CMS   C 641
Homework 2

Reading Assignment:
- Listen to Vivaldi's Le Quattro Stagioni (The Four Seasons)
- Read Chapter 31 of text and Chapters 0 to 2 of Algorithms by DPV

Homework:

1)

a) What is $2^{\left(2^{2006}\right)} \pmod{3}$? Why?

b) Determine whether or not $5^{30,000} - 6^{123,456}$ is a multiple of 31. Why?

2) Find a necessary and sufficient condition on x and c such that
$$ax \equiv bx \pmod{c} \Rightarrow a \equiv b \pmod{c}$$

3) Find the modular inverse of each of the following integers if it exists. If it does not exist, then state why.
a) $20 \pmod{79}$
b) $3 \pmod{62}$
c) $21 \pmod{91}$
d) $5 \pmod{23}$

4) Compute $GCD(210, 588)$ by factoring.

5) Use the Extended Euclidean Agorithm to find $d = GCD(210, 588)$ and integers x and y such that $d = 210x + 588y$. Display your work in the same table format as given in the class handout on the Extended Euclidean Algorithm.