Introduction

Installing Requirements

- VS Code
- Quantum Developer Kit (QDK): Microsoft's toolkit for quantum programming.
- QKD Extension: Adds quantum development support inside VS Code.

VS Code Instalation Guidline:

Step 1: Go to the VS Code Website

- Open your web browser and visit: https://code.visualstudio.com/

Step 2: Download VS Code

- Click the big **Download** button for your operating system (Windows, macOS, or Linux).

Step 3: Run the Installer

- Once downloaded, open the installer file.
- Follow the on-screen instructions to install VS Code.

Step 4: Launch VS Code

- After installation, open VS Code from your Start menu (Windows), Applications folder (macOS), or your app launcher (Linux).

Step 5: Install Recommended Extensions

- Open the **Extensions** view by clicking the square icon on the sidebar or pressing `Ctrl+Shift+X` (`Cmd+Shift+X` on Mac).
- Search for the **Quantum Development Kit (QDK)** and click **Install**.

Python Environment Setup

Python Version:

- Use Python 3.11 (recommended for compatibility and performance).

Required Packages:

- ***jupyterlab*** — Interactive coding environment.
- ***ipykernel*** — Allows Python code to run inside Jupyter notebooks.
- ***matplotlib*** — For creating plots and visualizations.
- ***qiskit*** — IBM's open-source quantum computing framework.

How to Install These Packages

1: Make sure Python 3.11 is installed.

2: Open your terminal (or Anaconda Prompt if you use Anaconda).

3: Create a new environment (optional but recommended):

`python -m venv quantum-env`

`source quantum-env/bin/activate` (*On Windows: quantum-env\Scripts\activate)

4: Install the packages with pip:

`pip install jupyterlab ipykernel matplotlib qiskit`

5: Launch JupyterLab by typing:

`jupyter lab`

Qiskit Learning Resources

1. **Official Qiskit Documentation**
   - https://qiskit.org/documentation/ Comprehensive guides, API references, and tutorials.
2. **Qiskit Textbook** (Free online book)
   - https://qiskit.org/textbook/ An interactive textbook covering fundamentals of quantum computing and how to program with Qiskit.
3. **Qiskit YouTube Channel**
   - https://www.youtube.com/qiskit Video tutorials, webinars, and workshops.
4. **IBM Quantum Experience**
   - https://quantum-computing.ibm.com/ Hands-on platform to run Qiskit programs on real quantum hardware.
5. **Qiskit Community and Slack**
   - https://qiskit.org/events/community/ Join the community for discussions, Q&A, and collaboration.
6. **Qiskit Tutorials on GitHub**
   - https://github.com/Qiskit/qiskit-tutorials Ready-to-run notebooks demonstrating various quantum algorithms and techniques.