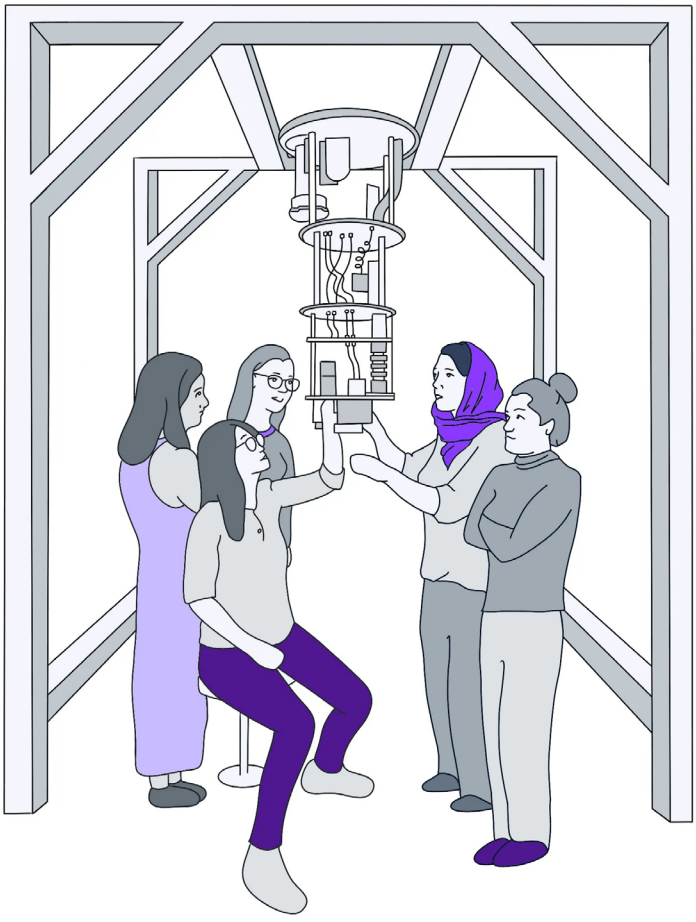
GUIDEBOOK

Qiskit | Quantum Explorers

A SELF-PACED QUANTUM LEARNING JOURNEY



Attendee Guide

JULY 2023 - FEBRUARY 2024

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DISCORD SERVER

QUANTUM EXPLORERS PORTAL

We appreciate your support in keeping this experience for registered attendees only, and welcome your feedback and suggestions for any improvement. Please do not upload or publicly share the learning materials of this program.

ABOUT THE QUANTUM EXPLORERS PROGRAM

Complete quantum learning tasks to unlock space exploration achievements.

Quantum Explorers is a self-paced, game-based quantum computing learning program for high school students and above.

This is a beginner-level program for people interested in quantum computing. The theme of the learning journey is space exploration.

There are seven themed achievements to unlock, with corresponding badges to collect. Each badge has a learning module, event, or set of tasks associated with it that must be completed in order to unlock its achievement.

Participants (Explorers) will gain a high-level understanding of quantum computing, some of its applications, and program real quantum computers.

Live events will be recorded and all materials will be available for the duration of the program so that participants can learn at their own pace.

The central hub of the program is the dedicated **Quantum Explorers Discord Server**, for all event communications, updates, mentor support, and participant engagement. Explorers can keep track of their individual progress and the achievements they've unlocked on the **Quantum Explorers portal**.

Official IBM Digital credentials will be issued to an Explorer at the end of the program, depending on the number of achievements a learner has unlocked.

Top performing Explorers will be highlighted at the end of the program.

PROGRAM HIGHLIGHTS

- 7 themed achievements to unlock
- Beginner-friendly, though it increases in difficulty as achievements are unlocked
- Heavy community focus that fosters organic collaborations and networking opportunities
- Top performing Explorers will be highlighted at the end of the program.

ABOUT ACHIEVEMENTS

TWO CATEGORIES OF BADGE ACHIEVEMENTS

On your interstellar journey, you will work towards unlocking space exploration themed badge achievements. Think of these as badges to collect and pin to your Explorer uniforms.

There are two types of space exploration themed badge achievements: learning and community.

LEARNING BADGES

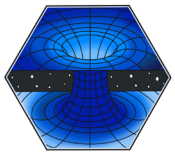
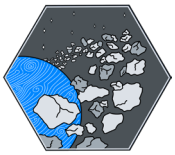
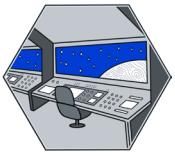
Learning badges are associated with learning modules. Each is comprised of a curated beginner to intermediate syllabus consisting of resources and labs that you can go through at your own pace. Once you've gone through the learning materials, you will have to pass a quiz to unlock the achievement.

COMMUNITY BADGES

These are associated with various community activities and events. For information on how to unlock each achievement, be sure to carefully read the instructions given in each badge's jupyter notebook on the Quantum Explorers portal.

BADGE OVERVIEW

BADGE ACHIEVEMENTS, TOPICS, AND DISCORD CHANNELS

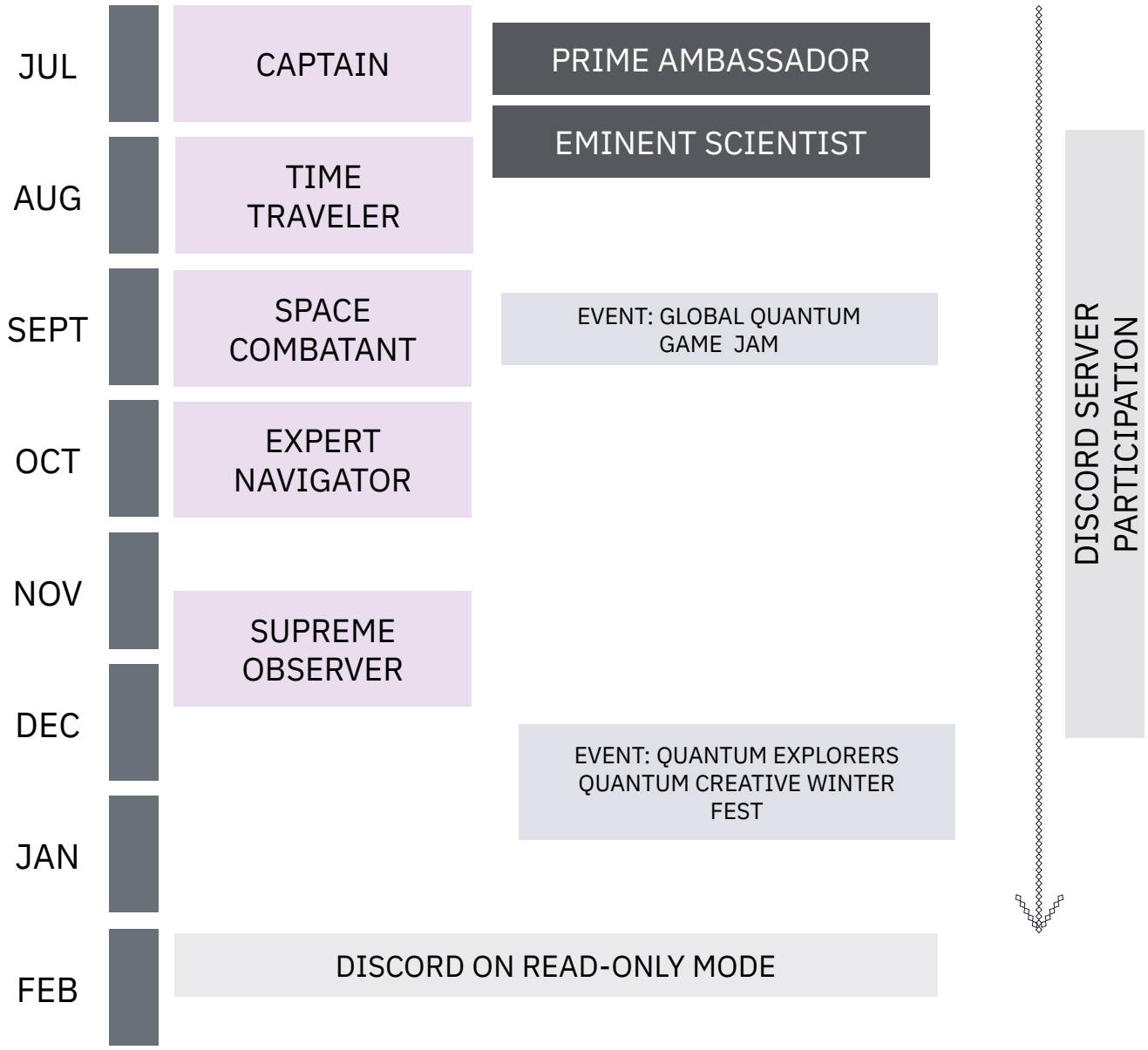
	CAPTAIN	Quantum Computing & Qiskit 101 #q-computing-101
	TIME TRAVELER	Quantum Error Correction & Mitigation #q-error-cm
	SPACE COMBATANT	Quantum Machine Learning #q-machine-learning
	EXPERT NAVIGATOR	Quantum Optimization #q-optimization
	EMINENT SCIENTIST	Quantum Women Invited Talks #q-women-invited-talks
	PRIME AMBASSADOR	Discord Activity & Community Events #q-prime-ambassador
	SUPREME OBSERVER	IBM Quantum Challenge Fall 2023 #ibmq-challenge

KEY: LEARNING BADGE COMMUNITY BADGE

TIMELINE

OVERVIEW OF WHEN BADGES WILL GO LIVE

Only the Captain badge will be available at program launch. Once a badge is live, all of the corresponding material will be available for the duration of the program until February 2024. Total materials cover approximately 50 to 85 hours. Level of engagement depends on you. A couple of notable, large events have been included in the timeline below. Other events and relevant information will be announced in the Discord server.



IMPORTANT NOTE: This is just an overview. Dates and times may be subject to change throughout the course of the program. The best way to keep up to date about program updates is to keep an eye on the #announcements channel on the Discord server.

HOW TO UNLOCK A BADGE ACHIEVEMENT

STEP BY STEP PROCESS OF OBTAINING YOUR BADGES

You may choose however many or few badges you wish to unlock, and order of completion (as long as they're live), however we encourage you to tackle the Captain badge as your first learning badge.

STEP 1: ACCESS THE JUPYTER NOTEBOOK ON THE QUANTUM EXPLORERS PORTAL

An announcement will be made in the #announcements channel when the badge goes live. When the badge is live, access its jupyter notebook through the Quantum Explorers portal and follow the instructions given there.

STEP 2: COMPLETE AT LEAST THE MINIMUM AMOUNT OF TASKS ASSOCIATED WITH THE BADGE

All tasks and learning materials will be outlined in the Badge workbook. There are optional tasks and additional resources that you may look at if you choose to do so.

STEP 3: PASS THE BADGE ASSESSMENT

Each learning badge has a quiz assessment in its jupyter notebook that you must pass by achieving a score percentage of at least 80%. A password will be revealed on successful completion.

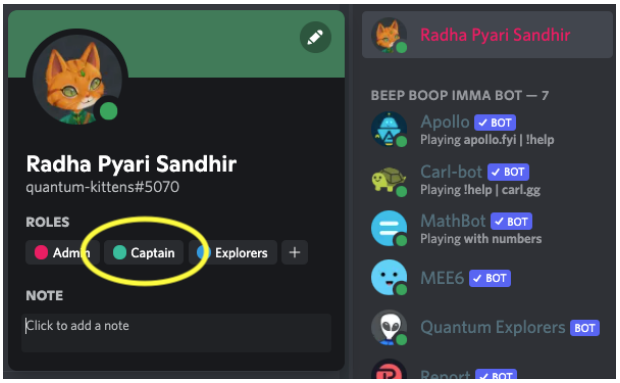
Each community badge has a single question that assesses a string password that you will be provided when you are eligible to unlock the badge. The exact manner will be detailed in each badge's jupyter notebook.

Important: Do NOT share the passwords with anyone! The passwords prove that you've unlocked an achievement.

HOW TO UNLOCK A BADGE ACHIEVEMENT (CONT'D)

STEP 4: DOWNLOAD YOUR BADGE AND SHARE YOUR ACCOMPLISHMENT IN #LEVEL-UP!

Each badge image is password protected. Access the badge image by entering the correct password. Once you have your badge image share you progress in the #level-up channel on Discord so admins may verify your achievement. Once your achievement is verified, a label will appear under your Discord name, such as this Captain label shown below:

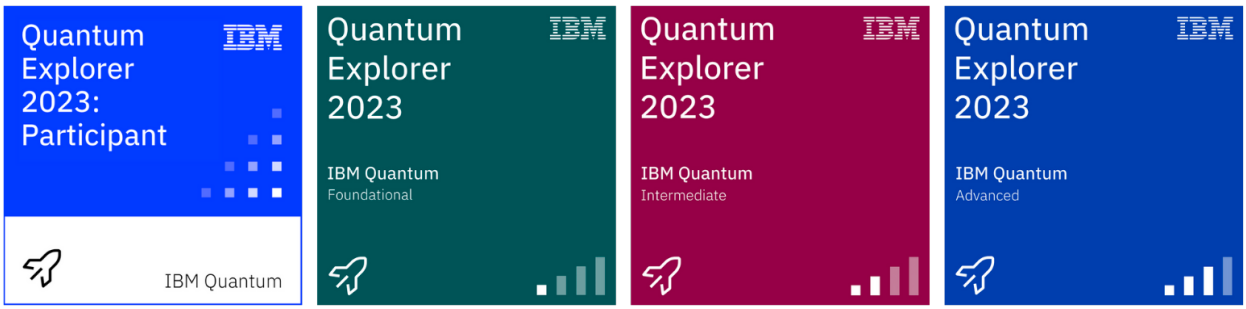


Please allow up to five working days for admins to verify your achievement and add the Discord label to your name.

IBM DIGITAL CREDENTIALS

ABOUT CREDENTIALS ISSUED VIA CREDLY

At the end of the program, you will have the opportunity to be issued IBM digital credentials via Credly based on how many badge achievements you've unlocked.



Eligibility criteria for each credential is as follows:

- Participant - 1/3 community achievements
- Foundational - 1/4 learning achievements
- Intermediate - 4/4 learning achievements
- Advanced - 7/7 total achievements

For further information about these digital credentials, please visit the Quantum Explorers Digital Credentials landing page.

HOW TO NAVIGATE DISCORD

HOW TO NAVIGATE AND USE THE DISCORD SERVER

STEP 1: INSTALL DISCORD AND CREATE AN ACCOUNT

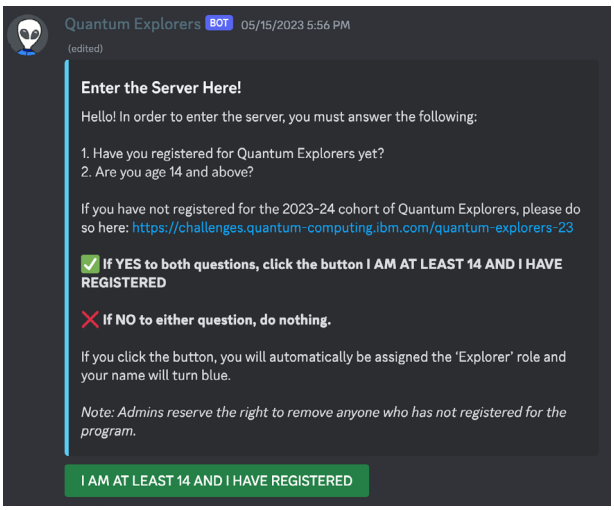
Discord is a community chat app, and will be the central hub of all communications. You can download and install it from discord.com. (Having trouble setting up an account? Here's How to Get Started with Discord.

STEP 2: CONFIRM THAT YOU HAVE REGISTERED FOR QUANTUM EXPLORERS TO ENTER THE SERVER

When you first join the server, you will only be able to see the #lobby and #code-of-conduct channels.

In the #lobby channel you will see a message titled "Enter the Server Here!" that asks if you have registered for the 2023-24 cohort of Quantum Explorers and are above the age of 14. Please follow the instructions in the message to enter the server, and to be given the Discord role of 'Explorer'.

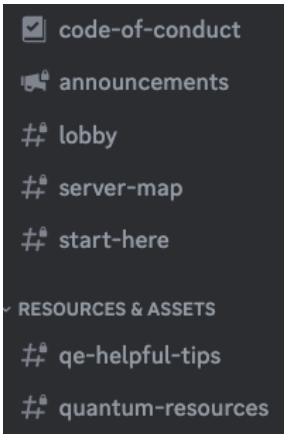
Note that admins reserve the right to remove unregistered members.



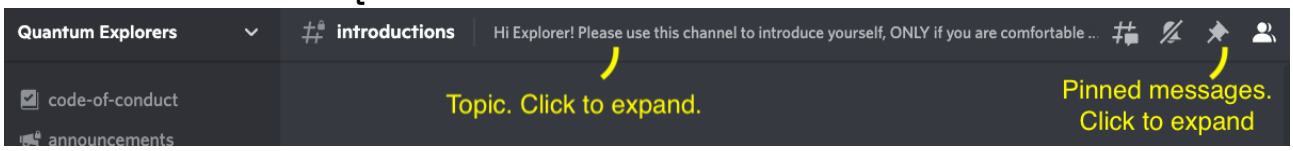
HOW TO NAVIGATE DISCORD (CONT'D)

STEP 3: READ AND PARTICIPATE IN THE CHANNELS!

When you are given the role of Explorer, more channels will be available to you. On your left panel there will be a list of channels that may look something like:



Some channels like the #announcements channels are read-only, for informational purposes. Some channels, like #introductions are for you to post in! Each channel has a dedicated purpose, called a 'topic'. Channel topics are located at the top of each channel. Pinned messages are also located at the top of the channel, and may contain important information and FAQs related to the channel.



Discord monitors your activity level, and awards XP (experience points) for each message you send.

Important note to ensure smooth functioning of the server: Please post messages in the appropriate channel, and do not post the same message in multiple places. If you are unsure what channel to use, please read its topic. We encourage organic discussion around resources, rather than excessive link dumping. Admins reserve the right to dock XP and even remove anyone demonstrating spammy or trolling behavior.

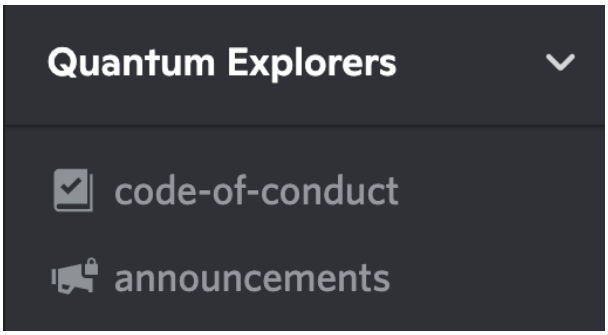
HOW TO NAVIGATE DISCORD (CONT'D) - DISPLAY NAME

HOW TO CHANGE YOUR DISPLAY NAME IN THE SERVER

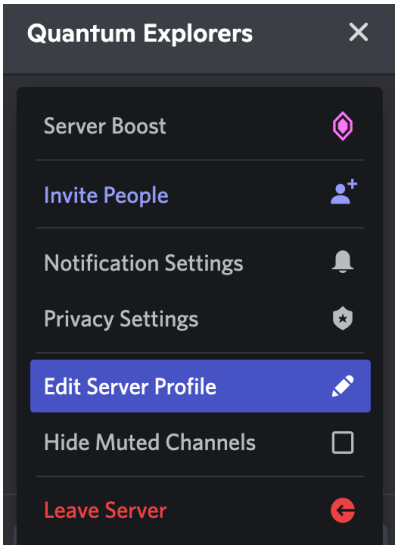
You can change your display name to be different from your Discord handle. You do not need to use your real name in the Discord server if you are uncomfortable doing so, but we ask that you choose an appropriate display name.

Admins reserve the right to prompt you to change an inappropriate display name and even remove you from the server should you not comply.

STEP 1: CLICK ON THE SERVER NAME, 'QUANTUM EXPLORERS'



STEP 2: CLICK ON EDIT SERVER PROFILE AND CHANGE YOUR DISPLAY NAME



HOW TO NAVIGATE DISCORD (CONT'D) - HELPFUL CHANNELS & ROLES

IMPORTANT INFORMATION FOR YOUR DISCORD EXPERIENCE

IMPORTANT ROLES TO KNOW

- **Explorer** is the basic role assigned to you when you first enter the server. The names of Explorers with no badges are dark blue.
- **Captain** names are bright green. Once you unlock the rank of Captain, the rest of the server and more channels will be available to you. We encourage you to unlock Captain first.
- **Admin** and **Space Crew** names appear in red. These are administrators and moderators. If someone is giving you information that should only come from an admin, ensure their name is red.
- **Mentor** names are purple. There is a fleet of talented mentors ready to guide you in quantum computing and its applications and answer questions you may have about the learning material.

IMPORTANT CHANNELS TO KNOW

- #announcements: Stay up to date with important program information and updates.
- #general-support: For any questions about where to go, how to get there, basically anything not related to a live badge! For badge related questions, please use the corresponding badge channel.
- #start-here: To help you get started with the Quantum Explorers program. Begin your journey here.
- #server-map: A guide to all the channels in the server.

Important note: Discord is in the process of rolling out a new username format. If your Discord handle changes during the program, please submit this form and notify an admin via posting in the channel #discord-handles to update your handle in the Quantum Explorers portal.

USING JUPYTER NOTEBOOKS IN THE CLOUD

QUICK BEGINNER'S GUIDE TO USING JUPYTER NOTEBOOKS IN THE IBM QUANTUM LAB

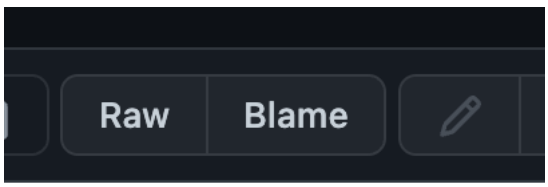
Some of the lab exercises provided during the program are in the form of jupyter notebooks, which are web-based interactive notebooks that can have text, code, images, etc. These can be run in the IBM Quantum Lab, which is a cloud-based jupyter notebook environment. The links provided in the learning materials either take you directly to the notebooks in the cloud or to the Quantum Explorers Github repository. (Note, these notebooks are different from the badge notebooks on the Quantum Explorers portal.)

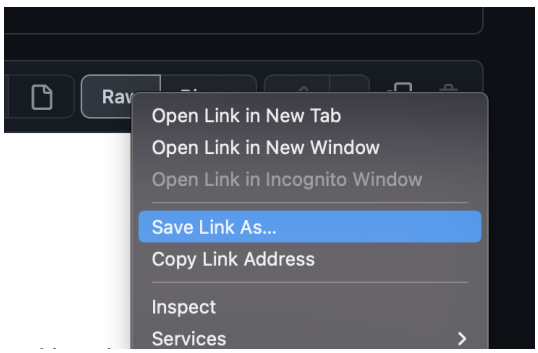
Outlined below is how you can take the jupyter notebooks from Github and use them in the Lab.

STEP 1: DOWNLOAD THE JUPYTER NOTEBOOK FROM GITHUB

The top right corner of the notebook will see one of two options: Download, which you click to download the notebook.

Or Raw, which you right-click and then click "Save link as" to download the notebook.

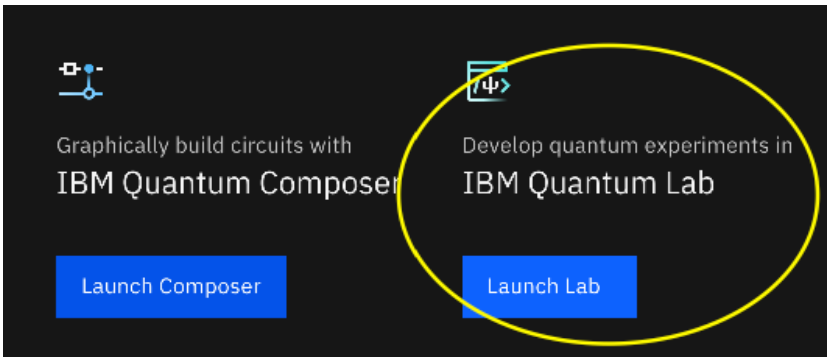




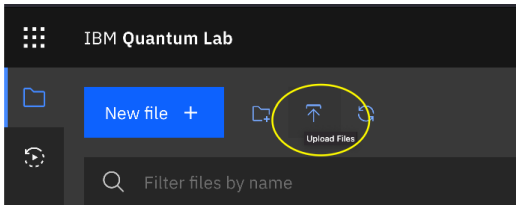
USING JUPYTER NOTEBOOKS IN THE CLOUD (CONT'D)

STEP 2: UPLOAD THE NOTEBOOK TO IBM QUANTUM LAB

Once you've logged into your IBM Quantum Platform account, go to the Lab.



Click upload. Note that you can also create new folders and notebooks in the Lab!



IBM QUANTUM COMMUNITY CODE OF CONDUCT

In our collective mission to continue to promote and encourage an inclusive and welcoming global quantum community, The IBM Quantum Community Code of Conduct is available for download and review here.

We appreciate everyone's support in this mission, and ask that any observed code of conduct violations or inappropriate behavior are reported here.

READ CODE OF CONDUCT

Live Incident Reporting on Discord

Submit anonymous Code of Conduct violations or offensive/ inappropriate content using the /report command:

/report [message]

This will send a report to the admins. It will also display a confirmation message that the report was sent which will be visible only to you.

Make sure to include a link to the reported message (Select the message you are reporting and "Copy Message Link") for admins to review.

You may use the #sandbox command testing channel, or any other channel to use the report command.

Once you write /report, the message that follows will be hidden from any other viewers.

FAQ

WHAT IS QISKIT AND HOW CAN I USE IT?

Qiskit is an open source Python framework used to program quantum computers. You can use it locally by installing it on your machine (go to qiskit.org), or you can use it in the cloud without installing it by accessing the Lab on IBM Quantum Platform.

WILL THE LIVE EVENTS BE RECORDED?

All lectures and invited talks will be recorded and available for viewing at any time for the duration of the Quantum Explorers program. Live social events will not be recorded, but there will opportunities to engage socially in the Discord channel through text messages if you are not able to make it to the live events.

I'M ENJOYING THE QUANTUM EXPLORERS PROGRAM. CAN I INVITE MY FRIENDS AND CLASSMATES TO JOIN THE FUN?

Yes! You can invite anyone you want to join throughout the duration of the program, simply send them to the event page: qisk.it/quantum-explorers.

Note: if numbers grow beyond capacity, we reserve the right to limit new entries into the program. This will be conveyed in the #announcements channel.

FAQ (CONT'D)

I'M NEW TO QUANTUM AND DON'T HAVE A TECHNICAL BACKGROUND. HOW CAN I CATCH UP?

The Captain badge syllabus begins from a non-technical approach, so we encourage you to begin there. Moreover, we have this handy Quantum Computing Prerequisite Math Syllabus (High School+) syllabus for you to take a look at. If you prefer a more creative approach, we have this Creative Introduction to Quantum Computing syllabus as well.

DO I HAVE TO COMPLETE ALL THE LEARNING TASKS BEFORE THE NEXT BADGE IS MADE LIVE?

Not at all! Feel free to study at your own pace. But complete everything you want to complete before the program closes in February 2024.

DO I HAVE TO DO THE BADGES IN A SPECIFIC ORDER?

Nope! You do not have to do the Badges in the order listed, except for the Captain Badge. You'll need to achieve the rank of Captain before being able to start the other learning module Badges.

CAN I UPLOAD AND PUBLICLY SHARE QUANTUM EXPLORERS MATERIAL?

Most of the material, no. You cannot upload and publicly share our learning materials like the workbooks, guidebooks, live event recordings, screenshots of our Discord server, etc.

However, you CAN post the badge images you have unlocked, your space exploration stories, and any fun things you've done with our extra notes and coloring pages. You may also use our syllabi for your own coursework and events.

Let’s Get Started!

QUANTUM EXPLORERS PORTAL

DISCORD SERVER

QISKIT.ORG

The pages that follow are extra sheets you can use during your learning journey to take notes, keep track of dates, etc.

And a coloring page with all the badges!

Color in the badges and share your art in #space-exploration.

MONTHLY TRACKER

A SPACE TO KEEP TRACK OF IMPORTANT DATES AND REMINDERS

JULY

AUGUST

SEPTEMBER

OCTOBER

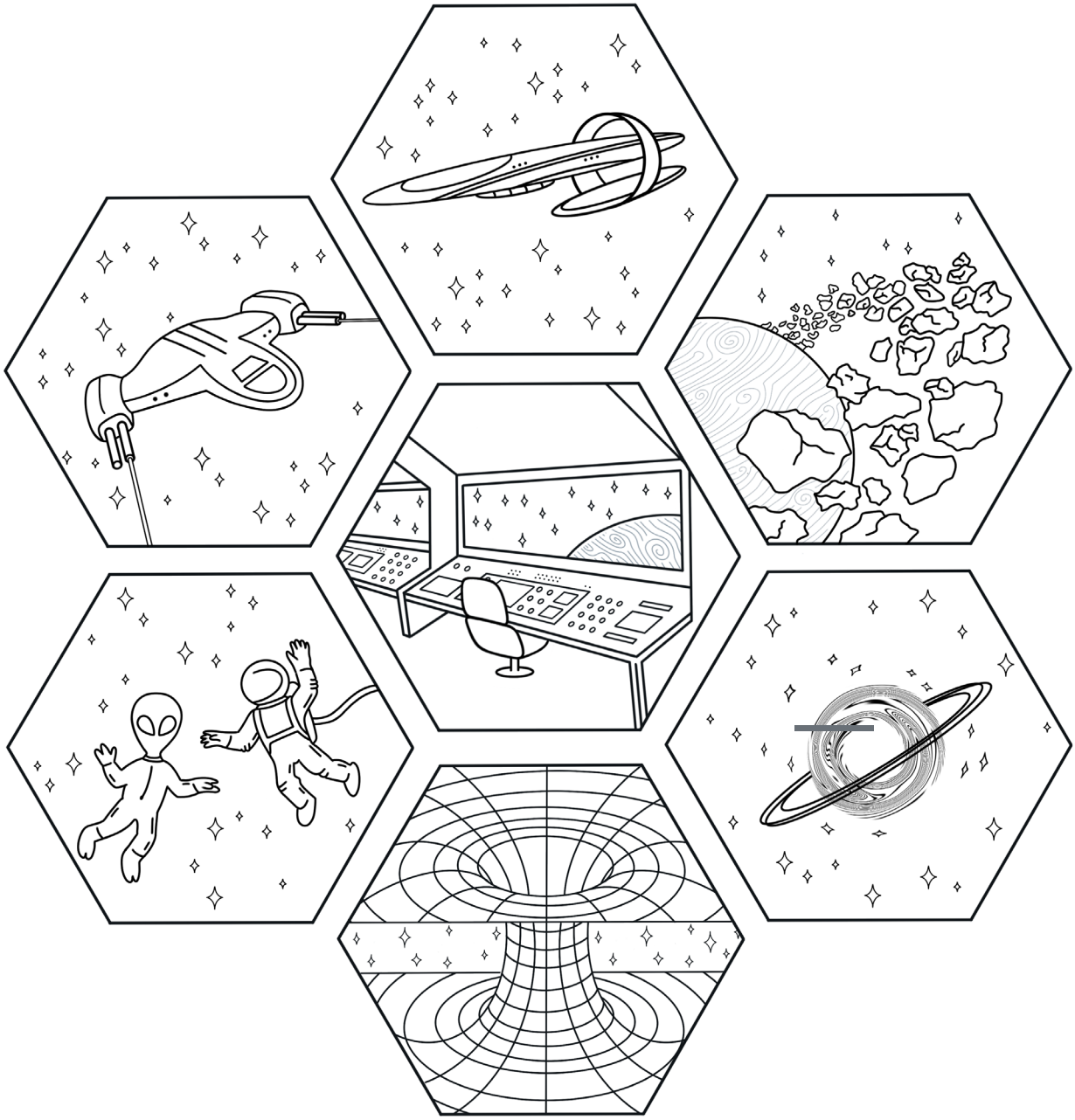
NOVEMBER

DECEMBER

JANUARY

FEBRUARY

EXTRA NOTES



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