45 pts

Name: _____

Class Day / Time: _____

Due Date: _____

Assignment #5 – Assembly - Greatest Common Divisor (GCD)

In this assignment you will create and implement a procedure to calculate the Greatest Common Divisor (GCD) for a pair of integer numbers.

Greatest Common Divisor

In mathematics, the greatest common divisor (GCD) of two or more integer numbers (when at least one of them is not zero) is the largest positive integer number that divides the numbers without a remainder. If one of them is **zero** then the larger value is the GCD.

The **GCD algorithm** involves integer division in a loop, described by the following C++ code:

```
int GCD (int x, int y)
{
      x = abs(x);                 // absolute value of x
      y = abs(y);                 // absolute value of y
      do
      {
         int n = x % y;
         x = y;
         y = n;
      } while (y > 0);
      return x;
}
```

Implement this function in assembly language and write a test program that calls the function. You function will need to handle the case where one of input numbers is zero. The program will perform the following steps:

1) You will **input two integers** from the console and store them in memory. Label the memory locations for the integers as *inputNum1* and *inputNum2*.
2) Call the procedure GCD passing the two integer numbers and obtain the GCD as return. Store the result in another integer; label the memory location for this integer as ***opResult***.

3) Once the procedure returns to the main program, **output the resulting integer** (*opResult)* to the console.

Draw a flowchart and **write the corresponding assembly language program** in the flowchart for the program you are implementing. It is not necessary to indicate memory locations in the flowchart, but include **all the variable** declaration as part of the flow chart.

Implement the program; test the program a number of times with different pair of input numbers. You will need to turn in **four** test runs for the program:

Use the following inputs for turning in the assignment:
74, 32
99, 30
48, 18
12, 0

Turn in (STAPLED IN THIS ORDER)

1. The **FIRST PAGE** of this assignment as a coversheet
2. Include the **flowchart** properly documented. The listing of **.asm source code** properly documented.
3. The **four** output from the program, either pasted into .asm source code or using print screen.