

## Simulating the random walk with a computer

The source code in C.

```
#include <stdio.h>

#define EXPERIMENTS 10000

int main()
{
    int ibm, t, tmax, d, dist, sqdist, r , i, average;
    int results[EXPERIMENTS];
    float av_result;
    ibm = 271279;
    d = 1;
    dist = 0;
    for (tmax = 100; tmax < 10001; tmax = tmax + 100)
    {
        for(r = 0; r < EXPERIMENTS; r++)
        {
            for(t = 0; t < tmax; t++)
            {
                ibm = ibm * 16807;
                dist = dist - 1;
                if(ibm < 0)
                    dist = dist + 2;
                sqdist = dist * dist;
            }
            dist = 0;
            results[r]=sqdist;
        }
        average = 0;
        for(i = 0; i < EXPERIMENTS; i++)
        {
            average = average + results[i];
        }
        av_result = average / EXPERIMENTS;
        printf("%d  %e \n", tmax, av_result);
    }
}
```

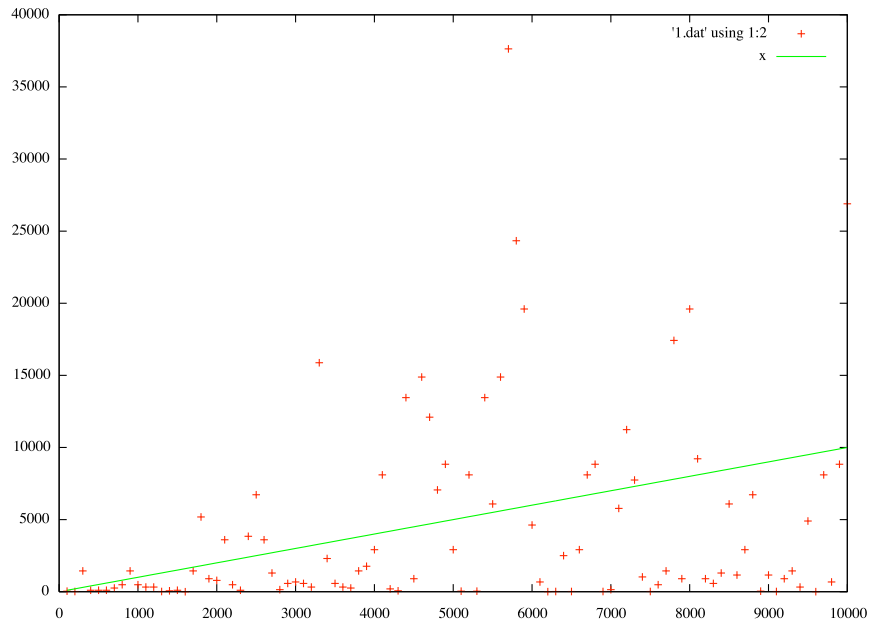


Figure 1: run with 1 experiment for 10000 time

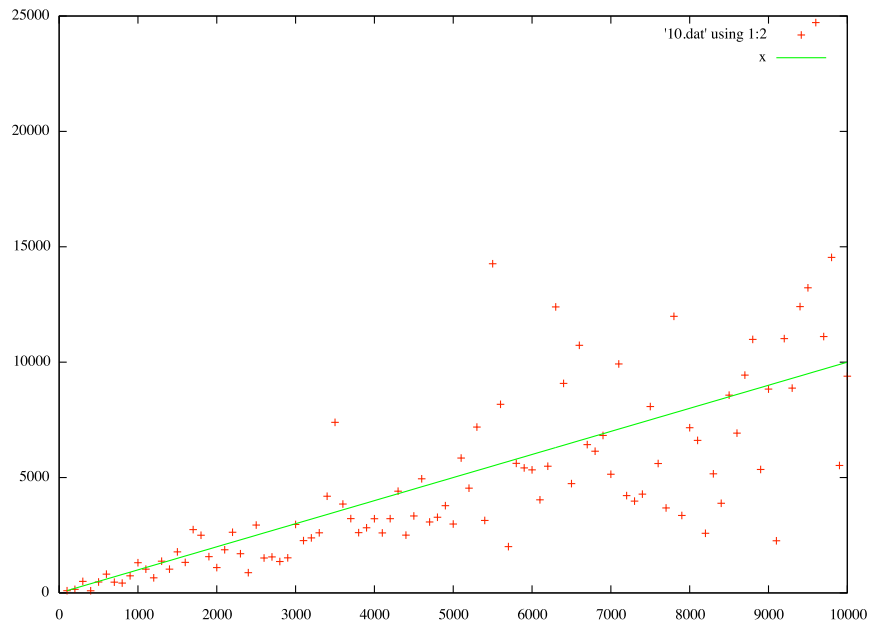


Figure 2: run with 10 experiment for 10000 time

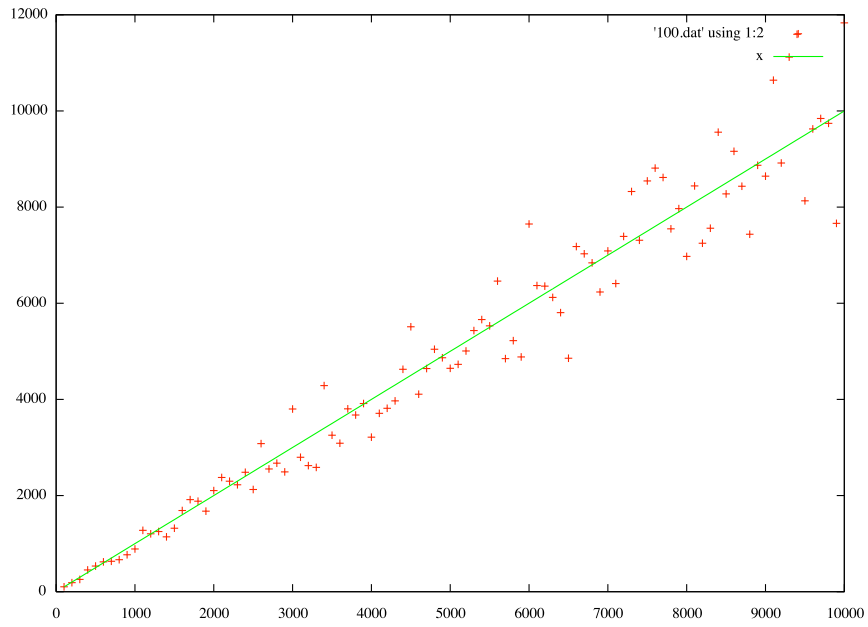


Figure 3: run with 100 experiment for 10000 time

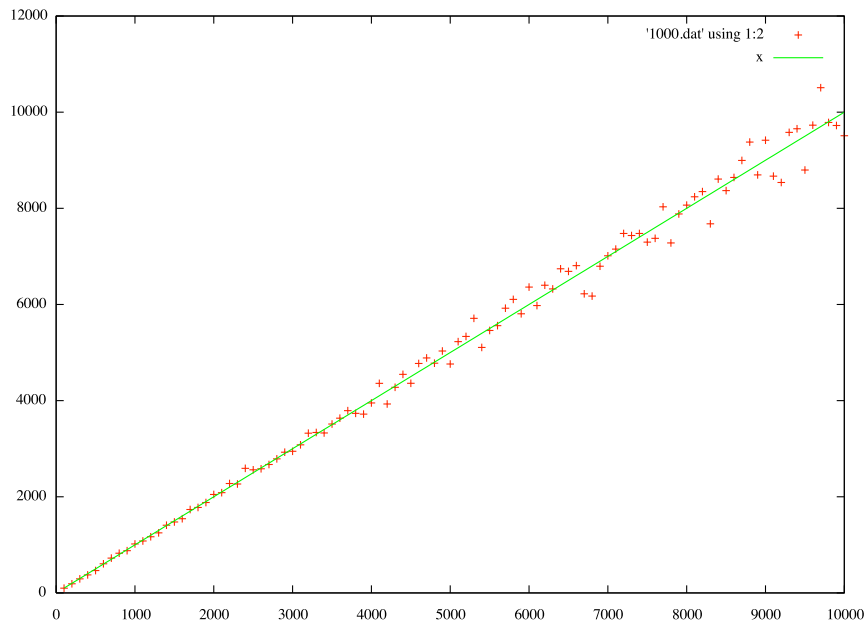


Figure 4: run with 1000 experiment for 10000 time

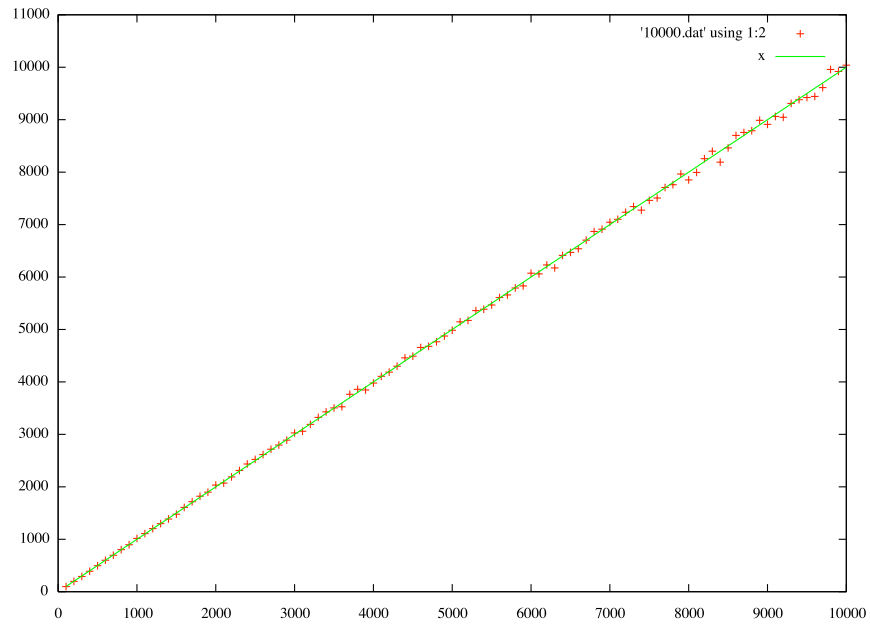


Figure 5: run with 10000 experiment for 10000 time

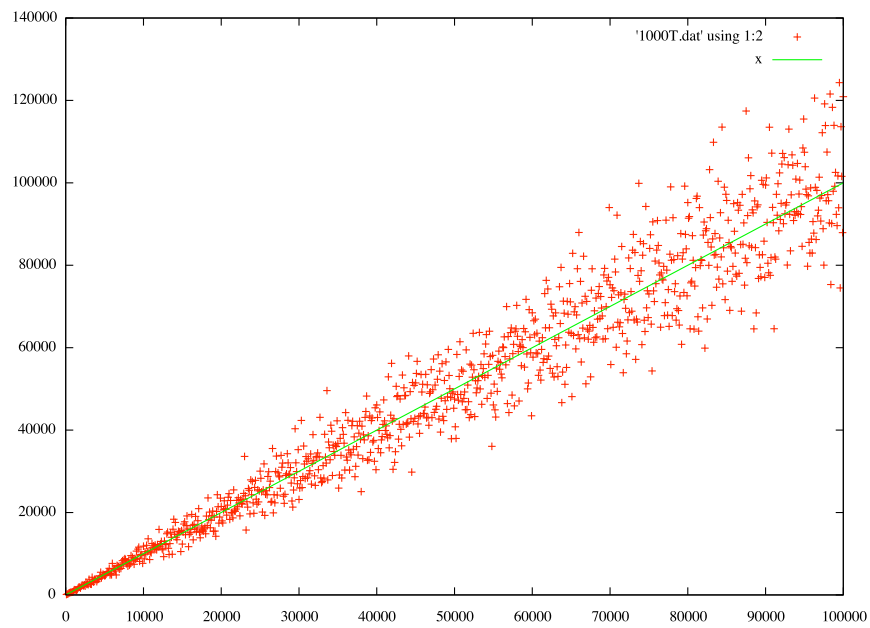


Figure 6: run with 100 experiment for 100000 time