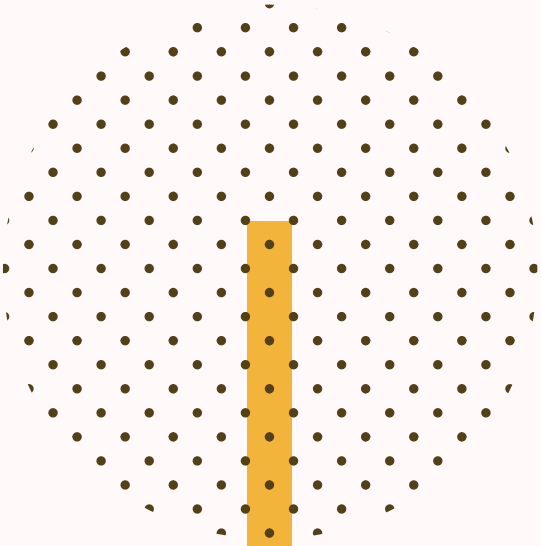
INSTALLATION

BRONZE-PROJECTQ



QWORLD

ProjectQ

Welcome to QBronze-ProjectQ!

This workshop consists of a collection of Jupyter notebooks

We use Python 3 (3.6+) as our programming language and we will be working on the library ProjectQ!

This is a beginners guide to install ProjectQ!

Note: If you have already installed ProjectQ on your system, you may skip this guide and move on to the Start notebook

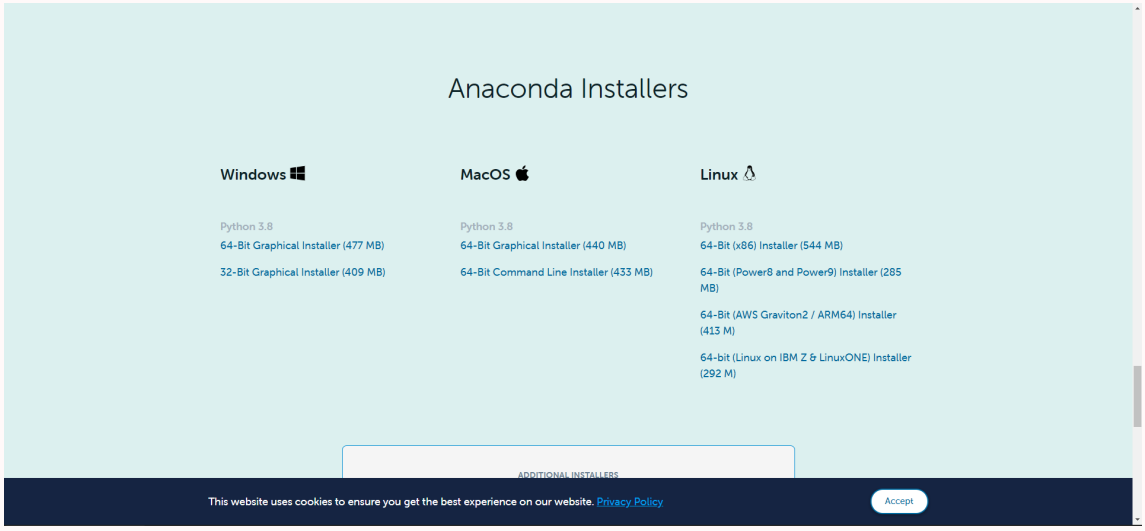
If you have Jupyter notebook/lab already installed, you may skip to the Install ProjectQ section for the installation part

Installing Anaconda®

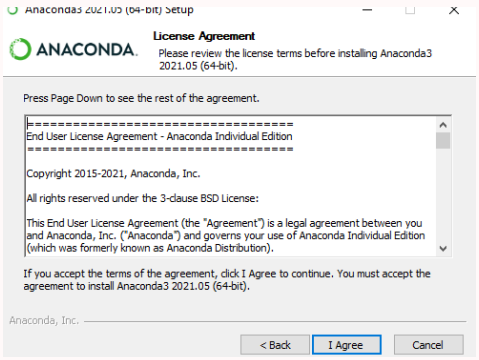
Installing Anaconda® will install the required Python compiler and libraries you need with one click! It will also make it easy to install Jupyter notebooks

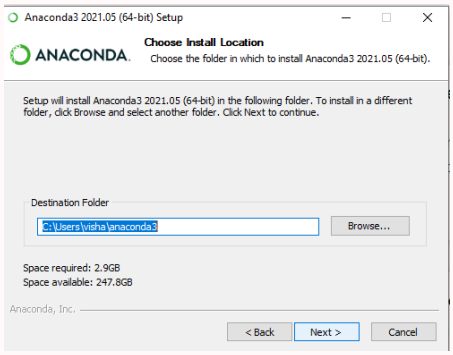
Click here to Download Anaconda

Setting up Anaconda®

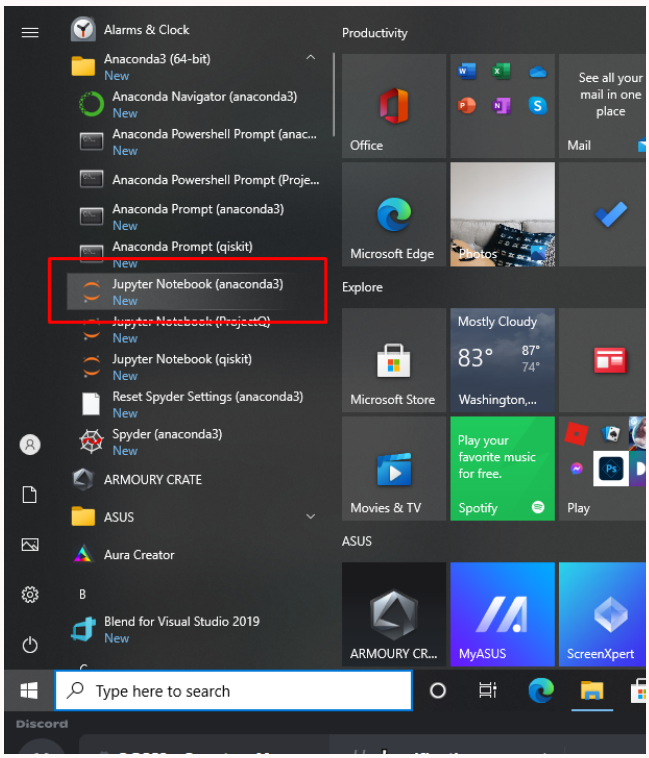


Select your preferred operating system and download the setup file. Run the setup file after downloading



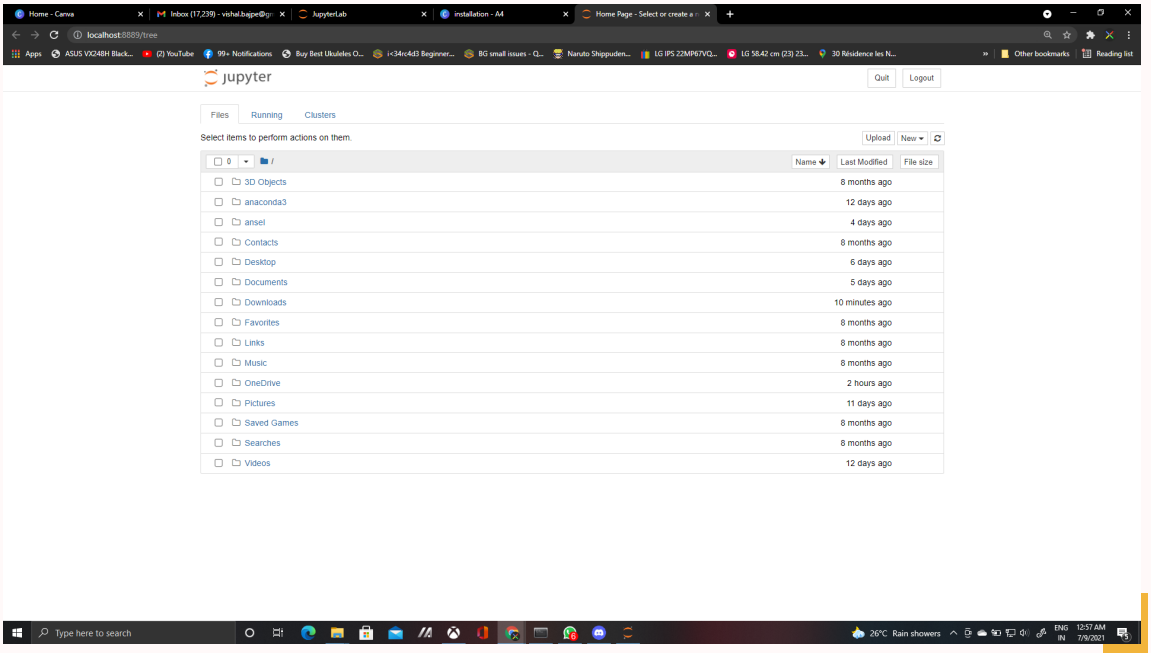


Setting up Jupyter notebooks



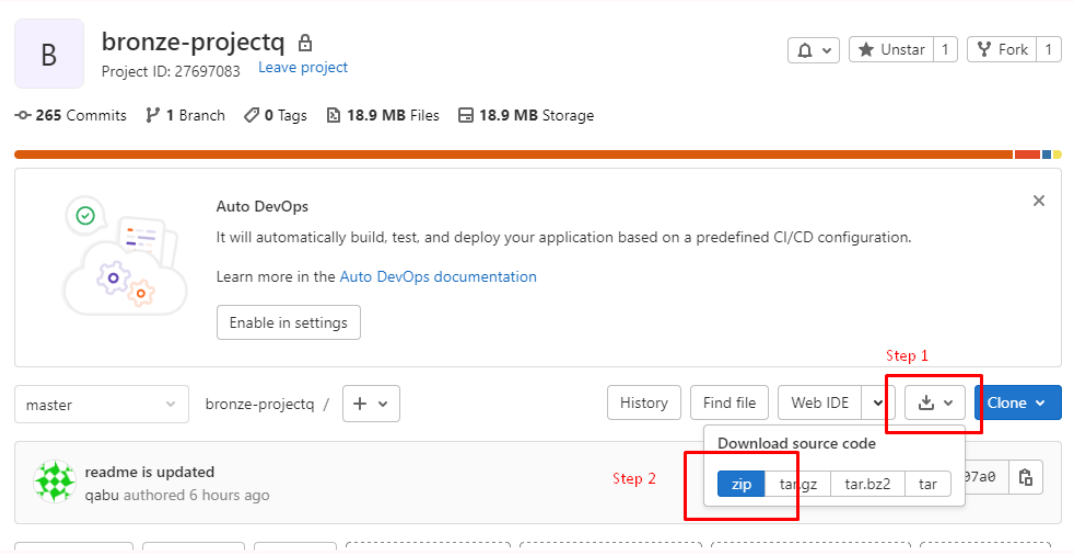
Run jupyter notebook from the start menu. A command prompt or powershell window should appear following an opening of a web browser page that looks like one below.

Note: Keep the command prompt window open while working



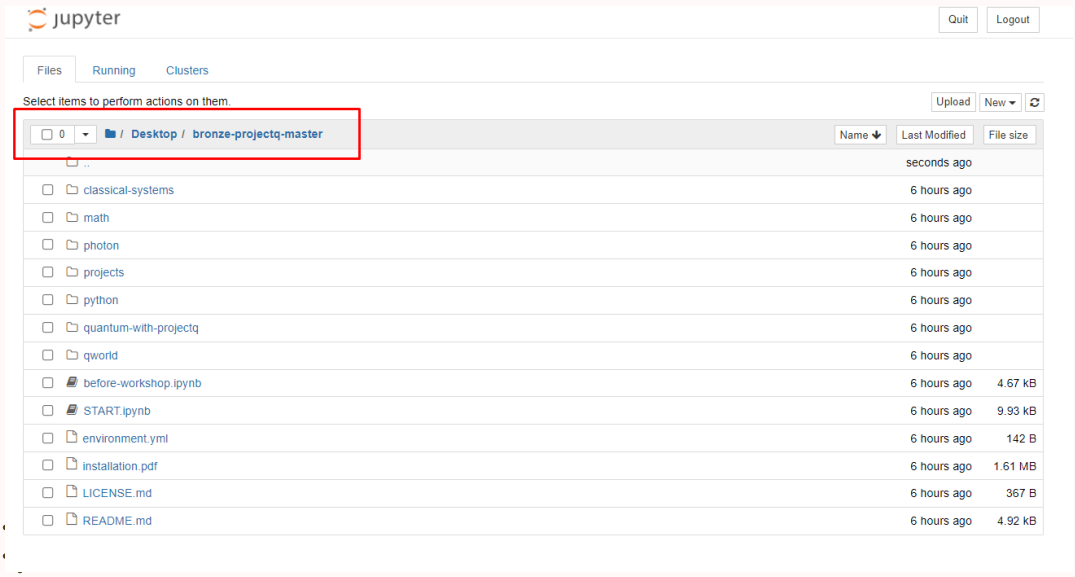
Setting up QBronze files

Download the QBronze-ProjectQ files from this link



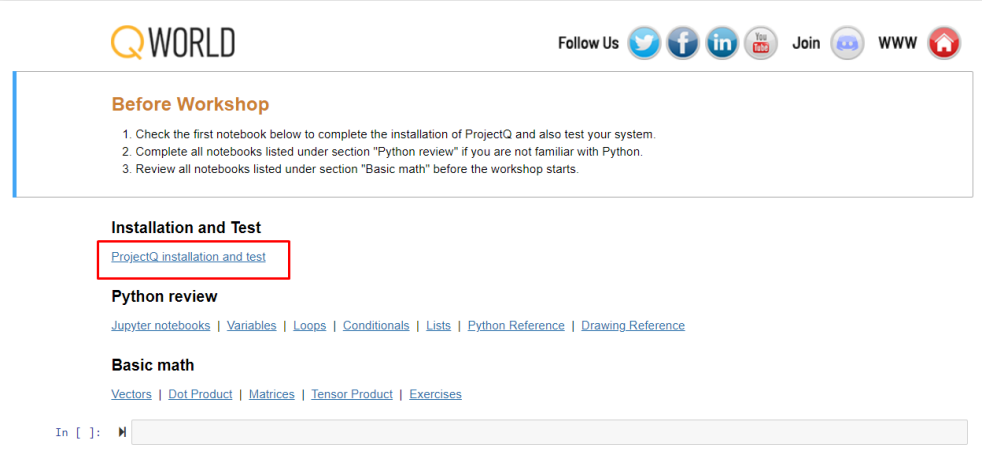
Extract the files to one of the accessible directories e.g. Desktop, Documents, Downloads etc.

We have extracted our files in the Desktop here and we can access it from the dashboard as shown

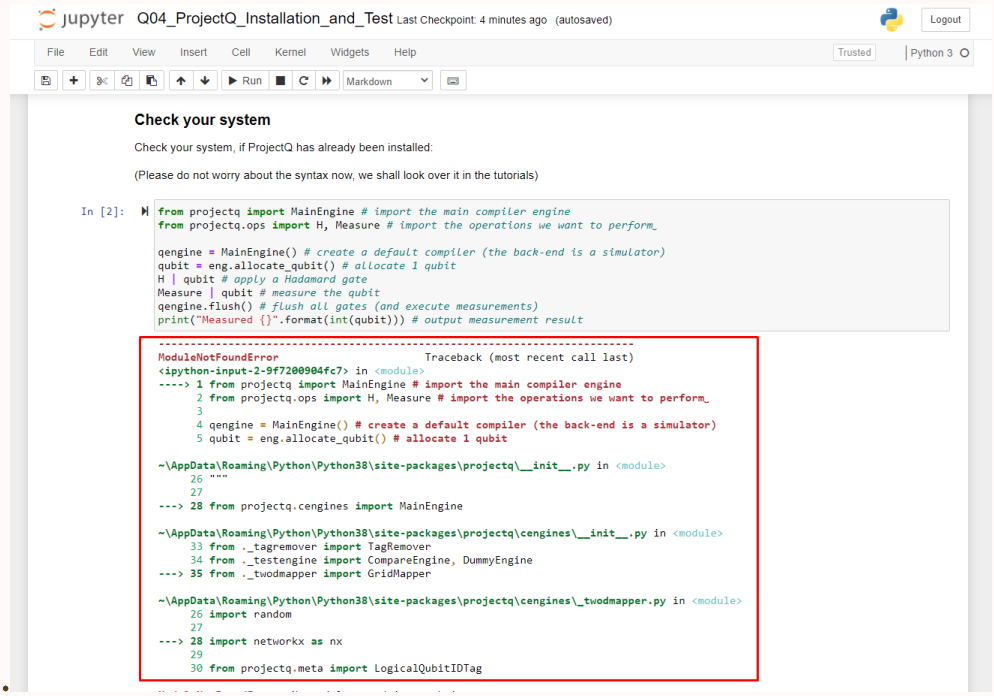


Installing ProjectQ

1) Open the notebook "before-workshop.ipynb" from the dashboard and open "ProjectQ Installation and Test"

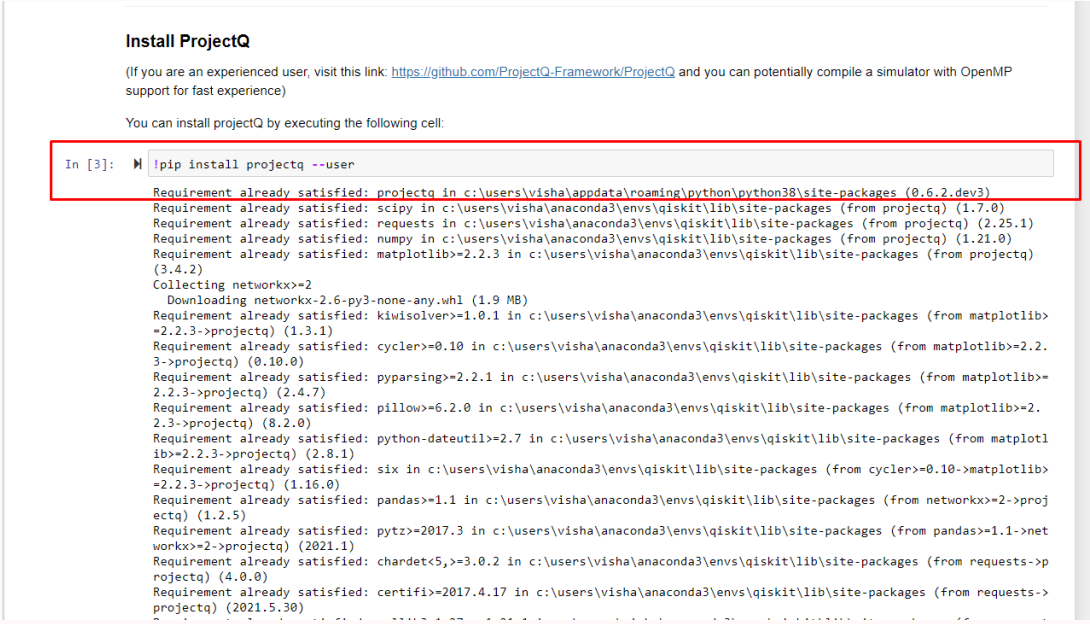


2) When you run the first cell, you should get an error if ProjectQ is not installed on your system



Installing ProjectQ

3) Run this cell to initiate installation of ProjectQ



Install ProjectQ

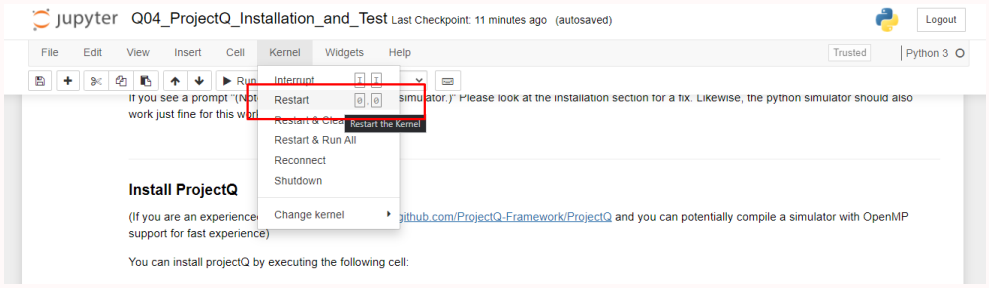
(If you are an experienced user, visit this link: https://github.com/ProjectQ-Framework/ProjectQ and you can potentially compile a simulator with OpenMP support for fast experience)

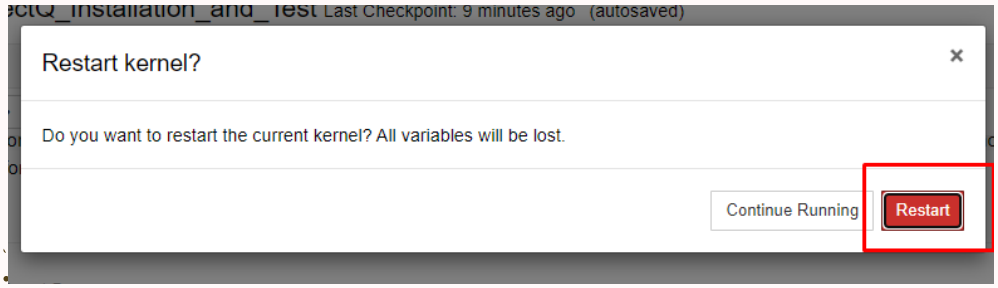
You can install projectQ by executing the following cell:

```
In [3]: !pip install projectq --user

Requirement already satisfied: projectq in c:\users\visha\appdata\roaming\python\python38\site-packages (0.6.2.dev3)
Requirement already satisfied: scipy in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from projectq) (1.7.0)
Requirement already satisfied: requests in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from projectq) (2.25.1)
Requirement already satisfied: numpy in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from projectq) (1.21.0)
Requirement already satisfied: matplotlib>=2.2.3 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from projectq)
(3.4.2)
Collecting networkx>=2
  Downloading networkx-2.6-py3-none-any.whl (1.9 MB)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from matplotlib>
=2.2.3->projectq) (1.3.1)
Requirement already satisfied: cycler>=0.10 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from matplotlib>=2.2.
3->projectq) (0.10.0)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from matplotlib>=
2.2.3->projectq) (2.4.7)
Requirement already satisfied: pillow>=6.2.0 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from matplotlib>=2.
2.3->projectq) (8.2.0)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from matplotl
ib>=2.2.3->projectq) (2.8.1)
Requirement already satisfied: six in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from cycler>=0.10->matplotlib>
=2.2.3->projectq) (1.16.0)
Requirement already satisfied: pandas>=1.1 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from networkx>=2->proj
ectq) (1.2.5)
Requirement already satisfied: pytz>=2017.3 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from pandas>=1.1->net
workx>=2->projectq) (2021.1)
Requirement already satisfied: chardet<5,>=3.0.2 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from requests->p
rojectq) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\visha\anaconda3\envs\qiskit\lib\site-packages (from requests->
projectq) (2021.5.30)
```

4) If there are no errors, Restart your kernel to finalise installation





Testing ProjectQ Installation

1) Run the cell below to create a quantum circuit with a qubit in superposition

Restart the kernel (check "Kernel" menu) to apply the changes to the current notebook. Run the cell below to test it out.

In [5]:
```
from projectq import MainEngine
from projectq.ops import H, Measure

# To draw in ProjectQ, we use a special backend called CircuitDrawerMatplotlib.
from projectq.backends import CircuitDrawerMatplotlib

# Now we create an instance of this backend
qdrawer = CircuitDrawerMatplotlib()

qengine = MainEngine(engine_list=[qdrawer]) # create a default compiler (the back-end is a simulator)
qubit = qengine.allocate_qubit() # allocate 1 qubit
H | qubit # apply a Hadamard gate
Measure | qubit # measure the qubit
qengine.flush() # flush all gates (and execute measurements)
print("Output {}".format(int(qubit))) # output measurement result
```

```
Output 0
```

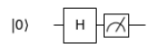
2) Run the next cell to display the circuit

```
Output 0
```

In [6]:
```
# Display circuit
display(qdrawer.draw())

# re-run the cell if the figures are not shown
```

```
(<Figure size 204.9x144 with 1 Axes>, <AxesSubplot:>)
```



If there are no errors, your installation is complete and succesful! You can continue onto the further notebooks and start your Bronze journey! :D

Prepared by - Vishal Sharathchandra Bajpe