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CS166 - HW6

1. 26 Suppose that when a fingerprint is compared with one other (non-matching) fingerprint, the chance of a false match is 1 in 10^10, which is approximately the error rate when 16 points are required to determine a match (the British legal standard).
    a. **The false matches that will occur is: ($\frac{10^7}{10^{10}}$ *(10^5)), then (10^{-3} *(10^5)), then 10^2 .**
    b. **For any individual suspect, the chance of false match is $\frac{10^7}{10^{10}}$, then (10^{-3}) or ($\frac{1}{10^3}$) probability.**
2. 37 Suppose that a particular iris scan systems generates 64-bit iris codes instead of the standard 2048-bit iris codes mentioned in this chapter.
    a. We use the equation d(x, y) = number of non-match bits divided by number of bits compared. Therefore,
    Bob: 1001110010001011011110100001010000100101001101101001010110000100
    Alice:1011111001000011100110101101010110011000111011110101000101000111
    Non-match bits = 29. Therefore, d(Alice, Bob) = 29/64
    Alice: 1011111001000011100110101101010110011000111011110101000101000111
    Charlie: 1000100001010101001000100011001101100110100110011100110010111011
    Non-match bits = 39. Therefore, d(Alice, Charlie) = 39/64
    Bob: 1001110010001011011110100001010000100101001101101001010110000100
    Charlie: 1000100001010101001000100011001101100110100110011100110010111011
    Non-match bits= 34. Therefore, d(Bob, Charlie) = 34/64
    b. Alice: 1011111001000011100110101101010110011000111011110101000101000111
    Bob: 1001110010001011011110100001010000100101001101101001010110000100
    Charlie: 1000100001010101001000100011001101100110100110011100110010111011
    U: 1100100101110101101000100001001100101110100010011100111010101111
    V: 1101101110011010100001100111010100110100001011111110110000010101
    W:1010011000000001110011010110101011111100011001111110110010110010 1
    X: 1110111001010011110100101010000100111001101001001011111001100
    Y: 1010111110001011011011000111110101011110001111110000111110011010
    d(Alice, W) - 10/64: distance is 0.15625, so W must be Alice
    d(Bob, X) - 10/54: distance is 0.15625, so X must be Bob.
    d(Charlie, U) - 11/64: distance is 0.171875, so U must be Charlie.
    V and Y are none of the above, since their distances are near 0.5.
3. 40 In addition to the holy trinity of “something” discussed in this chapter (something you know, are or have), it is also possible to base authentication on “something you do.”
    a. **One real-world example where authentication could be based on “something you do” is body and/or hand signals authenticated by a camera; these signals could be dance move or just plain sign language combo.**
    b. **Entering an exclusive room where a person who wants to enter — swipes the ID card (something that you have) then he/she does the required sign language (something that you do).**