

Генерация псевдослучайных чисел (линейный конгруэнтный метод)

Формула:

$$X_{n+1} = (aX_n + c) \bmod m,$$

Примеры аргументов

| Source | <i>m</i> | множитель <i>a</i> | слагаемое <i>c</i> | используемые биты |
|---|-----------------|--------------------|--------------------|--|
| Numerical Recipes [9] | 2 ³² | 1664525 | 1013904223 | |
| Borland C/C++ | 2 ³² | 22695477 | 1 | bits 30..16 in <i>rand()</i> , 30..0 in <i>lrand()</i> |
| glibc (used by GCC) [10] | 2 ³¹ | 1103515245 | 12345 | bits 30..0 |
| ANSI C: Watcom, Digital Mars, CodeWarrior, IBM VisualAge C/C++ [11] | 2 ³¹ | 1103515245 | 12345 | bits 30..16 |

| | | | | |
|--|--------------|---|---|------------------------------|
| C99, C11: Suggestion in the ISO/IEC 9899[12] | 2^{32} | 1103515245 | 12345 | bits 30..16 |
| Borland Delphi, Virtual Pascal | 2^{32} | 134775813 | 1 | bits 63..32 of (seed * L) |
| Microsoft Visual/Quick C/C++ | 2^{32} | 214013 (343FD ₁₆) | 2531011 (269EC3 ₁₆) | bits 30..16 |
| Microsoft Visual Basic (6 and earlier)[13] | 2^{24} | 1140671485 (43FD43FD ₁₆) | 12820163 (C39EC3 ₁₆) | |
| RtlUniform from Native API [14] | $2^{31} - 1$ | 2147483629 (7FFFFFFD ₁₆) | 2147483587 (7FFFFFFC ₁₆) | |
| Apple CarbonLib, C++11's <code>minstd_rand0</code> [15] | $2^{31} - 1$ | 16807 | 0 | see MINSTD |
| C++11's <code>minstd_rand</code> [15] | $2^{31} - 1$ | 48271 | 0 | see MINSTD |
| MMIX by Donald Knuth | 2^{64} | 636413622384679 3005 | 144269504088896 3407 | |
| Newlib | 2^{64} | 636413622384679 3005 | 1 | bits 63...32 |
| VAX's MTH\$RANDOM , [16] old versions of glibc | 2^{32} | 69069 | 1 | |
| Java | 2^{48} | 25214903917 | 11 | bits 47...16 |
| Ранее во многих компиляторах: | | | | |
| RANDU | 2^{31} | 65539 | 0 | |

Ссылки

<https://habr.com/ru/post/132217/>

<https://www.youtube.com/embed/-qLMTB61ZSs>

Пример кода с проверкой цикличности неповторяемого блока:

```
#include <stdio.h>

unsigned long int seed = 1;
unsigned int lcg() {
    int a = 433494438;
    unsigned int m = 99999989;
    seed = seed * a % m;

    return seed;
}

int main() {
    unsigned int r = lcg();
    unsigned int n = 1;
    while (lcg () != 433494438) {
        n++;
    }
    printf("%d\n", n);

    return 0;
}
```

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