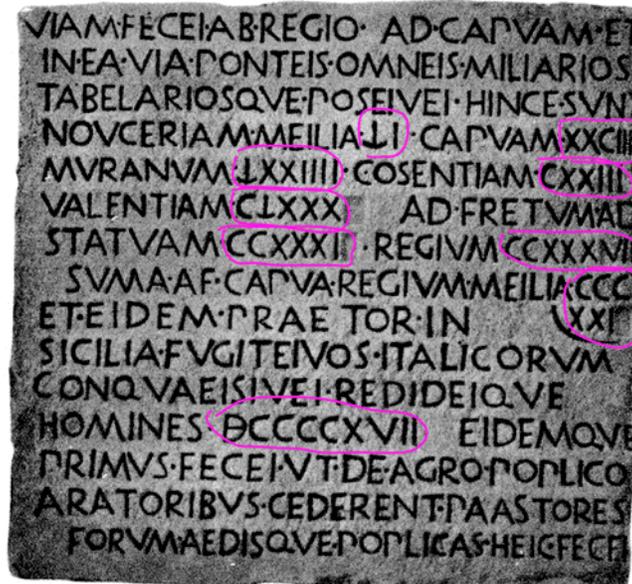


**GEK1536, Computation and Machine, Tutorial 4**  
(For week 6 starting 13 Feb 06)

1. Write the following numbers in the Greek Attic notation:  
(a) 78            (b) 809            (c) 1734            (d) 15809
  
2. Write the following numbers in Greek alphabetic numerals:  
(a) 8            (b) 17            (c) 365            (d) 903
  
3. Hebrew has a system similar to the Greek Attic notation. In it, the numbers are assigned letters as follows:  
א (1), ב (2), ג (3), ד (4), ה (5), ו (6), ז (7), ח (8), ט (9),  
י (10), כ (20), ל (30), מ (40), נ (50), ס (60), ע (70), פ (80), צ (90),  
ק (100), ר (200), ש (300), ת (400), י (500), ק (600), ר (700), ש (800),  
ת (900).  
With that, decide the value of the following symbols  
(a) א י            (b) ט מ            (c) ה ס ש            (d) ד י
  
4. Using the Euclidean algorithm, compute the greatest common divisors of the following pair of numbers:  
(a) 60, 12            (b) 1906, 278            (c) 987, 1597
  
5. (a) Given 3 integers, how can we compute the greatest common divisor of them all? I.e., compute  $\text{GCD}(a,b,c)$  which is the largest number that divides both  $a$ ,  $b$ , and  $c$ . Give at least two methods. (b) Compute  $\text{GCD}(60,12,1906)$ .
  
6. What is  $\text{GCD}(0,10)$ ? What is a sensible definition for  $\text{GCD}(0,0)$ ?
  
7. Make a Roman-type counting board with an A4 size paper or whatever convenient materials, and 30 or 40 some seeds, or pebbles, or stones as counters. Bring them to the tutorial class. Use them to compute the following Roman numeral arithmetic:  
(a) MMDCCCLXVII + MDCXXXIII  
(b) MMMCCLXI – MCXXVII  
(c) CXXXVII × XXXI  
(Well, you can draw your steps on paper.)

**Home Work** (*hand in the following week tutorial, after the term break*)

8. **(Homework)** The inscription on a Roman milestone in Latin on the Via Popilia in Lucania dated around 130 BC has nine numbers circled in red. Translate them in modern Hindu-Arabic notation. Take note that L (50) is written as inverted T.



9. **(Homework)** After you have read Prof Lam Lay Yong's paper on Chinese rods posted as reading materials for week 5, draw a sequence of figures to show the steps of the following computation with the Chinese rods on checker board. Of course, you need to translate the Hindu-Arabic numerals into the rod representation first.

(a)  $23 \times 87$

(b)  $6782 \div 19$