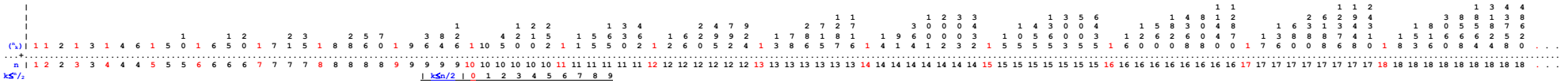
The Binomial Slide Rule by *István Szalkai*, Veszprém, Hungary, szalkai@almos.uni-pannon.hu , **2017.05.24**.
http://math.uni-pannon.hu/~szalkai/Binom-lec4.docx ,
http://math.uni-pannon.hu/~szalkai/Binom-lec4.pdf



Description and use

The **binomial coefficients** $\binom{n}{k} := \frac{n(n-1)\dots(n-k+1)}{k!}$ are defined for all natural numbers $n,k\in\mathbb{N}$, $0\le k\le n$.

By the *symmetry property* $\binom{n}{k} = \binom{n}{n-k}$ we have to compute their values only for $0\le k\le n/2$.

The slide rule above contains *three scales*: the scales denoted by "**$\binom{n}{k}$**" and by "**n**" are on the stator, the third one (below the dotted line), denoted by "**$k\le n/2$**" is on the slide. The digits of the numbers on the *first scale* are printed *vertically*, e.g. the three digits `1,2,6` above the last `9` (just before the red `10`) represent the number `126`.

To compute $\binom{n}{k}$ choose first n, say 10. Move the slide (scale "**$k\le n/2$**") so that the **0** sign on it would be exactly under the *first*, red **10** sign of scale "**n**", as it shown now on the slide rule. Now you can read the values $\binom{10}{k}$ above, on the top scale "**$\binom{n}{k}$**" as: $\binom{10}{0}=\binom{10}{10}=1$, $\binom{10}{1}=\binom{10}{9}=10$, $\binom{10}{2}=\binom{10}{8}=45$, $\binom{10}{3}=\binom{10}{7}=120$, $\binom{10}{4}=\binom{10}{6}=210$ and $\binom{10}{5}=252$. You may also imagine brackets around the figures on scales "**n**" and "**$\binom{n}{k}$**" to see "$\binom{10}{k}$" printed on the slide rule. (Clearly you can *not* use values of k under the next (red or black) $n+1$, i.e. for $k>n/2$.)

When using a text editor, you are able to *move* the slide with scale "**$k\le n/2$**" by deleting/inserting spaces from/to the line "**$k\le n/2$**" (since the font used is not proportional).

Further, using smaller font size the above slide rule can be extended for n larger than `18`.

Have a nice time, and let me know any comment you have!

István