```
*****************************************************
*   PROGRAMMED BY : Carlos Aguilera
*   CLASS         : CS1B
*   SECTION       : MW: 7:30p - 9:50p
*   LAB #3        : GCD
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Enter the first integer:  74
Enter the second integer: 32

Enter the first integer:  99
Enter the second integer: 30

Enter the first integer:  48
Enter the second integer: 18

Enter the first integer:  12
Enter the second integer: 0

Thank you for using my GCD calculator!
```

```
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*****************************************************

The GCD for 74 & 32 = 2

The GCD for 99 & 30 = 3

The GCD for 48 & 18 = 6

The GCD for 12 & 0 = 12


```

```
#pragma once
#include <iostream>
#include <ostream>
#include <fstream>
#include <sstream>
#include <string>
#include <iomanip>

void printHeader(std::ostream &output);//prints header using the ostream method to print to console and file
std::string printHeader();//prints header using ostringstream method to print to console and file
void readValues(int &value1, int &value2);//reads to values from user by reference
int GCD(int value1, int value2);//calculates GCD of 2 values in order of larger and smaller
void handleResults(std::ostream &output, const int &value1, const int &value2, const int &GCD);//handles the output of results to file
```

```cpp
/*****************************************************************************
 * AUTHOR      : Carlos Aguilera
 * STUDENT ID  : 1152562
 * LAB #       : GCD
 * CLASS       : CS1B
 * SECTION     : M-W
 * DUE DATE    : 02.09.22
 *****************************************************************************/

#include "main.hpp"

/*****************************************************************************
 * Title: GCD
 * ---------------------------------------------------------------------------
 * This program will output a GCD of 2 integers
 * ---------------------------------------------------------------------------
 * std::fstream outfile OUT - file variable
 * int value1 CALC & IN - value from the user and comparison
 * int value2 CALC & IN - value from the user and comparison
 *****************************************************************************/


int main()
{
    printHeader(std::cout);
    std::fstream outfile;
    outfile.open("output.txt", std::ios::out);
    printHeader(outfile);

    std::cout << printHeader(); //returns back a string and we print to the console
    outfile << printHeader(); //returns back a string and we write to file

    int value1 {};
    int value2 {};
    for(size_t i {0}; i < 4; i++)
    {
        readValues(value1, value2); //reads to values
        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
    }
    outfile.close();
    std::cout << "Thank you for using my GCD calculator!\n";
    return 0;
}

void printHeader(std::ostream &output)
{
   /*************************************************************************
    * CONSTANTS
    * -----------------------------------------------------------------------
    * OUTPUT - USED FOR CLASS HEADING
    * -----------------------------------------------------------------------
    * PROGRAMMER : Programmer's Name
    * CLASS      : Student's Course
    * SECTION    : Class Days and Times
```

```
    * LAB_NUM    : Lab Number (specific to this lab)
    * LAB_NAME   : Title of the Lab
    ********************************************************************/
  const char PROGRAMMER[] = "Carlos Aguilera";
  const char CLASS[]      = "CS1B";
  const char SECTION[]    = "MW: 7:30p - 9:50p";
  const int LAB_NUM       = 3;
  const char LAB_NAME[]   = "GCD";

  /*****************************************************************
   * OUTPUT - Class Heading
   *****************************************************************/
  output << std::left;
  output << "*********************************************\n";
  output << "*   PROGRAMMED BY : " << PROGRAMMER << std::endl;
  output << "*   " << std::setw(14) <<"CLASS" << ": " << CLASS << std::endl;
  output << "*   " << std::setw(14) <<"SECTION" << ": " << SECTION <<
std::endl;
  output << "*   LAB #" << std::setw(9) << LAB_NUM << ": " << LAB_NAME <<
std::endl;
  output << "*********************************************\n\n";
  output << std::right;
}

std::string printHeader()
{
   /*****************************************************************
    * CONSTANTS
    * ---------------------------------------------------------------
    * OUTPUT - USED FOR CLASS HEADING
    * ---------------------------------------------------------------
    * PROGRAMMER : Programmer's Name
    * CLASS      : Student's Course
    * SECTION    : Class Days and Times
    * LAB_NUM    : Lab Number (specific to this lab)
    * LAB_NAME   : Title of the Lab
    ********************************************************************/
  const char PROGRAMMER[] = "Carlos Aguilera";
  const char CLASS[]      = "CS1B";
  const char SECTION[]    = "MW: 7:30p - 9:50p";
  const int LAB_NUM       = 3;
  const char LAB_NAME[]   = "GCD";

  /*****************************************************************
   * OUTPUT - Class Heading
   *****************************************************************/
    std::ostringstream output;
  output << std::left;
  output << "*********************************************\n";
  output << "*   PROGRAMMED BY : " << PROGRAMMER << std::endl;
  output << "*   " << std::setw(14) <<"CLASS" << ": " << CLASS << std::endl;
  output << "*   " << std::setw(14) <<"SECTION" << ": " << SECTION <<
std::endl;
  output << "*   LAB #" << std::setw(9) << LAB_NUM << ": " << LAB_NAME <<
std::endl;
  output << "*********************************************\n\n";
  output << std::right;

    return output.str();
}
```

```cpp
#include "main.hpp"
/*******************************************************************************
 * Title: readValues
 * -----------------------------------------------------------------------------
 * This function will read to values from the user as pass by reference
 * -----------------------------------------------------------------------------
 * int &value1 IN - reference to value 1 in main
 * int &value2 IN - reference to value 2 in main
 ******************************************************************************/

void readValues(int &value1, int &value2)
{
    std::cout << std::left;
    std::cout << std::setw(26) << "Enter the first integer:";
    std::cin >> value1;
    std::cout << std::setw(26) << "Enter the second integer:";
    std::cin >> value2;
    std::cout << std::right;

    std::cout << "\n";
}
```

```cpp
#include "main.hpp"
/*****************************************************************************
 * Title: handleResults
 * ---------------------------------------------------------------------------
 * This function will output the results of the program to a file
 * ---------------------------------------------------------------------------
 * std::ostream &output OUT - output for file
 * const int &value1 OUT    - value 1 that user entered
 * const int &value2 OUT    - value 2 that user entered
 * const int &GCD OUT       - GCD of the 2 values
 *****************************************************************************/

void handleResults(std::ostream &output, const int &value1, const int &value2, const int &GCD)
{
    output << "The GCD for " << value1 << " & " << value2 << " = " << GCD << "\n\n";
}
```

```cpp
#include "main.hpp"
/*****************************************************************************
 * Title: GCD
 * ---------------------------------------------------------------------------
 * This function will return a GCD of 2 integers
 * ---------------------------------------------------------------------------
 * int largerValue CALC  - larger value taken from user
 * int smallerValue CALC - smaller value taken from user
 * int remainder CALC - remainder from mod of larger and smaller value
 *****************************************************************************/

int GCD(int largerValue, int smallerValue)
{
    int remainder {};
    do
    {
        remainder = largerValue % smallerValue; //mod to integers and store remainder in remainder
        if(remainder != 0) {//if remainder does not equal 0
            largerValue = smallerValue;
            smallerValue = remainder;
        }
    } while (remainder != 0);//once remainder equals 0 then we exit while loop

    return smallerValue;//return current small number
}
```