

Re: Bell-curve distribution wanted

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This is from the C-FAQ:

13.20: How can I generate random numbers with a normal or Gaussian distribution?

A: Here is one method, recommended by Knuth and due originally to Marsaglia:

```
#include <stdlib.h>
#include <math.h>

double gaussrand()
{
    static double V1, V2, S;
    static int phase = 0;
    double X;

    if(phase == 0) {
        do {
            double U1 = (double)rand() / RAND_MAX;
            double U2 = (double)rand() / RAND_MAX;

            V1 = 2 * U1 - 1;
            V2 = 2 * U2 - 1;
            S = V1 * V1 + V2 * V2;
        } while(S >= 1 || S == 0);

        X = V1 * sqrt(-2 * log(S) / S);
    } else
        X = V2 * sqrt(-2 * log(S) / S);

    phase = 1 - phase;

    return X;
}
```

See the extended versions of this list (see question 20.40) for other ideas.

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References: Knuth Sec. 3.4.1 p. 117; Marsaglia and Bray,
"A Convenient Method for Generating Normal Variables";
Press et al., *Numerical Recipes in C* Sec. 7.2 pp. 288–290.