Name: Okoye, Adunife Kizito
Student ID: 100611918
CSCI 4140U

Laboratory Eight

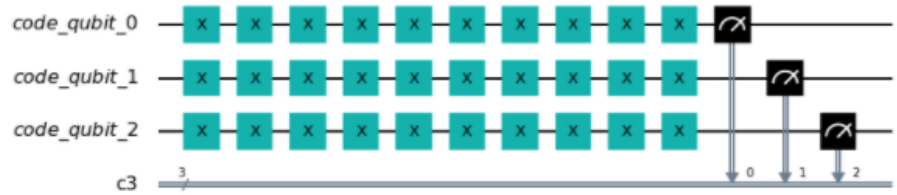
Laboratory Activity

If you examine the noise model that we are using a gate error of 0.1, which is quite large. For this laboratory repeat the last part of the experiment with a gate error of 0.01. This involves rerunning the last two circuits with the lower gate error. Cut and paste the two histograms that result from this change into your report for this laboratory. Submit the report as a PDF or PNG file.

First Circuit

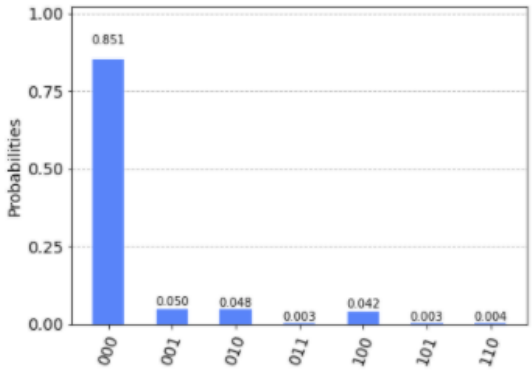
In [34]:
```
cq = QuantumRegister(3,'code_qubit')
sb = ClassicalRegister(3)
qc = QuantumCircuit(cq,sb)
N = 10
for i in range(N):
    qc.x(cq[0])
    qc.x(cq[1])
    qc.x(cq[2])
qc.measure(cq,sb)
qc.draw('mpl')
```

Out[34]:



In [35]:
```
noise_model = get_noise(0.01, 0.01)
counts = execute(qc, backend, noise_model=noise_model).result().get_counts()
plot_histogram(counts)
```

Out[35]:

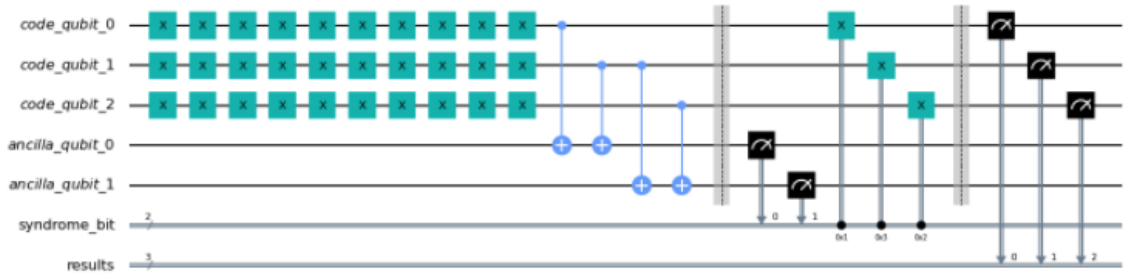


Second Circuit

In [36]:
```
cq = QuantumRegister(3,'code_qubit')
lq = QuantumRegister(2,'ancilla_qubit')
sb = ClassicalRegister(2,'syndrome_bit')
rs = ClassicalRegister(3,'results')
qc = QuantumCircuit(cq,lq,sb,rs)
N = 10
for i in range(N):
    qc.x(cq[0])
    qc.x(cq[1])
    qc.x(cq[2])
qc.cx(cq[0],lq[0])
qc.cx(cq[1],lq[0])
qc.cx(cq[1],lq[1])
qc.cx(cq[2],lq[1])
qc.barrier()
qc.measure(lq,sb)
qc.x(cq[0]).c_if(sb,1)
qc.x(cq[1]).c_if(sb,3)
qc.x(cq[2]).c_if(sb,2)
qc.barrier()
qc.measure(cq,rs)
print('This code produces the following circuit:')
qc.draw('mpl')
```

```
This code produces the following circuit:
```

Out[36]:



In [33]:
```
noise_model = get_noise(0.01, 0.01)
counts = execute(qc, backend, noise_model=noise_model).result().get_counts()
plot_histogram(counts)
```

Out[33]: