CSBB311: QUANTUM COMPUTING

ASSIGNMENT 1 :- Develop circuits to execute on them with Python and Qiskit

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Code:-

```python
from qiskit import QuantumCircuit
from qiskit_aer import Aer
from qiskit import transpile
from qiskit.visualization import plot_histogram
from qiskit_aer import AerSimulator
import matplotlib.pyplot as plt

# Create a quantum circuit with 1 qubit and 1 classical bit
qc = QuantumCircuit(1, 1)

# Measure the qubit in its initial |0) state
qc.measure(0, 0)

# Draw the circuit
qc.draw('mpl')

# Simulate the circuit
backend = AerSimulator()
compiled_circuit = transpile(qc, backend)
result = backend.run(compiled_circuit, shots=1024).result()
counts = result.get_counts()

# Plot the measurement result
plot_histogram(counts)
plt.show()
```

```python
from qiskit import QuantumCircuit, transpile
from qiskit.visualization import plot_histogram
from qiskit_aer import AerSimulator,Aer
import matplotlib.pyplot as plt
# Create a quantum circuit with 1 qubit and 1 classical bit
qc = QuantumCircuit(1, 1)

# Apply Hadamard gate to create superposition
qc.h(0)

# Measure the qubit
qc.measure(0, 0)

# Draw the circuit
qc.draw('mpl')

# Simulate the circuit using AerSimulator
backend = AerSimulator()  # Replaced the old 'qasm_simulator' with AerSimulator
compiled_circuit = transpile(qc, backend)
result = backend.run(compiled_circuit, shots=1024).result()

# Get the measurement counts
counts = result.get_counts()

# Plot the measurement result
plot_histogram(counts)
plt.show()
```

Output