CSCE 230 Computer Organization

Spring 2004
Steve Goddard

Homework 0, January 15
(Total of 50 points)

Evaluation of prerequisite knowledge

Due: 9:00pm Thursday, January 22

Individual Assignment. This is NOT a Team assignment.

50 points: This is a "simple" C programming problem to help familiarize you with some of the basic C language functions and the binary representation of numbers. The requirements are simple:

a. Your C executable program will be named `BitPattern`.

b. No input parameters on the command line will be required.

c. No C++ functions are to be used (e.g. cout, cin). Use C functions instead (e.g. printf, scanf).

d. The program will print the following to standard output (stdout), adhering to the format as shown.

```
Binary representations for the following positive integers are as follows:

          1  =  00000000  00000000  00000000  00000001
        175  =  00000000  00000000  00000000  10101111
  143165576  =  00001000  10001000  10001000  10001000
```

e. To accomplish the above, a function printBits(int ***x***) should be designed and coded, which prints the line ***x = yyyyyyyy yyyyyyyy yyyyyyyy yyyyyyyy*** , to standard output (stdout) where ***x*** is a positive integer and the series of ***y***'s represents the binary bit pattern of ***x***. Display the most significant bit to the left in the series. The format must include the right justification of the integers, 2 spaces between the integer and the equals sign, 2 spaces between the equals sign and the MSB of the bit pattern, and then 2 spaces between each group of 8 bits.

f. After the display (as described in item d) has been printed to screen, then the following 3 line prompt should be displayed:

```
Enter a positive integer in the range of   1   to   2147483647
  or
Enter 0 to quit.  →
```

One empty line should separate the last line of the initial display and the first line of the three-line prompt. If 0 is entered, then the program should terminate. If an integer in the range of 1 to 2,4147,483,647 is entered, than the bit pattern for that integer is printed to stdout after

which the above prompt is again displayed with one empty line between the bit pattern and the prompt. The format of the print out should match the first three bit patterns displayed. An example of the complete format is given below.

```
Binary representations for the following positive integers are as follows:

          1  =  00000000  00000000  00000000  00000001
        175  =  00000000  00000000  00000000  10101111
  143165576  =  00001000  10001000  10001000  10001000

Enter a positive integer in the range of   1   to   2147483647
  or
Enter 0 to quit.  → 127

        127  =  00000000  00000000  00000000  01111111

Enter a positive integer in the range of   1   to   2147483647
  or
Enter 0 to quit.  → 0
```

g. Version 3.0, dated September 3, 2003, of the JDEHP coding standard must be followed. This version is now available from the course Web site.

h. Create and turn in a Makefile that will build your executable from your source file(s).

The problem will be scored at follows:

Make File	5% (2.5 pts)
README.TXT file	5% (2.5 pts)
Program correctness	50% (25 pts)
Quality of design/readability	20% (10 pts)
In-line documentation/coding standard	20% (10 pts)

No analysis report is required, but a README.TXT file is required to explain program compilation and execution. Program correctness will be determined by the correct functionality of the program as well as adherence to format specifications.