a. During a previous lab we had to write pseudo code on our thoughts to tackle this project. I figured out we needed to use a for loop and had to use if statements to compare the bits. Using powerpoints and other resources to learn the syntax i was able to figure out the rest of the code, and how to output it correctly.

```
section .data
    str1 db "foo", 0
    str2 db "bar", 0
    result_msg db "Hamming Distance is: ", 0
    len equ  $ - result_msg
    newline db 10, 0

section .bss
    result resb 4

section .text
global _start

_start:
    ; Initialize registers
    xor ecx, ecx
    xor edx, edx

compare_loop:
    ; Load bytes from both strings
    movzx eax, byte [str1 + ecx]
    movzx ebx, byte [str2 + ecx]

    ; Check if we've reached the end of strings
    test eax, eax
    jz end_calculation

    ; XOR the bytes to find differences
    xor eax, ebx

    ; Count bits in the result
    push ecx
    mov ecx, 8

bit_count:
    shr eax, 1
    adc edx, 0
    loop bit_count

    pop ecx
```

```
        inc ecx
        jmp compare_loop

    end_calculation:
        ; Convert result to ASCII
        add dl, '0'
        mov [result], dl

        ; Print result message
        mov eax, 4
        mov ebx, 1
        mov ecx, result_msg
        mov edx, len
        int 0x80

        ; Print result number
        mov eax, 4
        mov ebx, 1
        mov ecx, result
        mov edx, 1
        int 0x80

        ; Print newline
        mov eax, 4
        mov ebx, 1
        mov ecx, newline
        mov edx, 1
        int 0x80

        ; Exit program
        mov eax, 1
        xor ebx, ebx
        int 0x80
```

Foo and bar

```
[icox1@linux6 Projects]$ nasm -f elf32 -g Project1.asm
[icox1@linux6 Projects]$ ld -m elf_i386 -o Project1 Project1.o
[icox1@linux6 Projects]$ ls
Project1  Project1.asm  Project1.o
[icox1@linux6 Projects]$ ./Project1
Hamming Distance is: 8
```

It and if

```
[icox1@linux6 Projects]$ nasm -f elf32 -g Project1.asm
[icox1@linux6 Projects]$ ld -m elf_i386 -o Project1 Project1.o
[icox1@linux6 Projects]$ ./Project1
Hamming Distance is: 2
```

Is and if

```
[icox1@linux6 Projects]$ nasm -f elf32 -g Project1.asm
[icox1@linux6 Projects]$ ld -m elf_i386 -o Project1 Project1.o
[icox1@linux6 Projects]$ ./Project1
Hamming Distance is: 3
```