

# Game Designed for Quantum Computing

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## 1 Background

“Edutainment” is an engaging form of knowledge dissemination that not only attracts learners’ active participation but also allows them to gain a sense of achievement through slightly challenging problem-solving, making the learning process enjoyable. In the field of computer science, many tutorials for technologies and tools incorporate similar elements to help readers assess their understanding. Additionally, some games are directly inspired by computer science concepts, such as Human Resource Machine and Turing Complete, which are excellent educational games that combine fun with knowledge-based backgrounds.

Due to the interdisciplinary nature and teaching challenges of quantum computing, there has yet to be a mature and innovative game design perspective. Currently, some quantum computing researchers have developed simple game projects as hobbies, such as Qubit Factory (<https://www.qubitfactory.io/>). Other examples include Quantum Chess (<https://arxiv.org/abs/1906.05836>), which introduces quantum-related rules into the classic game, transforming chess into an entirely new experience. There is also a board game based on quantum information principles (<https://github.com/csferrie/Brackets>). Designing a quantum computing game with a rigorous knowledge foundation while being unique and entertaining can serve as a way for beginners to review and consolidate relevant knowledge while also providing an opportunity to unleash creativity.

## 2 Task Description

You are tasked with designing a quantum computing game that allows players to learn and understand some fundamental principles and techniques of quantum computing. The design should include a simulator function and demonstrate the concept through a simple prototype system. Below are some guidelines and considerations:

The design can focus on a relatively independent topic within quantum computing. The emphasis should be on knowledge transmission and expression

rather than gameplay. The content design should both guide and educate players while retaining a degree of autonomy, allowing them to exercise creativity and test their own ideas.

### **3 Contact**

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