

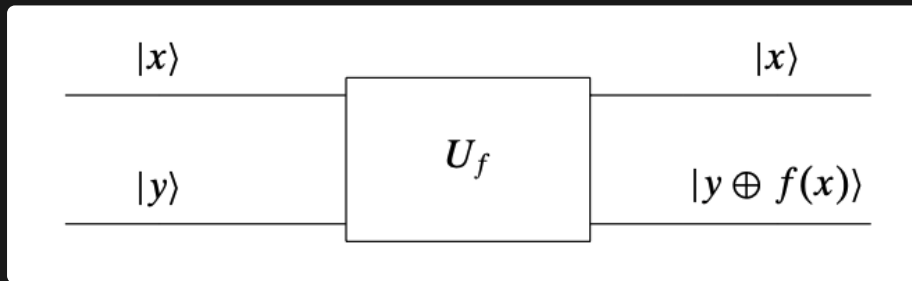
https://www.youtube.com/watch?v=F_Riqjdh2oM



Speaker notes

(answer: not reversible)

Quantum Oracle



Reversible

Requires a spare qubit

Speaker notes

We can always tell the input from the output.

Show how this oracle works with a spare bit. Assume that $|y\rangle$ starts at 0 (but we will break this assumption later)

Show on IBM Quantum Composer: Writing the 4 functions reversibly. Assume that Output starts at 0 (but we will break this assumption for our algorithm)

Image from the Quantum Computing for Computer Scientists video

Coding Time!

Speaker notes

Hadamards on both qubits, then apply the "black box function" (pick one for the sake of implementation). Hadamard the top (input) qubit after the black box and then measure. If it's constant we get $|1\rangle$, otherwise we get $|0\rangle$ if it's variable.

References

- Yanofsky, Mannucci. Quantum Computing for Computer Scientists
- https://www.youtube.com/watch?v=F_Riqjdh2oM