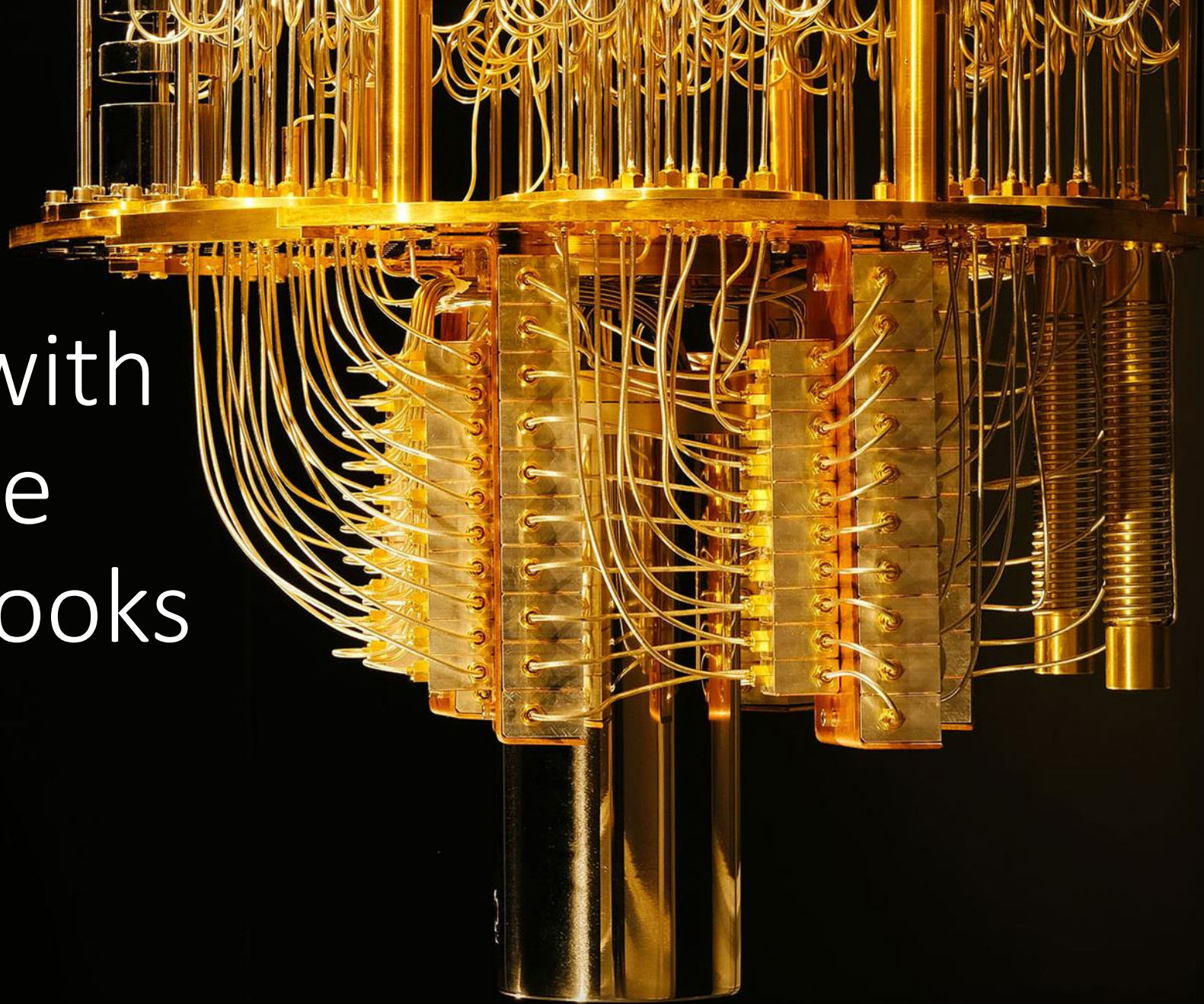


Getting Started with IBM Q Experience & Jupyter Notebooks

Explore the platform

Priya Angara, Ulrike Stege



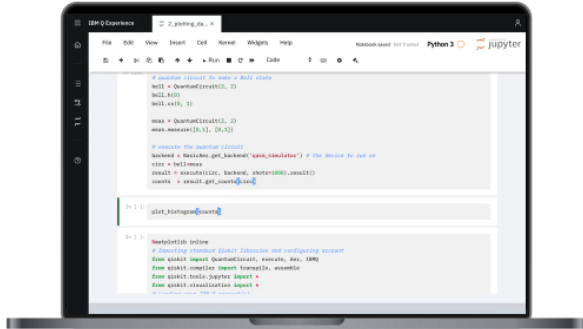
Sign in: <https://quantum-computing.ibm.com/>

IBM Q Experience

Real quantum computers. Right at your fingertips.

IBM offers access to the most advanced quantum computers for you to do real work.
Learn, develop, and run quantum programs on our systems with the IBM Q Experience quantum cloud platform.

[Learn More](#)



Write quantum programs

Easily program with Qiskit software integrated into the platform - no installation required.

Sign in to get started

IBMid

[G](#) [Q](#) [in](#) [T](#) [E](#)

New to IBM Q Experience?
[Create an IBMid account.](#)

IBM Q Experience

Home

Menu

Help

Profile


Welcome Prashanti Angara

Your providers

Personal profile
15 / 15 credits

[See more](#)

New here? Get started with the IBM Q Experience!



Circuit Composer

Explore the graphical interface for creating and testing circuits

Create a circuit →

Qiskit Notebooks

Create your first notebook and start using Qiskit

Create a notebook →


Pending results (0)

You have no experiment runs in the queue.

Your backends (9)


These are the quantum systems and simulators that you have access to.

[Got it!](#)

 maintenance


ibmq_16_melbourne (14 qubits)

Queue: 6 jobs

 online


ibmq_essex (5 qubits)

Queue: 24 jobs

 online

ibmq_burlington (5 qubits)

Queue: 22 jobs

 online

ibmq_london (5 qubits)

Queue: 36 jobs

Queue: 36 jobs

Components: Circuit Composer

The screenshot shows the IBM Q Experience dashboard. A red box highlights the 'Circuit Composer' section, which includes the text 'Explore the graphical interface for creating and testing circuits' and a 'Create a circuit →' button. Another red box highlights a text box that reads: 'The circuit composer lets you design and run circuits using a graphical user interface (i.e. you can drag and drop gates to form a circuit)'. The dashboard also features a welcome message for Prashanti Angara, a 'New here?' guide, and a list of backends including ibmq_essex, ibmq_burlington, and ibmq_london.

IBM Q Experience

Welcome Prashanti Angara

Your providers

Personal profile
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New here? Get started with the IBM Q Experience!

The circuit composer lets you design and run circuits using a graphical user interface (i.e. you can drag and drop gates to form a circuit)

Circuit Composer

Explore the graphical interface for creating and testing circuits

[Create a circuit →](#)

Qiskit Notebooks

Create your first notebook and start using Qiskit

[Create a notebook →](#)

Your backends (9)

These are the quantum systems and simulators that you have access to.

[Got it!](#)

(14 qubits)

ibmq_essex (5 qubits)
Queue: 24 jobs

online
ibmq_burlington (5 qubits)
Queue: 22 jobs

online
ibmq_london (5 qubits)
Queue: 36 jobs

Pending results (0)

You have no experiment runs in the queue.

Components: Qiskit notebooks

The screenshot shows the IBM Q Experience dashboard. A red box highlights a central text area that reads: "These are [Jupyter](#) notebooks. One can design and run experiments using code written in Python and [Qiskit](#)". Another red box highlights the "Qiskit Notebooks" section, which includes the text "Create your first notebook and start using Qiskit" and a "Create a notebook →" button. A third red box highlights the "Circuit Composer" section, which includes the text "Explore the graphical interface for creating and testing circuits" and a "Create a circuit →" button. The dashboard also features a welcome message for Prashanti Angara, a sidebar with navigation icons, and a right-hand panel titled "Your backends (9)" listing various quantum systems and their queue lengths.

IBM Q Experience

Welcome Prashanti Angara

New here? Get started with the IBM Q Experience!

These are [Jupyter](#) notebooks. One can design and run experiments using code written in Python and [Qiskit](#)

Circuit Composer
Explore the graphical interface for creating and testing circuits
[Create a circuit →](#)

Qiskit Notebooks
Create your first notebook and start using Qiskit
[Create a notebook →](#)

Your providers
Personal profile
15 / 15 credits
[See more](#)

Pending results (0)
You have no experiment runs in the queue.

Your backends (9)
These are the quantum systems and simulators that you have access to.
[Got it!](#)

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ibmq_16_melbourne (14 qubits)
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- online
ibmq_burlington (5 qubits)
Queue: 22 jobs
- online
ibmq_london (5 qubits)
Queue: 36 jobs

Components: Backends

IBM Q Experience

Welcome
Prashanti Angara

Your providers

Personal profile
15 / 15 credits

[See more](#)

New here? Get started with the IBM Q Experience!

<https://quantum-computing.ibm.com/support>

Circuit Composer

Explore the graphical interface for creating and testing circuits

[Create a circuit →](#)

Qiskit Notebooks

Where do you run the experiments? These are actual quantum computers and simulators that you have access to

Your backends (9)

These are the quantum systems and simulators that you have access to.

[Got it!](#)

- maintenance
- ibmq_16_melbourne** (14 qubits)
- Queue: 6 jobs

- online
- ibmq_essex** (5 qubits)
- Queue: 24 jobs
- online
- ibmq_burlington** (5 qubits)
- Queue: 22 jobs
- online
- ibmq_london** (5 qubits)
- Queue: 36 jobs

Pending results (0)

You have no experiment runs in the queue.

Click on Create a notebook

The screenshot shows the IBM Q Experience dashboard for user Prashanti Angara. A red box highlights a central text area stating: "These are [Jupyter](#) notebooks. One can design and run experiments using code written in Python and [Qiskit](#)". Another red box highlights the "Qiskit Notebooks" section, which includes the text "Create your first notebook and start using Qiskit" and a blue button labeled "Create a notebook →". A third red box highlights the "Circuit Composer" section, which includes the text "Explore the graphical interface for creating and testing circuits" and a blue button labeled "Create a circuit →". The dashboard also features a sidebar with navigation icons, a top header with the IBM Q Experience logo, and a right sidebar showing available quantum backends: **ibmq_16_melbourne** (14 qubits), **ibmq_essex** (5 qubits), **ibmq_burlington** (5 qubits), and **ibmq_london** (5 qubits). Each backend entry includes a status icon (online or maintenance), a queue size, and a progress bar. The bottom section shows "Pending results (0)" and a message: "You have no experiment runs in the queue."

IBM Q Experience

Welcome Prashanti Angara

Your providers

Personal profile
15 / 15 credits

[See more](#)

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online
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online
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ibmq_london (5 qubits)
Queue: 36 jobs

Pending results (0)

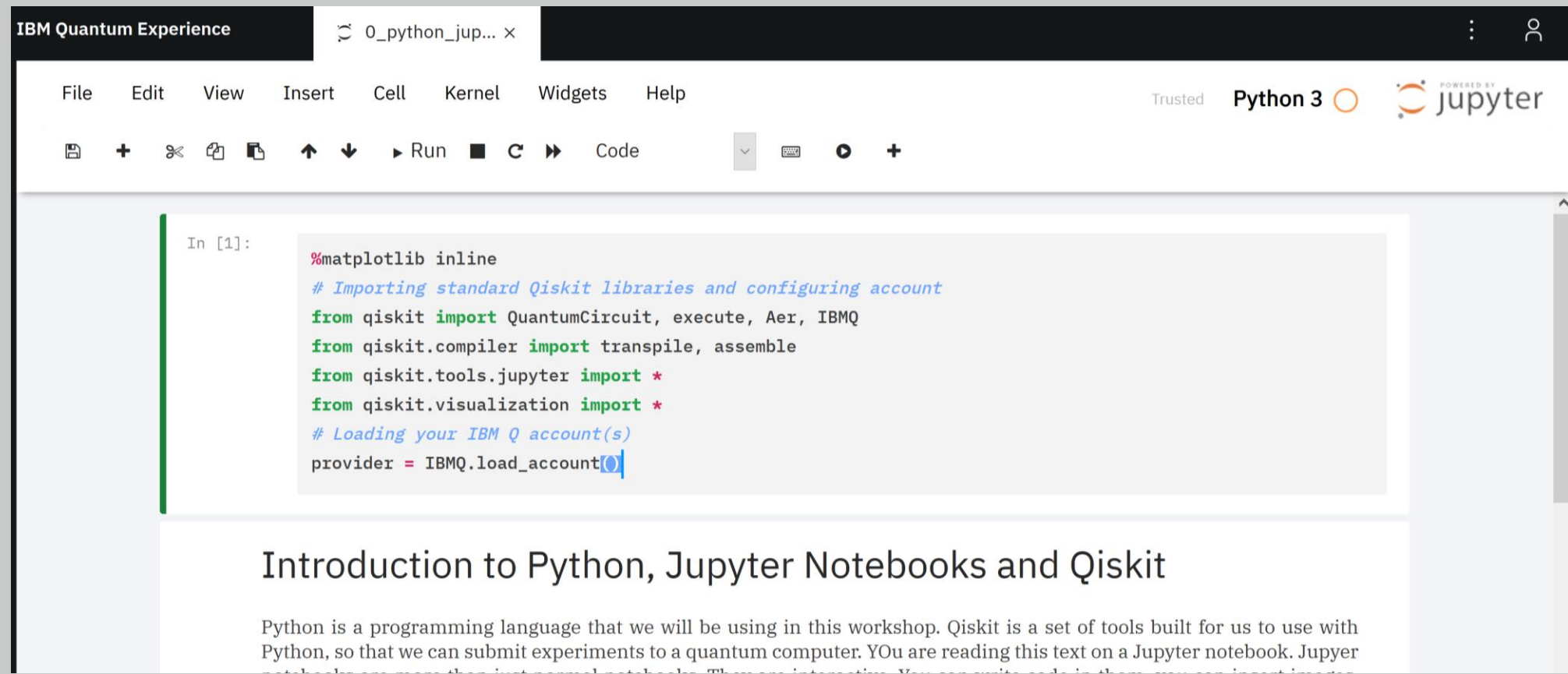
You have no experiment runs in the queue.

Import instructions

Working with Python, Jupyter Notebooks and Qiskit

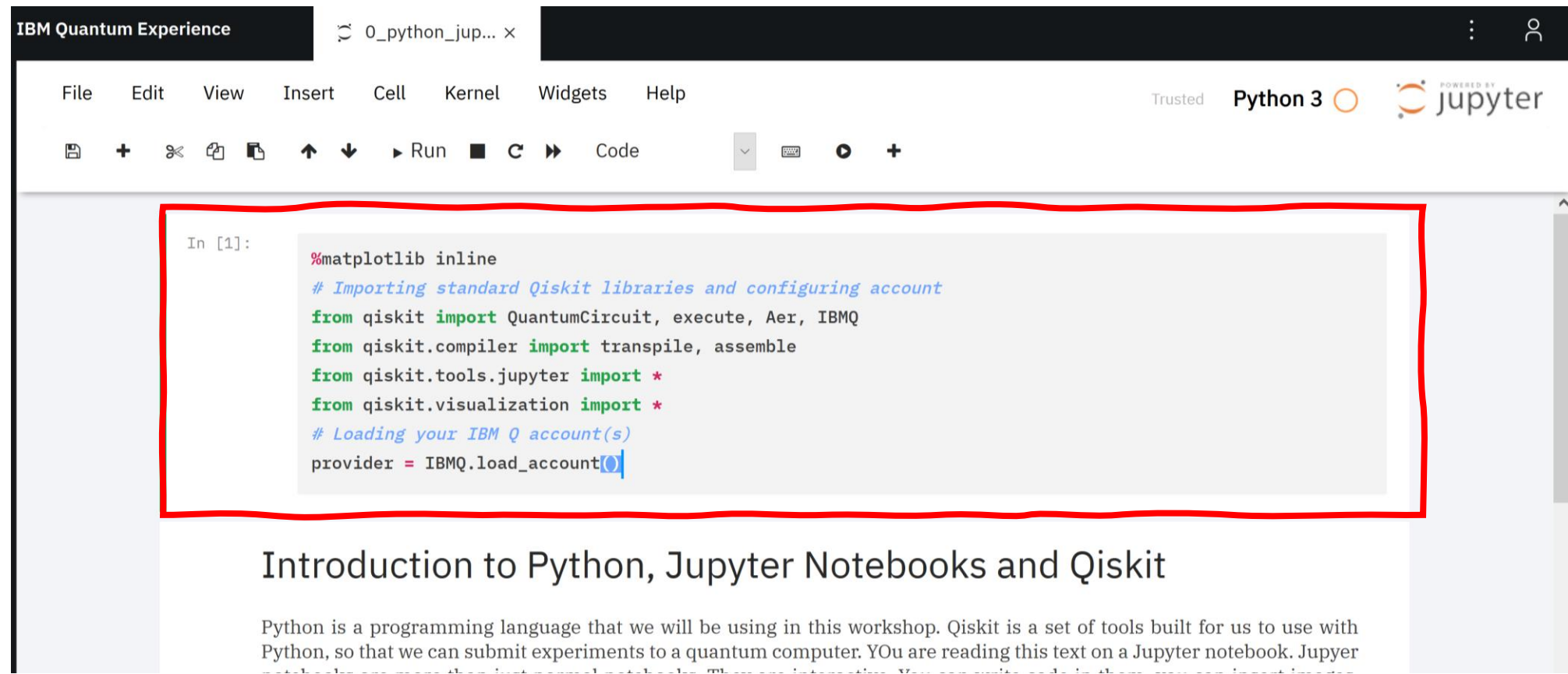
Let's open the first jupyter notebook:
`0_python_jupyter_qiskit.ipynb`





Jupyter Notebooks

- This is the interface you'll be working on.



Cells

- Each of these boxes is called a cell
- Cells are run one after another
- This particular cell is a set of import statements – think of this as things that will help you with your quantum code

IBM Quantum Experience

0_python_jup... x

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3 jupyter

In [1]:

```
%matplotlib inline
# Importing standard Qiskit libraries and configuring account
from qiskit import QuantumCircuit, execute, Aer, IBMQ
from qiskit.compiler import transpile, assemble
from qiskit.tools.jupyter import *
from qiskit.visualization import *
# Loading your IBM Q account(s)
provider = IBMQ.load_account()
```

Introduction to Python, Jupyter Notebooks and Qiskit

Python is a programming language that we will be using in this workshop. Qiskit is a set of tools built for us to use with Python, so that we can submit experiments to a quantum computer. YOU are reading this text on a Jupyter notebook. Jupyter

New Cell

- Click on + to create a new cell.

IBM Quantum Experience

0_python_jup... x

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3 jupyter

Code

```
In [1]:  
%matplotlib inline  
# Importing standard Qiskit libraries and configuring account  
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Change Cell Type

- You can change the cell type using this drop down
- A cell can be:
 - A code cell (Code)
 - A text cell (Markdown)

IBM Quantum Experience

0_python_jup... x

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3 

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Kernel

- Think of a kernel as an environment. A fish needs to be in water, similarly, a quantum program needs to be in a quantum kernel

IBM Quantum Experience

0_python_jup... x

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3 jupyter

Run

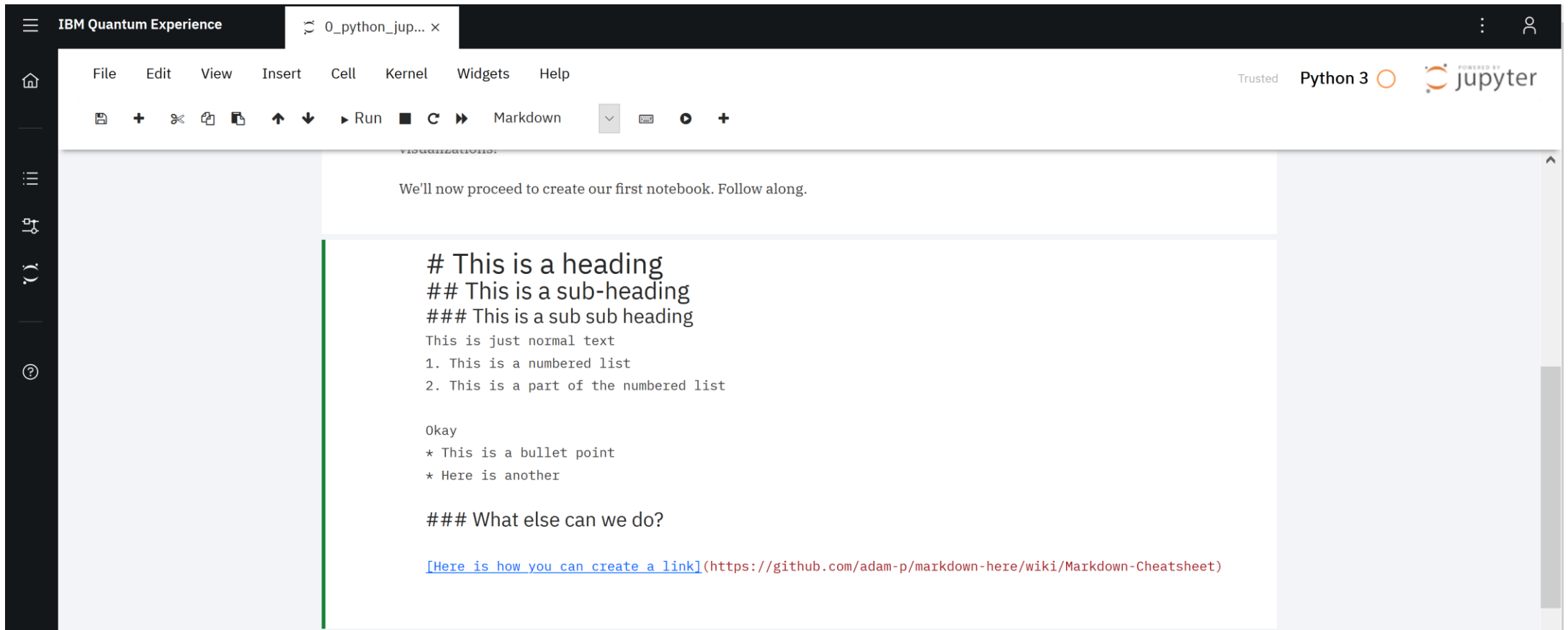
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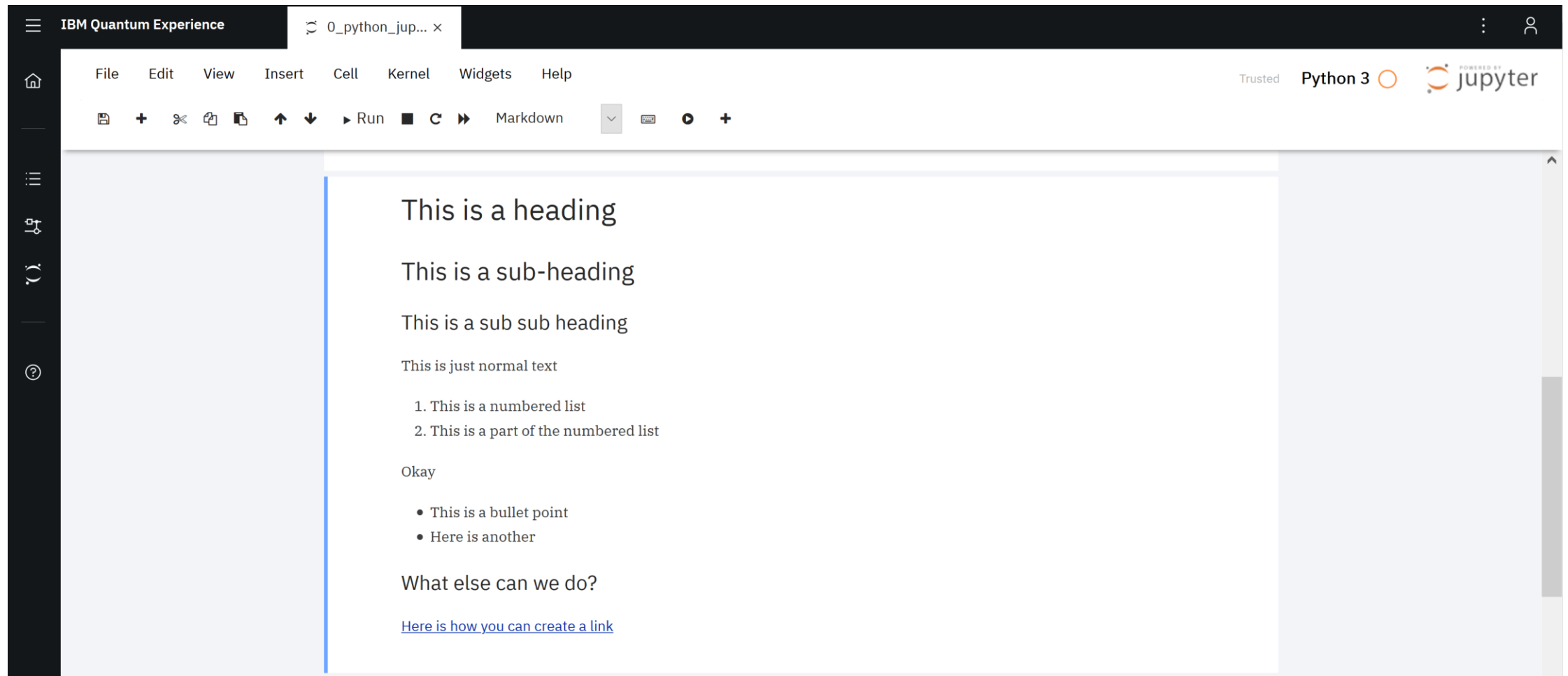
Run a cell

- You can run a cell one at a time, stop a running cell, refresh or run all cells at once



Markdown

Markdown is a fancy, but easy way to format this.



Markdown

When you run the cell, this is what we see. Looks nice?

Markdown

Resources

- <https://quantum-computing.ibm.com/support>
- <https://qiskit.org/>