CS 593/MA 592 - Intro to Quantum Computation
Homework 3

Due Monday, February 5 at 8pm (upload to Brightspace)

1. Do the following exercises from Nielsen and Chuang: 4.6, 4.11, 4.12, 4.17, 4.34, 4.35, 4.38, 4.39. For 4.17 and 4.39, just draw your answer, you do not need to justify it.

2. Give an example of a unitary 2-qubit gate $U : (\mathbb{C}^2)^{\otimes 2} \to (\mathbb{C}^2)^{\otimes 2}$ that is "entangling," that is, can not be expressed as a tensor product $U_1 \otimes U_2$ where U_1 and U_2 are two 1-qubit gates $U_1, U_2 : \mathbb{C}^2 \to \mathbb{C}^2$. Justify your example.