Organizing Workshops

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Below you will find certain information and suggestions helping you to organize an online or onsite workshop.

Workshops and Schedule

Both for the online and onsite events, we suggest a 5 day workshop plan or QBronze, QNickel and QSilver. The assignments on Canvas are also scheduled accordingly.

QBronze

Day 1: One Bit | Coin Flipping | Coin Flipping Game | Probabilistic States | Probabilistic Operators | Two Probabilistic Bits |

Day 2: Quantum Coin Flipping | First Quantum Programs with Qiskit | ,Hadamard Operator | One Qubit | Quantum State | Superposition and Measurement | Visualization of a (Real-Valued) Qubit

Day 3: Operations on the Unit Circle | Rotations | Reflections | Quantum Tomography | Two Qubits | Phase Kickback |

Day 4: Entanglement and Superdense Coding | Quantum Teleportation | Multiple Control Constructions

Day 5: Inversion About the Mean | Grover's Search: One Qubit Representation | Grover's Search: Implementation

QSilver

Day 1: Introduction to Qiskit | Basics of complex numbers | Quantum states with complex numbers | Mathematical notations | Quantum operators with complex numbers

Day 2: Global and local phase | State representation conversion and visualization | Bloch sphere |Quantum gates with complex numbers | Operations on Bloch sphere | Multiqubit operations

Day 3: Introduction to Cirq | Discrete Fourier Transform | Quantum Fourier Transform

Day 4: Phase Estimation | Order Finding Algorithm

Day 5: Shor's Algorithm | Shor's Algorithm in more detail

QNickel

Day 1: Introduction to Qiskit | Classical gates | Phase kickback | Deutsch Algorithm

Day 2: Deutsch-Jozsa Algorithm | Bernstein-Vazirani Algorithm | Simon's Algorithm

Day 3: Introduction to Cirq | Grover Algorithm revisited

Day 4: Max-Cut Problem and Bipartite Graphs | Adders and Numbers Checking

Day 5: Grover algorithm for Max-Cut Problem

QPrep

For QPrep, there is no Canvas assignment. The schedule can be more flexible. Days 1 and 2 and 3 and 4 can be combined to have a 3 day event but for QPrep, we suggest solving each task together with the participants during the workshop, hence the pace can be slower.

Day 1: Jupyter notebooks | Variables | Loops

Day 2: Conditionals | Lists

Day 3: Vectors | Dot Product |

Day 4: Matrices | Tensor Product

Day 5: A seminar on quantum physics or quantum computers

Online events

For the online events, we suggest a lecture of around 1.5 hours about that day's content. Then the participants are expected to work on the tasks on their own. You may reserve some time slots for mentor support or you may not indicate this time slot in particular if the mentors would be available in general. In addition to lectures, we suggest conducting coding sessions each day, where mentors solve some of the tasks from the notebooks.

Onsite events

We suggest a 20 hours workshop, where 4 hours will be spent each day. The ideal way to do it is lecturing and then letting participants solve the tasks while mentors try to help them in person, interchangeably.

Defining your event

An event must have the following:
- The owner of the event (QWorld, department of a QWorld, QCousin, or similar)
- At least one organizer or workshop-lead (instructors)

- A contact email
- The dates, time slots, venue, and target groups
- A tentative program
- The mentors, people who will help with technical setup (setting Discord server, managing Canvas)
- The language(s) of event
  - The language of content and language of teaching may be different
  - Mentoring can be done in different languages
- Criteria for giving diploma (Canvas assignments)

An event may have the following:
- Speaker(s)
- Partner(s), host(s), co-organizer(s)
- Sponsor(s)

After those items are defined, then you can proceed with
- Poster for your event
- Application form
- Web page

You may also ask for a workshop lead, mentor, or organizational help from QWorld. We suggest that you start organizing your event at least 1 month before the planned workshop date.

Communication with QWorld

You should contact the Marketing department (Aga Wolska, agnieszka.wolska@qworld.net) to get the id for your workshop (e.g. QSilver5). If it is an event held during a challenge etc., you may need to put down the details in a particular spreadsheet. QWorld provides an event page on "qworld.net" and graphical material preparation. The event may also have a local page. QWorld makes announcements about your events on its social media. In the case of the entangling workshop, the promotion should be started by QWorld.

As a basic rule, each event using the QWorld logo must have an event page on QWorld's website and it should be announced on their social media.

Next you need to contact the QEducation department (Abdullah Khalid, Abdullah.Khalid@qworld.net) for the Canvas server that will be used during the event. You should provide the name of the person who will be in charge of Canvas.

You should also put the details of the workshop in the QWorld's spreadsheet: https://docs.google.com/spreadsheets/d/1IPjwxs8cr2IICgSLjTX5HTfwWu7xUr4O9Epxa5Gvelc/edit?usp=sharing.

Application Form

An application form should have the following sections
- Information about the event
- Code of Conduct and privacy policy
- Personal questions
- Questions about motivation
- Questions about past knowledge (Optional)
- Quiz(Optional)

In a QPrep workshop, only the first three items should be sufficient. For QBronze, you may skip the quiz but based on our experience, having a test helps to eliminate participants who are not a good fit for the workshop. You may need a test in particular if you are organizing an onsite workshop where the number of participants is limited. For Nickel and Silver, you may decide based on the past experience of the participant or you may ask some questions on Bronze.

Please do not edit the forms below, create a copy and edit your own copy. You can also contact QWorld's Data Protection Officer (currently, it is Abuzer Yakaryilmaz) to create the forms for you.

For a QPrep workshop, you can only use the first sections. For Nickel workshops, you can use the same form as Silver. You can translate the form into your own local language.

Bronze | Silver

Code of Conduct and Privacy Policy

All participants should agree with QWorld's Code of Conduct to join an event.

We respect the privacy of applicants and participants of our events. **Each QCousin must have a privacy policy and a data protection officer if they collect the personal data of applicants and participants.** You may create a copy of QWorld's Privacy Policy and then modify it for your case. You should also have a data protection officer indicated in the Privacy Policy.

If you do not have a privacy policy, do not create an application form on your own. In this case, your application form will be created by QWorld's data protection officer (, and so contact qworld.dpo@gmail.com in advance). QWorld's data protection officer will provide the organizer the edit access of the application form and collect data. The access will be removed 30 days after the event. Do not store the data of applicants and participants after the access is removed.

Determine the parties (QWorld must be included by default) collecting and storing data. Each such party must have a written privacy policy and a link to that document. On the application form, clearly indicate each privacy policy and ask for permissions separately.

Besides privacy policy, we may need to ask for further permissions such as taking photos of the participants and using them for marketing purposes.

Please contact qworld.dpo@gmail.com for your questions or if you are not sure how to proceed.

Minors

We accept the applicants no younger than 14 years old. Depending on the country, you may set a higher age limit. For the participants between age 14-17, we need the consent of the legal guardian. There are two options:

- You prepare another [application form for the minors](#) and indicate this in the main application form (Check QSilver application form)
- You ask for a [consent letter](#) filled by the legal guardian of the participant in the application form. (Check QBronze application form)

Form Settings

Check settings of the application form:
- Verify the settings for "Collect email addresses". We suggest that each applicant should receive a copy of its application.
- There should be a confirmation message and you may share your local group's and QWorld's social media accounts.

Advertisement

We usually use Facebook, Twitter, LinkedIn, newsletter, and emailing to people who can be interested. Depending on the scope of the event, we make announcements on different venues. The marketing department may ask you to provide content for the advertisements. Please do not forget to provide the accounts to be tagged in the posts.

The local group is responsible for making their announcements locally. You can announce or advertise the same event several times, referring to the venue, program, target, sponsor. After the event, you can announce the number of diplomas given, thanks to participants and sponsors, etc. Do not forget to tag @QWorld19 in your twitter posts. You may also share the event in QWorld Discord Server.

Schedule one or more times for the group photo(s).Do not forget to take screenshots to share later.

Hashtag: If the event is part of a big project, such as QSpring2022 (*#qspring2022*), contact marketing@qworld.net to learn the hashtag, and then do not forget to use this hashtag with your posts.

If the event will be held in English and open to participants from all over the world, then you should also advertise it globally. Here are some suggestions:

Facebook Groups

- Quantum Information and Quantum Computer Scientists of the World Unite (16K+ members) https://www.facebook.com/groups/qinfo.scientists.unite/
- The Quantum Information Club (1.6K+ members) https://www.facebook.com/groups/thequantuminformationclub

Community/popular groups
- Quantum Computing (25K+ members) https://www.facebook.com/groups/896233200461905/
- Quantum Computing Now (7K members) https://www.facebook.com/groups/328231110942652/
- Quantum AI (5K+ members) https://www.facebook.com/groups/quantumai/
- Quantum Information Science and Technology in Latin America (almost 2.3K members) https://www.facebook.com/groups/152996132018274/

Others

Please be careful when posting in places you are not familiar with. Our advertisements might be considered as spam with respect to their defined rules or the moderator's opinion. Please avoid being offensive in such cases. Never spam people or groups. We all represent QWorld and our local groups besides ourselves.

Here are some examples:
- http://quantumapalooza.com
- Different forums on science, mathematics, or technology.
- http://reddit.com/r/QuantumComputing/
- DMANET: Discrete Mathematics and Algorithms Network (http://www.zaik.uni-koeln.de/AFS/publications/dmanet/)

Discord and Zoom (For online workshops)

Discord

Discord is a good alternative for the base of the workshop. Create a dedicated Discord server for the workshop. As the first message in each channel, you may share the purpose of the

channel. (Ex: Python-help, Please ask your questions related to problems you encounter while programming in Python here.)

It is also suggested that you create roles such as mentor, organizer etc. so that participants can see on the right hand side when mentors are online.

You may create a *private channel* for internal communication. It facilitates the process as the organizers can also talk in Discord without switching to another medium.

Here is a [template server](#).
Alternatively, you can also check "Appendix - Example of Discord server channels"

Zoom

We suggest using Zoom for the lectures but you may choose another alternative. You may contact QWorld for a licensed (shared) account (currently, the Zoom's account administrator is Paweł Gora). If you use QWorld's Zoom, you should fill in the QWorld's Zoom Reservation form: https://docs.google.com/spreadsheets/d/1EIOWAiCEEMY20-hWeCJJkKtRpgRV9_bN0CC2y69oQf8/edit?usp=sharing.

You should share the Zoom link and recordings of the sessions in the Discord Server.

Selection of the participants and communication

You may process the applicants based on your criteria. We encourage each group to be inclusive and support diversity. You may consider some gender-balanced criteria. For the online events, accepting 200 participants would result in around 120 participants in the Discord server based on our experience. It would be very good if 50% of the participants who joined the server would complete the workshop. We think that 1 mentor would be good for 20 to 25 participants For the onsite events, we suggest not exceeding 40 participants but this also depends on the room and available mentors.

Please do all communications by emails by CCing to all organizers. When sending email to more than one person, please put each recipient in BCC. The applicants or participants should not be able to see the other's email addresses. In addition to email, we suggest creating a Google Calendar event for sending acceptance letters, as sometimes the emails are marked as spam.

After the selection process, send an acceptance letter to the accepted participants, and send a declined letter to the others. Try to be clear, direct, and informative. Do not forget to remove the link for the application form if no further application will be received.

Online events

For the online events, invite the accepted participants to the Discord server. Once the participants are in the Discord server, the rest of the communications can be done there. We suggest that you hold a welcome meeting where you explain the workshop flow, Canvas, Discord server and installation. Ideally, the welcome meeting can be held on Thursday before the event starts. You can also indicate that there will be a welcome meeting in the e-mail and share the Zoom link.

Onsite events

Ideally, a single mail should be sent before the event consisting of the material link and installation instructions. Please also send the complete final program. It is important that participants complete the installation before joining the event.

Assessment

We have Canvas assignments for each day's content. For QBronze we only have multiple choice questions. For Nickel and Silver, participants are expected to complete jupyter notebook homeworks as well.

Participants are expected to get at least half of the points on each day and 70 over 100 overall. More information will be given in the Canvas seminar.

By default, <u>we should not extend deadlines or give more attempts</u>. It is always best to keep the default settings, because otherwise some people may feel that they have been treated unfairly, and there may be more and more requests for extensions. Some exceptions can be applied in the case of special circumstances, e.g., when there are some external partners/sponsors who have special requests.

Increasing Interaction (online)

- There is a quiz-bot in Discord in which you can create quizzes. You can create fun quizzes related to quantum computing to be played each day at a predetermined time slot. Check some already created [quizzes](#) in Discord related to Bronze content and quantum computing in general. We suggest launching a demo quiz before the first quiz so participants get used to the quiz mechanics. One such example can be launched whte the following command =play 5743410.
- You can play Kahoot games. Search for QWorld in Kahoot to access the already created quizzes.
- There can be a time slot during the week for an informal meeting where everyone can chat and get to know each other, like an informal 'workshop dinner'.

- [Myth or Truth game](#) can be played in one of the Zoom meetings. One of the implemented examples can be launched with the following command =play 3888057.
- A quantum puzzle can be asked on one of the last days such as making some target state with minimum gates.

Diplomas

After the workshop, you should create the list of participants who should get a diploma, with their emails and preferably genders in a spreadsheet and share with the QMarketing Department. You will be asked for further details like whose signature should be on the diploma.

Once you get the diploma template from QMarketing, please send Abdullah Khalid from QEducation (contact on Discord or abdullah.khalid@qworld.net) the following information (a) the list of successful participants with email. Please make sure all names are correct. (b) The list of lecturers for the workshop (3) the diploma template file from QMarketing. He will generate and optionally send the diplomas on your behalf.

Feedback Form

Prepare a form to receive feedback from the participants about the event, tutorial, workshop team, talks, etc. Do not collect any personal data on the feedback form.

[Here](#) is an example form for QBronze, and [here](#) is an example form for QSilver (**please create a copy of it before using**). You may remove or add some parts based on your event details. Store nice quotes about our events and share the very good ones with the marketing department.

Appendix

Example of Discord server channels

(in the brackets is possible informative text that you can put as a channel topic, this makes the experience for participants a bit more pleasant).

Category: Crew
crew
Crew voice (voice channel)

Category: Program
welcome-and-rules (Please take a look here :slight_smile:)
announcements (Announcements will be here :loudspeaker:)

schedule (Check the overall schedule and which notebooks to complete each day from this channel :calendar_spiral:)
live-sessions (Here we will publish Zoom links to join sessions and recordings of our lecture sessions :movie_camera:)
resources (Links to the resources for the workshop are published here :scroll:)
homework (Homework tasks will be announced here :pencil:)

Category: Help
installation-help (Please ask your questions about installation problems here :wrench:)
python-help (Ask your Python related questions here :grey_question:)
math-help (Ask you Math-related questions here :1234:)
quantum-help (Ask your general questions about quantum computing here :cat2:)
homework-help (You may ask your questions about homework in this channel :homes:)
canvas-help (Any issues related to Canvas can be discussed here :wink:)
Ask a mentor 1 (voice channel)
Ask a mentor 2 (voice channel)
Ask a mentor 3 (voice channel)

Category: General
introduce-yourself (Let's introduce ourselves in this channel :hugging:)
general (We will be sharing general information in this channel. You may also ask your general questions :globe_with_meridians:)
report-typos (Report any typos you find in Bronze in this channel :interrobang:)
social-media (Let us celebrate our successes using this channel! :slight_smile:)
join-qcountry (Join us and let's grow our community :people_holding_hands:)
quiz (Quiz games will be played in this channel :video_game:)
feedback (This channel is to give feedback to the organizers :sun_with_face:)

Category: Other
off-topic (You may share your thoughts and non quantum stuff in this channel :game_die:)
useful-sources (Share quantum computing related sources in this channel :orange_book:)

Category: Coffee break
coffee-break (You can use this channel for random chat :slight_smile:)
Coffee break (voice channel)

In category Crew put permissions on roles so this category is only available to crew members (mentros, instructors, etc.). For category Program put restrictions that only crew members can post there.