Benford’s Numbers

Frank Benford, a physicist with the General Electric Company, discovered an interesting relationship in numbers while examining statistics on river basin areas, baseball statistics and even numbers appearing in the Reader’s Digest. He found that, for any suitably large sample of numbers, 1 had a probability of being the first digit of any number 30% of the time! On closer examination, and by testing this on many different types of data, he arrived at the following table:

|  |  |
| --- | --- |
| Digit appearing first | Probability |
| 1 | 30% |
| 2 | 17.6% |
| 3 | 12.5% |
| 4 | 9.7% |
| 5 | 8% |
| 6 | 6.7% |
| 7 | 5.8% |
| 8 | 5% |
| 9 | 4.6% |

This law applies to any list of numbers, such as telephone numbers. (Just ignore the first 3 digits, since they determine the exchange, and are likely to be the same for long parts of the list).

Interestingly, this law also applies to a very famous, non-random sequence called the Fibonacci sequence.

1. Write a program to calculate the first two hundred Fibonacci numbers, and then count up the 1’s, 2’s etc. Calculate the percentage they make up. List their probabilities in a list box.
2. Use a random number generator to produce several hundred four-digit numbers, and check if they obey Benford’s Law. If they don’t, try to determine why.

*Source: Livio, M. 2002. The Golden Ratio Headline Book Publishing. London*