Global_Installation_Guide-Qiskit_SDK_And_Jupyter_Notebook

Pre-Event Setup Guide

Python + Jupyter + Qiskit + Qiskit Aer

Please complete this before the workshop.

WINDOWS INSTALLATION

Step 1 — Download Python

https://www.python.org/downloads/

Click **Download Python 3.x.x**

Step 2 — Install Python

✓ Check **"Add Python to PATH"**
✓ Click **Install Now**

Step 3 — Install Required Packages

```
pip install notebook matplotlib pylatexenc sympy graphviz seaborn numpy
pandas qiskit qiskit-aer qiskit-ibm-runtime
```

Step 4 — Install Graphviz

Download from:

https://graphviz.org/download/

Step 5 — Launch Jupyter

```
jupyter notebook
```

Click:

New → Python 3

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macOS INSTALLATION

Step 1 — Update Homebrew

```
brew update
```

If not installed:

https://brew.sh/

Step 2 — Install / Upgrade Python

```
brew install python
```

or

```
brew upgrade python
```

Verify:

```
python3 --version
```

Step 3 — Install Required Packages

```
pip3 install notebook matplotlib pylatexenc sympy graphviz seaborn numpy
pandas qiskit qiskit-aer qiskit-ibm-runtime
```

Step 4 — Install Graphviz

```
brew install graphviz
```

Step 5 — Launch Jupyter

```
jupyter notebook
```

FIRST CELL TO EXECUTE (MANDATORY)

Immediately after creating a notebook, run:

```
!python -m pip install --upgrade pip
```

Installation Checks (Qiskit Architecture Demo)

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1 Install / Upgrade Required Packages

```
!pip install qiskit qiskit-aer pylatexenc matplotlib sympy graphviz qiskit-ibm-runtime seaborn --upgrade
```

Expected Output Placeholder:

```
Requirement already satisfied / Successfully installed ...
```

---

2 Version Check

```
import qiskit, qiskit_aer, pylatexenc, matplotlib, sympy, graphviz, qiskit_ibm_runtime, seaborn

print(qiskit.__version__)
print(qiskit_aer.__version__)
print(pylatexenc.__version__)
print(matplotlib.__version__)
print(sympy.__version__)
```

```
print(graphviz.__version__)
print(qiskit_ibm_runtime.__version__)
print(seaborn.__version__)
```

Expected Output :

```
2.3.0
0.17.2
2.10
3.10.8
1.14.0
0.21
0.45.1
0.13.2
```

⚠ Graphviz Note (Windows Only)

If circuit visualization fails:

```
import os
os.environ["PATH"] += os.pathsep + 'C:/Program Files/Graphviz/bin/'
```

Adjust path if necessary.

Some Tests

Import Tests

```
from qiskit import QuantumCircuit, transpile
from qiskit.circuit import Parameter
from qiskit.circuit.library import PauliEvolutionGate

from qiskit.quantum_info import Statevector, SparsePauliOp, Operator,
DensityMatrix

from qiskit.converters import circuit_to_dag, dag_to_circuit

from qiskit.transpiler import generate_preset_pass_manager, Target,
InstructionProperties
from qiskit.circuit.library import RXGate, RZGate, CXGate, Measure
```

```
from qiskit.visualization import (
    plot_histogram, pass_manager_drawer, plot_state_city,
    plot_state_hinton, plot_gate_map, plot_state_paulivec,
    plot_coupling_map, plot_error_map, plot_circuit_layout
)

from qiskit_ibm_runtime import EstimatorV2
from qiskit_ibm_runtime.fake_provider import FakeManilaV2, FakeWashingtonV2

from qiskit_aer import AerSimulator

from qiskit.primitives import StatevectorSampler, StatevectorEstimator

import numpy as np
```

If no errors → environment is ready.

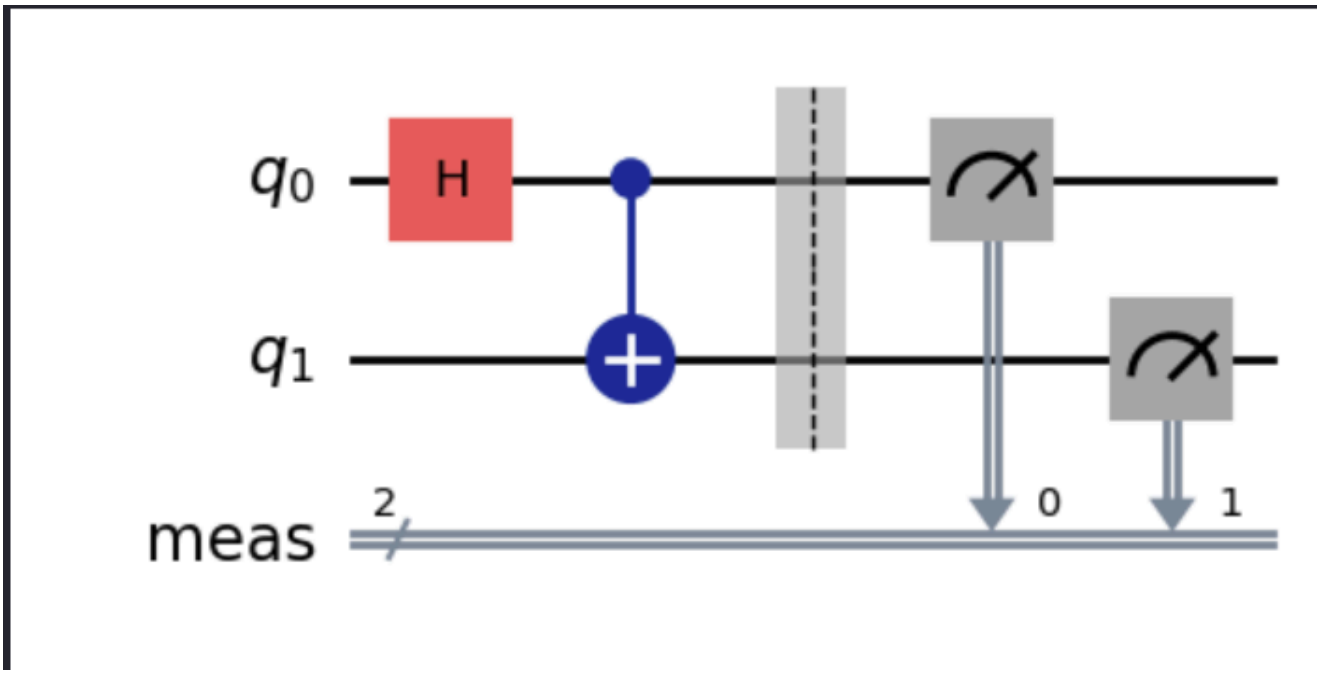
Running Tests

Bell Circuit Visualization

```
from qiskit import QuantumCircuit
from qiskit_aer import AerSimulator
from qiskit.visualization import plot_histogram

qc = QuantumCircuit(2)
qc.h(0)
qc.cx(0, 1)
qc.measure_all()

qc.draw("mpl")
```



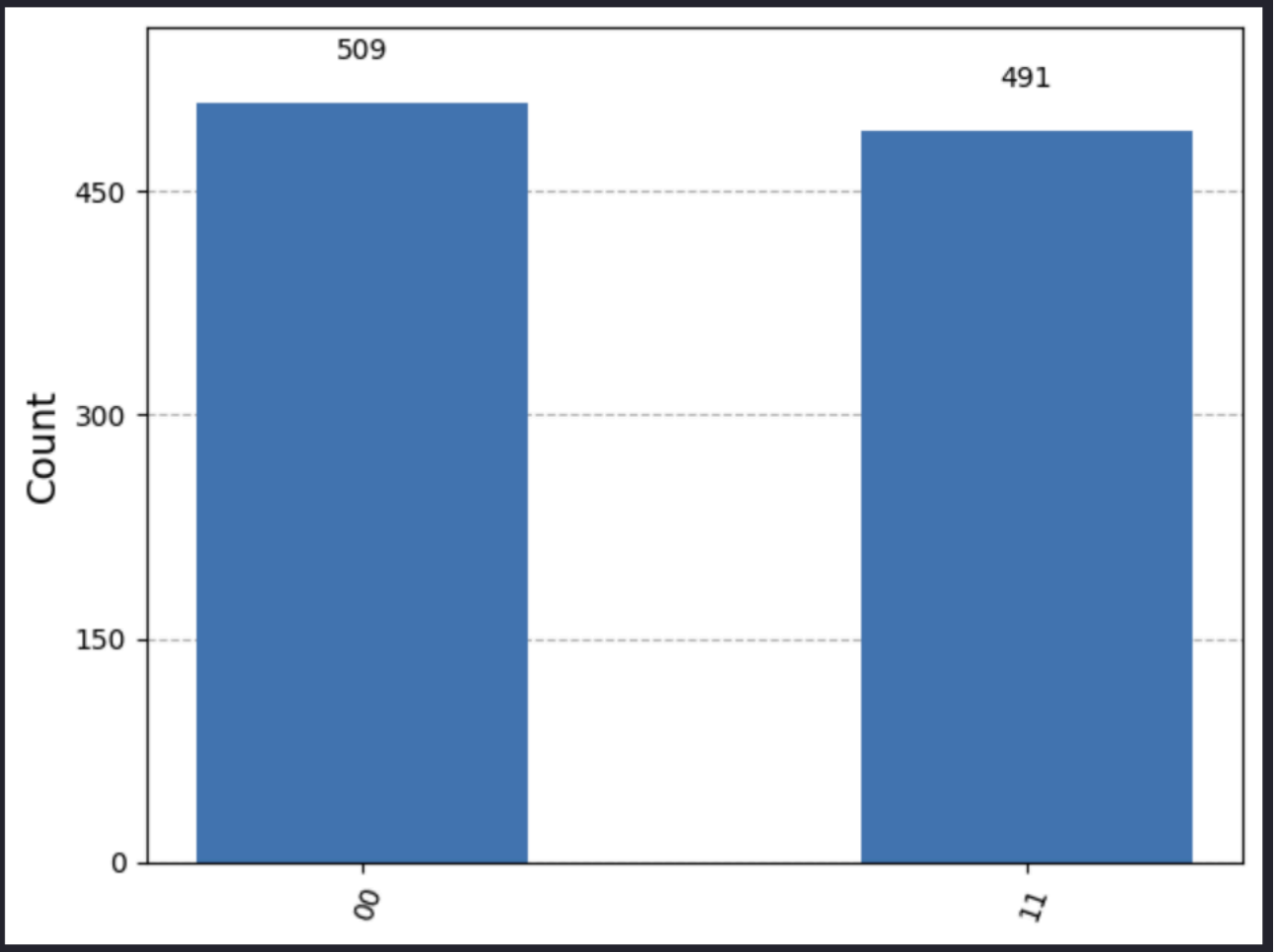
Simulation & Histogram

```
simulator = AerSimulator()
job = simulator.run(qc, shots=1000)
result = job.result()
counts = result.get_counts(qc)

print(counts)
plot_histogram(counts)
```

Expected Output :

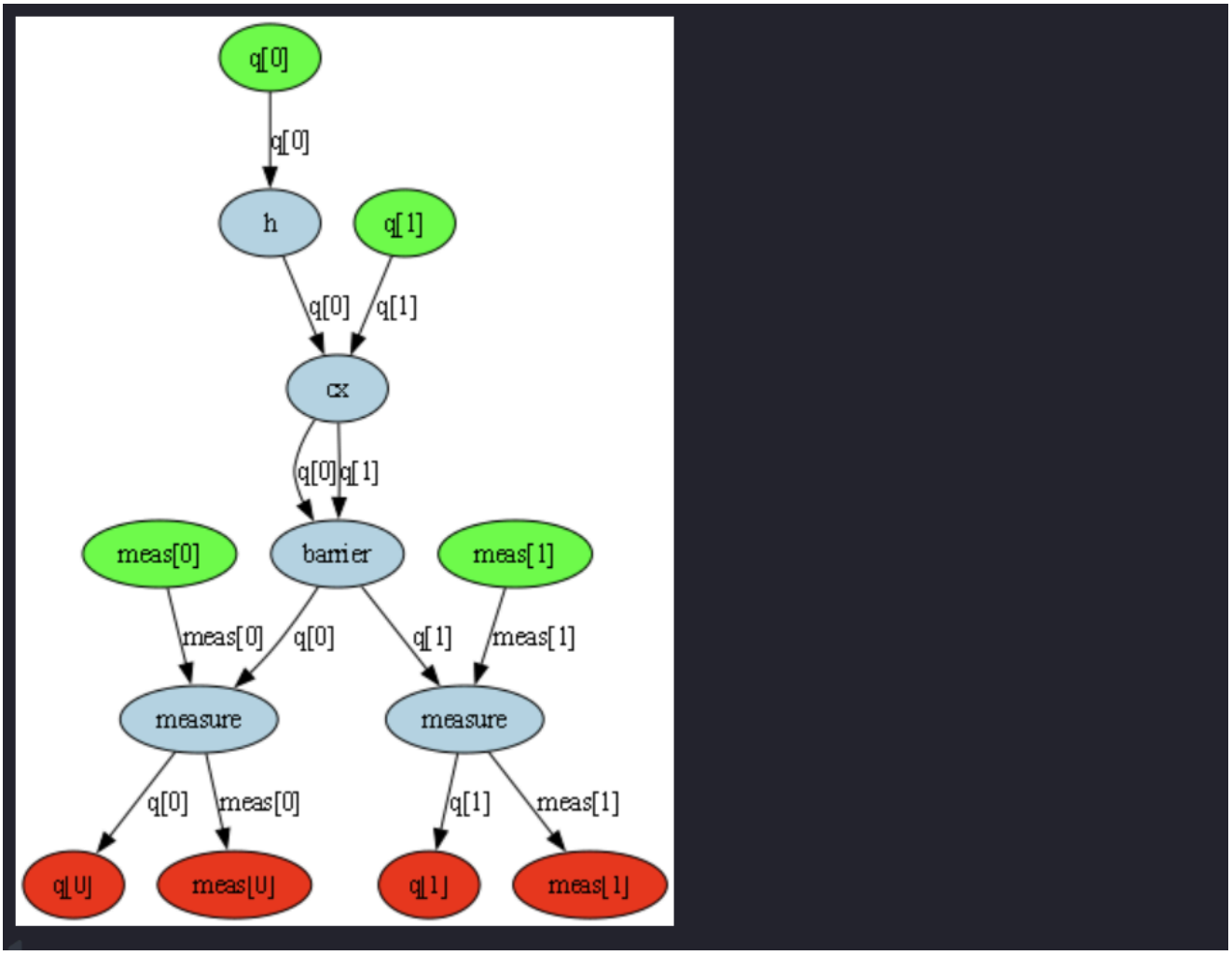
```
{'11': 491, '00': 509}
```



DAG Visualization

```
from qiskit.converters import circuit_to_dag
dag = circuit_to_dag(qc)
dag.draw()
```

DAG Visualization :



Final Pre-Event Checklist

- Python installed
- pip upgraded
- All packages installed
- Graphviz installed
- Imports run without errors
- Circuit draws successfully
- Simulator returns correct counts

Setup Complete

Your system is fully prepared for the Qiskit workshop.

You've officially started your journey into the quantum domain.