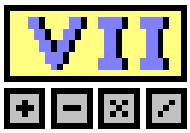
NUMERUS v2.0

22 October 2004



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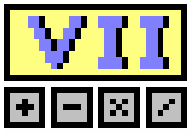


What is Numerus?

Numerus is a basic standard 4 functions calculator (addition, subtraction, multiplication, division) for the PDA running with Palm OS as an operating system. So, where is the difference? Well, Numerus works with Roman numerals!

Numerus accepts numbers in the range {0..99999}, which makes of it the most powerful Roman numerals calculator so far, as the other eccentric folks that programmed a Roman numerals calculator stopped at the 'normal' limit of 4999 for this numbering system. This limit of 99999 is not a technical limit. Numerus could work with higher numbers, but the screen size of the PDA devices limits in displaying numbers longer than 88888, or LXXXVIII.M DCCCLXXXVIII (the numbers higher than 88888 and lower than 99999 are shorter in Roman numerals).

I invite you to read carefully the explanations given in the chapter devoted to the description of the Roman numerals system. It twill surely help most of you to remember the principles in Roman numerals numbering. Therefore, it will alert you on the fact that there is a very interesting designing work for transcribing this numbering system into a program code. That was all the fun I had when developing this program and I hope that you will have some too when using it.

Contact Information

- ✓ World Wide Web main download Site : http://www.aldweb.com
- ✓ Author e-mail : info@aldweb.com

Numerus is free to use. However, if you like it, please consider making a donation to show your support. Any amount will be greatly appreciated.
To proceed, just connect to:

http://give.aldweb.com (secured PayPal transaction)

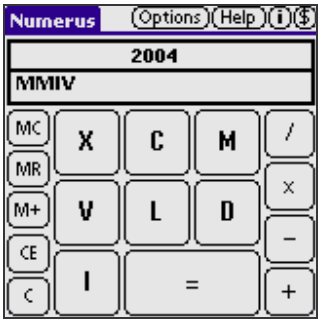
How to install Numerus?

Numerus is a PRC file that is installed like any other Palm file using HotSync.
So, extract **Numerus.PRC** from the ZIP archive file.
Double-click on it and the Palm install tool will popup.
Numerus.PRC will be transferred to your Palm device next time you synchronize your Palm with your PC with HotSync.

Avoid installing the current version of Numerus over a previous one. I do not guarantee that it will work fine doing so. Please, uninstall any previously installed version of Numerus before installing this one.

- ✓ **Minimum Palm OS requirement for Numerus is version 3.0**
- ✓ **Numerus is Palm OS version 5 and version 6 compliant**

How to use Numerus?



The use of Numerus is quite intuitive as it behaves just like any other basic calculator, having the standard four basic operations keys and the reserve memory management keys. Only the standard numerals (from 0 to 9) are replaced with the Roman numerals in a logical way.

The double display of both standard numbers and Roman ones helps you (and me as well!) to easily translate the numbers into Roman numbers (it was almost easier to move from French Franc to Euro than to translate Roman numbering to our usual numbering!).

The different menu options (buttons in the top bar) are obvious so they will not be detailed here except for the way of keying in Roman numerals: Numerus lets you choose between two ways of keying in the Roman numerals: either by using an “additive” method or a so called “natural” method.

The “additive” method

Numerus adds the Roman numerals as you input them.
For example, if you key in :

- X and then V and then I you will get X + V + I = XVI = 16 as a result
- V and then X and then I you will get V + X + I = 16 = XVI as a result (and not VXI which, by the way, is not a valid Roman numeral)

This method might seem to be not very native. But, it allows inputting the different digits in any order without wondering of the real order (from the highest to the lowest).

The “natural” method

Numerus will check that you input a valid number.
For example, if you key in V and then X, the entry will be refused because VX is not a valid Roman number.
Numerus will also assist you in your input.
For example, if you key in IIII it will replace it with the more common IV value.

Please, read the paragraph underneath for a full understanding of the rules that Roman numerals follow.

The Romans numerals

The objective of this chapter is to quickly show you, and not in an exhaustive way (unfortunately, I wished I had more time to write a better text!), the genius that Romans of the antic Rome had to invent and use this numbering system, but also all its complexity… which is therefore not easy to code in a program. The reading of the source code which I also post for free should be rich for you if you take the time to read it.

The Romans used seven alphabet letters by affecting them a value:

I	=	1
V	=	5
X	=	10
L	=	50
C	=	100
D	=	500
M	=	1000

History

The history of Roman numerals is not well documented. There are various and contradictory hypothesis. It is anyway possible that the people started to count using their fingers which would explain why we count using a 10 basis. The I letter would then symbolize one finger, the V letter could symbolize the shape of a hand, and the X letter could symbolize two crossed hands. The X letter could as well symbolize two V letters put upside down.

Basic conversion and numbering principles

Even though the practice has changed over time, the “modern” convention has been that, to interpret a number in Roman numerals into Arab numerals, we operate by successive additions from left to right when a letter is superior or equal to the previous one.
Examples:

VIII = 5 + 1 + 1+ 1 = 8
LXVII = 50 + 10 + 5 + 1 + 1 = 67
MMII = 1000 + 1000 + 1 + 1 = 2002

On the opposite, to transcribe a number in Arab numerals (our classical 0, 1, 2, 3, 4, 5, 6, 7, 8 et 9), we split the number into multiples of Roman numerals.
Example:

61 = 50 + 10 + 1 = LXI

To this basis principle, were added over time, but not in a systematic way, some rules with the aim of shortening the length of the generated numbers.

A well known rule of the “modern” numbering, but which is also often confusing, is the subtraction principle which states that a smaller Roman numeral being put just before a higher one is subtracted from the next one and not added to the total.
Examples:

IX = 1 – 10 = 9
XIX = 10 + (1 – 10) = 9 instead of 21 which is written XXI (10 + 10 + 1)

Three sub rules govern this way of doing:

- Only I, X and C can be used this way, not V, L and D, as well as M which is the highest Roman numeral.
- One numeral only can be placed at the left hand side of the numeral from which it is subtracted. For example, 18 cannot be written XIIX but XVIII.
- The subtracted number must be at most equal to the one tenth of the value of the number from which it is subtracted. For example, X can be placed at the left hand side of a C or a L, but not of a M or a D. Then, 49 is written XLIX and not IL.

It is also common not to repeat in a consecutive way the V, L and D (5, 50 and 500) values in a same number.
Example:

X rather than VV for 10.

Another “modern” convention is to avoid the occurring of the same letter more than three times, by choosing the shorter version obtained by the sub contraction rule.
Examples:

IV rather than IIII for 4
XL rather than XXXX for 40
CD rather than CCCC for 400

One exception is the M number (which stands for 1000) which is used four times to symbolize the 4000 numbers as the Romans had no letter to symbolize values higher than M.

All these rules give a limit to the usefulness of the subtraction principle to reduce the length of Roman numerals. Nevertheless, year 2000 is symbolized by the short MM when the previous year, being 1999, is symbolized by the harder to decrypt MCMXCIX.

Not a very rigorous numbering system…

As already written, we can find many exceptions to these rules, at all times of the antic Rome. Let's illustrate this with a beautiful example:

The Colosseum (built between 70 and 80 after Jesus Christ and known as the Flavian Amphitheatre, it could host 55000 seated people!) had 80 arches among which 76 are numbered (the 4 main ones were not numbered). Today, only remain the arches numbered between 23 and 54. As a matter of fact, the numbers do not use the IV (for 4) or IX (for 9) contractions. So, the arch number 29 is XXVIIII and the arch number 54 is LIIII. But, the XL (for 40) contraction is used and arch number 44 is XLIIII.

Note: Numerus follows all the modern rules.

The case of numbers higher than 4999

As already said, M is the highest Roman numeral. It is tolerated to add it four times to get number 4000. So, the highest number is: MMMMCMXCIX = 4999

But it was of course needed from time to time to write higher numbers, and the Romans never normalized the writing of higher numbers.

Here are a few examples of how to write 5000:

V̄
VM
V.M
|))
V (|)

And some ways to symbolize 10000:

X̄
XM
X.M
((|))
X (|)

Note: it was arbitrarily decided to choose the n.M symbolic representation in Numerus, where n is any integer number. Then, n.M will mean «n thousands». For example, VII.M CLIII will be the number 7153.