RUN 1 WITHOUT EVE

Alice's Point of View:

--NOTE:
--The horizontal/vertical basis is represented by 'H'
--The diagonal45 basis is represented by 'D'.
--Empty/unknown contents are denoted by '_'

Whenever the program pauses, press ENTER to continue.
Would you like to simulate an eavesdropper (y/n):
n
Eve will not be simulated.

1. Alice is waiting for Bob...
2. Bob has connected.

3. Generating a 1024-bit candidate key, converting it into Qubit form using a random basis and sending it to Bob one qubit at a time:
1001010100110011110001010111000011110011010001110100110101001010111011010010111010010000110110110101110000010001000011011010000100011110111111110110100101000001100111000000001101000001000111111101000001001101101110100101111010101110010110100011101101111110110010011001101110101000010100010000100111000110000110000100010000010101011000110100110001010110100110011001010010001001100110100110110010100101011010010100110101101100001111110110011001111111110111101000001011010100101110010101011110101110111001001000111111011110101000100000011111100101100010111011111101001000010010010101011100000100101000011100011000011010000101010010001100101010010111000110100001011000100010011111101111010110010110011110101001101010101011001011110010100111011000011110000101001001001001100001011000010101100101010101101001100111110110001000100110000101010010001111010101000110010110000111001111010100110011100110111110100000101000110011000000110110111010000010110101000110111110100011101100010100111111110101011110101110011100110011011011001000001110011

4. The random bases that were used to generate qubits that are displayed above are:
DHHDDHHDDDHHDDHHDDDDHHDHHHDHDDHHDDDHHHHHHDDHHHDHDHDHDHDDDDHHHDDDDHHHHHDDDDDHDDDDHHDHDDHHHDDHHHHDHDHDHDDDDHHHDHHHDHHHHDHDHDDDHHDHDHHHHDDDDHHDDHHD
DDDHDDHDDHHHHDDDHDHDHDDHDHDHHDHHHHHDHHHHHDDHDDDDHHDHDDDDHHDHHDHHHHHDDDDDHHHDHDHDDDHHHHDHDDHHDDDHHHHHDHHHDHHHHDHDHDDDHHHDHDHDDDDDDDHHHHHHDHDHHHDHDHDHDDD
DDDHHDHDDDHHHDDHHHHHHDDHDHDHDHDHHHHHDDHDHHHHDDHDHHHHHDDDDDHHDDHHHDDDHHHHDDHDHDHHHDHHHHDDHDHDDHHDDHHHHDDDHHHHHDDDHHDHHHDHDHHHHDDDDHDDDHDDDDDDDHHHHHHHDHDHHHDHDHDHDDD
DDDDDHHDHDDHDHHHHDDDHHDDHHHHHDHDDDHDHDHDHDHDDDDDHDHDDHHHHHDHHHHDHHHDDHHHHDDDHHHHDDHHHHHDHHDDDHHDDHHHDHHHHHDDDHDDHHHHDDDHHDHHHDHDHHHHDDDDHDDHHHDDDDHHDHDHHDDDHDHDHDDH
DDHHDDHHHHDHDHHHHHDDHDDDHDDDDHHDHHHHDHHDHHDDHDHHHHHDDHDHHHDDHHDDDDDHDDDDDDDDHHDHHDHDHDDDDHDHDHDDDDDHHDHHDDHDHDDDHHHHDHHHHHDHHHDHHHDDHHHDHDHDDHDHHHHHDDHDHDHDHHHHHDDDDDD
DDDHDHDHDDHDHDHHHDDDDDHHHHHDDHHHHHDDHDHDDHHHHDHDHHDHHHHHDHHHHHHDHHHHHHHHHDHHHHHHHHDDDHDHHHDDDDDDHDHHDHDHHHHHDDDDDDHDHHHHHDDHDHHHHDDHDHHHHDDDDDHDHDDHDHDHHHHHDDDDHDDDHH
HHHHDDHHHHHDDDDDDHHDHHDHHDHDDHDDHHDHDDDHDHHHHHHHHDHDHHHHDDDHHHDHDHDHDDDHDHDHDDHDHHHHHDHDHDDDHHHDHDDHHDHDHDHHDHHDHHHHDDDHDDDDHHHHDDHDHDDHDDHHHDHDHDDHDHHHHHDDHDDDD
HDDHHDDDH

5. Receiving bases that were used by Bob:
HDHHDDDDHDDDDHHHDDDDHHDDHDHDHDDDHHDHDDDDDHDHHHDDDDDHDHDHDHHDDHDDDDDHDHHHDDDHHHHHDHHHHHDHHHHHDDDHHHHDDDHDDDHHHDHDHDHHHDHDHHHHDHHDHDHDDDDDDHHHHHHDDHHHHDHDHDDHH
HDHDDDDDDDDHHHHDHDHDHHHHDDHHHDDHHDDDDDDDHDDHDHHHDHHDHHDHHHHHHHHHDDHDDHDHDDDDDHDHHHHHDDDHDHDDDHHHHHDHDHHHHDHDHHHDHDDHDHDHDDHDHHHHHHDDDDHHDDHHHDDHDHDDDHDHDHDDDDDHDHDDHHHHDDDHDHDHDDDDHDHHDDHHHHHDDDDDHHHDHDHDDDDDHHHHHDHDHHHHDDDHHHHHHDHHDHDDHHHHHHHDHDDDDHHDHHHHDHHHDHDHHDHDHDDDDHHHHDDHDDDDDHDHHDDDHHHHHDDDHDHDDHHHHHDHHHHDDDDHHHDDDH
DHDHDHDHHHHHHDHDHHHHHHDDHHDDDDDDHHDHHDDDHHHDHDHHHHHDHDDDDDHHHHHDDDHDHDDHHHDHHHHHDHDHHHDDHDHHHHHHHHDDHHHHHDDHHHHHHHHDHDDDDDHDHDHHHHHDDDHHHHDHDDDDHDDDDDHDHHHHHHDDHHHHDHDHHHHHHDDHHHHHDHDHHHHHDHDDDDDHDHDHHHHHHHDDHHHHHDHDHHHHDHDDDDDHHHHHHHHDHHHHHHHHDDHDDDDDHDHDHDHHHHHDDDHDHDHDDDDHDHHDDHHHHHDDDDD
HHDHDDHHH

6. Sending own bases for comparison.

7. Finding the common bases... The common bases are:
__H__D__D_D__D_HHDDDDDHHD_H_DHDD_H_D_____H___H_DD_D____D_DH___DDD__H___DDDHD__HHDH__H_DD_HH_D_____H___D_D_H_DH_H_H_HHDHD_DDDHH_H_H__H__D___D_H__D__DDD__DD_HH_H
__DH____HD_H__HD_HH__D_D_H_____D_HH_D_H_DH___HH_HH_H__D_DDHDH_____DHHHH__D_HD__D__HH___HD__D___H__H_DH_DHHH__D___D___DH__D_DD_D___D_HHHDDD___H_H_D__H____D___
HHD_HD____DH___DD_H_D___HD_HDD____D____H_D__D_____DHD__HDD_HHH____DDD_HHH__H_D__D_D_DD__H_H___H___HH___HD_D__DD_D_DH_____H_HH_HDD_HH__HH__HD_DDDH__D___DHDD____

DD__H_H_HHHHDD_HHD_DHH___DH_HHHH_H__DD____H__H_H___D____HHDH_D_HHDDD____H__DD_D__DHD__D_H__DDHDDHH__H_HH____DHHHH_H__H__H__DH__HD_HHD__D_H_D__H__H_DDHDHH_DD__D
DD__DH____DDHDH_DHDHDHDDD___DD____H__H_DDH_DHH_H_HH____H__HD_DHHD__HD_D__D_D____D_D__H___D__DH_H__DD_D__DHHHH_D__HHH_DH__D__HH___HHDD_____D__HH_D__H__HH_HDH_
DHH____D_HD_D_DD_DDDHDH___HHD_H__DDDDH_HDH__DD___DHHDHHDH__DH_D__H___D__H_H_____DHHD__D_D__HD___D__DH__HH_HH_HDH____D_HH_D_DD___D_H___D_H_HHHH_H_DH_____
H_D___D_____HHHD_D_D_D_D__HH__H_D_H_HDH_HHDD_DDDH_DH_D__H

8. Sending own, random bits from the valid key to test for the presence of Eve:
__0____1____1__1_11_0_1_1__1___0_1_____0_____0___0___1__01001__1_01____0__11_____0_____0_001_0_1_1___0_0__1__1_____1__1_____00___1_____0__0_____
0_____01__0_____1__1_____0_____1001____10_1_____11_0__0__0_1__101_0_____1_____1_____0_____0_____0_____0_01___0____0_1_0_____110_____
_____1__0_____0___01__100____1__101_____0_____10__1_____1_00_____11_1_____10_0__0___0__10_1_____0___1_01_11__11_1_____1_1____11_____0___
___0_01___0__11_____10_0__0___0_1____0_0_____00_____010_0___0__1__0_1___0_____11__10_1_1____0_____0_____011_____11___0_1_10__001_____0__10_1_01__0__
___1_____0__0_____00_1__11_0__101_0_0__0_1_____10____0_1_____10_0___10_1__11_____0_____100____1_1_0__0_1__10__1_____1_110___1_1__1_____011__
_____10_____0_____0___1____0_____1__00_____0_0_____0_0____1___10__1_____01__0__10_____

9. Receiving Bob's corresponding bits to test for Eve:
__0____1____1__1_11_0_1_1__1___0_1_____0_____0___0___1__01001__1_01____0__11_____0_____0_001_0_1_1___0_0__1__1_____1__1_____00___1_____0__0_____
0_____01__0_____1__1_____0_____1001____10_1_____11_0__0__0_1__101_0_____1_____1_____0_____0_____0_____0_01___0____0_1_0_____110_____
_____1__0_____0___01__100____1__101_____0_____10__1_____1_00_____11_1_____10_0__0___0__10_1_____0___1_01_11__11_1_____1_1____11_____0___
___0_01___0__11_____10_0__0___0_1____0_0_____00_____010_0___0__1__0_1___0_____11__10_1_1____0_____0_____011_____11___0_1_10__001_____0__10_1_01__0__
___1_____0__0_____00_1__11_0__101_0_0__0_1_____10____0_1_____10_0___10_1__11_____0_____100____1_1_0__0_1__10__1_____1_110___1_1__1_____011__
_____10_____0_____0___1____0_____1__00_____0_0_____0_0____1___10__1_____01__0__10_____

10. The two sets of test bits are the same - Eve has not been detected.

11. Key exchange was successful, your key is:
0001001101110111011011001001000110110000001001101011001111110101000001110001000101011001110111011011110111010111110110000110101101010010111101110010000000010100000100110011110
00001000011011000101000110010000000011000000011011000011110111010010111000111

Bob's Point of View:

--NOTE:
--The horizontal/vertical basis is represented by 'H'
--The diagonal45 basis is represented by 'D'.
--Empty/unknown contents are denoted by '_'

1. Bob is trying to connect to Alice...
2. Bob has connected.

3. Receiving the candidate key in qubit format from Alice:
0101000110011001110001010111000011101011001011110100010001111010101000010011011011011000110101100101011000001101000100110110100101001101110111100110101011000000101010110010000
1100001011111000011010010110111110110010010101111010001110011010100011001101111001110000010111011000100001100000010001101111000010001000001100000100100011010001111011001010111
0001010000011010100001001110111100001011011011011100110101010011010101001011100101100010110111111001001011001101111011010101111000011111001011101111010010000111100011110001110
0101111100001010001011001011010101000001011011010101111000011101010101010101111100110101000000001000110010001111011000100010000101100010011101111010001110110010100001000101011
10101011101111110000001101110110001111110001010010100011010100010001000111110001110000010110111001111101110010001101100010110110000011100100110100100101100001011011000011001011
10000101111010010100010100000010001101010100100101111000100011011111000010011011000111101010010101001011001100010011100111011001000011101
4. The random bases that were used to receive qubits that are displayed above are:
HDHHDDDDHDDDDHHHDDDDHHDDHDHDDDHHDHDDDDDHDHHHDDDDDHDHDDHHDHDDHDDDDDHDHHDDHDHHHHDHHHHHDDHHHHDDDDHDDHHHDHDHDHHDDHDHHHHDHHDDDDHHHHHHDDHHHHDHDHDDHH
HDHDDDDDDDDHHHHDHDHHDHHHDDHHDHDDHHDDDDDDHDDDHHDHHHDDHHHHDDHHDHDHDHDHHHHHHHDDHHDHDHDDDDDHDHHHHHDDDHDDHDDDDHHHHDHDHHHHHDHDHHHDHDHDDDHHHHHHHDDDDHDDDHDDDDD
DHDHDHHHHHDDDDHDHDDDDHDHHDDDDHHHHDHHHDDDDDDHHHDHHDDDHHHHDDHDDHHDDDHDDHDDHHHDHDDDHDHDDHHHHHHDHDDDDHHHHHDHDHDDHHHHHDHDHDHDHDDHHHHHHHDHHDHDHDDDHHHHDDDDH
DHDHDHDHHHHHDHDDHHHHHHDHDHDHDDHHDDDDDHHHDDDHDHDDHDHDDHDDDDHDDDHDHHHHHHDDDHHDDHHDHDHHHHHHHDHDDDDHHHHDHDHDDDHDHDHDDDDDHHDDDHHHDHDHDHHDDHHDHHHHHHHHHDHHDDDDH
DDHHHHHHHDHDDHHHHDHHHHHHHHHHDHDHDDHHDDDDDHHHDDHHDHDDDDDHDHHHDDDDDDHHDHHHHHDDHDHDDDHDHDHDDDDHHDDDHHHHHHDHHDHHHHHHHHDHHHDDHHHDHDHDHDHHDDHHDDDDDDDHDHH
HHDDDDHHDHDDDDHHHDDDDHDHDDHHHHHDHDHHHHDHHHDHHHHHDHHHDHHHDDDDHDDDDHHHHDDDDHDHHHHHDHDHHHHHDDDHDHDHDDDDDHDHHDHHHHDHHHDDDHHHHDHDDDDHDHDHDHHDHHHHHDHHDDD
HDDDDHHHDHDHHHHHHDDDHHDDDDHDDHDHDHHHHDHDHDHDDHDDHHDHHHHHDHDDDHDHHHDDDDDDHHHHHDHHHHHHHHHDHHHHHDHHHHHDHDDDDDHDHHHHHDDDDHDDDDHHHHHDHHHHHDHHHDDDDDD
HHDHDDHHH

5. Sending own bases for comparison.

6. Receiving Alice's basis:
DHHDDHHDDDHHDDHHDDDDHHDHHHDHDDHHDDDHHHHHHHDDHHDDHDHDHDDDDHHHDDDDHHHHDDDDDHDDDHHDHDDHDDDDHHDDHHHDHHDHDHDDDDDHHDHHHDHHHHDHDHDDHHHDHHHHDDDDHHDDHHD
DDDHDDDHHDDDHHDHHDDHDHDDHDHHDHHDHHHHHDHDHHHHDDHDHDDDDHHHDDHHDDHDHDHHHDHHDHDHDDDDHDHHHHHHDDHHHHDHDHHHDHDDHHHHDDHHHDDDDDDHHHHHHDHDDHHHDDDDHHDDHHDHHHHDHD
DDDHDHDDHHHDDDHDHHHHHDHHHHDDHHDHDHHHDHDHHHDDHHHHDDDHDDDDDHHDDDHDDDDHHDDHHDHHHDDDDDHHHDHDHDDDDHDDHHHHDDHDDDDDHHHHDHHHDDHDDDDDDDDHHHHHHHDHDHHHDHDHDHDDD
DDDDDHHHDHDHDHHHHDDDHHDDHHHHHDHDDDHDHDHDHDHDDDDHDHDDHHHHDHHHHHDHHHHDDDHHHHDDDHHHHHHDHDDDHHHDDHHHDDHHHHHDDDDHHDDHHHDHHHDHHHHDDDHDDHHHDDDHHHDHHHDDHDHDDDH
DDHHDDHDHHHHDHDHHHHHHDDHHDDDDDHHHDHHHHDHDHHHHDHDHHHHDDHDHHHHHDDDHHDHHHDDHHDDDDDDHDDDDDDHDHDHDHDHHDDHDDDHDHDDDDDHHDHHDDDHDDHHHHHHDHHHHDHHHHDDHHDHDHDHHHDDDDD
DDDHDHDHHDHDHDHHHHDDDDDHDHHHHDDDHHHHHDDDHDDDHDHDHDHHHDDHHDHHHHHDDDHHHHHHHDHHDHDHDHHDHHHDDDHDHHHHDDDDDDHDDDHDHDHDHHHDHHHHDDDDDDHDHDHHHDDDHDHHHDHDHDDDHDDDHH
HHHHDDDHHHHDHDDDDDHHDHHDHHDDHDHDHDHDDHDDDHDHHHHHHHHDHDHHHHDDDHHHDHDDHHHDDDHDHDHDDHDHHHHHDHHDHDDDHHDDDHHHDHHDHDHHDHHHDHHHHDDDHDDDDHDDHHHHDDHDHDDHHDHDHHHHHDDHHDDD
HDDHHDDDH

7. Finding the common bases... The common bases are:
__H_D__D_D__D_HHDDDDHHD_H_DHDD_H_D_____H___H_DD_D____D__DH___DDD__H___DDDHD__HHDH__H_DD_HH_D_____H___D_D_H_DH_H_H_HHDHD_DDDHH_H_H__H__D___D_H__D__DDD__DD_HH_H
__DH___HD_H__HD_HH__D_D_H_____D_HH_D_H_DH___HH_HH_H__D_DDHDH_____DHHHH__D_HD__D__HH___HD__D__H__H_DH_DHHH__D___D__DH__D_DD_D___D_HHHDDD___H_H_D__H____D___
HHD_HD___DH__DD_H_D___HD_HDD___D___H_D__D_____DHD__HDD_HHH___DDD_HHH__H_D__D_D_DD__H_H___H___HH___HD_D__DD_D_DH____H_HH_HDD_HH__HH__HD_DDDH__D__DHDD_____
DD_H_H_HHHHDD_HHD_DHH___DH_HHHH_H__DD_____H__H_H__D____HHDH_D_HHDDD____H__DD_D__DHD__D_H__DDHDDHH__H_HH___DHHHH_H__H__H__DH__HD_HHD__D_H_D__H__H_DDHDHH_DD__D
DD__DH___DDHDH_DHDHDHDDD____DD___H_H_DDH_DHH_H_HH___H__HD_DHHD__HD_D___D_D___D_D__H___D__DH_H__DD_D__DHHHH_D__HHH_DH__D__HH___HHDD_____D__HH_D__H__HH_HDH_
DHH____D_HD_D_DD_DDDHDH___HHD_H__DDDDH_HDH__DD___DHHDHHDH__DH_D__H__D___H_H_____DHHD__D__D___HD___D__DH__HH_HH_HDH___D_HH_D_DD___D_H___D_H_HHHH_H_DH_____
H_D___D_____HHHD_D_D_D_D__HH__H_D_H_HDH_HHDD_DDDH_DH_D__H

8. Receiving valid key bits from Alice to test for the presence of Eve:
__0____1___1_1_11_0_1_1__1___0_1_____0_____0___0___1__01001__1_01____0__11_____0_____0_001_0_1_1___0_0__1_1_____1_1_____00___1_____0__0____
0_____01__0_____1__1_____0_____1001____10__1_____11__0__0__0_1__101__0_____1_____1_____0_____0_____0_____0_01_____0____0_1_0_____110____
_____1__0_____0__01__100___1___101_____0_____10___1_____1_00_____11_1_____10__0___0___0__10_1_____0___1_01_11___11_1_____1_1____11_____0_____
___0_01___0__11_____10_0_0____0_1_____0_0_____00_____010_0_____0___1__0_1___0_____11__10_1__1_____0_____0_____011_____11____0_1_10__001_____0_10_1_01__0__
___1_____0__0_____00_1__11_0__101_0_0__0_1_____10____0_1_____10_0____10__1__11_____0_____100___1_1_0___0_1__10_1_____1_110___1_1__1_____011___
_____10_____0_____0_____1_____0_____1__00_____0_0_____0_0_____1____10_1_____01__0____10_____

9. Sending corresponding, own bits of the key to test for Eve:
__0____1___1_1_11_0_1_1__1___0_1_____0_____0___0___1__01001__1_01____0__11_____0_____0_001_0_1_1___0_0__1_1_____1_1_____00___1_____0__0____
0_____01__0_____1__1_____0_____1001____10__1_____11__0__0__0_1__101__0_____1_____1_____0_____0_____0_____0_01_____0____0_1_0_____110____
_____1__0_____0__01__100___1___101_____0_____10___1_____1_00_____11_1_____10__0___0___0__10_1_____0___1_01_11___11_1_____1_1____11_____0_____
___0_01___0__11_____10_0_0____0_1_____0_0_____00_____010_0_____0___1__0_1___0_____11__10_1__1_____0_____0_____011_____11____0_1_10__001_____0_10_1_01__0__
___1_____0__0_____00_1__11_0__101_0_0__0_1_____10____0_1_____10_0____10__1__11_____0_____100___1_1_0___0_1__10_1_____1_110___1_1__1_____011___
_____10_____0_____0_____1_____0_____1__00_____0_0_____0_0_____1____10_1_____01__0____10_____

10. The two sets of test bits are the same - Eve has not been detected.

11. Key exchange was successful, your key is:
0001001101110111011011001001000110110000001001101011001111110101000001110001000101011001110111011011110111010111110110000110101101010010111011100100000000101000000100110011110
0000100001101100010100011001000000011000000011011000011110111010010111000111

RUN 2 WITH EVE:

Alice's Point of View:

--NOTE:

--The horizontal/vertical basis is represented by 'H'
--The diagonal45 basis is represented by 'D'.
--Empty/unknown contents are denoted by '_'

Whenever the program pauses, press ENTER to continue.
Would you like to simulate an eavesdropper (y/n):
y
Eve will be simulated.

1. Alice is waiting for Bob...
2. Bob has connected.

3. Generating a 1024-bit candidate key, converting it into Qubit form using a random basis and sending it to Bob one qubit at a time:
100101010110111011001101101010100001100010100010100111100010111110100010001010010101000101110011110111010111110101110111111101100110010101010001111111010011000100100100010100010
001011010110101001101110000101010000000011111011101011111011111000111010000100000101001110011000110101111010010001001001010101000000100101111010111110001101001010100101011001010
100110001010100101101100100001100110010000011111001111000000000101000110001011110110101000101110101010001100111111101010010010001101111100000101111111101101100000101001011101101001
001001100110010001011111101001010101111000001111010101100110100100001010100101101010110100000000001010000101010111000111100000010111000000101111101100101111010001111101101011001
110100011111010011111111100010010110111010110100011000110100001000000100110100111000010101010001011011110110110101111000101100101100000100010001000100111101111001010100000111001111
111011010011000011110110010001110000010111101110000101100000111100000011000010101000010110001101011011000010011010001100101111100011101010
4. The random bases that were used to generate qubits that are displayed above are:
DHHDHHHDHHDHHDDHDDHDHDHDDDHHHDDDDHDDDHHHDDDDHDDHHHDDDDHHHDDHHDHHDHDHDHHDDDDHDDHHDHHDHHHDHDHDDHDHDHDDHHDHHDHDHDHHHHHHHDDHHDHHHHDHHHDDHHDDDDHD
DDHDDDDDDDHHDHHHHDDDHDHHDHHHHDHDHHDDDDHHHDHHHDDDDDHDHDHDDDHDDHHDDHDHHHDDDDDHHHDHDDDDDHDDHHHHDDDDHHDDHHDDHHDHDDDDDDDDDHHDHHDHHDDHDHDHHHHHHDHDHHHHHDHDDHDDD
DHDHDHDDDHHDHHDHHDDHHDHHHHHDDDHHDDDDDDDDDDHHDHHHDHHDDHHHHHHDDHDHDDHHHDDDHHHHDDHHDHHHDHHHDHHHDDHHDDDDDHDHDDDHHDHHHDHDDDDHHHHHDHDHDHHDDHHHHHDDHHHHHHDDD
HDHHHDHHDHHDHDHDHHDHHDDDHDHDHHHHDDHHHDHDHHHHDDDHDHDDDHDDDDHDDDDDHHHHHHDHHHHHDDDHDHHHHDDDDHHHHHHHDHHDDHHHHHDDDDDHHDDHDHDDDHHHDHHHHHDHDHHHDDDDHHH
DHHDDHHHHHDDDDDDDHHDDDHHHHHDDHDHHDDDDHDHHDHDHDDDDDHHHHHDHDDDDDDDDHDHHHDDDDHHHHHHHDHHDDDDDDDHDDDHHHDDHDHHDHHHHHHHDDHDHHDDDHDHHHHHHHHHDHDHHHH
DDHDHHHDHHDDDDDHHHHHHHHDDHDHDDHDHHHHHDHDHDHDDDHHHDHDDDDDDHHHHHHHHDHHDDDDDDDHDDHHHHDDHDDHHHDHHHHHHHDDHHDHHDHHDDHDHHHDDDHHHHHDHHDHDHHDHHHDDDD
DDHHDHHHDHDDDHDDDDDDHHDDDDDDHHDHHHDHDHHHHDHDDDHDHHHDDHHHHDHHDDDHDHDHDHHDDDHDHHDHHHHDDDHDHDHDHDDDHHHHHDDDDHHDDDDDDHHHHHHDDHHHHDDHHHDDDDDHHHDHDH
HDHDHDHDH

5. Receiving bases that were used by Bob:
HDDDHHHHHDDHHHHDDHDDHHHDDHDHHHHHDHHHHDHHHHDHHDDHHDHHDHHHHHDDHHHDDDHDHHHHDDHHHHDHHHHHHHDHDHHDDHHDHHHHDHDDDDDHHHHHDDHDHDHDDDHHHHHDHHHHDDHHHHHHHHDHDDDHHHDHDH
DDHHHHDHDDHDHDHHHHHDHDHDHHHHHDDDHDHHHHDHDHDDHHHDDDDHHDHHHHHDHDDHHHHHDHDHHDHHHHHHHDHDDHHHDDHHHDDHHDDDDDHDDDDHDDHHDDDHHHHHHDHHDDDHHHDDHHHHHDDHHHDHDHDDDDDHDHH
DDHHDHDHHHHHDHHDDHHDHHHDHHHDDHDHDDDHDHDHDHHHHDHHDDDHDDDHDDHDDDDDDHHDHHDHHHHDDHHHDDDDDDHHHDHDHDHHHHHDHDDHDHDDDHHHDHHDHHHHDHDHDDDDHHHDHDHDHHHHDHDDDDDHHHDDHH
DHDHDHDDHHDHHHHHHDHHDHHHDHDHHHDHHHDDHHHDDDDHDHHHDHDHHHHHHDDHHHHHDDDHHHHHHDDDHDHHHHHDHDHHHDHHDDHDHHHHDHHHHHHHDHDHDHHHHHDHDHDHHHHHHHHDDHDDHHDD
HHHHHHHHHDDHHHDHDDDDDDDHHHHDHHHHDHHHDDHDHHHHDDDHHDDDDHDHHHHHDHHDHDDDDDHHHDDDHDHHDHHHHDDHHDDHDHHDHHHDHDHDHHHHHHDHHHHDHHHHDHDHDDDDHH
HHDDDDDHHHHDDDDDHHDHDHHHHHHHDHHDDHDHDHDDHHDHDHHHHHDHDHDHDDDHHHDDDHHHHHDDHDDHHHHHHDDDHHHDDHDHHHDDDDHDHDHHDHDHHHHHDHDHHDHDHDDHHHHHHH
DDHHHDHHHDDDDDDDDHHDHDHDHDHDHHDHDHDDDHDHDHDDDDHHHHDHDHDDDHHHDHHHDHHHHHHDHDDHHHDDDDDHDHDHDHHHDDHHDHHHHHDHHHHHDHDHHHDDDHDHDHHHDHHHHDDDDDHDDDHHHHHHHDDHHD
HHHHDDDDD

6. Sending own bases for comparison.

7. Finding the common bases... The common bases are:
___DHHH____HHDDHDHDDH_HD__D_HHHD_____H_H_DD_HD_H_HH__DDHHHDDDH__HH__D_H_____H_DH__H_DHHDH_HD__D_D___HH___DHD____HHHH_____HHHH_H_HDD_H__D___DDH__D_DD___HDH
HHHD_DHDHH_HH_D_____DH____H__DDD__HDH__HD____H_H__D_HHHDHDD___D_H__H_DDD_HDD_HDDHDDD_____H___DHH_D___HH__DH__H_HHD_DDHD__D_____H_____H_H_HHHDDD
H__DD_D_D_DHHDHH_D_HDD_H__H_DD_D_HD___HD_D_____D___H_H_DHH__DDDH_DDD_____HDHD____H__HD_DH_H_DH_HH__D___HH_D____HD_____H__H__H__H__D___HD_H____HH_DH_H__DD
_DH___D_H_____DD__DHH___H___HH__DDHD_HHH_DDDHHH__H__DD_H_DH__D_____HHD_D_H___HHH__H_HD_HDD____H__H_HHHD_DD__DDD___H_H__H__D_H_DDHD_H_D___HD_D_D___H_HH___DH_
_DHHHDHD_DD_DDD_H__HH__DDD__HDHH_DH_HH____H__HH_DH_HD_DH_H___HDHHHHHDH__DH_D__HH__D____HDD_____HH_H_HH_D_H_D__HDD_D__H_____HHH_D__HD__H___H_DH_DDDDD___DH_
DD__H___HHD_H___H_HHH_D_D_H____HD_DH_____HDDH_H_HD_DH_D_DHHDHHH_HHDDHH__H__D____DDDD_DD__D__HD_D_DHHDH___D_H___D_D_HH_DH_H_D_H_D_H_DH__H_DDH___D____DHDHDH__D_
H__HH_DD_HHD_D__D____H_H_DH_H__D__DDH___H_D___H_DH__H_H__D_D_

8. Sending own, random bits from the valid key to test for the presence of Eve:
___1__0___11_0_10_1___1_____0_0_0___0_0___1__0_____1_____0___10111_0____0_____11____10_1_____11_0____0_____11____0___0_0___1000__10_____
___10_____0__1___0___1_0____1_1_____1_0_1_1_000__1__0_____0__01____10_11__0_1____0_____0_____0_____01111___11_1_0_1_0100____0___0_10_____
_0_____00___01_0_0____1_____1____0_1_0_1____11_1___0_____1_____0_10__0_01__1____1___1_____00__1_0__1_01_____
___11__0_____1_1_1__01____1_000____1____01_1__00____1_1_____1_1_0____1____0___10___0_11__0_0_0_0____000__1_1__01_0__1__0_____0__1_10_____

1__0_____1_____1_____01_1_1__1__0__0_____0_0____1__0__1_0__0101____0_0_____1__1____1_____10_0_____0_1_0_____1__1_100__0__00__1__0_____1____
1_0__1_1____0_____0___0____0_1__0_____01100____0__01_110_0__1____1_1____0____010_____11__0_1__1__

9. Receiving Bob's corresponding bits to test for Eve:
___0__0_____10_0_01_0___1_____1_0_0___0_1_____1_0_____0_____0____10111_0____0_____11____01_1_____00_1____0____10_____0____1_0__1100__11_____
___11_____0__0___0____1_0_____1_0_1_____1_0_1_1_010___1__0_____0___11____10__00__0_1____0_____0_____01110___01_1_0_1_0110____1___0_11___
_0_____00___01_0_0___1_____1____0_1_0_0____11_0___0_____1_____1_10___0__00__1_____1____0_____00___0_0__1_11_____
___01__0____0__0_1__10___1_010____1____01_1__01____1_1_____0_1_0____1____0___10__0_11__0_0_1_0____000_1_1_01_0___1__0_____0___1_00____
1__1_____0____1_____10_0_1_1__1__1_____1_0____1__0__1_0__1101____0_0_____1__1____1_____10_0_____0__0_0____1__0_100__0__00__0_0_____0____
1__1_1_1___0_____0___0_____1_1__0_____01110_____0__01_110_0__0____1_1____1_____000_____11__1_1__1__

Alice's and Bob's test bits do not match - the qubits were tampered with! Exiting!

Bob's Point of View:

--NOTE:
--The horizontal/vertical basis is represented by 'H'
--The diagonal45 basis is represented by 'D'.
--Empty/unknown contents are denoted by '_'

1. Bob is trying to connect to Alice...
2. Bob has connected.

3. Receiving the candidate key in qubit format from Alice:
0010000101001000101101101011100100100100001100011101011100101100000101111111000010110110111100101101010101001110001011110110000100110010100000001010101011010110011011001111001
0110011111001110010010110111011010010010011110011000101100111100100110100000011101100110110010010001001110001001101111010010110100101101101011001100111101101101100011110100011100
1000100001100001011101100000101001100100110101110001111000000111100001001011100111100100110101010011011100111110001011101010110100000011010001111111000001010000100000111011110
1011111000011100101000100001110010101111000101010010011000110101101000010101100111010010110101001011110001001100010011110001001000101110001111101010000011101010100111100010111
100110110100101011010100100100011110000100010001111101101110101110011111101010011001110100000101100010111100111110101001001000010000110001000000111111100001001110100000001000111
010101000011111011111011110100010100111001110001001101100000001001111110111011011100101111010100001111000111001100000110001000110010111101
4. The random bases that were used to receive qubits that are displayed above are:
HDDDHHHHDDHHHDHDDHHHDHDHHHHDHHHDHHHHDHHDDHHDHHDHHHHDHHHDDDHDHHHHDDHHHDHHHHHHDHDHHDDHHDHHHHDHDDDDDHHHHHDDHDHDHDDDHHHHDHHHDDHHHHHHHHDHDDDHHHDHDH
DDHHHDHDDHDDHDHHHHDHDHDHHHHHDDDHDHDHHHDHDHDDHHHDDDDDHHDHHHHDHDDHHHHDHDHHDHHHHHDHDDHHHDDHHDDHHDDDDHDDDDHDHDDDHHHHHHHDHHDDHHHDHHHHHDDDHHHDHDHHHDDDDHDHHH
DDHHDHDHHHHDHDDHHDHHHDHHHHHDDDHDHDDHDHDHDHHDHHDDDDHDHHDHHHDDDDHDDDHDDDDDHHDHDDHHHDDDDDDHHDHDHHHHDHDDDDDHHHDHDHDHHHDHDDDHHDHDHHHHHDHDDDDDHHHDDH
DHDHDHDDDHHHHHDHDHDDDHHHDHDHHDHHHHHDDDDHHHHDDDDHHHHDDHHHHDHDHHHDDDHHDHHHHHHDHHHDHHHDDHHHHHDHDDDDHDDDDHHHHDHDHDHHHHDHDHDHHHHHHDHDHDHDHHHHHHDHDDDDH
HHHHHHHHHDDDHDHDDDDDDHHHHDHHHDHHDHDHHHHDDDHHDDHDHHHHDHHDHHDHHHDHDDDDDHHDHHHHHHDHDDDDHDDDDHHDHHHDHDDDDDHDHHDHDHHHHDHDHHDHDHHDHDHHDHHHHHDHDHDHDDDHH
HHDDDDDHHHDDDDHHDHDHHHHDHHHDDHHDDHDHDHDHHDHDHHHHHDHDHDDDHHDDHDHDHDDDDDDHDHDHHDDDHHHHHHDHDHDDDHHHHHHDDHHDHDDDHDHDHDHHHDHDHDHHHHHHDHDHDHDHHHHHDHHHHDHH
DDHHHDHHDHDDDDDDDDDDHHDHDHDHDHDHHHHDHDHDDDHDHDHDDDDHHHHDHDHDDDHDHHHDHHHDHHDDHHHDDDDDDHDHDHDHHDDHHHDHHHDDHHHHHDHDHHDDHDHDHHHHDHDHHHHDDDDDHDDDHHHDHHHHDDHHHD
HHHHDDDDD

5. Sending own bases for comparison.

6. Receiving Alice's basis:
DHHDHHHHDHHDHHDDHDHDHDHDDDHHHHDDDDHDDDDHHHDDDDHDDHHHHDDDDHHHDDDHHHDHDHDHDHHDDDDDHDDHHDHHDHHDHDHDDHDHDHDHDDHHDHHDHDHDHHHHHHHHDDHHHDHHHHDHHHDDHHDDDDHD
DDHDDDDDDDHHHDHHHHDDDHDHHDHHHHDHDHHDDDDHHDHHHDDDDDHDHDHDDHDDHHDHDHHHDDDDDHHHDHDDDDDHDDHHHHDDDDHHHDHHDDHDDDDDDDDHHDHHDHHHDHHDHHHHHHDHDDHDDDD
DHDHDHDHDDDHHDHHHDHHDDHHDHHHHHDDDHHDDDDDDDDDHHDHHHDHHHDHHHDHHHHHHDDHDDHDDDHHHDDDHHHHDDHDHHHHDHHHDDDHDHDHDHHHHDHDHDHHDDHHHHHHDDDDHHHHDHDHDHHDDHHHHHHDDD
HDHHDDHDHHHDDHHDHDHDDHHDDDDHDHDHHHHDDHHHHDHDHHHHDDDHDHDDDDHDDDDHDDDDDHHHHHHDHHHHHHDDDDHDHHHHHDDDDHHHDHHHHDHHDDHDHHHHDDDDHHDHHDDDHHHHDHHHHHDHDHDHHDDDDHH
DHDDDHHHHDDDDDHDDDHHHHHHDDHDHHDDHHDDDHDDHHDHHHHDHDHDDDDDHHHHHHDHHHHDHHHDHHDDHHHDDDDDDHHDDDDDHHHDHHDHDHHHHDHDDHDHHHDDHHHHHDHHDDDHDDHDHDHHDDDHDHHHHDHHHHDDDDDHHDHHDDHHHHDHHDHHHHHHDDDDHHDHDH
HDHDHDHDH

7. Finding the common bases... The common bases are:

```
___DHHH_____HHDDHDDH_HD__D_HHHD_____H_H_DD_HD_H_HH__DDHHHDDDH__HH__D_H_____H_DH__H_DHHDH_HD__D_D___HH___DHD_____HHHH_____HHHH_H_HDD_H__D___DDH__D_DD___HDH
HHHD_DHDHH_HH_D_____DH____H__DDD__HDH__HD_____H__H___D__HHHDHDD___D_H__H_DDD_HDD_HDDHDDD_____H___DHH_D___HH__DH__H_HHD_DDHD__D_____H_____H_H_HHHDDD
H__DD_D_D_DHHDHH_D_HDD_H__H_DD_D_HD___HD_D_____D___H_H_DHH__DDDH_DDD_____HDHD____H__HD_DH_H_DH_HH__D___HH_D_____HD_____H__H__H__H__D___HD_H____HH_DH_H__DD
_DH___D_H_____DD__DHH___H___HH___DDHD_HHH_DDDHHH__H__DD_H_DH__D_____HHD_D_H___HHH__H_HD_HDD_____H___H_HHHD_DD__DDD___H_H__H__D_H_DDHD_H_D___HD_D_D___H_HH__DH_
_DHHHDHD_DD_DDD_H__HH__DDD__HDHH_DH_HH_____H__HH_DH_HD_DH_H___HDHHHHHDH__DH_D__HH___D____HDD_____HH_H_HH_D_H_D__HDD_D__H_____HHH_D__HD__H__H_DH_DDDDD___DH_
DD__H___HHD_H___H_HHH_D_D_H____HD_DH_____HDDH_H_HD_DH_D_DHHDHHH_HHDDHH__H__D_____DDDD_DD__D__HD_D_DHHDH___D_H____D_D_HH_DH_H_D_H_D_H_DH__H_DDH___D____DHDHDH__D_
H__HH_DD_HHD_D__D____H_H_DH_H__D__DDH___H_D___H_DH__H_H__D_D_
```

8. Receiving valid key bits from Alice to test for the presence of Eve:
```
___1__0_____11_0_10_1___1_____0_0_0___0_0_____1__0_____1_____0___10111_0_____0_____11_____10_1_____11_0_____0_____11_____0_____0_0___1000__10_____
___10_____0__1____0_____1_0_____1__1_1_____1_0_1_1_000__1__0_____0___01_____10__11__0__1_____0_____0_____01111____11_1_0_1_0100_____0____0_10_____
_0_____00____01__0_0_____1_____1_____0_1_0_1_____11_1____0_____1_____0_10_____0__01___1_____1_____00___1_0___1_01_____
___11__0_____1_1_1___01_____1_000_____1_____01_1__00_____1_1_____1__1_0_____1____0___10____0_11___0_0_0_0_____000__1_1__01__0____1__0_____0___1_10____
1__0_____1_____1_____01_1_1__1__0__0_____0_0_____1__0__1_0__0101_____0__0_____1__1_____1_____10_0_____0__1_0_____1__1_100___0__00__1_0_____1_____
1_0__1_1_____0_____0___0_____0_1__0_____01100_____0__01_110_0__1____1_1_____0_____010_____11__0_1__1___
```

9. Sending corresponding, own bits of the key to test for Eve:
```
___0__0_____10_0_01_0___1_____1_0_0_____0_1_____1__0_____0_____0___10111_0_____0_____11_____01_1_____00_1_____0_____10_____0_____1_0___1100__11_____
___11_____0__0__0_____1_0_____1__0_1_____1_0_1_1_010__1__0_____0___11_____10__00__0__1_____0_____0_____01110____01_1_0_1_0110_____1____0_11_____
_0_____00____01__0_0_____1_____1_____0_1_0_0_____11_0____0_____1_____1_10_____0__00___1_____1_____00___0_0___1_11_____
___01__0_____0_0_1___10_____1_010_____1_____01_1__01_____1_1_____0_1_0_____1____0___10____0_11___0_0_1_0_____000__1_1__01__0____1__0_____0___1_00_____
1__1_____0_____1_____10_0_1__1__1__1_____1_0_____1__0__1_0__1101_____0__0_____1__1_____1_____10_0_____0__0_0_____1__0_100___0__00__0_0_____0_____
1_1__1_1_____0_____0___0_____1_1__0_____01110_____0__01_110_0__0____1_1_____1_____000_____11__1_1__1___
```

Alice's and Bob's test bits do not match - the qubits were tampered with! Exiting!