Math 211 - Spring 2006-2007
Maple Assignment 2

Due date: May 10, 2007

Important Instructions:

- Students are allowed to work in groups consisting of **at most 3** students.
- Students will be interviewed based on which the assignment grades will be finalized
- Assignment submissions should be on Moodle
- Penalty of 20 points per day after May, 10 2007
- If you have any question pass by bliss 206 Tuesday and Thursday anytime between 11:00 and 2:00

Exercise 1. Write a procedure **CompositeNumbers(n)** which takes as input an integer n and prints all the composite numbers less than n.
Test the procedure and save the results.

Exercise 2.

1. Write a procedure **PrimeFactors1(n)** which takes as input an integer n and returns a set containing all the prime numbers which divide n.

   For example:

   - PrimeFactors1(10) should return $2, 5$
   - PrimeFactors1(396) should return $2, 3, 11$
   - PrimeFactors1(5940) should return $2, 3, 5, 11$

2. Write a procedure **PrimeFactors2(n,A)** which takes as input an integer n and a set A containing the result returned by **PrimeFactors1(n)** and returns a new set containing the multiplicity of each of the elements of A.

   For example:

- PrimeFactors2(10,PrimeFactors1(10)) should return $1, 1$ since $10 = 2^1 * 5^1$
- PrimeFactors1(396,PrimeFactors1(396)) should return $2, 2, 1$ since $396 = 2^2 * 3^2 * 11^1$
- PrimeFactors1(5940,PrimeFactors1(5940)) should return $2, 3, 1, 1$ since $5940 = 2^2 * 3^2 * 5^1 * 11^1$

3. Write a procedure **myLCM(a,b)** which takes as input two integers a and b and returns their least common multiple by using **PrimeFactors2**.
4. Write a procedure **myGCD(a,b)** which takes as input two integers a and b and returns their greatest common divisor by using **PrimeFactors2**.
5. Test each procedure and compare your results with the built-in **gcd** and **lcm** functions of Maple.

Exercise 3. Let $P(n) = P(n-1) + n^2$ with $P(1) = 1$

1. Write an iterative procedure **myIterativeEval(n)** which takes as input an integer n and returns the value of $P(n)$.
2. Write a recursive procedure **myRecursiveEval(n)** which takes as input an integer n and returns the value of $P(n)$.
3. Test each procedure twice

Note. For the first two problems use the following functions of Maple:

1. isprime(n) - takes as input an integer n and returns true if n is prime and false if not.
2. nextprime(n) - takes as input an integer n and returns the next largest prime.
3. mod(a,b) - takes as input two integers and returns the remainder computed upon dividing a by b.

GOOD LUCK ⌣