EXPERIMENT NO.3

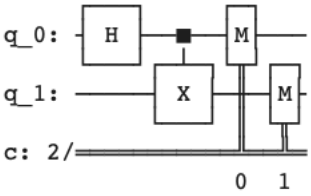
Code:

```
!pip install qiskit qiskit-aer matplotlib

from qiskit import QuantumCircuit, transpile
from qiskit_aer import AerSimulator
from qiskit.visualization import plot_histogram
import matplotlib.pyplot as plt

def create_bell_state(bell_type):
    qc = QuantumCircuit(2, 2)
    qc.h(0)
    qc.cx(0, 1)
    if bell_type == "Phi-":
        qc.z(0)
    elif bell_type == "Psi+":
        qc.x(1)
    elif bell_type == "Psi-":
        qc.x(1)
        qc.z(0)
    qc.measure([0, 1], [0, 1])
    return qc

simulator = AerSimulator()
bell_states = ["Phi+", "Phi-", "Psi+", "Psi-"]
results = {}

for state in bell_states:
    qc = create_bell_state(state)
    compiled = transpile(qc, simulator)
    job = simulator.run(compiled, shots=1000)
    result = job.result()
    counts = result.get_counts()
    results[state] = dict(counts)
    print(f"\nBell State |{state}> Measurement Counts: {counts}")
    print(qc.draw())

plot_histogram(results)
plt.show()
```

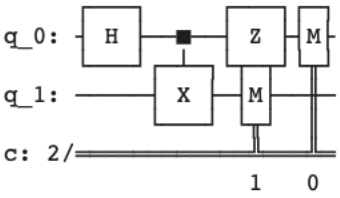
EXPERIMENT NO.3

OUTPUT:

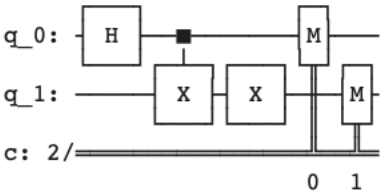
```
Bell State |Phi+> Measurement Counts: {'11': 458, '00': 542}
```




```
Bell State |Phi-> Measurement Counts: {'11': 520, '00': 480}
```




```
Bell State |Psi+> Measurement Counts: {'10': 465, '01': 535}
```




```
Bell State |Psi-> Measurement Counts: {'01': 485, '10': 515}
```