

Source File: ~/1337/24/lab24. (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 printQuaternary(int word, ostream& os);
```

The function writes the quaternary representation of `word` to output stream `os`.

Write a second function whose prototype is given by

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

The function writes the octal representation of `word` to output stream `os`.

A sample `main` function for testing your functions 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 `lab24` to `targets2srcfiles`.

```
1 #include <iostream>
2 #include <cstdlib>
3 #include <iomanip>
4 #include <bits.h>
5 #include <bitset>
6 #include <climits>
7
8 using namespace std;
9
10 // printQuaternary: Writes the quaternary representation of word to
11 // output stream os.
12 void printQuaternary(int word, ostream& os);
13
14 // printOctal: Writes the octal representation of word to output
15 // stream os.
16 void printOctal(int word, ostream& os);
17
18 // printLine: prints a horizontal line of length hyphens to output
19 // stream os
20 void printLine(int length, ostream& os);
21
22 extern const int N = sizeof(int) * CHAR_BIT; // # of bits in an int
23
24 int main()
25 {
26     int num;
27
28     // Print heading
29     printLine(79, cout);
30     cout << setw(9) << "Decimal" << setw(24) << "Binary"
31         << setw(29) << "Quaternary" << setw(14) << "Octal" << endl;
32     printLine(79, cout);
33
34     while (cin >> num)
35     {
36         cout << right << setw(11) << num << setw(3) << " "
37             << bitset<N>(num) << setw(3) << " ";
38         printQuaternary(num, cout);
```

Figure 1. /usr/local/1337/src/lab24main.C (Part 1 of 2)

```
39     cout << setw(3) << " ";
40     printOctal(num, cout);
41     cout << endl;
42 }
43
44 printLine(79, cout);
45
46 return EXIT_SUCCESS;
47 }
48
49 void printLine(int length, ostream& os)
50 {
51     char ch = os.fill();
52     os << setfill('.') << setw(length) << "-" << setfill(ch) << endl;
53 }
```

Figure 1. /usr/local/1337/src/lab24main.C (Part 2 of 2)

```

1 newuser@csunix ~> cd 1337
2 newuser@csunix ~/1337> mkdir 24
3 newuser@csunix ~/1337> cd 24
4 newuser@csunix ~/1337/24> cp /usr/local/1337/data/24/* .
5 newuser@csunix ~/1337/24> cp /usr/local/1337/src/lab24main.C .
6 newuser@csunix ~/1337/24> cp /usr/local/1337/src/Makefile .
7 newuser@csunix ~/1337/24> touch lab24.cpp
8 newuser@csunix ~/1337/24> # Edit Makefile and lab24.cpp
9 newuser@csunix ~/1337/24> make lab24
10 g++ -g -Wall -std=c++11 -c lab24main.C -I/usr/local/1337/include -I.
11 g++ -g -Wall -std=c++11 -c lab24.cpp -I/usr/local/1337/include -I.
12 g++ -o lab24 lab24main.o lab24.o -L/usr/local/1337/lib -lm -lbits
13 newuser@csunix ~/1337/24> cat 01.dat
14 0 1 -1 2 -2 1362 -1362 2147483647 -2147483647 -2147483648
15 newuser@csunix ~/1337/24> cat 01.dat | ./lab24
16 -----
17      Decimal                Binary                Quaternary                Octal
18 -----
19              0  00000000000000000000000000000000  0000000000000000  0000000000
20              1  000000000000000000000000000000001  0000000000000001  0000000001
21             -1  1111111111111111111111111111111111111  3333333333333333  3777777777
22              2  00000000000000000000000000000000010  0000000000000002  0000000002
23             -2  1111111111111111111111111111111111110  3333333333333332  3777777776
24             1362  00000000000000000000000010101010010  000000000111102  0000002522
25            -1362  11111111111111111111111010101011110  33333333322232  3777775256
26      2147483647  01111111111111111111111111111111111  1333333333333333  1777777777
27     -2147483647  10000000000000000000000000000000001  2000000000000001  2000000001
28     -2147483648  10000000000000000000000000000000000  2000000000000000  2000000000
29 -----
30 newuser@csunix ~/1337/24> cat 01.dat | ./lab24 > my.out
31 newuser@csunix ~/1337/24> diff 01.out my.out
32 newuser@csunix ~/1337/24>

```

Figure 2. Commands to Compile, Link, & Run Lab 24