

Source File: ~/1337/28/lab28.(C|CPP|cpp|c++|cc|cxx|cp)
Input: Under control of main function
Output: Under control of main function
Value: 2

Write a function whose prototype is given by

```
void printHexadecimal(int word, ostream& os);
```

The function writes the hexadecimal representation of `word` to output stream `os`. The function must use bit operations (using the `hex` manipulator is not allowed).

A sample `main` function for testing your function is shown in Figure 1 and a sample execution sequence is shown in Figure 2. To use the `Makefile` as distributed in class, add a target of `lab28` to `targets2srcfiles`.

```
1  #include <iostream>
2  #include <cstdlib>
3  #include <iomanip>
4  #include <bitset>
5  #include <climits>
6
7  using namespace std;
8
9  // printHexadecimal: Writes the hexadecimal representation of word to
10 // output stream os.
11 void printHexadecimal(int word, ostream& os);
12
13 // printLine: Prints a horizontal line of length hyphens to output stream os
14 void printLine(int length, ostream& os);
15
16 extern const int N = sizeof(int) * CHAR_BIT; // # of bits in an int
17
18 int main()
19 {
20     int num;
21
22     // Print heading
23     printLine(60, cout);
24     cout << setw(9) << "Decimal" << setw(24) << "Binary"
25         << setw(27) << "Hexadecimal" << endl;
26     printLine(60, cout);
27
28     while (cin >> num)
29     {
30         cout << right << setw(11) << num << setw(3) << " "
31             << bitset<N>(num) << setw(4) << " ";
32         printHexadecimal(num, cout);
33         cout << endl;
34     }
35
36     printLine(60, cout);
37
```

Figure 1. /usr/local/1337/src/lab28main.C (Part 1 of 2)

```

38     return EXIT_SUCCESS;
39 }
40
41 void printLine(int length, ostream& os)
42 {
43     char ch = os.fill();
44     os << setfill('-') << setw(length) << "-" << setfill(ch) << endl;
45 }

```

Figure 1. /usr/local/1337/src/lab28main.C (Part 2 of 2)

```

1  newuser@csunix ~> cd 1337
2  newuser@csunix ~/1337> mkdir 28
3  newuser@csunix ~/1337> cd 28
4  newuser@csunix ~/1337/28> cp /usr/local/1337/data/28/* .
5  newuser@csunix ~/1337/28> cp /usr/local/1337/src/lab28main.C .
6  newuser@csunix ~/1337/28> cp /usr/local/1337/src/Makefile .
7  newuser@csunix ~/1337/28> touch lab28.cpp
8  newuser@csunix ~/1337/28> # Edit Makefile and lab28.cpp
9  newuser@csunix ~/1337/28> make lab28
10 g++ -g -Wall -std=c++11 -c lab28main.C -I/usr/local/1337/include -I.
11 g++ -g -Wall -std=c++11 -c lab28.cpp -I/usr/local/1337/include -I.
12 g++ -o lab28 lab28main.o lab28.o -L/usr/local/1337/lib -lm -lbits
13 newuser@csunix ~/1337/28> cat 01.dat
14 0 1 -1 2 -2 1362 -1362 11259375 -11259375 2147483647 -2147483647 -2147483648
15 newuser@csunix ~/1337/28> cat 01.dat | ./lab28
16 -----
17      Decimal                Binary                Hexadecimal
18 -----
19           0  00000000000000000000000000000000  00000000
20           1  00000000000000000000000000000001  00000001
21          -1  11111111111111111111111111111111  FFFFFFFF
22           2  00000000000000000000000000000010  00000002
23          -2  11111111111111111111111111111110  FFFFFFFE
24          1362 00000000000000000000000010101010010  00000552
25         -1362 11111111111111111111111010101010110  FFFFFAAE
26        11259375 000000001010101111001101110110111  00ABCDEF
27       -11259375 11111111010101000011001000010001  FF543211
28        2147483647 01111111111111111111111111111111  7FFFFFFF
29       -2147483647 10000000000000000000000000000001  80000001
30       -2147483648 10000000000000000000000000000000  80000000
31 -----
32 newuser@csunix ~/1337/28> cat 01.dat | ./lab28 > my.out
33 newuser@csunix ~/1337/28> diff 01.out my.out
34 newuser@csunix ~/1337/28>

```

Figure 2. Commands to Compile, Link, & Run Lab 28