ESc101N: Fundamentals of computing(Lab Session 3)

August 18, 2009

Instructions

1. Please read the question carefully and write the program accordingly

2. Make sure that the TA has graded you program

3. The marks are distributed as follows. You get 60% of the marks if the basic algorithm is current, 20% if you manage to compile and execute and 20% for writing the code cleanly, i.e. using proper variable names, intending and making the code more readable.

Question 1. Use Euclid's algorithm i.e. the fact that $gcd(m, n) = gcd(n, m \mod n)$ to write the following

   (a) (5 marks) Write an iterative, i.e. using loops, function `int gcd(int m, int n)` to compute the gcd of two numbers.

   (b) (5 marks) Write a recursive function `int gcdRec(int m, int n)` to compute the gcd of two numbers.

      Make sure that your algorithm works even when m and n are negative integers. Also there is no gurantee on which of m or n is the larger number; your function should be correct even if $m < n$ or $m > n$.

The sample output is given below

```
$ ./a.out
enter the number m: 9
enter the number n: 12
gcd(9, 12) is given by
        Iterative: 3
        Recursive: 3
$
```

Question 2. (0 marks) This question is for those who have completed the Question 1. There are no marks for this question, however it illustrates how to compile functions seperately.

Try out separate compilation that was discussed in the class today. Write the definitions of functions `int gcd(int, int)`, `int gcdRec(int, int)` and the main function `int main(void)` in files `gcd.c`, `gcdRec.c` and `main.c` respectively. Compile/Debug them separately and link them together to obtain the executable.