Quantum Computing and Cryptography - 10: The Basics

Length	Module
Collection	NSA NCCP
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Contributors	Abhishek Parakh
Academic Levels	Undergraduate, Graduate
Topics	Cryptography, Quantum Computing
Link	https://clark.center/details/aparakh/8cc5fb40-882a-4df2-8999-1956ee619531

Description

This module covers the basics of quantum computing and cryptography. After the completion of the module, students will be able to model two level quantum systems using vector and ket representations, understand the notions central to the quantum field such as amplitud, probability of collapse, and superposition. Students will also be able to change between different basis representations for a given qubit.

Although the files are named nanomodule, completing all the material including exercises will take over four hours. Hence, it is categorized as a module.

Email Dr. Abhishek Parakh at aparakh@unomaha.edu for solutions to the problems.

Note: To get started with Jupyter notebooks please follow the userguide available at: https://sites.google.com/unomaha.edu/userguideqcl/

Outcomes

- Restate the notions qubit, amplitude and probability of collapse.
- Change between basis representations for a given qubit.
- Model two level quantum systems using vector and ket representations.
- Apply the notion of superposition.

Alignment

The standards and guidelines this learning object is mapped to

- NICE Workforce Knowledge (2017) - K0052: Knowledge of mathematics (e.g. logarithms, trigonometry, linear algebra, calculus, statistics, and operational analysis).