**Quantum Teleportation** (*QT*)

* 1. Equal output: (oracle)
* **Input:** Qubit vector  of size
* **Precondition:** True
* **Operation:**  =*QT* ()
* **Postcondition:** 
  1. Uniform superposition on the two non-teleported states (invariant):

Proof (<https://tomrocksmaths.com/2022/02/28/quantum-teleportation-and-entanglement-how-do-they-work-1/>)

* **Input:** Qubit vector of size
* **Precondition:** True
* **Operation:**  =*QT* ()
* **Postcondition:** )
  1. Double application with a SWAP, does not yield initial state on register (not idempotent)

This is because applying teleportation modifies the quantum state.

* **Input:** Qubit vector of size
* **Precondition:** True
* **Operation:**  = *QT* ((*QT* ()))
* **Postcondition:** 
  1. Different paths, same outcome (change hat to unitary and make tensor with I)
* **Input:** Qubit vector of size
* **Precondition:** True
* **Operation:**  = ( *QT* ())

= *QT* ( ())

**Where:**  is a random 2x2 unitary operator (thus acts on one qubit)

* **Postcondition:**  =

**NOTE:**  denotes the first qubit of

= =

where H is the Hadamard gate

() = ()