Phys 31415 Homework #5

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Please do all the work on your own. Be curious and honest and prosperity shall be yours. If you have any questions seriously email me. Check out this before trying the homework.

Short and sweet homework so please study for your final, if you are missing any assignments please send before August.

1 How DID they get there?

1. Take the protocol from the lesson to help you with the homework.

   (a) In the lesson we use the maximally entangled $|\phi_+\rangle$ to teleport our state (entangling the entangled qubit and Bob's qubit at the beginning of the circuit). Create a circuit to teleport our state but using $|\psi_-\rangle$ instead. List out what gates to use X or Z with which measurements to successfully send Bob, Alice's qubit.

   (b) Initialize the original circuit from the lesson with a random state for Alice's qubit q_0. Show me that Bob receives that state in the end.

   (c) Do the same as (b) but with the other circuit you made using a different bell state.

2 Explain what you did

(a) Briefly explain how to do the teleportation protocol, how is it different from super-dense coding? (not in the scope of qiksit, just in general)

(b) Does it matter which bell state you use in teleportation?

(c) Going beyond, what would we need to teleport bigger states of multiple qubits?