

Source File: ~/1337/20/lab20.(C|CPP|cpp|c++|cc|cxx|cp)
Input: Under control of main function
Output: Under control of main function
Value: 1

Write a function whose prototype is

```
bool isNegative(int num);
```

The function should return `true` if the `int` argument is negative and `false` otherwise. The function must use bit operations.

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 `lab20` to `targets2srcfiles`.

```
1 #include <iostream>
2 #include <cstdlib>
3
4 using namespace std;
5
6 // Function isNegative returns true if num is negative and false otherwise
7 bool isNegative(int num);
8
9 int main()
10 {
11     int num;
12
13     while (cin >> num)
14         cout << num << " is "
15             << (isNegative(num) ? "negative" : "not negative") << endl;
16
17     return EXIT_SUCCESS;
18 }
```

Figure 1. /usr/local/1337/src/lab20main.C

```
1 newuser@csunix ~/> cd 1337
2 newuser@csunix ~/1337> mkdir 20
3 newuser@csunix ~/1337> cd 20
4 newuser@csunix ~/1337/20> cp /usr/local/1337/data/20/* .
5 newuser@csunix ~/1337/20> cp /usr/local/1337/src/lab20main.C .
6 newuser@csunix ~/1337/20> cp /usr/local/1337/src/Makefile .
7 newuser@csunix ~/1337/20> touch lab20.cpp
8 newuser@csunix ~/1337/20> # Edit Makefile and lab20.cpp
9 newuser@csunix ~/1337/20> make lab20
10 g++ -g -Wall -std=c++11 -c lab20main.C -I/usr/local/1337/include -I.
11 g++ -g -Wall -std=c++11 -c lab20.cpp -I/usr/local/1337/include -I.
12 g++ -o lab20 lab20main.o lab20.o -L/usr/local/1337/lib -lm -lbits
13 newuser@csunix ~/1337/20> cat 01.dat
14 -2147483648 -2 -1 0 1 2 2147483647
15 newuser@csunix ~/1337/20> cat 01.dat | ./lab20
16 -2147483648 is negative
17 -2 is negative
18 -1 is negative
19 0 is not negative
20 1 is not negative
21 2 is not negative
22 2147483647 is not negative
23 newuser@csunix ~/1337/20> cat 01.dat | ./lab20 > my.out
24 newuser@csunix ~/1337/20> diff 01.out my.out
25 newuser@csunix ~/1337/20> cat 02.dat | ./lab20 > my.out
26 newuser@csunix ~/1337/20> diff 02.out my.out
27 newuser@csunix ~/1337/20>
```

Figure 2. Commands to Compile, Link, & Run Lab 20