

```
1 *****
2 *   PROGRAMMED BY : Andrew Gharios
3 *   STUDENT ID    : 1449366
4 *   CLASS         : M-Th 5-7:20p
5 *   LAB #1        : Functions - GCD
6 *****
7 *****
8 *   PROGRAMMED BY : Andrew Gharios
9 *   STUDENT ID    : 1449366
10 *   CLASS         : M-Th 5-7:20p
11 *   LAB #1        : Functions - GCD
12 *****
13 The GCD for 72 & 32 = 8
14
15 The GCD for 99 & 30 = 3
16
17 The GCD for 48 & 18 = 6
18
19 The GCD for 12 & 0 = 12
20
21
```

```
1 *****
2 *   PROGRAMMED BY : Andrew Gharios
3 *   STUDENT ID    : 1449366
4 *   CLASS         : M-Th 5-7:20p
5 *   LAB #1        : Functions - GCD
6 *****
7 *****
8 *   PROGRAMMED BY : Andrew Gharios
9 *   STUDENT ID    : 1449366
10 *   CLASS         : M-Th 5-7:20p
11 *   LAB #1        : Functions - GCD
12 *****
13 Enter the first integer: 72
14 Enter the second integer: 32
15
16 Enter the first integer: 99
17 Enter the second integer: 30
18
19 Enter the first integer: 48
20 Enter the second integer: 18
21
22 Enter the first integer: 12
23 Enter the second integer: 0
24
25 Thank you for using my GCD calculator!
```

```
1 /
    *****
    *****
2 * AUTHOR      : Andrew Gharios
3 * STUDENT ID  : 1449366
4 * AS #1      : Functions and Arrays
5 * CLASS      : CS1B
6 * SECTION    : M-TH: 5-7:20p
7 * DUE DATE   : 6/15/21
8 *****
    **/
9
10 #ifndef HEADER_H_
11 #define HEADER_H_
12
13 #include <iostream> // cin, cout.
14 #include <string>   // string datatype variables.
15 #include <fstream>  // Fstream files.
16 #include <iomanip>   // fixed, setw, setprecision.
17 #include <ostream>  // Ostream data type.
18 #include <sstream>  // Ostringstream data type.
19 using namespace std;
20
21 /
    *****
    *****
22 * Get Two Ints
23 * This function will take an input of two integers from user and pass them
24 * back to the source code by reference.
25 * ==> returns nothing.
26 *
27 *****
    **/
28 void GetTwoInts(int& int1, // IN - First Integer.
29                int& int2); // IN - Second Integer.
30
31 /
    *****
    *****
32 * Get Gcd
33 * This function will receive two integers and calculate the GCD for those
34 * two numbers.
35 * ==> returns the calculated Gcd.
36 *
37 *****
    **/
38 int GetGcd(int int1, // IN - First Integer.
39            int int2); // IN - Second Integer.
40
41 /
    *****
    *****
```

```

****
42 * Output Results
43 * This function will output the gcd of all integers inputed into the
    Output
44 * file.
45 * ==> returns nothing
46 *
47
*****
**/
48 void OutputResults(ofstream& OFile, // CALC - Output File variable.
49                  int int1,        // IN   - First Integer.
50                  int int2,        // IN   - Second Integer.
51                  int gcd);        // IN   - calculated Gcd.
52
53 /
    ****
54 * PrintHeaderFile
55 * This function will output the header information
56 *
57
*****
**/
58 void PrintHeaderFile(ostream& output, // IN - output datatype.
59                    ofstream& OFile, // OUT - Output file.
60                    string asName, // IN - assignment name
61                    int asNum, // IN - assignment number
62                    string studentName, // IN - student's name
63                    string classInfo, // IN - class that is being
    taken
64                    char asType, // IN - assignment type
65                    long long studentID); // IN - student ID
66
67 /
    ****
68 * PrintHeaderString
69 * This function will output the header information
70 *
71
*****
**/
72 string PrintHeaderString(string asName, // IN - assignment name
73                        int asNum, // IN - assignment number
74                        string studentName, // IN - student's name
75                        string classInfo, // IN - class that is being
    taken
76                        char asType, // IN - assignment type
77                        long long studentID); // IN - student ID
78
79
80 #endif

```

81

82

```
1  /
    *****
    *****
2  * AUTHOR      : Andrew Gharios
3  * STUDENT ID  : 1449366
4  * LAB #3      : Functions - GCD
5  * CLASS       : CS1B
6  * SECTION     : M-TH: 5-7:20p
7  * DUE DATE    : 6/15/21
8  *****
    ***/
9
10 #include "Header.h"
11
12 /
    *****
    *****
13 * GCD
14 *-----
    ---
15 * This program will take in two integers from the user 4 times and calculate
16 * the GCD for these two integers, and outputs each GCD into the output file.
17 *-----
    ---
18 * INPUT:
19 * int1 - first integer input by user.
20 * int2 - second integer input by user.
21 *
22 * OUTPUT:
23 * gcd - GCD of the two integers inputted.
24 *****
    ***/
25 int main()
26 {
27     /
        *****
        *****
28     * CONSTANTS
29     *
        -----
        ---
30     * OUTPUT - USED FOR CLASS HEADING
31     *
        -----
        ---
32     * PROGRAMMER : Programmer's Name
33     * CLASS      : Student's Course
34     * SECTION    : Class Days and Times
35     * LAB_NUM    : Lab Number (specific to this lab)
36     * LAB_NAME   : Title of the Lab
37     *****
        **/
}
```

```
38
39     const string AS_NAME = "Functions - GCD";
40     const int AS_NUM = 1;
41     const string STUDENT_NAME = "Andrew Gharios";
42     const string CLASS_INFO = "M-Th 5-7:20p";
43     const char AS_TYPE = 'L';
44     const long long STUDENT_ID = 1449366;
45
46     ofstream OFile; // IN & OUT - OutputFile variable.
47     int int1; // IN & CALC - First integer input by user.
48     int int2; // IN & CALC - Second integer input by user.
49     int gcd; // CALC & OUT - GCD to be calculated.
50     int index; // CALC - index for Array manipulation.
51
52     OFile.open("OFile.txt");
53
54     PrintHeaderFile(cout, OFile, AS_NAME, AS_NUM, STUDENT_NAME, CLASS_INFO,
55                     AS_TYPE, STUDENT_ID);
56     PrintHeaderFile(OFile, OFile, AS_NAME, AS_NUM, STUDENT_NAME, CLASS_INFO,
57                     AS_TYPE, STUDENT_ID);
58
59     cout << PrintHeaderString(AS_NAME, AS_NUM, STUDENT_NAME,
60                               CLASS_INFO, AS_TYPE, STUDENT_ID);
61     OFile << PrintHeaderString(AS_NAME, AS_NUM, STUDENT_NAME,
62                               CLASS_INFO, AS_TYPE, STUDENT_ID);
63
64
65     for (index = 0; index < 4; index++)
66     {
67         GetTwoInts(int1, int2);
68         gcd = GetGcd(int1, int2);
69         OutputResults(OFile, int1, int2, gcd);
70     }
71
72     cout << "Thank you for using my GCD calculator!";
73
74     OFile.close();
75
76     return 0;
77
78 }
79
80
```

```

1  #include "Header.h"
2
3  /
    *****
    ****
4  * PrintHeaderFile
5  *   This function will output the header information
6
    *
7  * PRE-CONDITIONS
8  *   The following parameters need to have a defined value prior to calling
9  *   the function
10 *
11 *       asName: The name of the assignment given in the course
12 *       asNum: The number of the assignment given in the course
13 *       studentName: The name of the student writing the code
14 *       classInfo: The course name, date, and time of the class
15 *       asType: Will either output as a lab or an assignment
16 *       studentID: The Identification Number of the student
    *****
    **/
17
18 void PrintHeaderFile(ostream& output,          // IN - output datatype.
19                     ofstream& OFile,
20                     string asName,             // IN - assignment name
21                     int asNum,                 // IN - assignment number
22                     string studentName,        // IN - student's name
23                     string classInfo,          // IN - class that is being taken
24                     char asType,               // IN - assignment type
25                     long long studentID) // IN - student ID
26 {
27     output << left;
28     output <<
        "*****\n";
29     output << "*" PROGRAMMED BY : " << studentName << endl;
30     output << "*" " << setw(14) << "STUDENT ID " << ": " << studentID <<
        endl;
31     output << "*" " << setw(14) << "CLASS " << ": " << classInfo << endl;
32     output << "*" ";
33
34     // PROCESSING - This will adjust setws and format appropriately based
35     //               on if this is a lab 'L' or assignment
36
37     if (toupper(asType) == 'L')
38     {
39         output << "LAB #" << setw(9);
40     }
41     else
42     {
43         output << "ASSIGNMENT #" << setw(2);
44     }
45     output << asNum << ": " << asName << endl;

```



```
46     output <<  
        "*****";  
47     output << right << endl;  
48  
49     return;  
50 }
```

```

1  #include "Header.h"
2
3  /
    *****
    ****
4  * PrintHeaderFile
5  *   This function will output the header information
6
7  * PRE-CONDITIONS
8  *   The following parameters need to have a defined value prior to calling
9  *   the function
10 *
11 *       asName: The name of the assignment given in the course
12 *       asNum: The number of the assignment given in the course
13 *       studentName: The name of the student writing the code
14 *       classInfo: The course name, date, and time of the class
15 *       asType: Will either output as a lab or an assignment
16 *       studentID: The Identification Number of the student
    *****
    **/
17
18 string PrintHeaderString(string asName,    // IN - assignment name
19                          int asNum,       // IN - assignment number
20                          string studentName, // IN - student's name
21                          string classInfo,  // IN - class that is being taken
22                          char asType,      // IN - assignment type
23                          long long studentID) // IN - student ID
24 {
25     ostringstream output; // CALC - Ostringstream variable.
26
27     output << left;
28     output <<
        "*****\n";
29     output << "*" PROGRAMMED BY : " << studentName << endl;
30     output << "*" " << setw(14) << "STUDENT ID " << ": " << studentID <<
        endl;
31     output << "*" " << setw(14) << "CLASS " << ": " << classInfo << endl;
32     output << "*" ";
33
34     // PROCESSING - This will adjust setws and format appropriately based
35     //               on if this is a lab 'L' or assignment
36
37     if (toupper(asType) == 'L')
38     {
39         output << "LAB #" << setw(9);
40     }
41     else
42     {
43         output << "ASSIGNMENT #" << setw(2);
44     }
45     output << asNum << ": " << asName << endl;

```

```
46     output <<  
        "*****";  
47     output << right << endl;  
48  
49     return output.str();  
50 }
```

```
1 #include "Header.h"
2
3 /
4 * Get Two Ints
5 * This function will take an input of two integers from user and pass them
6 * back to the source code by reference.
7 *
8 * INPUTS:
9 * int1 - First integer.
10 * int2 - Second integer.
11 *
12 * No Outputs.
13
14 void GetTwoInts(int& int1, // IN - First Integer.
15                int& int2) // IN - Second Integer.
16 {
17     const int INPUT_COL = 26; // CALC - Input setw size.
18
19     cout << left;
20     cout << setw(INPUT_COL) << "Enter the first integer:";
21     cin >> int1;
22     cin.ignore(10000, '\n');
23
24     cout << setw(INPUT_COL) << "Enter the second integer:";
25     cin >> int2;
26     cin.ignore(10000, '\n');
27
28     cout << right;
29     cout << endl;
30 }
```

```
1 #include "Header.h"
2
3 /
4     ****
5     * Get Gcd
6     * This function will receive two integers and calculate the GCD for those
7     * two numbers.
8     *
9     * INPUTS:
10    * int1 - First integer.
11    * int2 - Second integer.
12    *
13    * OUTPUTS:
14    * gcd - Calculated gcd.
15
16    ****
17    **/
18 int GetGcd(int int1, // IN - First Integer.
19            int int2) // IN - Second Integer.
20 {
21     int gcd; // CALC & OUT - GCD to be calculated.
22     int smaller; // CALC - Smaller integer.
23     int larger; // CALC - Larger integer.
24
25     larger = int1;
26     smaller = int2;
27
28     if (int2 == 0)
29     {
30         gcd = larger;
31     }
32
33     if (int2 != 0)
34     {
35         gcd = larger % smaller;
36         while (gcd != 0)
37         {
38             larger = smaller;
39             smaller = gcd;
40
41             gcd = larger % smaller;
42         }
43         gcd = smaller;
44     }
45 }
```

```
1 #include "Header.h"
2
3 /
4  ****
5  * Output Results
6  * This function will output the gcd of all integers inputed into the
7  * Output
8  * file.
9  *
10 * INPUTS:
11 * OFile - Output file.
12 * int1 - First Integer.
13 * int2 - Second Integer.
14 * gcd - Calculated gcd.
15 *
16 * No Ouputs.
17
18 ****
19 **/
20 void OutputResults(ofstream& OFile, // CALC - Output File variable.
21 int int1, // IN - First Integer.
22 int int2, // IN - Second Integer.
23 int gcd) // IN - calculated Gcd.
24 {
25     OFile << "The GCD for " << int1 << " & " << int2;
26     OFile << " = " << gcd << endl << endl;
27 }
```