Homework 4

# Question 1

We want to normalize

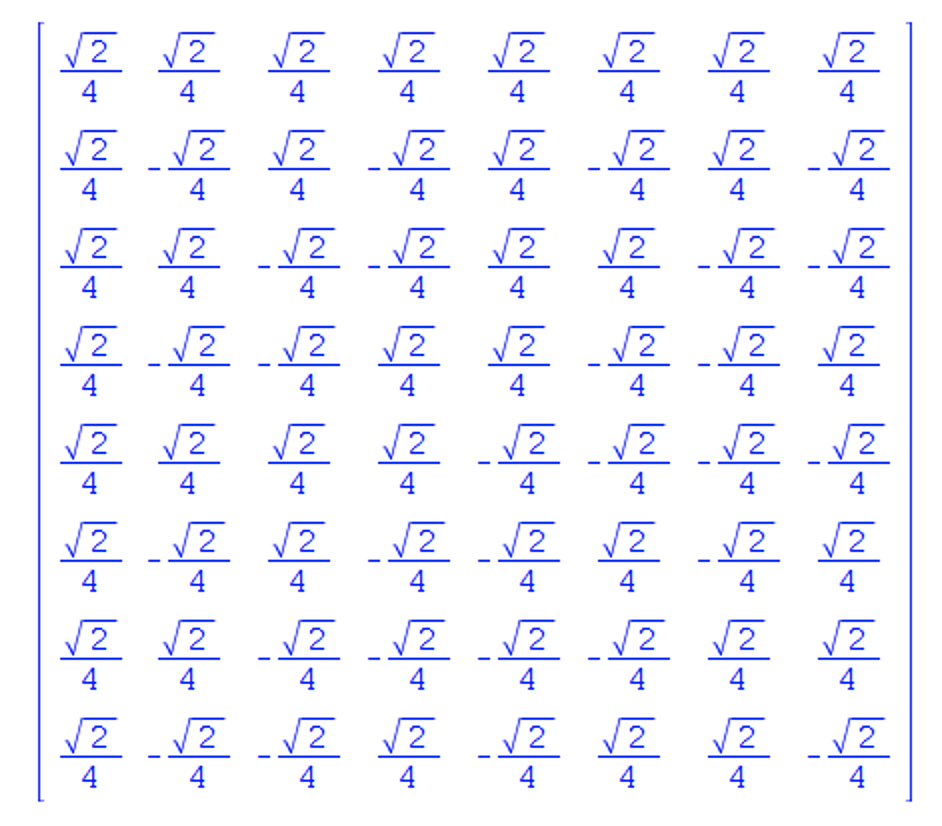
So, we get the new state

# Question 2

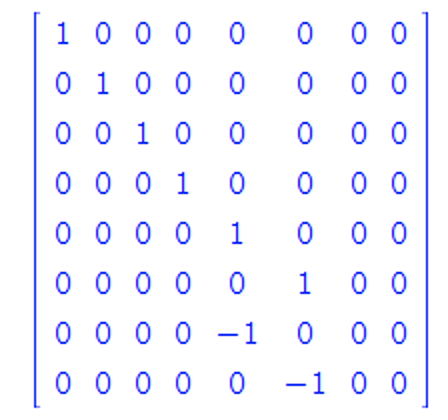
The probability to get is then

# Question 3

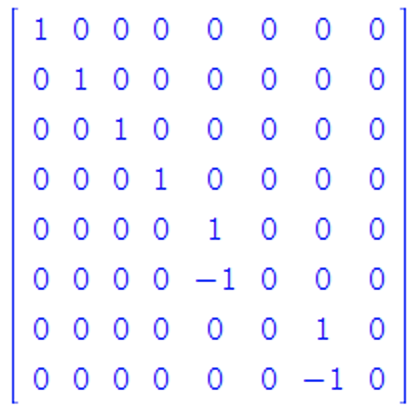
Three Hadamard together matrix:



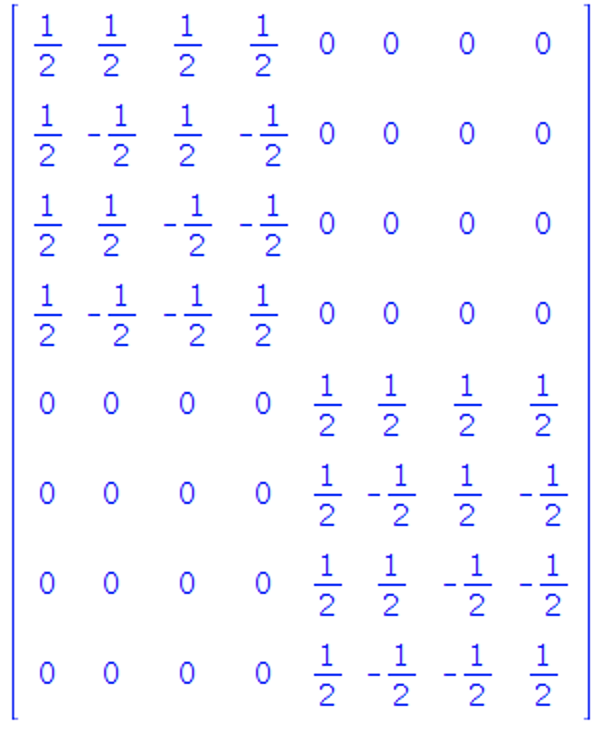
Control-Z on first two qubits:



Control-Z on first and third qubits:



Hadamard on second and third qubits:



So, applying the circuit on , we get

So, the probability of getting is .

# Question 4

Suppose we measure the qubit with index 0 in the standard basis. What is the probability

of getting 0, and if that happens, what is the state of the other qubit?

Probability is

The other states vanish. Meaning that we are now at just state

Also, suppose we measure the qubit with index 1 in the standard basis. What is the probability of getting 1, and if that happens, what is the state of the other qubit?

Probability is

The other states vanish. Now are at state