# do not take natural language *too* seriously

Freek Wiedijk
Radboud University Nijmegen

Seminar Formal Mathematics
University of Bonn

2007 04 17, 13:00

**C:** `i++;`

**Cobol:** `ADD 1 TO i.`

**HyperTalk:**

```
function delimitedSum theList, listDelimiter
  put the itemDelimiter into storedDelim -- save itemDelimiter for restore
  if listDelim is empty then put comma into listDelimiter -- like 'sum'
  else set the itemDelimiter to char 1 of value(listDelimiter) -- UNlike 'sum'
  put 0 into sumOfItems
  repeat with i = 1 to number of items in theList
    add value(item i of theList) to sumOfItems -- try to convert to a number
  end repeat
  set the itemDelimiter to storedDelim -- restore itemDelimiter
  return sumOfItems
end delimitedSum
```

*making a programming language looks like natural language is a silly idea*

## formulas

Deducito tertiam partem numeri rerum ad cubum, cui addes quadratum dimidij numeri æquationis, & totius accipe radicem, ſcilicet quadratam, quam ſeminabis, uniqꝫ dimidium numeri quod iam in ſe duxeras, adijcies, ab altera dimidium idem minues, habebisqꝫ Binomium cum ſua Apotome, inde detracta ℞ cubica Apotomæ ex ℞ cubica ſui Binomij, reſiduũ quod ex hoc relinquitur, eſt rei ęſtimatio.

solutions of $x^3 + px = q$:

**modern style:**

$$x = \sqrt[3]{\frac{q}{2} \pm \sqrt{\left(\frac{q}{2}\right)^2 + \left(\frac{p}{3}\right)^3}} - \sqrt[3]{-\frac{q}{2} \pm \sqrt{\left(\frac{q}{2}\right)^2 + \left(\frac{p}{3}\right)^3}}$$

**ancient style** (Gerolamo Cardano, *Ars magna*, Nürnberg, 1545)**:**

> Cube the third part of the number of unknowns, to which you add the square of half the number of the equation, and take the root of the whole, that is, the square root, which you will use, in the one case adding the half of the number which you just multiplied by itself, in the other case subtracting the same half, and you will have a binomial and apotome respecitvely; then subtract the cube root of the apotome from the cube root of the binomial, and the remainder from this is the value of the unknown.

Bertrand's postulate:

**HOL Light:**

```
!n. ~(n = 0) ==> ?p. prime p /\ n <= p /\ p <= 2 * n
```

$$\forall n.\, n \neq 0 \Rightarrow \exists p.\ \text{prime}\ p \wedge n \leq p \wedge p \leq 2 \cdot n$$

**Mizar:**

```
for n being Element of NAT st n>=1 holds
  ex p being Prime st n<p & p<=2*n
```

For all $n$ being an element of the natural numbers such that $n \geq 1$ holds that there exists a $p$ being prime such that $n < p$ and $p \leq 2n$.

# submarines aren't fishes