# TNM098 – Lab 1

## Background

A list of 60 data points with coin tosses was given. Each data point contained 200 tosses. The task was to find out which of the data points that were a random number generator and which ones that were humans faking randomness. In this report head and tails are represented with ones and zeros.

## Hypothesis

While a computer would create a string with a truly random result where the next toss is not dependent on any of the tosses before, a human would be biased by seeing the row of previous faked tosses. The human perception of randomness is different from what it really is. A real random string of tosses would contain sequences of consecutive heads or consecutive tails with a lot of different lengths. A human would feel that after about three heads in a row a tail is needed for it to look random enough. Since the human quickly shifts between heads and tails, the total number of heads or tails in a faked data point would be relatively close to 50 %.

According to “Signals, information and communication” by Erik G. Larsson, a data point with number of tosses will most likely be a so called typical string. If the probability of getting heads is , which in this case is , most strings will be typical strings and contain heads, when is big. Therefore, a true random number generator would have most of its strings in that range, but since N in this case is relatively small, this may not be applicable, and the tosses outside of the standard deviation may be the computer.

## Method

First, all data points with a number of heads that were outside of the standard deviation were removed. They were most likely to be computers. After that, 41 points were left.

Points removed (from 0-59)

8, 9, 11, 16, 17, 19, 21, 23, 24, 29, 31, 33, 35, 42, 43, 45, 53, 56, 57

## Conclusion