

Source File: ~/3304/lab06.(C|CPP|cpp|c++|cc|cxx|cp)
Input: Under control of main function
Output: Under control of main function
Value: 2

This assignment is based on Algorithm Workbench #9, p. 32. Write a function that receives two unsigned binary integer strings and returns a string containing the binary difference from subtracting the second from the first. Let the first argument represent the minuend and the second the subtrahend. The strings are of arbitrary length. The result should have the same length as the minuend.

A sample main function for testing your implementation is shown in Figure 1, a sample data file is shown in Figure 2, and a sample execution sequence is shown in Figure 3. To use the Makefile as distributed in class, add a target of lab06 to targets2srcfiles.

```

1  #include <iostream>
2
3  using namespace std;
4
5  string subtract(string minuend, string subtrahend);
6
7  int main()
8  {
9      string minuend, subtrahend;
10
11     while (cin >> minuend >> subtrahend)
12         cout << minuend << " - " << subtrahend << " = "
13             << subtract(minuend, subtrahend) << endl;
14
15     return 0;
16 }

```

Figure 1. /usr/local/3304/src/lab06main.C

1	10001000 101	15	1111 1100	29	1100 1
2	1000 1000	16	1111 1011	30	1100 10
3	1000 111	17	1111 1010	31	1100 11
4	1000 110	18	1111 1001	32	1100 100
5	1000 101	19	1111 1000	33	1100 101
6	1000 100	20	1111 111	34	1100 110
7	1000 11	21	1111 110	35	1100 111
8	1000 10	22	1111 101	36	1100 1000
9	1000 1	23	1111 100	37	1100 1001
10	1000 0	24	1111 11	38	1100 1010
11	0 0	25	1111 10	39	1100 1011
12	1111 1111	26	1111 1	40	1100 1100
13	1111 1110	27	1111 0		
14	1111 1101	28	1100 0		

Figure 2. /usr/local/3304/data/06/01.dat

```
1 newuser@csunix ~> cd 3304
2 newuser@csunix ~/3304> ./getlab.ksh 06
3 * Checking to see if a folder exists for Lab 06. . .No
4 * Creating a folder for Lab 06
5 * Checking to see if Lab 06 has sample input and output files. . .Yes
6 * Copying input and output files for Lab 06
7   from folder /usr/local/3304/data/06 to folder ./06
8 * Checking to see if /usr/local/3304/src/lab06main.C exists. . .Yes
9 * Copying file /usr/local/3304/src/lab06main.C to folder ./06
10 * Checking to see if /usr/local/3304/include/lab06.h exists. . .No
11 * Copying file /usr/local/3304/src/Makefile to folder ./06
12 * Adding a target of lab06 to targets2srcfiles
13 * Touching file ./06/lab06.cpp
14 * Edit file ./06/lab06.cpp in Notepad++
15 newuser@csunix ~/3304> cd 06
16 newuser@csunix ~/3304/06> make lab06
17 g++ -g -Wall -std=c++11 -c lab06main.C -I/usr/local/3304/include/ -I.
18 g++ -g -Wall -std=c++11 -c lab06.cpp -I/usr/local/3304/include/ -I.
19 g++ -o lab06 lab06main.o lab06.o -L/usr/local/3304/lib/ -lm
20 newuser@csunix ~/3304/06> ./lab06 < 01.dat
21 10001000 - 101 = 10000011
22 1000 - 1000 = 0000
23 1000 - 111 = 0001
24 1000 - 110 = 0010
25 1000 - 101 = 0011
26 1000 - 100 = 0100
27 1000 - 11 = 0101
28 1000 - 10 = 0110
29 1000 - 1 = 0111
30 1000 - 0 = 1000
31 0 - 0 = 0
32 1111 - 1111 = 0000
33 1111 - 1110 = 0001
34 1111 - 1101 = 0010
35 1111 - 1100 = 0011
36 1111 - 1011 = 0100
37 1111 - 1010 = 0101
38 1111 - 1001 = 0110
39 1111 - 1000 = 0111
40 1111 - 111 = 1000
41 1111 - 110 = 1001
42 1111 - 101 = 1010
43 1111 - 100 = 1011
44 1111 - 11 = 1100
45 1111 - 10 = 1101
46 1111 - 1 = 1110
47 1111 - 0 = 1111
```

Figure 3. Commands to Compile, Link, & Run Lab 06 (Part 1 of 2)

```
48 1100 - 0 = 1100
49 1100 - 1 = 1011
50 1100 - 10 = 1010
51 1100 - 11 = 1001
52 1100 - 100 = 1000
53 1100 - 101 = 0111
54 1100 - 110 = 0110
55 1100 - 111 = 0101
56 1100 - 1000 = 0100
57 1100 - 1001 = 0011
58 1100 - 1010 = 0010
59 1100 - 1011 = 0001
60 1100 - 1100 = 0000
61 newuser@csunix ~/3304/06> ./lab06 < 01.dat > my.out
62 newuser@csunix ~/3304/06> diff 01.out my.out
63 newuser@csunix ~/3304/06>
```

Figure 3. Commands to Compile, Link, & Run Lab 06 (Part 2 of 2)