

```
1 *****
2 *   PROGRAMMED BY : Carlos Aguilera
3 *   CLASS          : CS1B
4 *   SECTION        : MW: 7:30p - 9:50p
5 *   LAB #3         : GCD
6 *****
7
8 *****
9 *   PROGRAMMED BY : Carlos Aguilera
10 *   CLASS          : CS1B
11 *   SECTION        : MW: 7:30p - 9:50p
12 *   LAB #3         : GCD
13 *****
14
15 Enter the first integer: 74
16 Enter the second integer: 32
17
18 Enter the first integer: 99
19 Enter the second integer: 30
20
21 Enter the first integer: 48
22 Enter the second integer: 18
23
24 Enter the first integer: 12
25 Enter the second integer: 0
26
27 Thank you for using my GCD calculator!
```

```
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2 *   PROGRAMMED BY : Carlos Aguilera
3 *   CLASS          : CS1B
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6 *****
7
8 *****
9 *   PROGRAMMED BY : Carlos Aguilera
10 *   CLASS          : CS1B
11 *   SECTION        : MW: 7:30p - 9:50p
12 *   LAB #3         : GCD
13 *****
14
15 The GCD for 74 & 32 = 2
16
17 The GCD for 99 & 30 = 3
18
19 The GCD for 48 & 18 = 6
20
21 The GCD for 12 & 0 = 12
22
23
```

```
1 #pragma once
2 #include <iostream>
3 #include <ostream>
4 #include <fstream>
5 #include <sstream>
6 #include <string>
7 #include <iomanip>
8
9 void printHeader(std::ostream &output); //prints header using the ostream
  method to print to console and file
10 std::string printHeader(); //prints header using ostringstream method to print
  to console and file
11 void readValues(int &value1, int &value2); //reads to values from user by
  reference
12 int GCD(int value1, int value2); //calculates GCD of 2 values in order of
  larger and smaller
13 void handleResults(std::ostream &output, const int &value1, const int &value2,
  const int &GCD); //handles the output of results to file
```

```

1  /*****
2  *
3  * AUTHOR      : Carlos Aguilera
4  * STUDENT ID  : 1152562
5  * LAB #       : GCD
6  * CLASS       : CS1B
7  * SECTION     : M-W
8  * DUE DATE    : 02.09.22
9  *****/
10 #include "main.hpp"
11
12 /*****
13 * Title: GCD
14 * -----
15 * This program will output a GCD of 2 integers
16 * -----
17 * std::fstream outfile OUT - file variable
18 * int value1 CALC & IN - value from the user and comparison
19 * int value2 CALC & IN - value from the user and comparison
20 *****/
21
22
23 int main()
24 {
25     printHeader(std::cout);
26     std::fstream outfile;
27     outfile.open("output.txt", std::ios::out);
28     printHeader(outfile);
29
30     std::cout << printHeader(); //returns back a string and we print to the
console
31     outfile << printHeader(); //returns back a string and we write to file
32
33     int value1 {};
34     int value2 {};
35     for(size_t i {0}; i < 4; i++)
36     {
37         readValues(value1, value2); //reads to values
38         handleResults(outfile, value1, value2, GCD((value1 > value2) ? value1
: value2, (value1 < value2) ? value1 : value2)); //handles results and passes
GCD 2 values in the order of largest and then smallest
39     }
40     outfile.close();
41     std::cout << "Thank you for using my GCD calculator!\n";
42     return 0;
43 }
44
45 void printHeader(std::ostream &output)
46 {
47     /*****
48     * CONSTANTS
49     * -----
50     * OUTPUT - USED FOR CLASS HEADING
51     * -----
52     * PROGRAMMER : Programmer's Name
53     * CLASS       : Student's Course
54     * SECTION     : Class Days and Times

```

```

55     * LAB_NUM      : Lab Number (specific to this lab)
56     * LAB_NAME     : Title of the Lab
57     *****/
58 const char PROGRAMMER[] = "Carlos Aguilera";
59 const char CLASS[]      = "CS1B";
60 const char SECTION[]    = "MW: 7:30p - 9:50p";
61 const int LAB_NUM       = 3;
62 const char LAB_NAME[]   = "GCD";
63
64 /*****/
65 * OUTPUT - Class Heading
66 *****/
67 output << std::left;
68 output << "*****\n";
69 output << "* PROGRAMMED BY : " << PROGRAMMER << std::endl;
70 output << "* " << std::setw(14) << "CLASS" << ": " << CLASS << std::endl;
71 output << "* " << std::setw(14) << "SECTION" << ": " << SECTION <<
std::endl;
72 output << "* LAB #" << std::setw(9) << LAB_NUM << ": " << LAB_NAME <<
std::endl;
73 output << "*****\n\n";
74 output << std::right;
75 }
76
77 std::string printHeader()
78 {
79     /*****/
80     * CONSTANTS
81     * -----
82     * OUTPUT - USED FOR CLASS HEADING
83     * -----
84     * PROGRAMMER : Programmer's Name
85     * CLASS      : Student's Course
86     * SECTION    : Class Days and Times
87     * LAB_NUM    : Lab Number (specific to this lab)
88     * LAB_NAME   : Title of the Lab
89     *****/
90 const char PROGRAMMER[] = "Carlos Aguilera";
91 const char CLASS[]      = "CS1B";
92 const char SECTION[]    = "MW: 7:30p - 9:50p";
93 const int LAB_NUM       = 3;
94 const char LAB_NAME[]   = "GCD";
95
96 /*****/
97 * OUTPUT - Class Heading
98 *****/
99     std::ostringstream output;
100 output << std::left;
101 output << "*****\n";
102 output << "* PROGRAMMED BY : " << PROGRAMMER << std::endl;
103 output << "* " << std::setw(14) << "CLASS" << ": " << CLASS << std::endl;
104 output << "* " << std::setw(14) << "SECTION" << ": " << SECTION <<
std::endl;
105 output << "* LAB #" << std::setw(9) << LAB_NUM << ": " << LAB_NAME <<
std::endl;
106 output << "*****\n\n";
107 output << std::right;
108
109     return output.str();
110 }

```

```

1 #include "main.hpp"
2 /*****
3  * Title: readValues
4  * -----
5  * This function will read to values from the user as pass by reference
6  * -----
7  * int &value1 IN - reference to value 1 in main
8  * int &value2 IN - reference to value 2 in main
9  *****/
10
11 void readValues(int &value1, int &value2)
12 {
13     std::cout << std::left;
14     std::cout << std::setw(26) << "Enter the first integer:";
15     std::cin >> value1;
16     std::cout << std::setw(26) << "Enter the second integer:";
17     std::cin >> value2;
18     std::cout << std::right;
19
20     std::cout << "\n";
21 }

```

```
1 #include "main.hpp"
2 /*****
3  * Title: handleResults
4  * -----
5  * This function will output the results of the program to a file
6  * -----
7  * std::ostream &output OUT - output for file
8  * const int &value1 OUT    - value 1 that user entered
9  * const int &value2 OUT    - value 2 that user entered
10 * const int &GCD OUT       - GCD of the 2 values
11 *****/
12
13 void handleResults(std::ostream &output, const int &value1, const int &value2,
14 const int &GCD)
15 {
16     output << "The GCD for " << value1 << " & " << value2 << " = " << GCD <<
17     "\n\n";
18 }
```

```

1 #include "main.hpp"
2 /*****
3  * Title: GCD
4  * -----
5  * This function will return a GCD of 2 integers
6  * -----
7  * int largerValue CALC - larger value taken from user
8  * int smallerValue CALC - smaller value taken from user
9  * int remainder CALC - remainder from mod of larger and smaller value
10 *****/
11
12 int GCD(int largerValue, int smallerValue)
13 {
14     int remainder {};
15     do
16     {
17         remainder = largerValue % smallerValue; //mod to integers and store
18         remainder in remainder
19         if(remainder != 0) { //if remainder does not equal 0
20             largerValue = smallerValue;
21             smallerValue = remainder;
22         }
23     } while (remainder != 0); //once remainder equals 0 then we exit while loop
24     return smallerValue; //return current small number
25 }

```