COMP 222 Computer Organization
Assignment #3—Error detection/correction

Objective:

To check a Hamming code for a single-bit error, and to report and correct the error (if any).

Inputs:

The maximum length of a Hamming code
The parity of the check bits (even=0, odd=1)
The Hamming code

Outputs:

The erroneous bit (if any)
The corrected Hamming code (if there was an error)

Specification:

The program checks a Hamming code for a single-bit error based on choosing from a menu of choices, where each choice calls the appropriate procedure, where the choices are:

a) Enter parameters
b) Check Hamming code
c) Quit

To use the Math library, use: "#include <math.h>" to access various functions, such as pow(base, exp), log(number), etc. To perform the XOR function, use the operator "^".

To use the String library, use: "#include <string.h>" to access various functions, such as strlen(string) which returns an integer representing the length of a string of characters.

If necessary, include the flag "-lm" when you compile,
i.e. **gcc asmt3_yourlastname.c –lm** to be able to utilize the math library.

What to turn in:

The source code as a single C file uploaded to Canvas (http://canvas.csun.edu) by the deadline (-20% per consecutive day for late submissions, up to the 4th day).

Sample test run

```
% ./a.out

Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: a

Enter the maximum length: 12
Enter the parity (0=even, 1=odd): 0


Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: b

Enter the Hamming code: 1000110
There is an error in bit: 6
The corrected Hamming code is: 1100110


Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: a

Enter the maximum length: 21
Enter the parity (0=even, 1=odd): 1


Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: b

Enter the Hamming code: 1000110
There is an error in bit: 1
The corrected Hamming code is: 1000111


Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: b

Enter the Hamming code: 1000111
There is no bit error


Hamming Code Error detection/correction:
---------------------------------------
a) Enter parameters
b) Check Hamming code
c) Quit

Enter selection: c
```