Task1,3 is in the code

Task2

텍스트, 스크린샷, 번호, 사각형이(가) 표시된 사진

자동 생성된 설명

We can represent each board number as quantum state. I represent this with ‘Area’ qubit. And coin as ‘coin’ qubit.

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자동 생성된 설명

Because there is 7 area qubit, it can represent 0~127. Because there is no backward, we can consider over the 15 value is winning the game probability.

Task4,6

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자동 생성된 설명

After QFT add of the coin value, now the circuit check the state is 9,13,10,3.

The brown box represents that circuit. The circuit first checks the 3,10. If There is 3, circuit add 7 to 3 state. 3 state activate the sub ancilla layer and activate the QFT adder. And the state of adder is 7 only when the area state is 3 or 10 and else 0. So the result is 3 state becoming 10 and when 10 is in the state, 10 state doesn’t activate the sub ancilla layer and activate the QFT minus. So the result is 10-7 = 3.

Task 5

If we measure each step, the result became the Gaussian function.

스크린샷, 라인, 그래프이(가) 표시된 사진

자동 생성된 설명

This is same with classical random walk. But if we don’t measure each state, the result is different.

텍스트, 스크린샷, 그래프, 도표이(가) 표시된 사진

자동 생성된 설명

quantum analog of the “memoryless” nature of the classical game is that in each layer, the quantum circuit is same. Like coin, each quantum state has chance to get 1 1/2 and get 0 1/2. But the result is different because the state is superposition. This is major quantum properties that is different from classical algorithms. So when we treat the superposition, we have to careful about our basic knowledge.