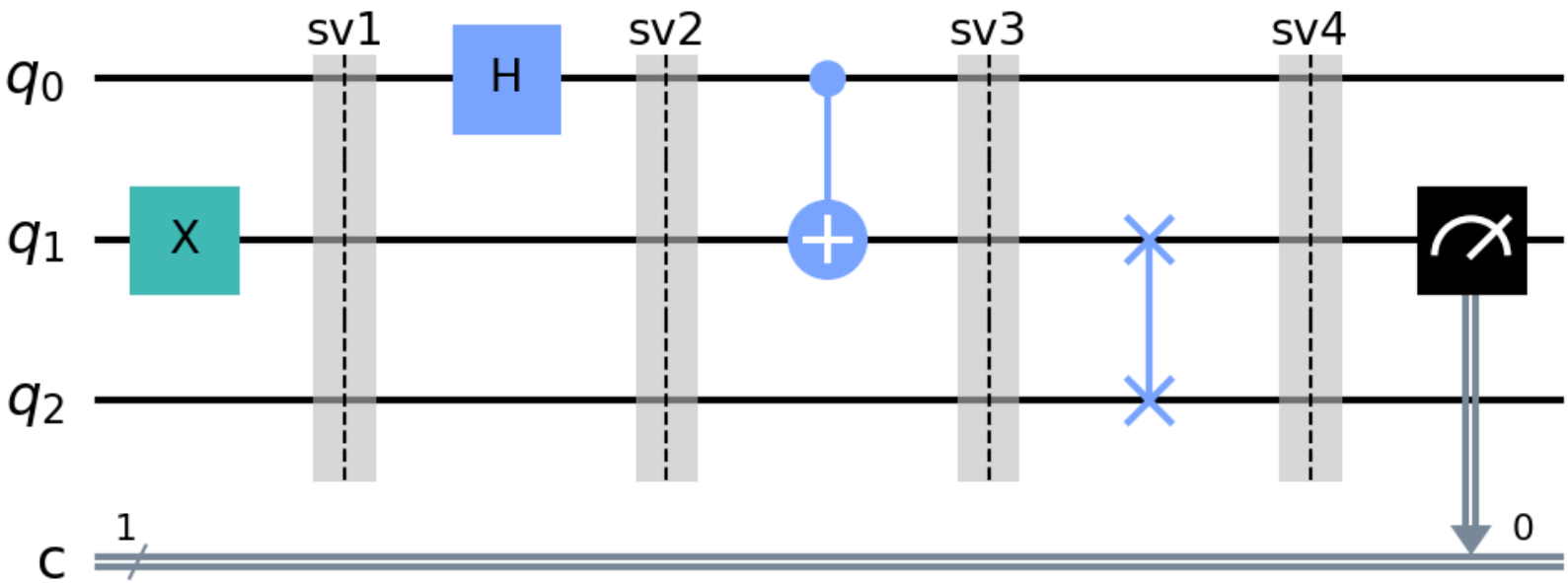
Task 23-01 (Part A)

- Edit **quantum_circuit1.ipynb** to implement the circuit below by applying the correct IBM Qiskit quantum gates and saving the four designated state vectors:



Task 23-01 (Part B)

- After implementing the circuit in Task 23-01 Part A, answer the following <u>two</u> questions in **Cell 2** of your notebook:

1. Using the truth table below as a reference, explain the results depicted in state vector 4:

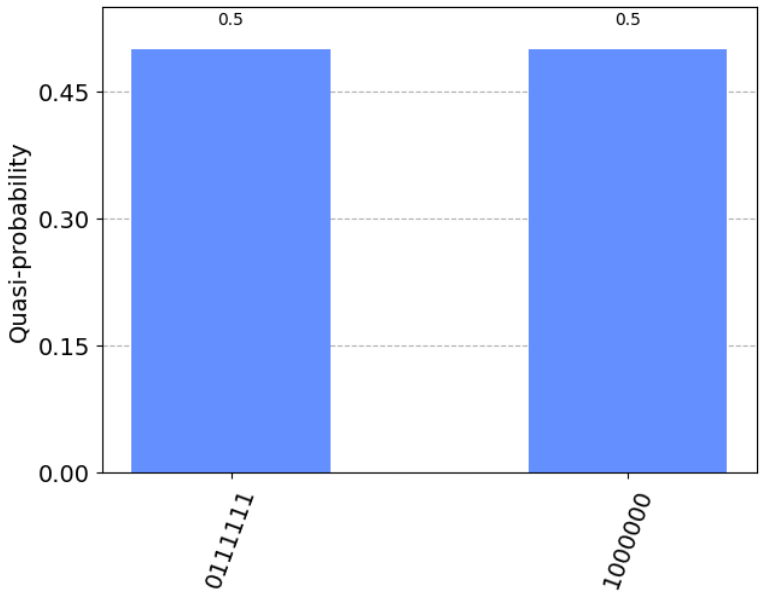
Base 10	q2	q1	q0	Ket
0	0	0	0	|000>
1	0	0	1	|001>
2	0	1	0	|010>
3	0	1	1	|011>
4	1	0	0	|100>
5	1	0	1	|101>
6	1	1	0	|110>
7	1	1	1	|111>

2. Explain why is there a 100% chance of measuring only a value of 0 for the single classical bit?

- Upload your solution to the BNL QIS101 SharePoint site

Task 23-02

- Edit **quantum_circuit2.ipynb** to implement and display an IBM Qiskit circuit that has an equal probability of generating a state vector representing only 63 or 64



- Upload your solution to the BNL QIS101 SharePoint site

Task 23-03

- Create a new file **quantum_circuit3.ipynb** that implements this circuit and displays the histogram after **1,024** shots
- In **Cell 2** of your notebook, explain the exact probability if there was no quantum noise
- Upload your solution to the BNL QIS101 SharePoint site