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:

1) Enter parity
2) Check Hamming code
3) Quit program

To use the Math library, use: "#include <math.h>" to access various functions, such as pow(base, exp), log(fnumber), 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 (not necessary using mingw), include the flag "-lm" when you compile, i.e. **gcc –o asmt3_yourlastname.c –lm** to be able to utilize the math library.

What to turn in:

Softcopy of source code submitted to http://moodle.csun.edu via the submission instructions. Be sure to name your source code: asmt3_*yourlastname*.c

Any deviation from the format for submission will result in an automatic -10%. You can use any editor and/or compiler, but make sure your code compiles and executes under the gcc compiler—otherwise you will receive 0 points for compilation and execution.

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Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 1

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


Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 2

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


Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 1

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


Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 2

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


Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 2

Enter the Hamming code: 1000111
There is no bit error

Error detection/correction:
---------------------------
1) Enter parameters
2) Check Hamming code
3) Quit

Enter selection: 3
```