FDSAI – Lab 2

2024/2025

1) **Illustration of CLT**. Draw $n = 1000$ random observations $x_1, \ldots, x_n$ from a distribution you like. Repeat 1000 times.

   For each of the 1000 samples, compute the sample mean $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$ and fill in the following table:

	x_1	x_2	$\ldots$	x_n	$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$
$t = 1$					
$\vdots$					
$t = 1000$					

   Plot a histogram for the 1000 sample means thus obtained. What do you observe?

2) **Simulating a χ^2 distribution**. Draw $n = 3$ samples from $N(0, 1)$. As in the previous exercise, repeat 1000 times and fill in the following table:

	z_1	z_2	z_3	$\sum_{i=1}^{3} z_i^2$
$t = 1$				
$\vdots$				
$t = 1000$				

   Plot a histogram for the values in the rightmost column versus χ^2 with $3 - 1 = 2$ degrees of freedom. Comment on the result.