Note on Homework 7

5.1 Follow the algorithm, and compute $(|00\rangle(-1)^{f(00)} + \cdots + |11\rangle(-1)^{f(11)})(|0\rangle - |1\rangle)$.

5.2 Again follow the algorithm and verify the result.

6.1 Let $|v\rangle = (\tilde{f}(0), \ldots, \tilde{f}(N-1))^t$, and $|u\rangle = (f(0), \ldots, f(N-1))^t$. Then ...

6.2 May see the hint at the end of the book and write down the solution clearly.

6.3 Work one the $n = 2, 3$ case carefully, and argue that cancellation will occur except at the $|x\rangle$ with $x = 0, \ldots, (P-1)2^n/P$.

Note that if we get $k_1 2^n/P$ and $k_2 2^n/P$ for k_1, k_2 of different parities, we can decide $2^n/P$ and hence P.

6.4 Use the fact that U_{QFT_n} is symmetric.