

# IMT573 Lab 5: probability

October 28, 2020

## Instructions

This task is about performing a random experiment and reporting the results. The calculations are simple but you have to generate your own data!

1. Please be clear. Do your draft calculations on a separate sheet. Clearly strike through the chunks that are wrong. Use your best handwriting and leave enough space around your text!
2. Working together is fun and useful but you have to submit your own work. Discussing the solutions and problems with your classmates is all right but do not copy-paste their solution! First understand, and thereafter create your own solution. Please list all your collaborators on the solution.

## 1 Toss two coins

Your task here is to collect data through a simple experiment: toss two coins at least 20 times (both coins at least 20 times). Each time you record the number of heads you got. If you only have a single coin today, you can toss it twice, first for the coin A and thereafter for coin B.

We expect you to flip a physical object and not to cheat with random numbers and online simulators. If you have no coins (what a loser!), you can flip something else—your credit card, your cellphone, your laptop, your neighbor. . . . Just use your imagination! It does not have to be a fair coin!

1. Which objects are you tossing? If these are not coins, what event will you call “heads”?

Note that you can always have a binary outcome, e.g. when rolling a die, you got either a “six” or a “non-six”.

2. Toss two coins (or other objects) at least 20 times each. Each time note how many heads did you get.

We recommend to store these results into a data frame.

3. Create a (readable)! table about the number of heads in each trial. The table might look like this:

Trial	Number of Heads
1	0
2	2
$\vdots$	$\vdots$
20	1

If you created a data frame above, you can just print the data frame here. Consider using `knitr::kable` for nicer print.

4. Show a summary table of your results (0 heads–how many times; 1 head–how many times..)
5. Compute mean of your results
6. Compute variance of your results. We recommend to use the shortcut formula for the variance

$$\text{Var } \mathbf{X} = \bar{X}^2 - \overline{(\mathbf{X}^2)}.$$

Please use one of the variance formulas, not the **var** function!

7. Plot a histogram of your results.
8. What type of distribution is this, discrete or continuous? Do you know how it is called?
9. Does it look symmetric, or right/left skewed?