Homework Quiz - Week 10 Results for Murshed SK

Score for this attempt: 10 out of 10
Submitted Dec 10, 2023 at 3:55pm
This attempt took 125 minutes.

⠿

Question 1
1 / 1 pts

If Alice has 5 bits (00101) and the random bases of XXZZX, what qubits would she send to Bob?

○ |0⟩ |0⟩ |1⟩ |0⟩ |1⟩

○ |0⟩ |0⟩ |-⟩ |+⟩ |1⟩

◉ |+⟩ |+⟩ |1⟩ |0⟩ |-⟩

○ |1⟩ |1⟩ |0⟩ |1⟩ |0⟩

○ There is no way to know.

⠿

Question 2
1 / 1 pts

Alice sends Bob 10 qubits (1000101011). She uses the random bases XXXZZXZXXZ. Bob uses the random bases ZZXZZXZXZX. Assuming they share one bit and there is no eavesdropper, what is their final key?

◉ 01010

○ 001010

○ 1011

○ 011

○ 1000101011

⠿

Question 3
1 / 1 pts

On which step does Eve attempt to interfere in the Measurement Attack?

○ Step 1: Generate a Key

◉ Step 4: Send Qubits

○ Step 6: Bob Measures Qubits

○ Step 8: Compare Bases

○ Step 9: Checking for an Eavesdropper

::

Question 4

1 / 1 pts

Why is Eve detected during the measurement attack?

○ She guesses incorrectly when trying to mimic Alice's bases.

○

Once she measures the qubits Alice sends, Eve does not send them along to Bob, so he knows someone intercepted them.

○ When she measures the qubits, Alice and Bob detect interference on the channel.

◉

When she measures the qubits, she changes the state of each qubit in a superposition to either a 0 or a 1, which she then passes along to Bob.

○ None of the above.

::

Question 5

1 / 1 pts

Which random basis by Alice gives Eve the best chance of going undetected during the Measurement Attack?

○ XZXZZX

○ XXXXX

○ X

◉ ZZZZZZZ

○ All of these bases give Eve an equal chance of being detected.

::

Question 6

1 / 1 pts

Why is Eve detected during the Intercept and Resend Attack?

◉ She guesses incorrectly when trying to mimic Alice's bases.

○

Once she measures the qubits Alice sends, Eve does not send them along to Bob, so he knows someone intercepted them.

○ When she measures the qubits, Alice and Bob detect interference on the channel.

○

When she measures the qubits, she changes the state of each qubit in a superposition to either a 0 or a 1, which she then passes along to Bob.

○ None of the above.

⋮⋮

Question 7

1 / 1 pts
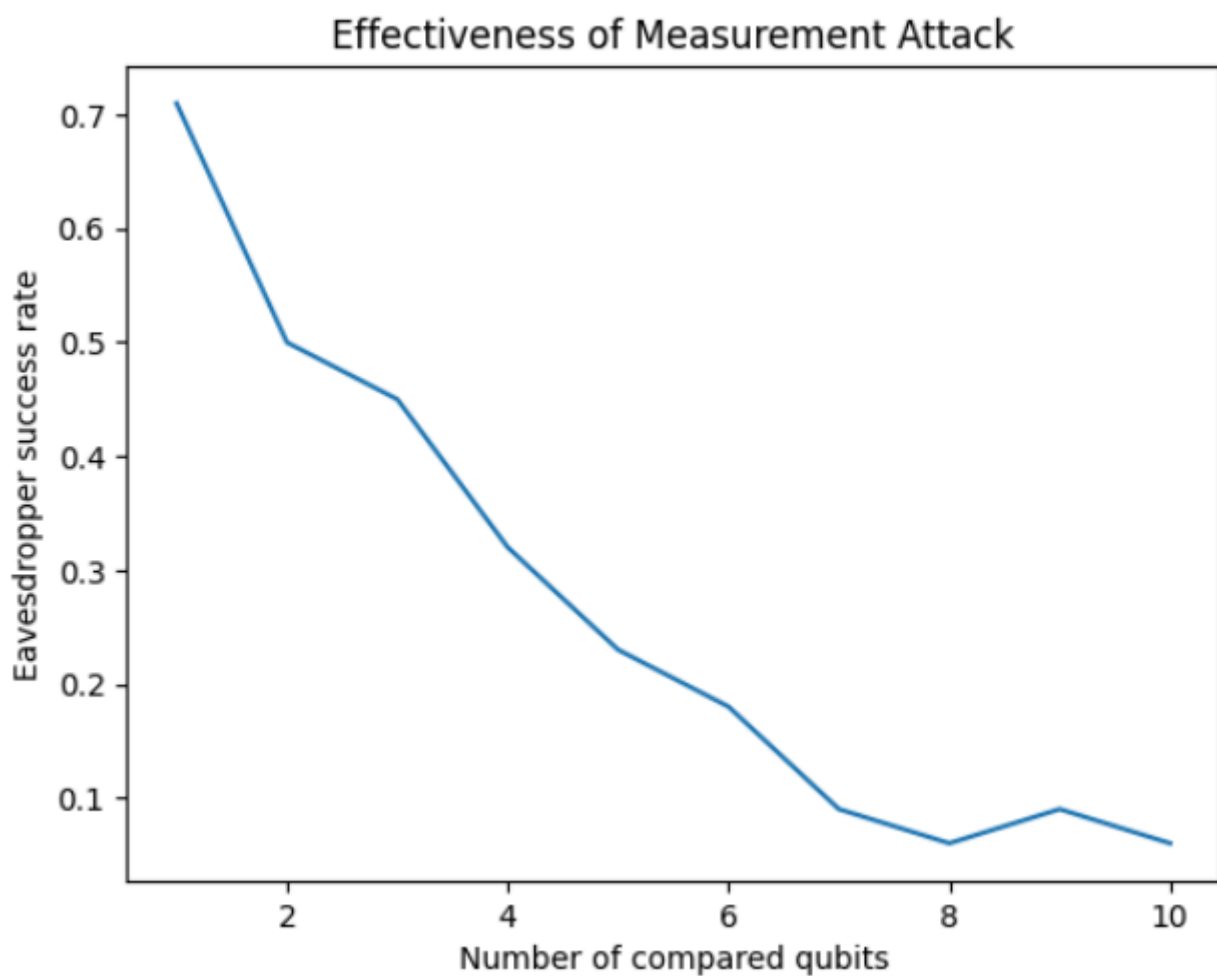
When does Eve measure her qubits in the Entanglement Attack?

○ Step 3: Create Qubits

○ Step 4: Send Qubits

○ Step 5: Bob Picks Bases

○ Step 7: Bob Creates a Key

◉ Step 8: Compare Bases

⋮⋮

Question 8

1 / 1 pts

Using the graph showing the effectiveness of the Measurement Attack, what is the relation between the number of compared qubits and the eavesdropper success rate?

○ As the number of qubits compared increases, the success rate of the eavesdropper increases.

◉ As the number of qubits compared increases, the success rate of the eavesdropper decreases.

○ The number of qubits has no effect on the success rate of the eavesdropper.

○

As the number of qubits increases, the success rate of the eavesdropper decreases until 5 qubits are reached, and then the success rate of the eavesdropper begins to increase.
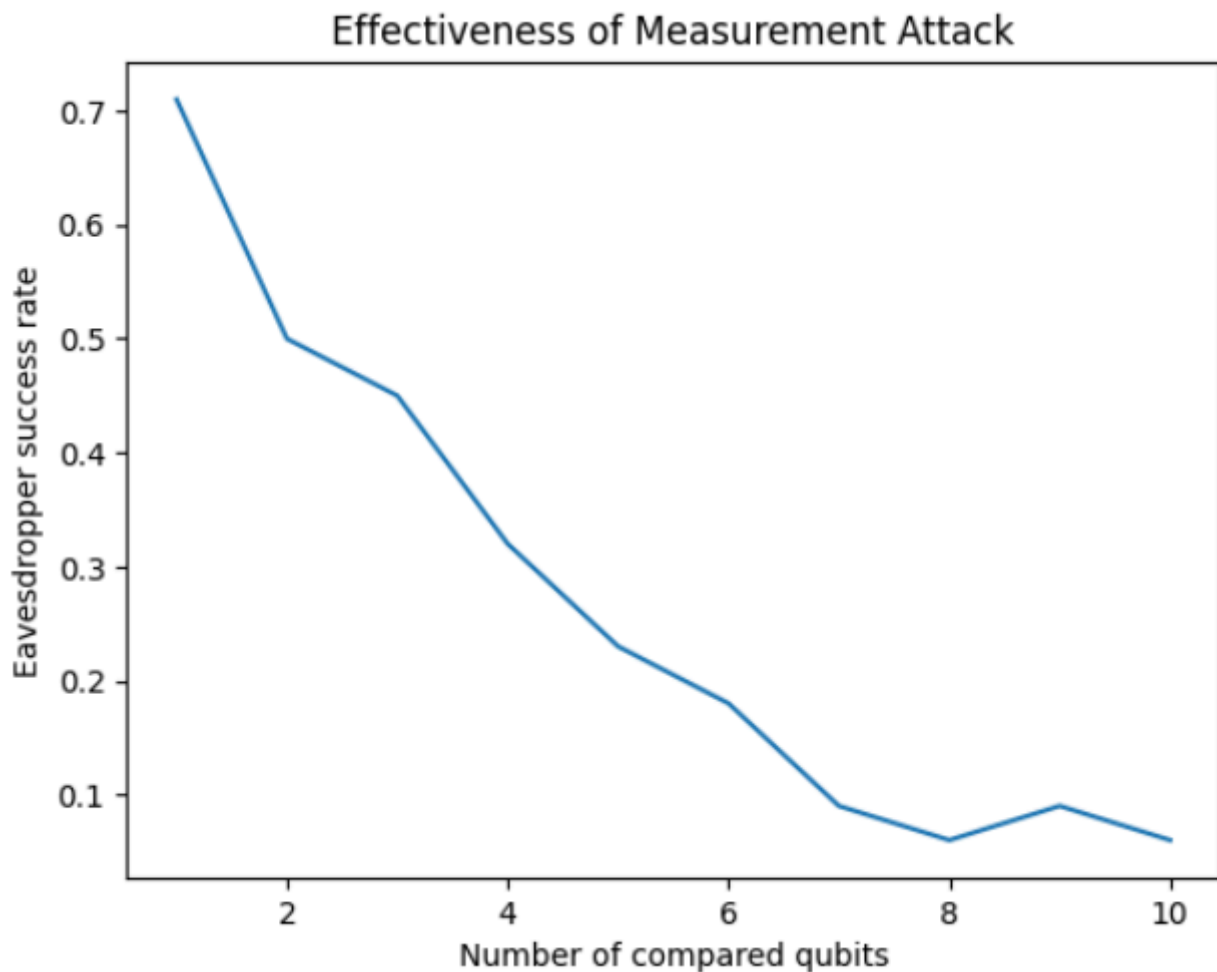
○

As the number of qubits increases, the success rate of the eavesdropper increases until 5 qubits are reached, and then the success rate of the eavesdropper begins to decrease.

⋮⋮

Question 9
1 / 1 pts

Effectiveness of Measurement Attack

Using the graph showing the effectiveness of the Measurement Attack, what is the minimum number of qubits that should be compared to detect Eve more than 50% of the time?

○ 1

○ 2

◉ 3

○ 5

○ 10

⋮⋮

Question 10
1 / 1 pts

Eve is trying to create a circuit that will allow her to measure Alice's qubits and send a perfect replica of her qubits to Bob in order to avoid detection. Why will she fail?

○ The technology does not yet exist for her to do that.

○ She needs to know Alice's initial key and her qubits in order to avoid detection.

◉ The No Cloning Theorem states that it is impossible to perfectly replicate a quantum state.

○ All of the above.

○ If she designs her circuit well, she can successfully avoid detection.

Quiz Score: 10 out of 10