THE UNIVERSITY OF THE WEST INDIES
Department of Computing
COMP1126–Introduction to Computing I
Tutorial 3B

Question 1

The mathematical `factorial` function is defined as being the product of all the numbers up to and including the argument, and the factorial of 1 is 1. Thinking about this, we see that another way to express this is that the factorial of N is equal to N times the factorial of (N-1).
Thus,

```
1! = 1
2! = 2 x 1! = 2 x 1 = 2
3! = 3 x 2! = 3 x 2 x 1! = 3 x 2 x 1 =6
N! = N x (N-1)!= N x (N-1) x (N-2)! = N X (N-1) x (N-2)..1
```

Write a recursive function `factorial` in python which calculates the factorial of a number given as input.

Question 2

Write a recursive function in python that takes a number as argument and returns the sum of all even numbers between 1 and x.

Question 3

Write a recursive function in python which calculates the greatest common divisor of two integers i.e. the largest integer that divides both a and b with no remainder. For example, the GCD of 16 and 28 is 4. The method for computing GCD is the Euclid's algorithm. It is based on the observation that, if r is the remainder when a is divided by b, then the common divisor of a and b are precisely the same as common divisors of b and r. Thus we can use the equation:

gcd(a,b)= gcd(b,r)

For example,

gcd(206,40) = gcd(40,6)
= gcd(6,4)
= gcd(4,2)
=gcd(2,0)
=2

where 2 is the gcd of 206 and 40.