mimiQ++ Report

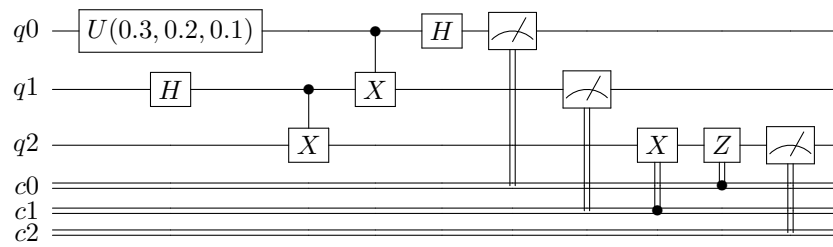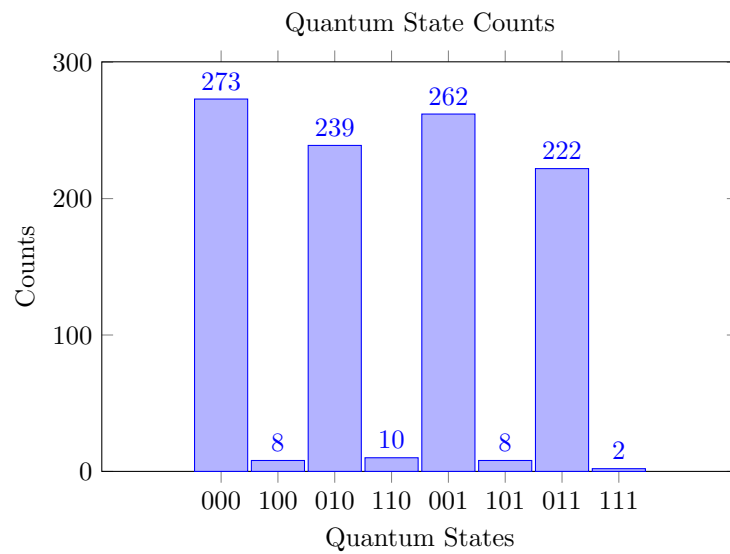Monday 10th March, 2025   03:52

Quantum Circuit

Figure 1: quantum teleportation 1

the OpenQASM 2.0 code for the above qircuit is:

```
OPENQASM 2.0;
include "qelib1.inc";
qreg q[3];
creg c[3];
u(0.300000,0.200000,0.100000) q[0];
h q[1];
cx q[1], q[2];
cx q[0], q[1];
h q[0];
measure q[0] -> c[0];
measure q[1] -> c[1];
if ( c == 2) x q[2];
if ( c == 1) z q[2];
measure q[2] -> c[2];
```
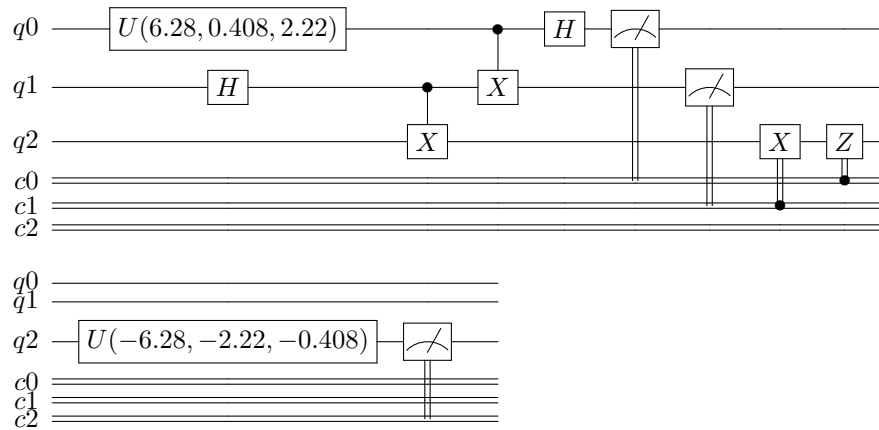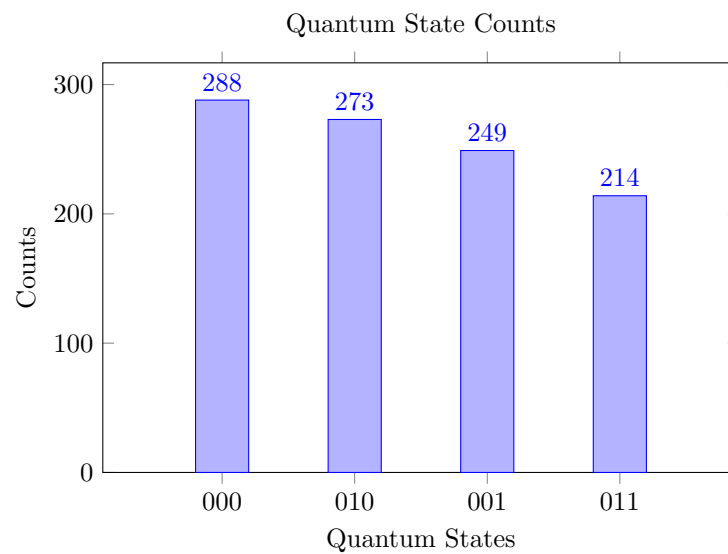
Quantum Circuit

Figure 2: quantum teleportation ibm

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[3];
creg c[3];
u(6.280000,0.408000,2.220000) q[0];
h q[1];
cx q[1], q[2];
cx q[0], q[1];
h q[0];
measure q[0] -> c[0];
measure q[1] -> c[1];
if ( c == 2) x q[2];
if ( c == 1) z q[2];
u(-6.280000,-2.220000,-0.408000) q[2];
measure q[2] -> c[2];
```
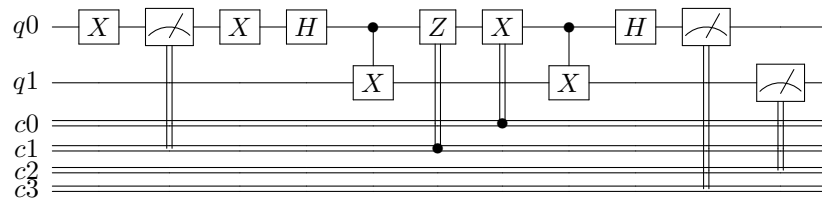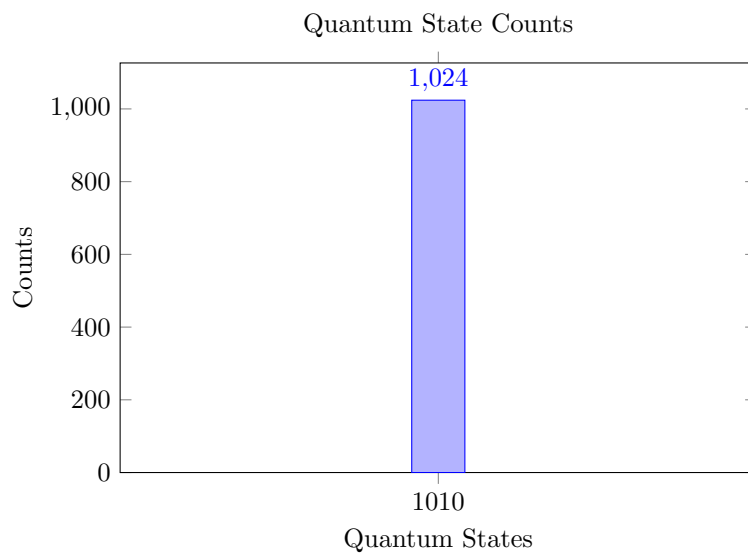
Quantum Circuit

Figure 3: superdense coding

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[2];
creg c[4];
x q[0];
measure q[0] -> c[1];
x q[0];
h q[0];
cx q[0], q[1];
if ( c == 2) z q[0];
if ( c == 1) x q[0];
cx q[0], q[1];
h q[0];
measure q[0] -> c[3];
measure q[1] -> c[2];
```
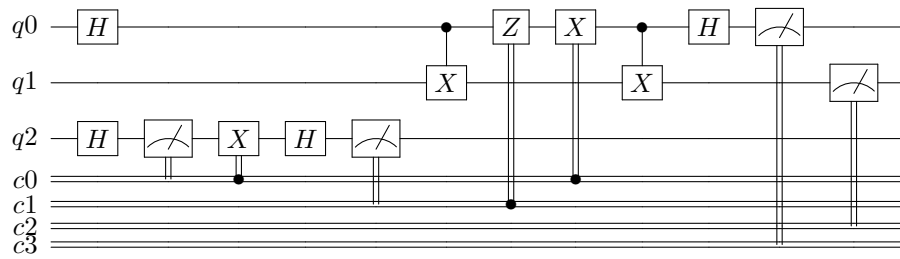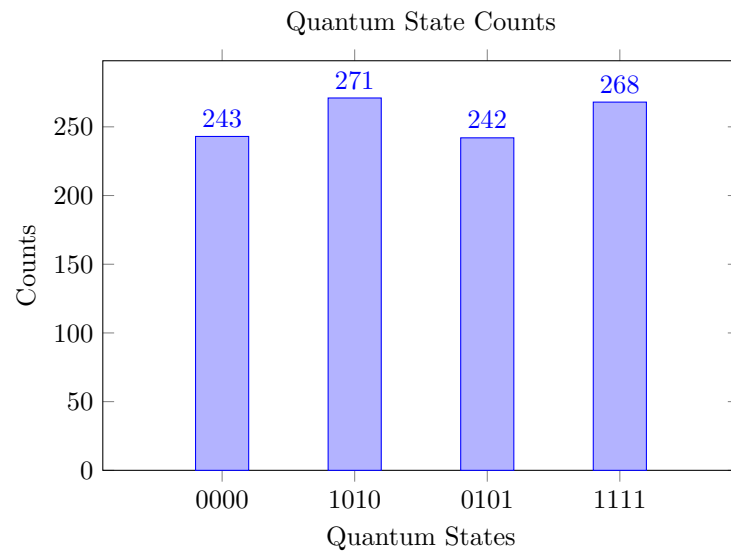
4

Quantum Circuit

Figure 4: superdense coding - random

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[3];
creg c[4];
h q[2];
measure q[2] -> c[0];
if ( c == 1) x q[2];
h q[2];
measure q[2] -> c[1];
h q[0];
cx q[0], q[1];
if ( c == 2) z q[0];
if ( c == 1) x q[0];
cx q[0], q[1];
h q[0];
measure q[0] -> c[3];
measure q[1] -> c[2];
```
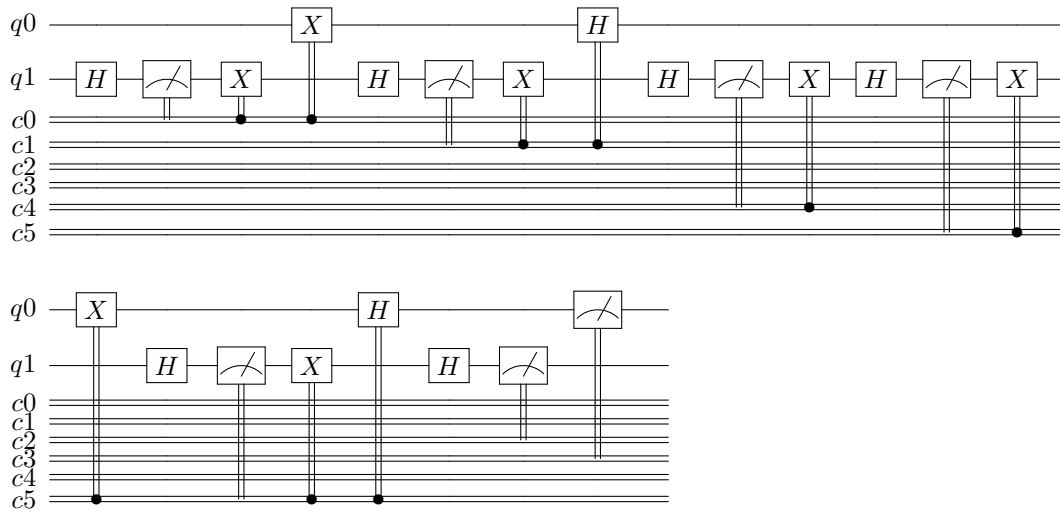
Quantum Circuit

Figure 5: BB84-ptcl QKD

Resultant key: 010011111101000100001110100111010011111001101100100
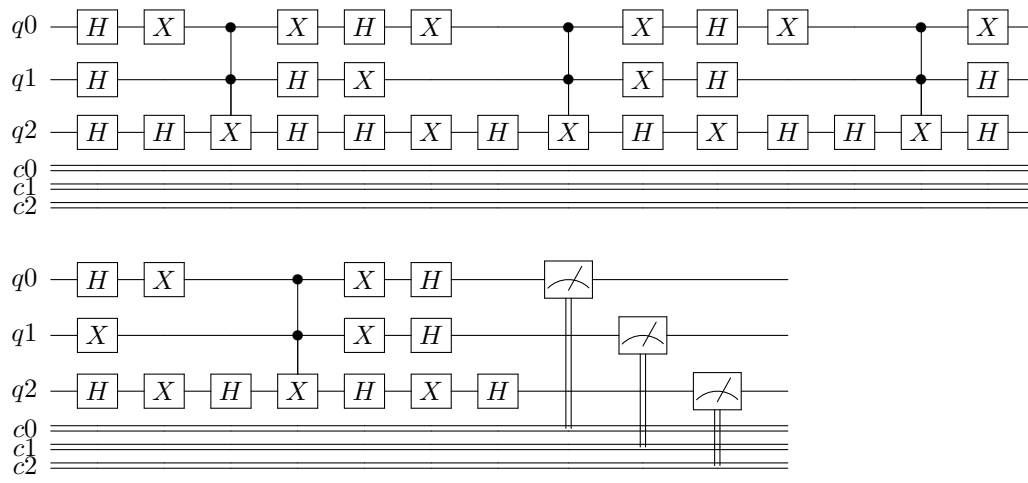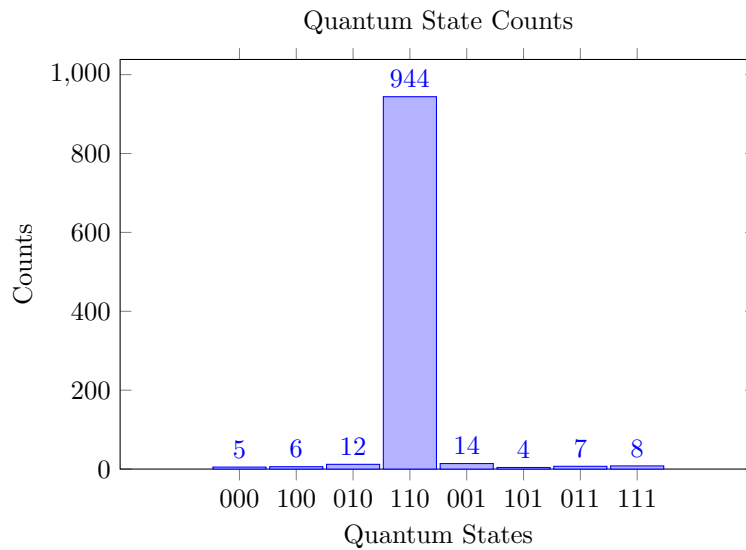
Quantum Circuit

Figure 6: grover

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[3];
creg c[3];
h q[2];
h q[1];
h q[0];
x q[0];
h q[2];
ccx q[0], q[1], q[2];
h q[2];
x q[0];
```

```
h q[0];
h q[1];
h q[2];
x q[0];
x q[1];
x q[2];
h q[2];
ccx q[0], q[1], q[2];
h q[2];
x q[1];
x q[0];
x q[2];
h q[0];
h q[1];
h q[2];
x q[0];
h q[2];
ccx q[0], q[1], q[2];
h q[2];
x q[0];
h q[0];
h q[1];
h q[2];
x q[0];
x q[1];
x q[2];
h q[2];
ccx q[0], q[1], q[2];
h q[2];
x q[1];
x q[0];
x q[2];
h q[0];
h q[1];
h q[2];
measure q[0] -> c[0];
measure q[1] -> c[1];
measure q[2] -> c[2];
```
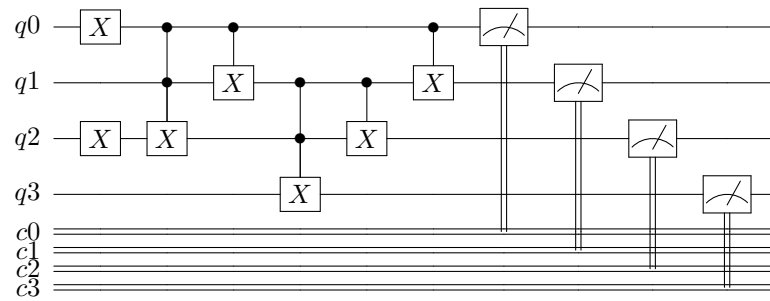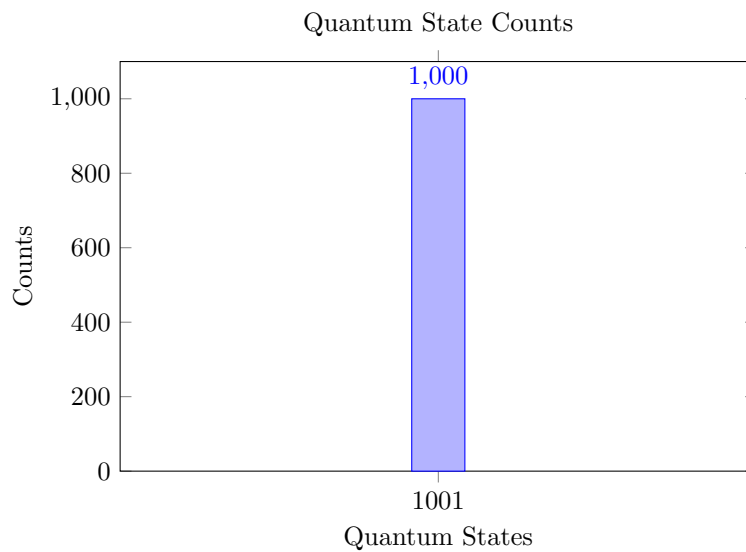
Quantum Circuit

Figure 7: full adder

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[4];
creg c[4];
x q[0];
x q[2];
ccx q[0], q[1], q[2];
cx q[0], q[1];
ccx q[1], q[2], q[3];
cx q[1], q[2];
cx q[0], q[1];
measure q[0] -> c[0];
measure q[1] -> c[1];
measure q[2] -> c[2];
measure q[3] -> c[3];
```
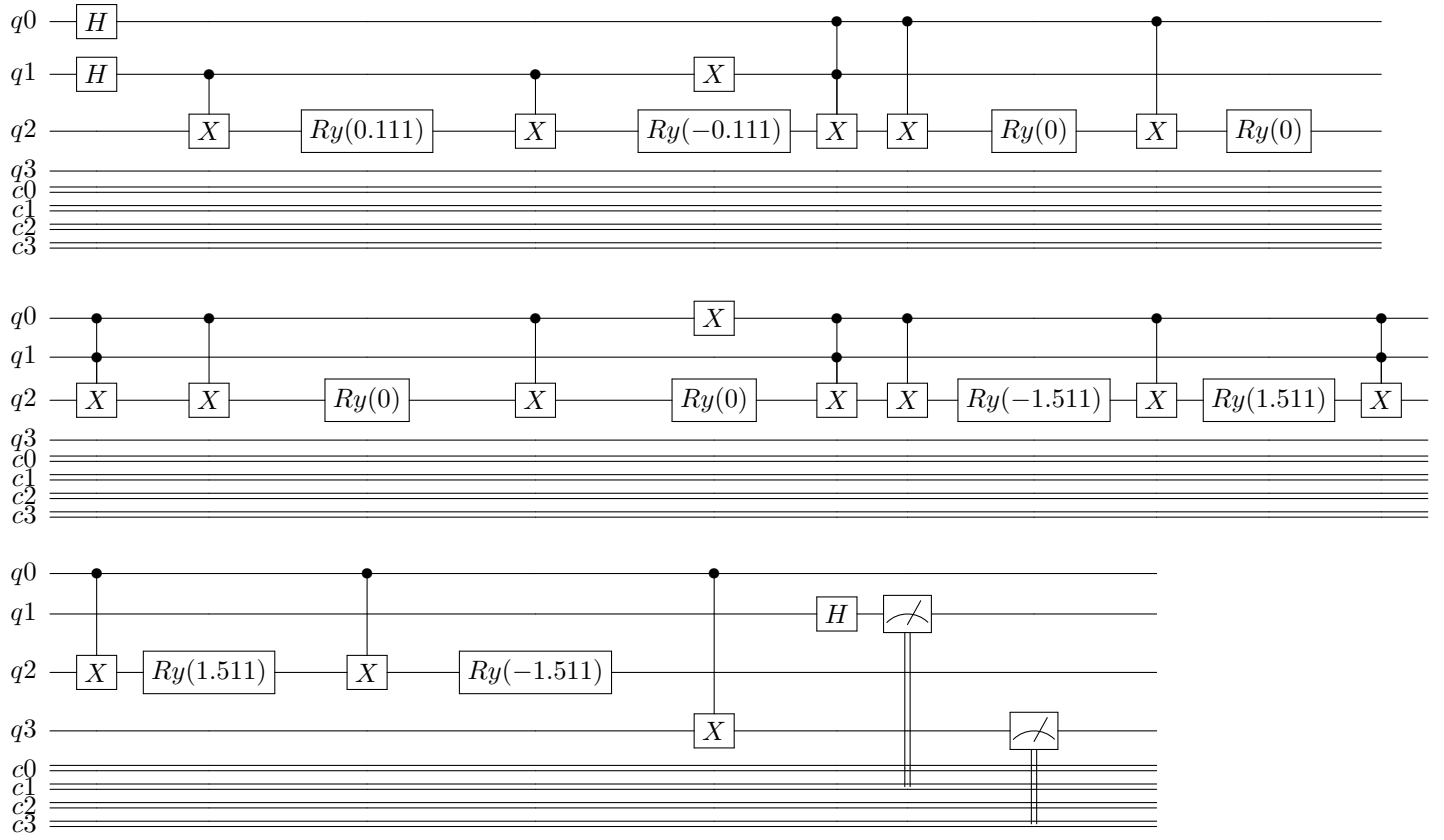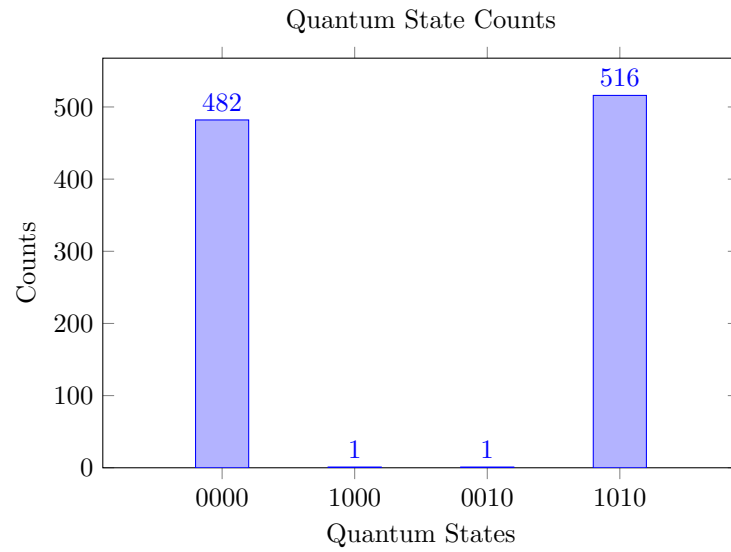
9

Quantum Circuit

Figure 8: quantum classification

the OpenQASM 2.0 code for the above qircuit is:

```
qreg q[4];
creg c[4];
h q[0];
h q[1];
cx q[1], q[2];
ry(0.110500) q[2];
cx q[1], q[2];
ry(-0.110500) q[2];
x q[1];
ccx q[0], q[1], q[2];
cx q[0], q[2];
ry(0.000000) q[2];
cx q[0], q[2];
ry(0.000000) q[2];
ccx q[0], q[1], q[2];
cx q[0], q[2];
ry(0.000000) q[2];
cx q[0], q[2];
ry(0.000000) q[2];
x q[0];
ccx q[0], q[1], q[2];
cx q[0], q[2];
ry(-1.511125) q[2];
cx q[0], q[2];
ry(1.511125) q[2];
ccx q[0], q[1], q[2];
cx q[0], q[2];
ry(1.511125) q[2];
cx q[0], q[2];
ry(-1.511125) q[2];
cx q[0], q[3];
h q[1];
measure q[1] -> c[1];
measure q[3] -> c[3];
```