

## Re: Non-random numbers generated by excel's data analysis random gener

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*Source:*

<http://www.tech-archive.net/Archive/Excel/microsoft.public.excel.worksheet.functions/2005-09/msg02303.html>

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- *From:* [joeu2004@xxxxxxxxxxxxx](mailto:joeu2004@xxxxxxxxxxxxx)
  - *Date:* 14 Sep 2005 02:23:05 -0700
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Allie wrote:

- > I've been trying to generate random numbers using excel's random number generator in the analysis toolpak. I'm using Uniform number generation between 0 and 1, and I am using a random seed, as I would like to be able to re-generate the same numbers in the future.
- >
- > Using seeds from 1 to 10, when i fill a range of 16 cells with random numbers, the first cell filled is always the lowest. This is an extremely unlikely circumstance with a true RN generator.

Not at all.

First, because you are seeding the RNG, it is not "a true RNG" at all. The sequence is predictable and repeatable, which is your intention.

Second, if we knew the RNG algorithm, it might not be surprising at all that a low seed (1 to 10) might generate a very low number initially, perhaps even the lowest value a small set (16) of numbers.

In fact, if you increase the set to 100 with a seed of 10, the first number is not the smallest. The same is true of a set of 16 numbers if you choose a large seed, e.g. 10000.

MS Excel documentation should offer some guidance for choosing a seed. It can greatly affect not only the range of numbers generated, but also the apparent randomness (distribution over the range) of at least the first small set of numbers. I do not find any such guidance in the Help text.

In any case, all of this is common to all RNGs. An RNG simply uses a recursive mathematical formula. For example, a linear congruential method might use

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the formula  $X[n+1] = (a * X[n] + c) \bmod m$ , where  $X[0]$  is the seed or a deterministic function of the seed (apparently the latter for the ATP RNG, since its seed must be an integer), and  $a$ ,  $c$  and  $m$  are chosen by the RNG designer, hopefully based on the plethora of research literature on the subject. For an introduction, see Knuth, Art of Computer Programming, vol 2 (Seminumerical Algorithms).

I hope this gives you some insight into your observation. If it bothers you (I don't know why it would), choose a different seed or generate a larger set of numbers.

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• **Follow-Ups:**

- ◆ **Re: Non-random numbers generated by excel's data analysis random gener**  
◇ From: D Hilberg

• **References:**

- ◆ **Non-random numbers generated by excel's data analysis random gener**  
◇ From: Allie

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