Homework 8

Oded Regev & Amnon Ta-Shma
Dept. of Computer Science
Tel Aviv University

1. Fill in the gaps in the proof that Group Nonmembership is in QMA (recall that the sampling procedure, instead of outputting a uniform distribution, outputs a distribution in which each element of the subgroup H has probability $1/|H| \pm \varepsilon$ where the running time depends polynomially on $\log 1/\varepsilon$).

2. Show that the 4-local Hamiltonian problem is QMA-complete. Then try to improve it to 3-local Hamiltonian. Hint: for 4-local, try to replace the unary encoding; for 3-local, you'll need to make H_{clock} strong so that it 'enforces' a legal clock state.