Problem Set 5 - LV 141.A55 QISS - 25.4.2016

1. Grover Algorithm

Implement the Grover algorithm in Python on a three qubit register. Implement your oracle such that 5 (binary 101) is the sought-after entry.

$$f(101) = 1 \qquad f(x) = 0 \text{ for } x \neq 101$$

For an explanation of the Grover algorithm, please refer to Nielsen Chuang, *Quantum Computation and Quantum Information*,pp 248ff.
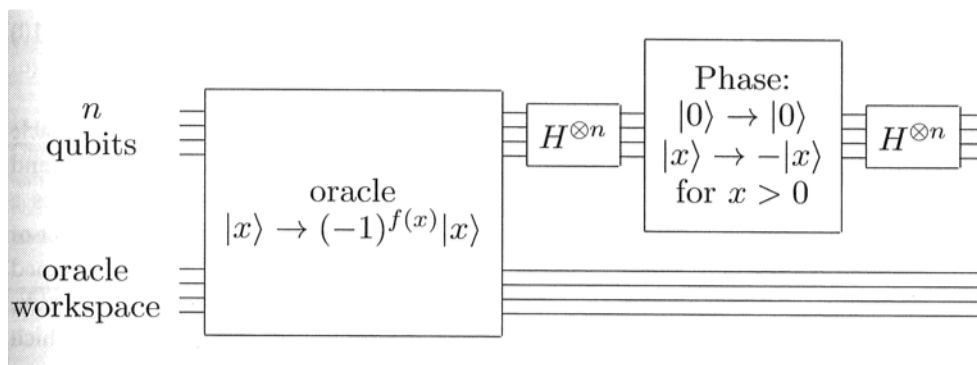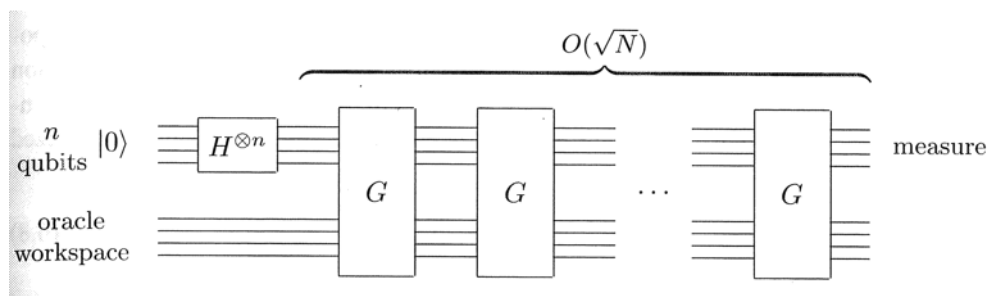

Abbildung 1: Grover Gate

Abbildung 2: Grover Algorithm

2. Bitcoin Mining

How would a quantum computer help in mining bitcoins?

This question is not mandatory.