repository Git to your Devpost submission.
6. It is not allowed to submit your project from any other events.
7. Official time zone of the event "Montreal, QC" (UTC-5)
8. Submit your project at conuhacks-viii.devpost.com

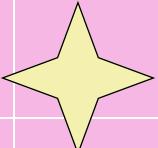
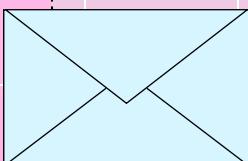
WIFI & QR CODE

Connect using the Wi-Fi

- Option 1: Connect to ConUHacksVIII using the password HACKCONCORDIA (all caps)
- Option 2: Connect to eduroam with your school's standard login username and password



- Download the app for your smartphone:
 - Android: Barcode Scanner from the Play Store
 - iOS: QR Code Reader by Scan from App Store
- Open the application and scan the QR code.
- It will direct you to the desired website.



CODE OF CONDUCT

In order to foster a safe and comfortable hackathon, please read and abide by the code of conduct at the following link:
<https://static.mlh.io/docs/mlh-code-of-conduct.pdf>

Any violation will be handled with respect to this code of conduct. If you have any questions, please reach out to the appropriate channel or an organizer on Discord.

SHOWERS

Saturday: 9AM to 7PM
Sunday: 9AM to 5PM
Le Gym (EV-S2-206)
EV Building (Metro-level)

RESTING

There are rooms in JMSB S1
(please see page 18)
for you to rest in.

EMERGENCY CONTACTS

As a hacker, please refer to a volunteer, team leader, or an organizer before calling Security or 911! We are here to handle emergencies for your sake! Should you find no one around, please contact the following numbers for help.

Concordia University Security: (514) 848-3717
Emergency Services: 911

Dial 1 for urgent situations
Dial 2 for non-urgent situations

EVENT SCHEDULE

SATURDAY

7 AM

8 AM

9 AM

10 AM

11 AM

12 AM

1 PM

2 PM

3 PM

4 PM

5 PM

6 PM

7 PM

8 PM

9 PM

10 PM

REGISTRATION

7:15 - 9:15 AM

BREAKFAST

7:15 - 9:15 AM

OPENING CEREMONY

9:30 - 10:30 AM

CAREER FAIR

10:45 AM - 5:30 PM

LUNCH

12:30 - 2:30 PM

HACKING

11 AM - 11 AM

NBC

11:00 - 12:00 AM

MLH

1:00 - 2:00 PM

DRW

2:45 - 3:30 PM

CSE

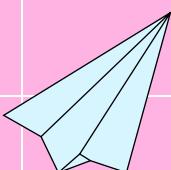
3:45 - 4:30 PM

MLH

4:45 - 5:45 AM

DINNER

7:30 - 9:30 PM



SUNDAY

7 AM

8 AM

9 AM

10 AM

11 AM

12 AM

JUDGING

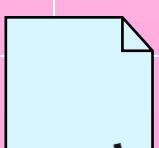
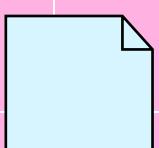
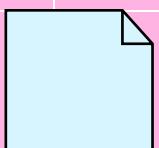
12:00 - 3:30 PM

LUNCH

11:00 - 1:00 PM

CLOSING CEREMONY

4:00 - 5:00 PM



WORKSHOP SCHEDULE

SATURDAY



NATIONAL BANK

11:00 AM - 12:00 PM

Introduction to GitOps: Streamlining App Lifecycle Management in Kubernetes

MLH ACTIVITY

1:00 PM - 2:00 PM

Github Copilot Mini Event

DRW

2:45 PM - 3:30 PM

Working with Time-Series Data

CSE

3:45 PM - 4:30 PM

Introduction to DevSecOps

MLH ACTIVITY

4:45 PM - 5:45 PM

Soroban Quest [Webs3Apps] Mini Event

SPONSORED CHALLENGES

NATIONAL BANK

Seeing the Forest for the Trees

Today anyone can go on their phone and search up the price of a stock and immediately get an answer. What is that price and where does it come from? At its simplest, that price is the execution price of the most recent transaction. Better than nothing but not it is not particularly useful if you want to trade; that price doesn't tell you what price you would get.

In this challenge, we want to take you behind the scenes and show you the inner workings of equity markets. Exchanges have an order book where all the buy and sell orders are recorded. Market participants, like National Bank, are in constant communication with those exchanges, continuously creating, modifying, and deleting orders on most securities to reflect the latest information.

We are going to be providing teams with a sample of the conversation National Bank has with three different exchanges from 9:28AM and 9:32AM, totaling more than 200k messages. While this sample is but a small fraction of what we do, it should give a sense of scale. We want students to render and visualize this data in real time; your work should result in a ~4minute animated visualization. The goal is to expose patterns in the data that would not be obvious if looking on a message per message basis.

There are multiple ways to render this data, the goal is to expose the most dimensions possible through shapes, colors, movement, or anything else. The more creative a group is the better they will be judged. There are no specified languages or APIs that you must use but a web based application is preferable. Bonus marks will be given to projects that have integrated anomaly detection! Projects will be judged on its creativity, complexity, its completeness, and the bonus.

The project that impresses our team the most will receive \$500 dollars to each member of the team.



**NATIONAL
BANK**

FINANCIAL MARKETS

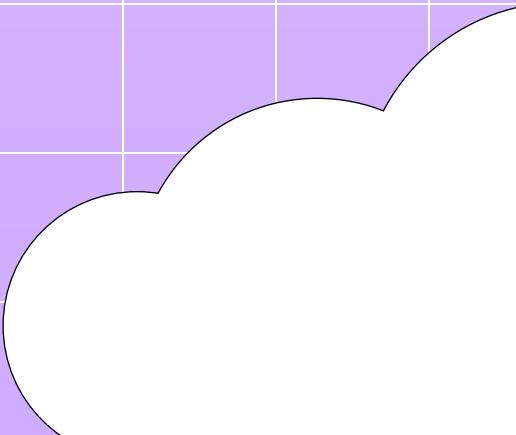


DRW Open Data Visualization Challenge

Everything we do at DRW is driven by data. Some of it is internal, but many decisions are made using publicly available datasets. Here at our Montreal office, we happen to live in a city where the municipal government has an Open Data policy, giving citizens access to the data the City of Montreal uses to make decisions. In 2024, we challenge teams to use any dataset within Montreal's Open Data portal to create visualizations that address real-world challenges, highlight trends, or uncover hidden patterns. Whether it's transportation data, environmental statistics, cultural information, or any other relevant dataset, the key is to extract meaningful insights through visualization. Would you be more likely to find a Bixi if you came earlier or later? Do streets with free parking have more car break-ins? Are parts of Montreal with more road construction the most affluent ones? Are cars more likely to be towed in areas with low amounts of city parks? These are all examples of answers that live within the Montreal Open Data site.

Note: Teams are not restricted to using only one dataset from the Montreal Open Data Site. We ask participants to use at least one from this source, but we are not limiting the use of other data. Please feel free to combine your required dataset with any open data source available to you.

We will be providing Nintendo Switch to each member of the winning team (will be delivered at their home after the event)





Communications Security Establishment – DevSecOps Challenge

From development and testing to deployment and monitoring, implementing DevSecOps best practices lets you deliver better code, faster. Using new or existing application code, demonstrate a complete CI/CD pipeline that builds and deploys an application while incorporating tools and best practices such as:

GitHub pre-commit / pre-push hooks, branch protection rules, automated security and secret scanning (e.g. GitHub Advanced Security, Dependabot)

Automated static or dynamic security tests

Automated test suites with code coverage reports

Pipeline secret management

Anything that improves the security, velocity, or reliability of the software process

Prize: Amazon gift cards



SUN LIFE

Make Our Clients Lives Better!

Act as a consultant for Sun Life! Create an engaging digital solution that outlines strategies to help our Clients understand how inflation impacts their personal finances and assets and how to prepare for the future.

This could include topics such as, but not limited to:

- Student loans/debt.
 - Mortgage.
 - Car payments.

Prize: Sun Life Swag Gift bags filled with Sun Life Swag worth \$400



BEENOX

2D Zombie Shooter

You must create a simple game where you control a soldier located on the left of your screen. The soldier should be able to:

- Move up and down
- Shoot

Enemy zombies will spawn out of bounds on the right of the screen and advance towards the player. The game should be infinite and have a way to lose, displaying your end score for the game.

STYLE: 2D

LANGUAGE: preferably C++ or any other languages you are familiar with

TECH: CPP, SDL, GIT

BONUS IDEAS:

- Highscore screen
- Dynamic environment (explosive barrels, ...)
- Ability to have new weapons
- Zombies waves
- Other creative features

Prize - Each member of the winning team will receive the following:

- 1 Logitech gaming mechanical keyboard
- 1 Logitech gaming wireless mouse
- 1 HyperX gaming headset
- 1 copy of Call of Duty: Modern Warfare 3
(on the platform of their choice)

[BEENOX]

SAP

Your role is to construct a software solution focused on optimizing the schedule for a tire change shop. This shop operates from 7AM to 7PM, beginning in early October and ending in late November. The vehicles served include compact, medium, and full-size passenger cars, as well as class 1 and class 2 trucks.

The services for these vehicles have different time requirements and costs:

- Compact Cars: 30 minutes servicing time, \$150 charge
- Medium Cars: 30 minutes servicing time, \$150 charge
- Full-Size Cars: 30 minutes servicing time, \$150 charge
 - Class 1 Trucks: 1 hour servicing time, \$250 charge
 - Class 2 Trucks: 2 hours servicing time, \$700 charge

Your optimal scheduling program should constantly maintain minimum one service bay available for each vehicle category at all times. Importantly, all service spots start each day anew, with no tasks rolling over from the previous day.

The application needs to process information contained in a CSV file, where each row denotes a service request with the following components: a date/time timestamp of the request call, requested appointment date/time, and vehicle type. In the event of overlapping bookings, a First In, First Out (FIFO) policy could be used.

Additionally, customers who request a time slot that is already occupied, or walk-in customers for whom no immediate spot is free, are regarded as "turned away". It should be noted that customers are permitted to place appointments from the start of September, for services during the specified winter season.

Your solution requires you to track both actual revenue (from vehicles serviced) and lost revenue (from turn-away instances). Implement a reporting feature in your application, enabling it to detail the number of served and declined customers for each vehicle category, total revenue generated and possible revenue missed from the declined services.

Consider that all stations are free at the beginning of each day, as no service is kept from one day to another. Ensure your code keeps track of the availability of each changing spot for each day. Also, print at the end the number of serviced customers for each vehicle type, as well as the turned away customers for each type. Also print out the total revenue and total revenue loss from turned away customers.

We want to make it clear that we'll be judging our submissions based on:

- Does the solution solve the problem
- Is the team able to provide a working demo
 - Code quality
 - Code cleanliness
 - UX/UI

Prize:

- Lunch and Tour with SAP Hiring managers and Members of our Executive Leadership Team
- 750\$ by HackConcordia



BEHAVIOUR

Behaviour Interactive Dead by Daylight Sponsor Challenge: Estimating Wait Times

Nobody likes to wait to play their favourite game, yet that is what hundreds of thousands of people do every day to get into a match of Dead by Daylight. They queue up to play, and they wait until a match is made.

Because the conditions under which people queue up vary tremendously, it is very difficult to predict an accurate waiting time before a good match is available. Maybe it's night time and many gamers in your area are asleep. Maybe you are in a party with some friends, looking for one last player, and there are no solo players in the queue. Maybe you are just too good and there is nobody at your skill level with whom to match you up.

To improve player experience, we would like to display estimated wait times while players are in the queue. To this end, we will share a sample log of historical anonymized matchmaking events containing information about matched players, their party size, their skill rank, their approximate location, and more; crucially, the events will indicate how long each player ultimately had to wait before the match was made.

Your task is to come up with a way to predict wait times for each player as accurately as possible. In other words, given a player's state when entering the queue (rank, location, party size, selected character, etc.), you should predict as accurately as possible how much time will be required for a match to be made. The estimate doesn't have to be a single number; for example, you could output a probability density function.

As a stretch goal, you can also visualize these estimates in an interesting fashion, as a function of various parameters - for example, how player skill or location impacts matchmaking time.

Prize:

- 4 keys for DBD
- keys for DLC Tool of Torment
- Private studio tour and meeting with experts to the 4 winners



MORE PRIZES

IN KIND SPONSORS



1-year FREE subscription for 1Password Families

We're proud to offer 1Password Teams for free to the open source community. This is part of our 1Password Teams for Open Source program.



1-month FREE access to our Pro tier

echo3D is a 3D asset management platform that enables developers to manage, update, and stream 3D content to real-time apps and games.



WOLFRAM

1-year of Wolfram|One Personal Edition plus a one-year subscription to Wolfram|Alpha Pro.

Access to Wolfram|One for ALL for thirty days. Wolfram|One includes both Desktop and Cloud access, full access to the Wolfram Language and Knowledgebase, FreeCDF Deployment, 5000 Wolfram|Alpha API calls, 5000 Cloud Credits, 2 installations per user and 2 GB of Cloud Storage.



Best use of matlab prize:

Receive two complimentary gift bags containing exclusive merchandise.

Downloading MATLAB and all the toolboxes for ALL:

<https://www.mathworks.com/licensecenter/classroom/4315150/>

Access MATLAB Online and all the toolboxes for ALL:

<https://www.mathworks.com/licensecenter/classroom/4315151/>



- 1) Best Use of MongoDB
- 2) Best Use of Autho
- 3) Best Use of Starknet
- 4) Best .Tech Domain Name
- 5) Best AI Application Built with Cloudflare
- 6) Best Use of AI in Education with Schmidt Futures

JUDGING INSTRUCTIONS FOR HACKERS

ConUHacks VIII Organizers will announce when the judging period is starting in the Discord server.

GO TO DEVPOST

GET TABLE #

MEET YOUR JUDGE!

Head over to devpost.com and navigate to the tab for TABLES.

Find your **table #** and which wave you will be presenting in.

There will be two (2) waves of approximately 50 teams¹.

Check the Discord **#announcement** channel to know which wave your team is in.

NOTE: Make sure to have a contact person in your Devpost.

GO TO DEVPOST

GET TABLE #

MEET YOUR JUDGE!

Remember, the judging period comes in two waves of approximately 50 teams¹ each. If you are in the second wave, keep an eye out for an announcement on Discord.

When it's your team's turn, head over to JMSB 1F, where the Career Fair was located, to find your table.

Judging takes approximately one hour in total.

GO TO DEVPOST

GET TABLE #

MEET YOUR JUDGE!

Your project will be judged by three (3) different judges.

If you are not judged thrice, please ping an organizer.

If you did a sponsor challenge, a sponsor judge will come to you.

They will be in the same area and will be judging you first.

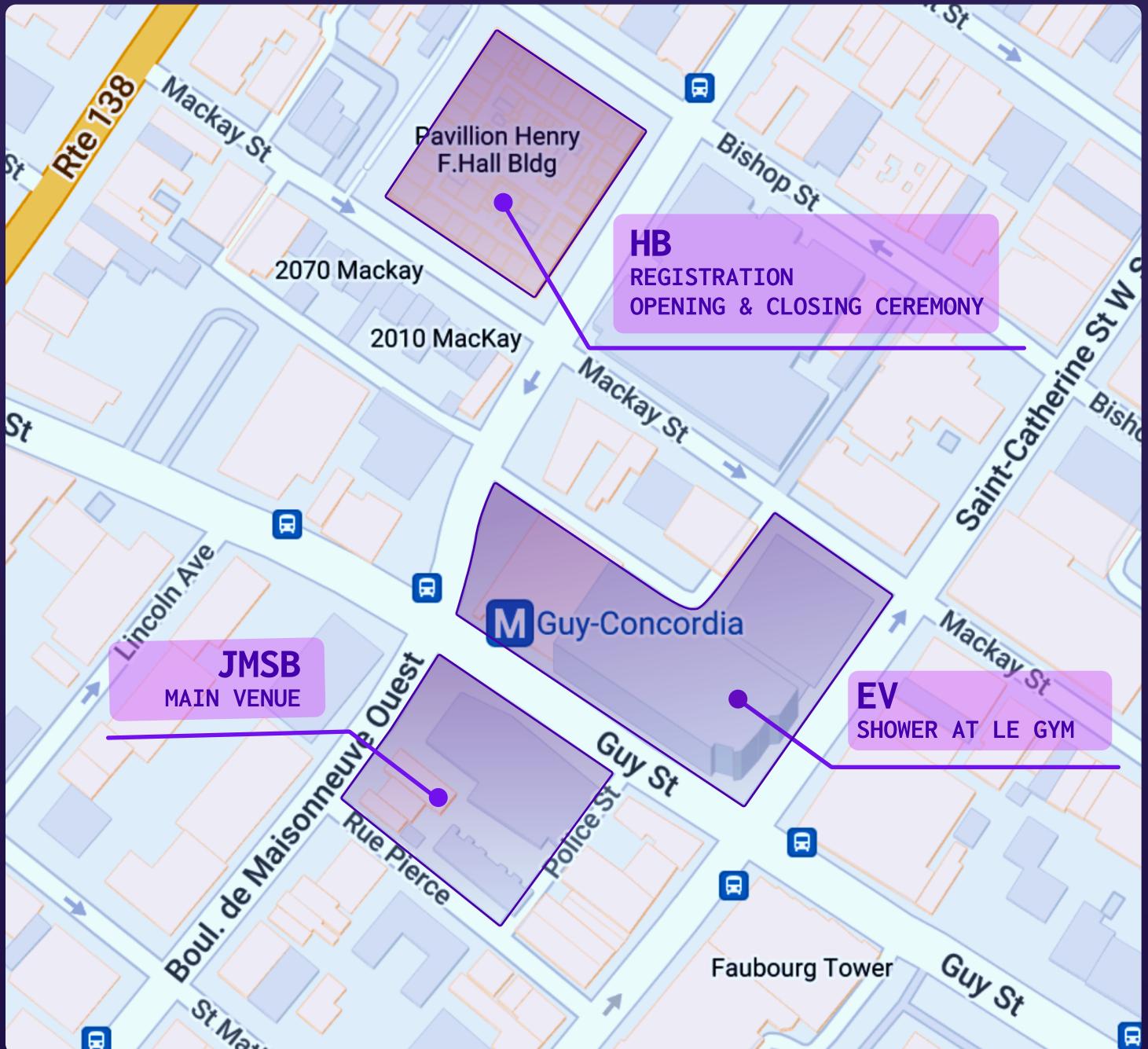
¹ The number of teams per wave can change on the day of the event.

Please make sure to check the announcement on Discord.

CAMPUS MAP

[Hall Building, John Molson School of Business & EV]





We know, it's freezing outside!

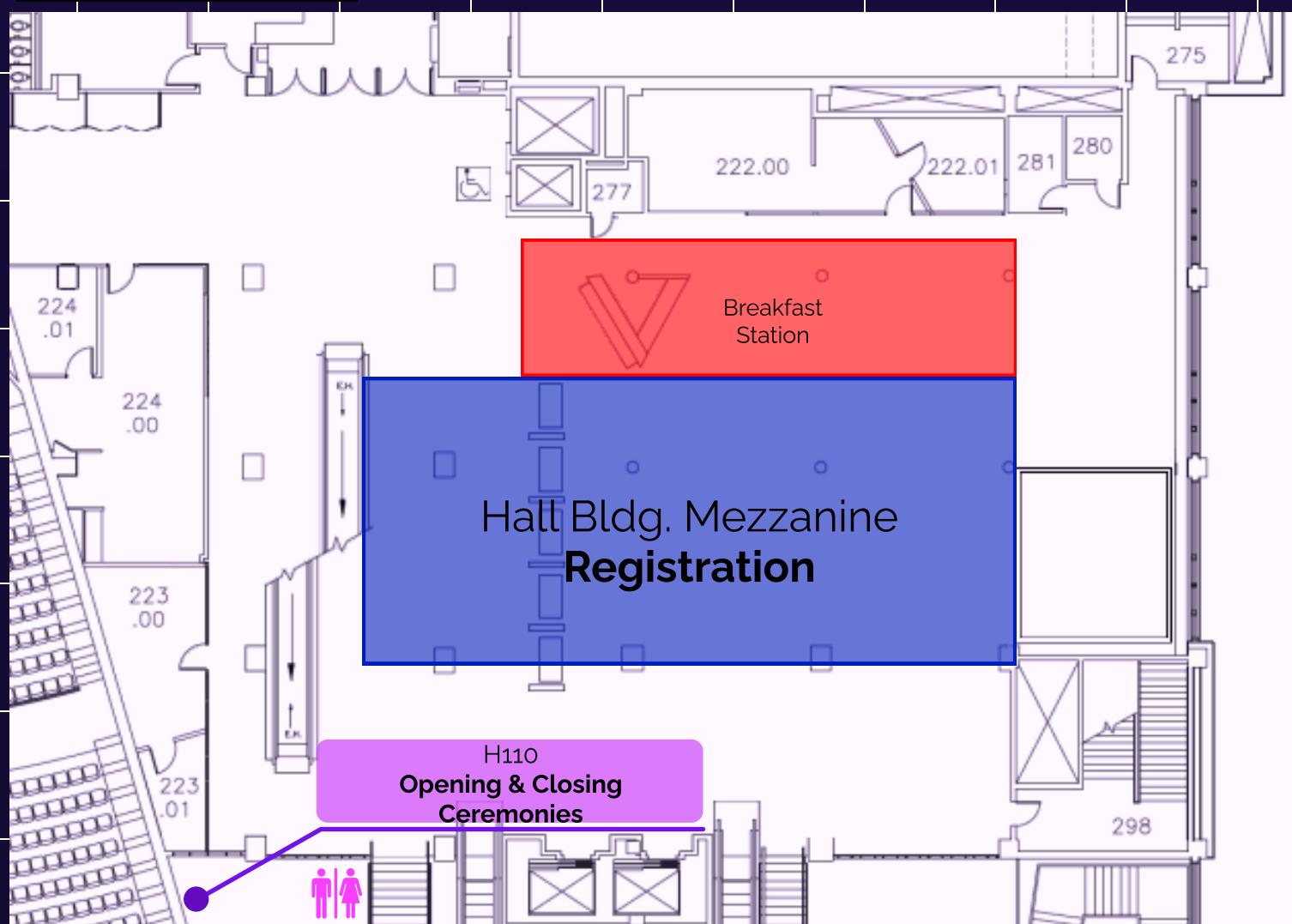
Underground paths are available to connect between
the buildings

LEGEND:

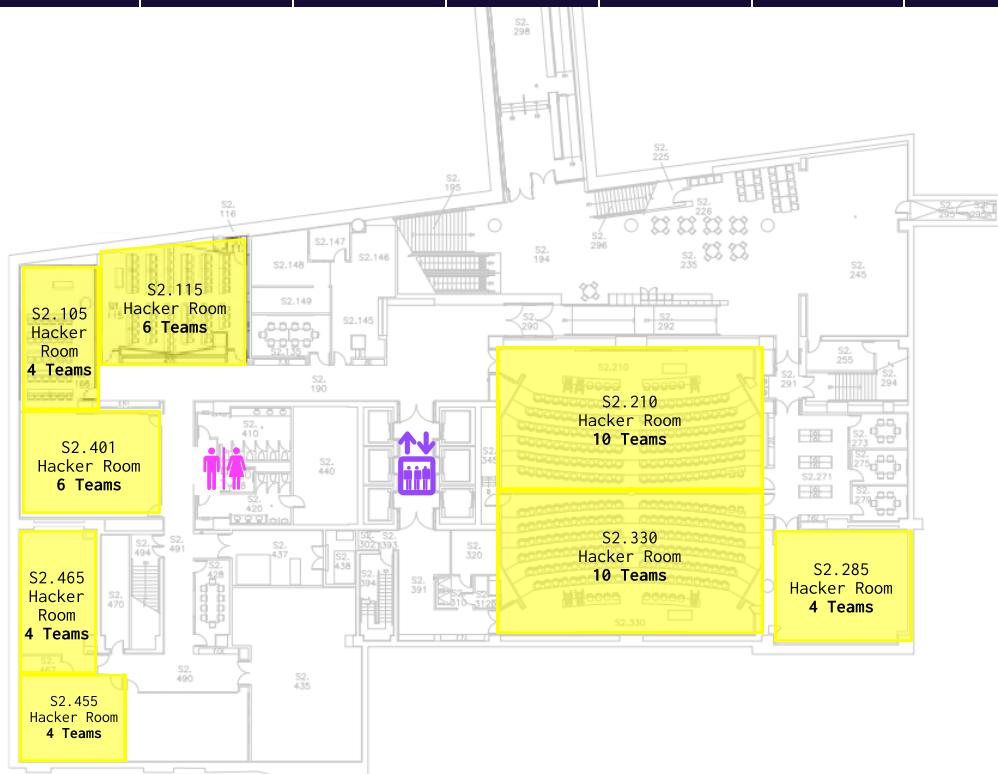
- Registration
- Mentor Room
- Career Fair
- Workshops
- Judging Area

- Food Station
- Hacker Room
- Resting Room
- Activities

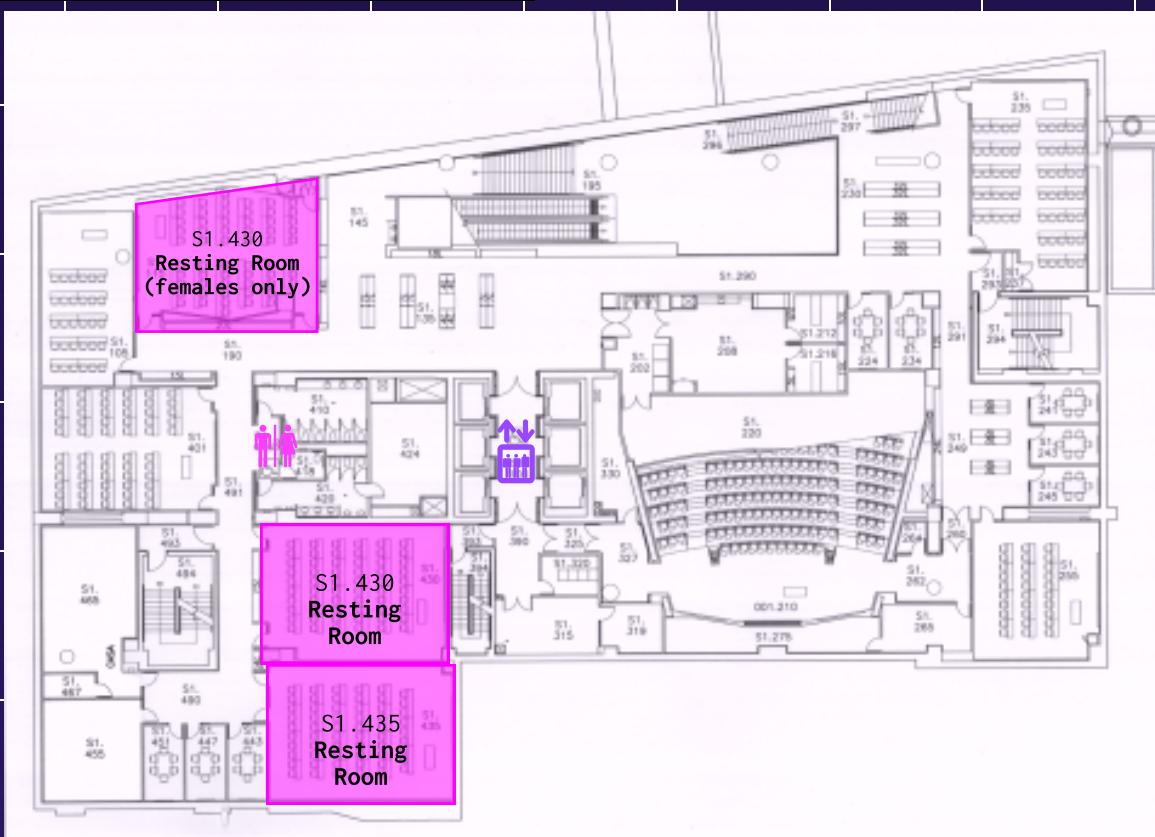
Hall Mezzanine



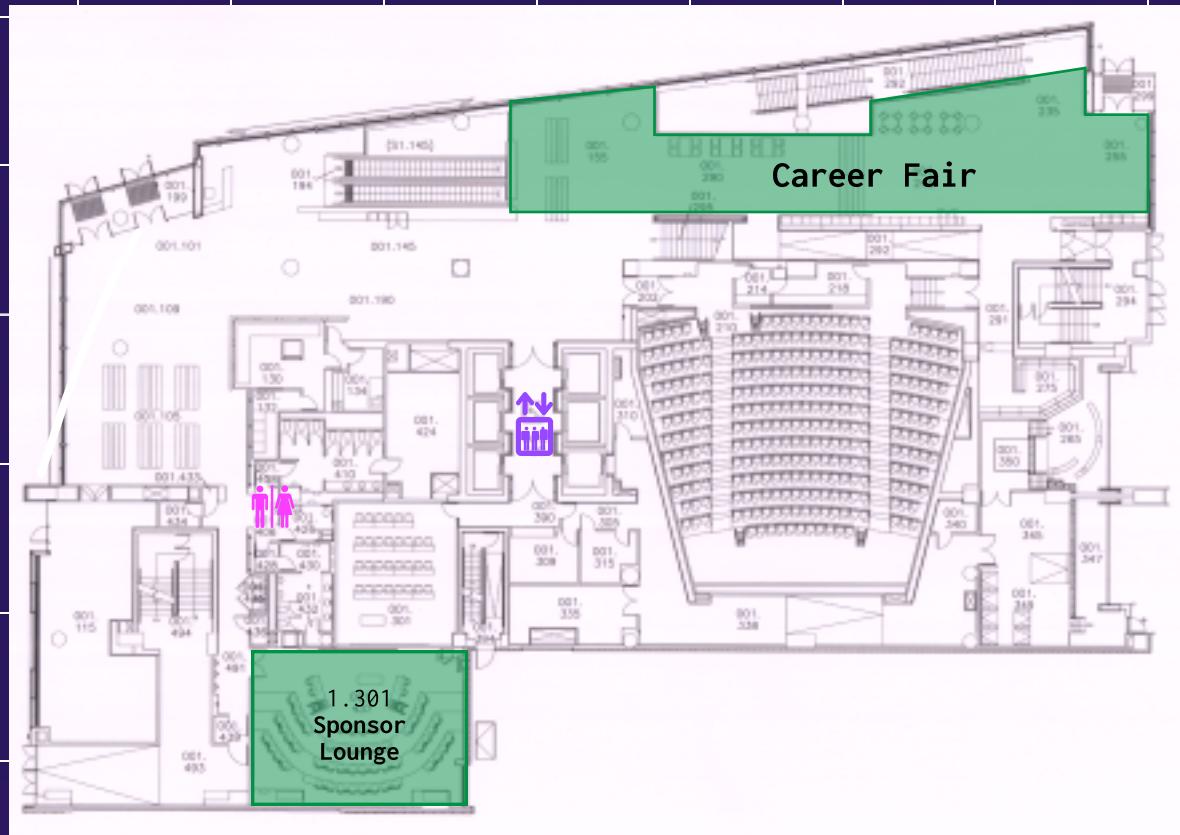
JMSB Sub-basement 2 (S2)



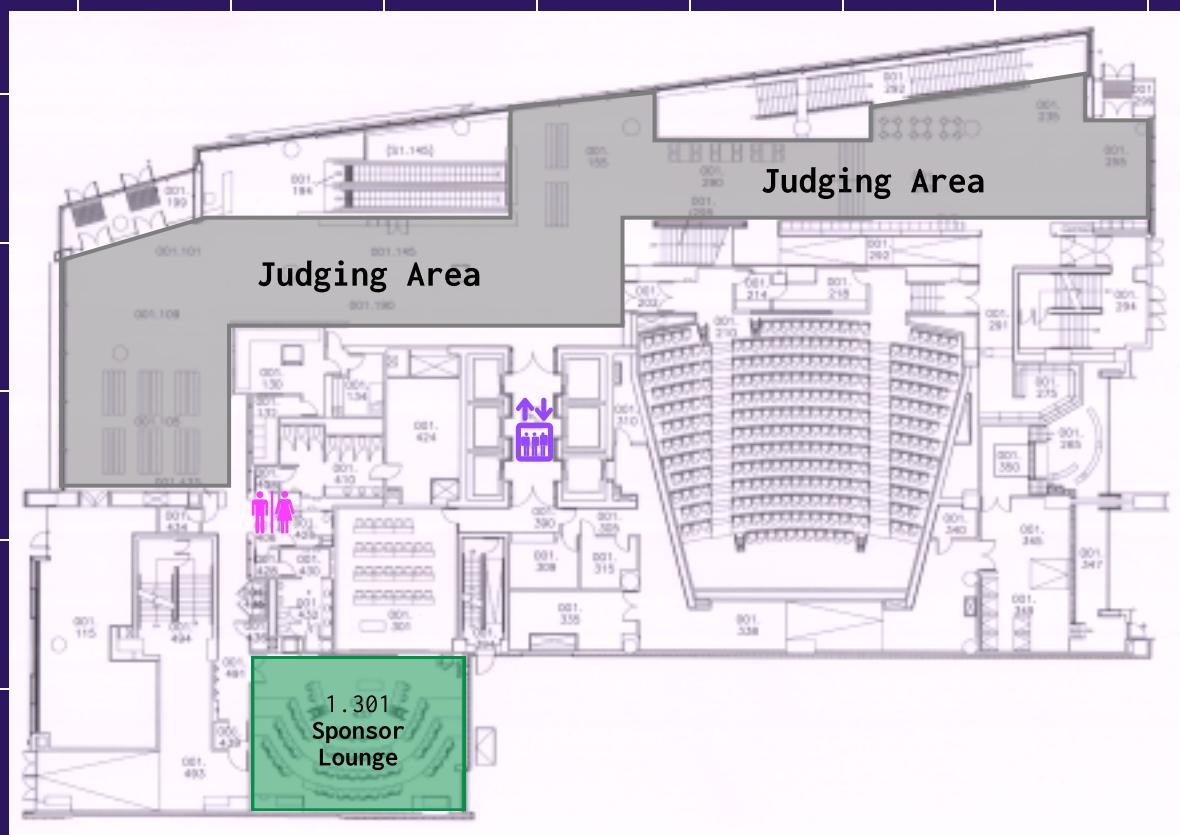
JMSB Sub-basement 1 (S1)



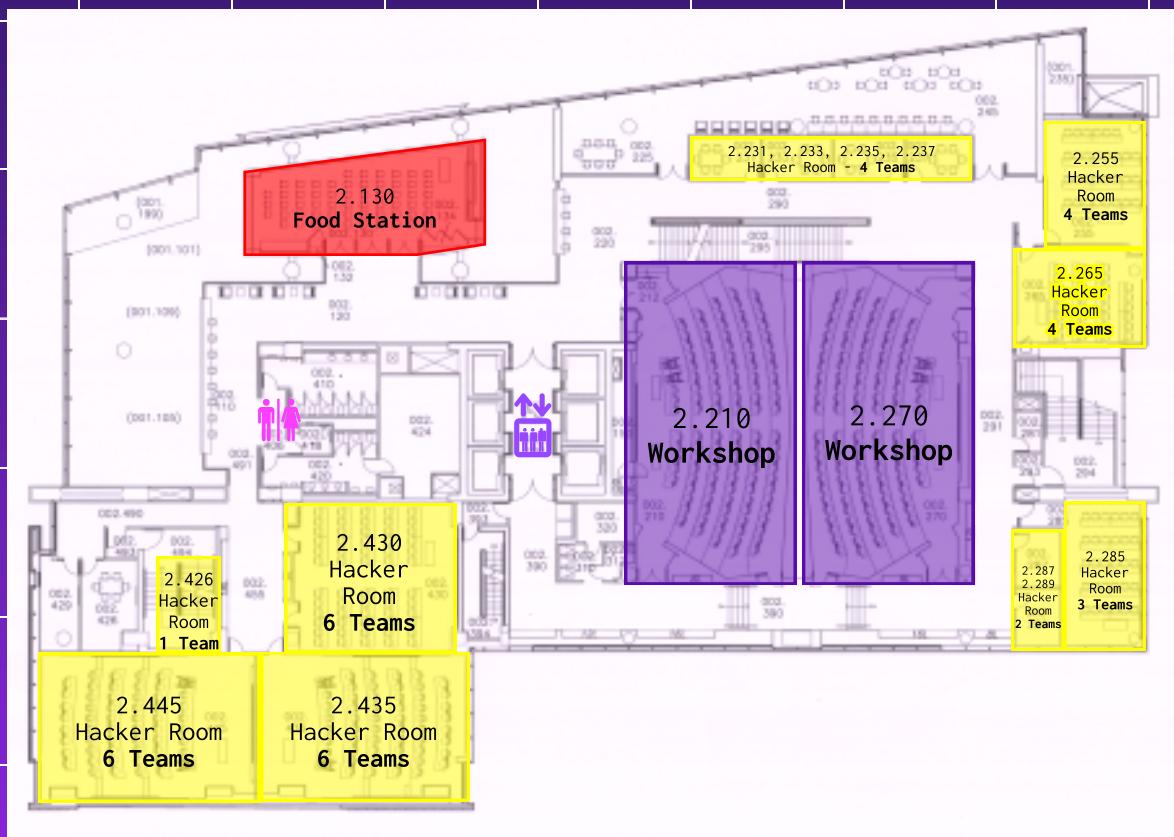
JMSB 1st Floor - Saturday



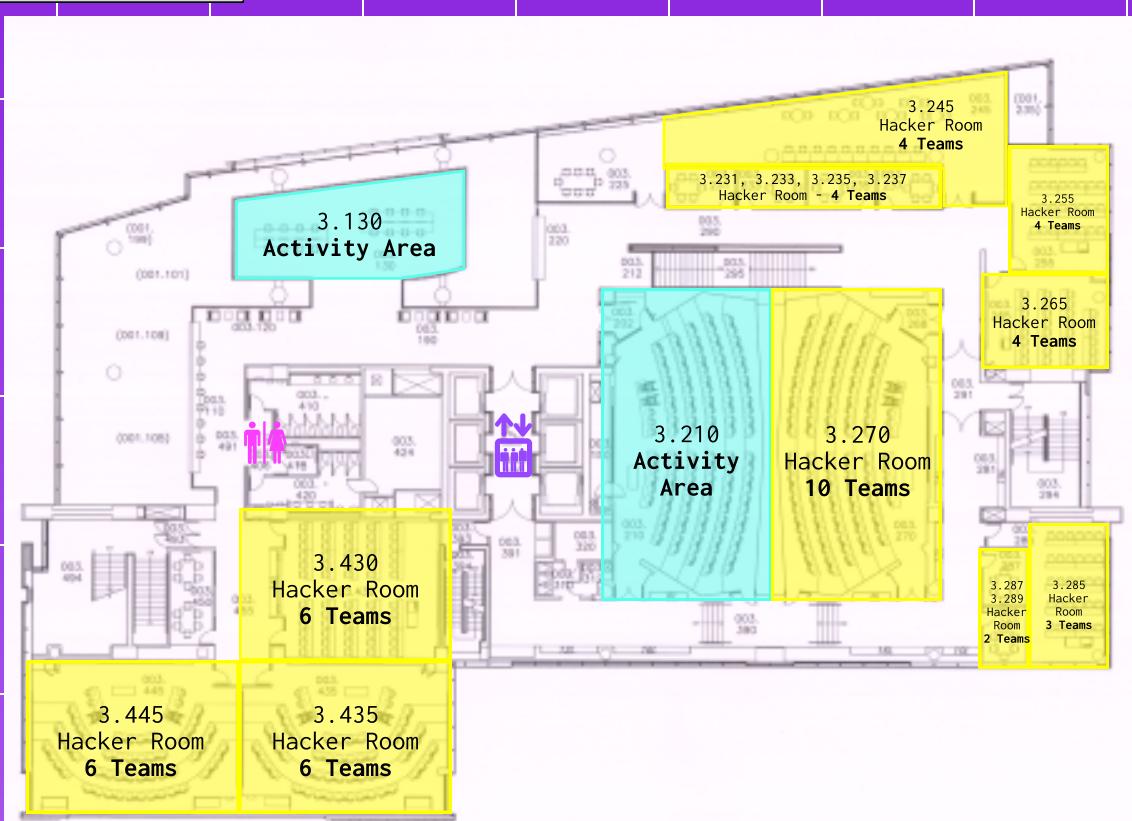
JMSB 1st Floor - Sunday



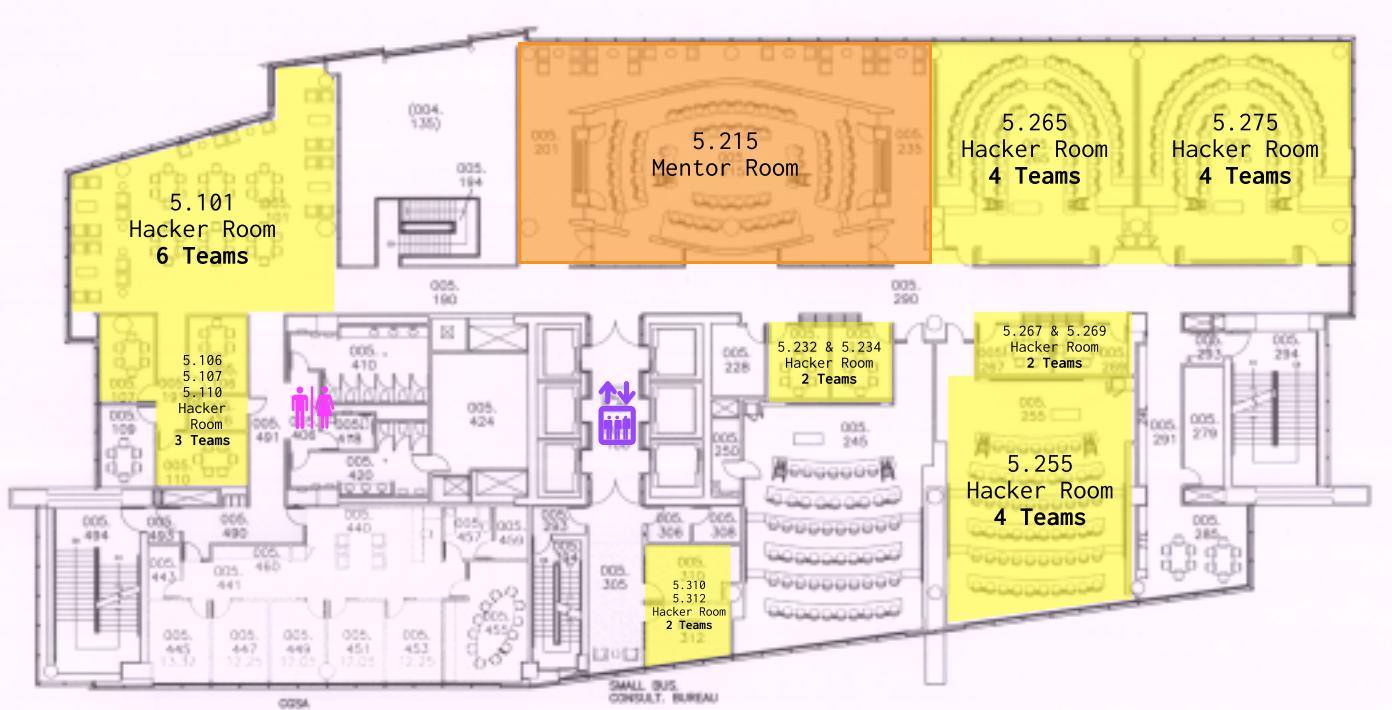
JMSB 2nd Floor



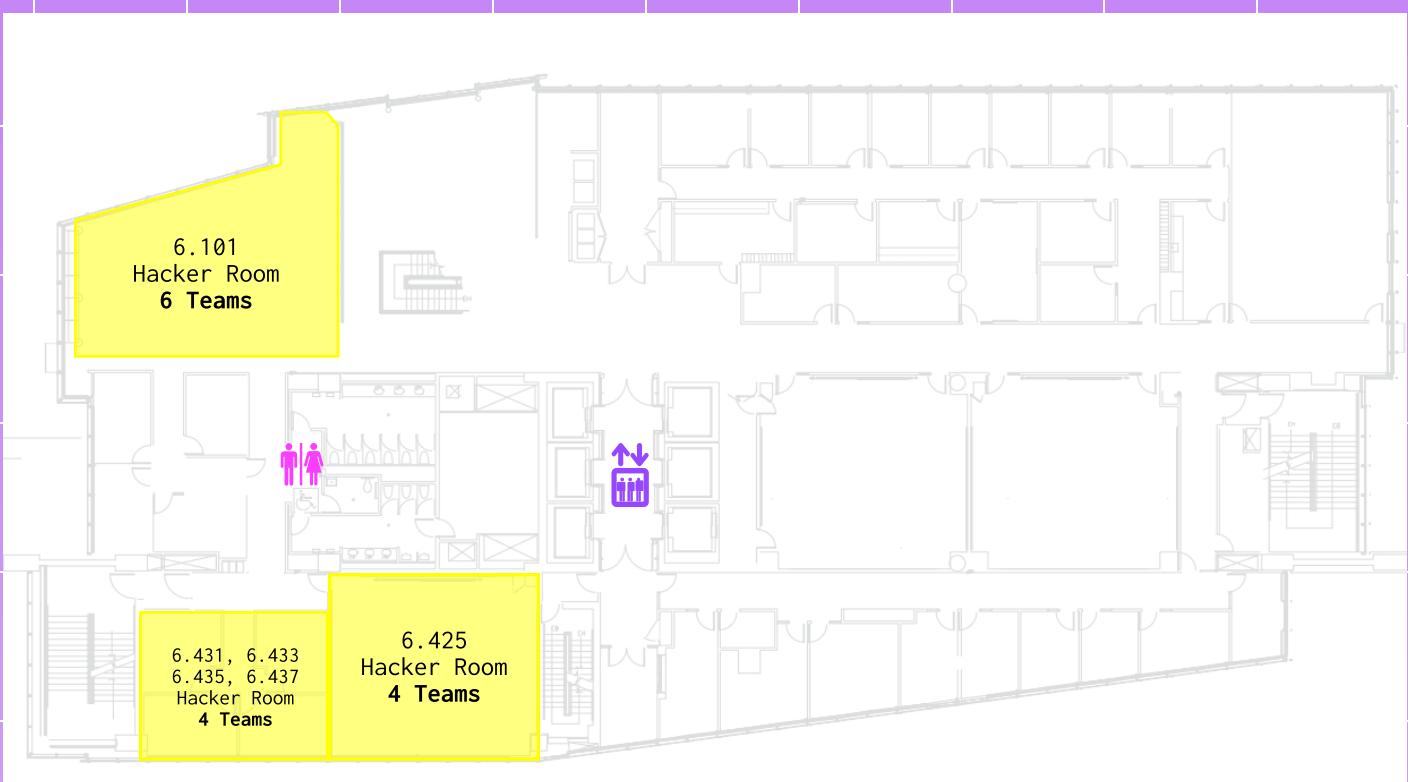
JMSB 3rd Floor



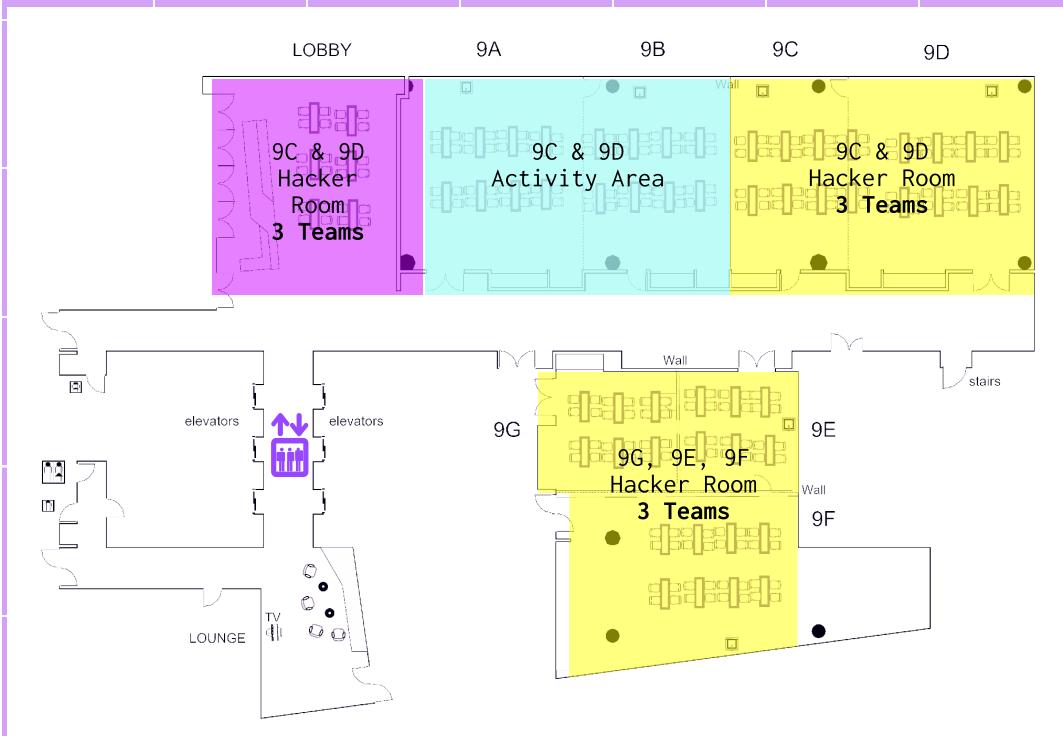
JMSB 5th Floor



JMSB 6th Floor



JMSB 9th Floor



OUR SPONSORS



National Bank Financial Markets is the trade name of the Financial Markets division of National Bank of Canada. With \$404 billion in assets under administration, National Bank of Canada is a fully-integrated investment dealer combining retail advisory and brokerage services with institutional brokerage, investment banking, corporate finance, and securities clearing for third parties. National Bank Financial Markets has a major presence in Toronto, Montreal, Calgary, and Vancouver, as well as operations in the United States, Europe and Asia. Our professionals are passionate, entrepreneurial and client-focused team players. Our "One Client, One Bank with One Mission – Putting People First" culture creates an environment of collaboration and accountability. We work together to deliver solutions that help our clients achieve long-term success. To learn more about our work environment and training programs see the [Careers page at www.nbc.ca](http://www.nbc.ca)



DRW is a diversified trading firm with over 3 decades of experience bringing sophisticated technology and exceptional people together to operate in markets around the world. We value autonomy and the ability to quickly pivot to capture opportunities, so we operate using our own capital and trading at our own risk. Headquartered in Chicago with offices throughout the U.S., Canada, Europe, and Asia, we trade a variety of asset classes including Fixed Income, ETFs, Equities, FX, Commodities and Energy across all major global markets. We have also leveraged our expertise and technology to expand into three non-traditional strategies: real estate, venture capital and crypto assets. We operate with respect, curiosity and open minds. The people who thrive here share our belief that it's not just what we do that matters—it's how we do it. DRW is a place of high expectations, integrity, innovation and a willingness to challenge consensus.

CSE is the Government of Canada's foreign signals intelligence agency. We alert the government to the activities of foreign entities that seek to undermine Canada's national prosperity and security. Cyber security is a key part of CSE's mandate. We use our technical expertise to safeguard the information and systems that Canadians rely on every day.

CSE hires Canadians with a wide range of skills, experiences and perspectives because diversity makes us stronger. We offer exciting career opportunities for both professionals and students. We are team players, pathfinders, and problem solvers, all different, all united by a common mission: protecting Canada and Canadians.



Sun Life is a leading international financial services organization providing asset management, wealth, insurance, and health solutions. We're a global company with a passion for people, helping our Clients achieve lifetime financial security and live healthier lives. Through our own digital leadership journey, we understand the importance of embracing new tools and innovations, evolving the way we work, and delivering truly exceptional Client experiences. We are honoured to support ConUHacksVIII, and to support the next generation of digital leaders.

Located in Quebec City and Montreal, **Beenox** is an Activision studio with over 20 years of expertise in game development. Today, we are 500 people who are passionate about delivering outstanding gaming experiences to the community. Beenox is a proud contributor to the popular Call of Duty franchise, from crafting content for the Warzone seasons, to leading the development of the PC version of Call of Duty, as well as being involved in the development of Warzone™ Mobile. We have also contributed to the success of Crash Bandicoot, Tony Hawk's Pro Skater, Skylanders, Spider-Man and Guitar Hero.





SAP is one of the world's leading producers of software for the management of business processes. Our main focus is to provide multiple business functions with a single view of the truth so they can better manage complex business solutions. We are proud to be a continuing sponsor of ConUhacks. We're excited to once again challenge the hackers of ConUHacks 2024. We hope you find our challenge intriguing, as we've decided to ask hackers to provide a real-world solution, much like what you would do for one of our clients. So be wary not only of your code, but also how clients perceive your solution. Good luck!



Behaviour is a leading independent video game studio whose purpose is to reimagine what video games can do and transform those dreams into reality, all with a firm eye on work-life balance and our team's happiness. As one of the world's leading independent video game studios, Behaviour exists to develop innovative, world-class video games and help others do the same by providing development services for the biggest clients and publishers across all platforms, including Microsoft, Sony, EA, Warner Brothers, 2K, and many others.



Work at the heart of change With us, at **Accenture**, you'll work with exceptional people, the latest and greatest tech and leading companies across industries to harness meaningful, powerful change. Join us, let's do incredible things.



Hackers, this weekend represents an amazing learning experience! Share your ideas, keep an open mind, and go for it! At **Genetec**, innovation is part of our core values, which is why we encourage you to break the mold and try new things throughout the competition. As a Montreal company that supports the next generation of leaders, we wish you all the best during ConuHacks VIII!



Longbow Advantage is an end-to-end warehousing strategy company that leverages real-time data to manage people, processes, and warehouses through The Rebus® Platform, and WMS consulting services purpose-built to expand and enhance warehouse technologies. We take a holistic approach to warehousing strategy, understanding that technology is only one piece in the solution process. Our warehouse experts work with customers to understand challenges and goals, developing a recommendation that's aligned to the customer's business objectives and supply chain initiatives.

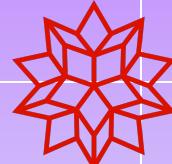


SOFTEL Communications is a leading company in customer experience, contact centers, unified communications, and Microsoft products. It has over 30 years of experience and works with major industry partners. SOFTEL delivers high-quality services through its deep expertise and comprehensive understanding of the market. It fosters a dynamic and inclusive work environment and offers exciting career prospects at the cutting edge of innovation and technology.

OUR IN-KIND SPONSORS



NordVPN®

The NordVPN logo features a blue circular icon with a white mountain range silhouette inside it, followed by the brand name "NordVPN" in a bold, black, sans-serif font with a registered trademark symbol.

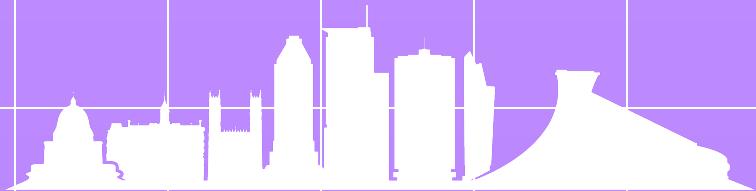
Enjoy a **20% discount** when you order

from **GURU** (<https://www.guruenergy.com>)
with the promo code: **ConUHacks15**





THANK YOU



On behalf of the whole HackConcordia team, we would like to thank our sponsors for helping us host Concordia University's annual hackathon. ConUHacks is made possible by the immense support of our sponsors. Special thanks to the late Dr. Terrill Fancott, ConUHacks' founder, Dr. Gina Cody, Canada's first female building engineer, Dr. Graham Carr, President and Vice-Chancellor of Concordia University, Dr. Mourad Debbabi, Dean of Gina Cody School of Engineering and Computer Science, Dr. Lata Narayanan, Chair and Professor of Computer Science and Software Engineering, Dr. Constantinos Constantinides, ConUHacks' advisor, the Concordia University administration, and our volunteers. Their continued support was necessary for us to organize the province's biggest hackathon, year after year. Last, but not the least, we would like to thank you fellow hacker, for hacking with us and being part of this incredible event. Happy Hacking!

DREAM IT, HACK IT!

MADE BY HACKCONCORDIA