

**CS 4390/5353**  
**Quantum Computing**  
**Home Assignment 2**  
Due September 3, 2009

1. Compute the probability of 0 and 1 for the following state:

$$\frac{\sqrt{2}}{\sqrt{5}}|0\rangle + \frac{\sqrt{3} \cdot i}{\sqrt{5}}|1\rangle.$$

Check that it is a physically valid state.

2. Describe the conjunction operation  $\&$  as a Toffoli gate; write down the truth table for this gate.