Homework 3 Conceptual Solutions

1a)

measure ↑ only
↳ qubits start ↑ & nothing changes it

1b)

measure ↓ only
qubits start ↑
NOT gate flips the qubit, now ↓

1c)

measure ↑ or ↓ 50% probability of each
qubit starts ↑
Z gate does nothing to ↑
Hadamard gate creates the superposition $\frac{1}{\sqrt{2}}(|\uparrow\rangle+|\downarrow\rangle)$

2a) $|\psi^+\rangle$:

measure ↑↑, ↓↓ with 50% probability each

$|\psi^-\rangle$:

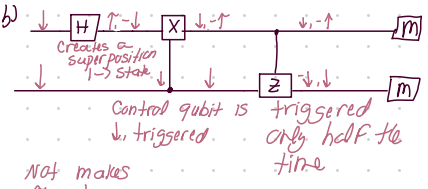
measure ↑↑, -↓↓ with 50% probability each

$|\Phi^+\rangle$:

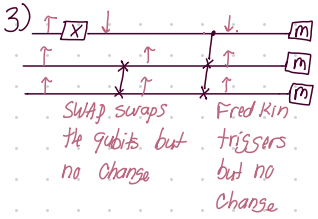
measure ↑↓ or ↓↑ with 50% probability each

$|\Phi^-\rangle$

measure ↑↓ or -↓↑ with 50% probability each

2b) 

Will measure either the state -↓↓, -↑↓

3) 

measure the state ↓↑↑