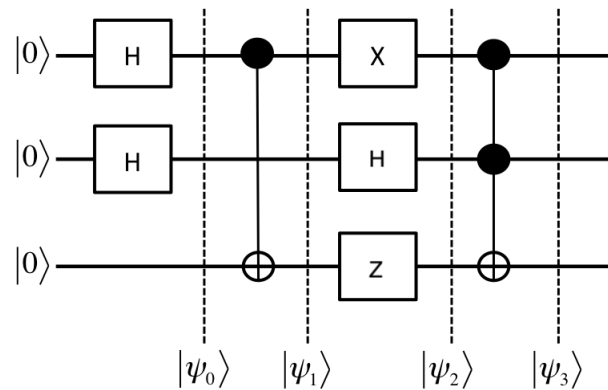

COL863: Quantum Computation and Information**Quiz: 1**

1. Give the the intermediate states $|\psi_0\rangle, |\psi_1\rangle, |\psi_2\rangle, |\psi_3\rangle$ of the 3-qubit circuit given below. Show your calculations.



2. Alice and Bob together create an EPR pair $\frac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$. Alice and Bob then go to their hometowns with ~~one copy of the pair~~ one qubit each. Alice has two classical bits $x, y \in \{0, 1\}$ based on which she does the following operations on her ~~copy of the~~ qubit:
- Alice performs the X gate on her ~~copy~~ qubit if and only if $x = 1$.
 - Alice performs the Z gate on her ~~copy~~ qubit if and only if $y = 1$.

After this, Alice sends her qubit to Bob. Construct a Quantum circuit for the two qubits that Bob has which will enable him to know the bits x and y .