

ISBN: 978-81-948993-1-0

# Basic Concepts of Quantum Computing

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**Abstract:** Quantum computing is one of the most interesting topic of twentieth century. The core of quantum computing is quantum physics and quantum mechanics. Though some aspects of quantum computing is incredibly though and hard to understand still it is believed that one can understand the basics and over all idea or quantum computing easily. In order to have a start to learn Quantum computing in deep it is very much needed to know the basic fundamental notions of Quantum Computing. That is what we tried to provide in this paper briefing the mathematical and physical notions in relation to Quantum mechanics. In this paper much more focus is being given to discuss in detail about superposition, Qubit and Entanglement, the three basic building blocks of quantum computing.

**Keywords:** Qubit, superposition, entanglement and inner product, outer product, learning resources, Interference.

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## 1. Introduction to Quantum Computing:

Quantum computer exists! And so does Quantum programming! Here, everything will be discussed that one needs to understand about quantum programming. The chapter built of from the mathematical foundation of qubits, some Basic requirement of mathematics such as complex numbers, Inner product and outer product and the tensor product.

Quantum computing effectively harnesses the power of quantum mechanics for computing. As opposed to the bits used by the traditional classical computers quantum computer uses quantum bits or qubits. Qubits can exist in combination of 0 and 1. This property called the superposition states that the individual qubits can take on states that are not possible in case of a classical computer.

Also the another property that makes quantum computer stronger is that multiple qubits can also be entangles. For a quantum computer both the properties, superposition