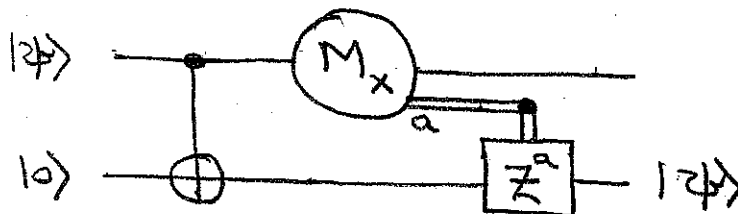


Homework Problem 2.2  
(10 points)

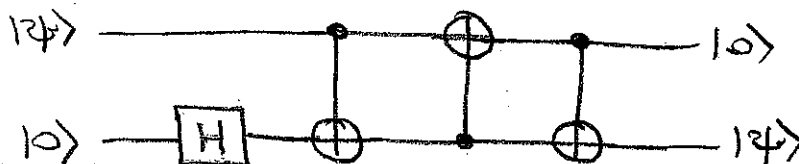
Due Tuesday, March 7  
(at lecture)

2.2 Another cheap teleportation primitive. In the lectures we showed that the following circuit moves a state  $|\psi\rangle$  from the top qubit to the bottom qubit, and we used this circuit to find a circuit that uses only measurements to apply a unitary  $U$ .

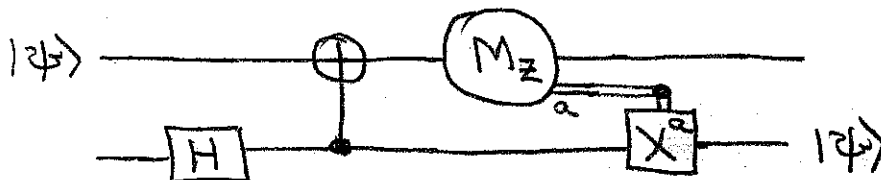


In this problem we explore another cheap teleportation primitive.

(a) Starting with the SWAP circuit below,



derive the following teleportation primitive:



Verify directly that this teleportation primitive moves  $|\psi\rangle$  from the top qubit to the bottom qubit.

(b) Use the teleportation primitive of part (a) to find a single-qubit-unitary measurement circuit. You should find the same measurement circuit that we found for the teleportation primitive at the top.