Lab 5 Instructions

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Hamming Distance

The *Hamming distance* between two equal length sequences is the number of positons in which they differ. That is, the Hamming distance between the two sequences "ABCD" and "AXCY" is two, because they differ in their second and fourth positions.

Base-10 Hamming Distance

Write a program `decimal_hamming.c` that reads in *two* unsigned integers with the same number of digits from the standard input stream and prints out their base-10 Hamming distance. We will define the Hamming distance in base-10 between two natural numbers to be the number of positions in which their digits differ.

For example: if the two numbers read in are "45678" and "45867" then your program would print 3 because these two numbers differ in 3 locations.

Base-2 Hamming Distance

Write a progam `binary_hamming.c` that reads in `two` unsigned integers from the standard input stream and prints out their base-2 Hamming distance. We will define the Hamming distance in base-2 between two natural numbers to be the number of positions in which their *bits* differ.

For example: if the two numbers read in are "65" and "97" then your program would print 1 because the the 32-bit fixed with binary representations of 65 and 97 respectively are

```
00000000000000000000000001000001
00000000000000000000000001100001
```

which differ in only one bit.