

Probability and Statistics

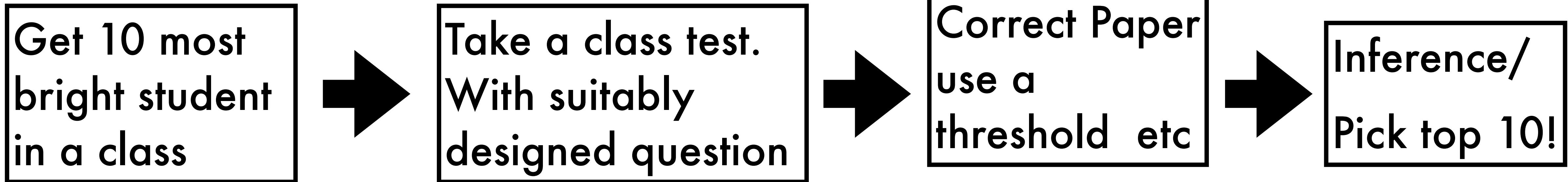
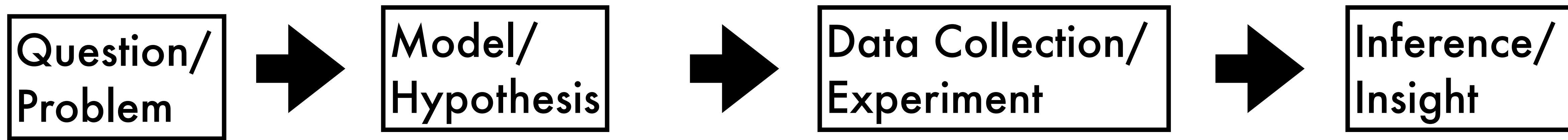
Part-3

MA2103 - 2023

Rajesh Kumble Nayak

Data Sampling

Statistical analysis





“The nose of Cleopatra: if it had been shorter, the whole face of the earth would have changed”

~ Blaise Pascal

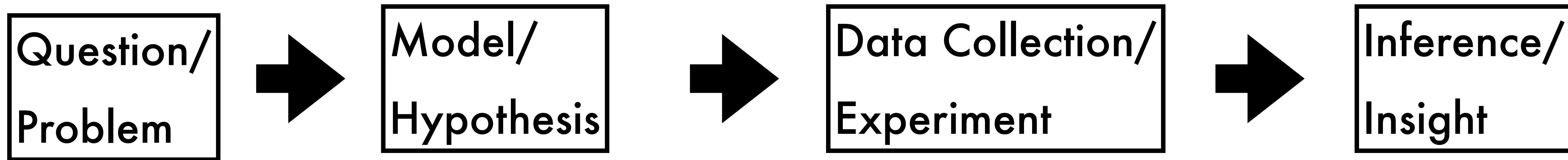
We need a good hypothesis.

May be correlation between length of nose and influence and face of earth!

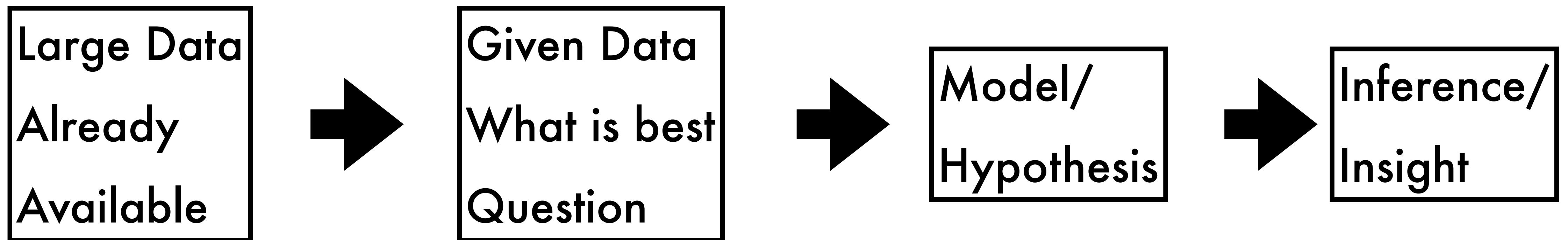


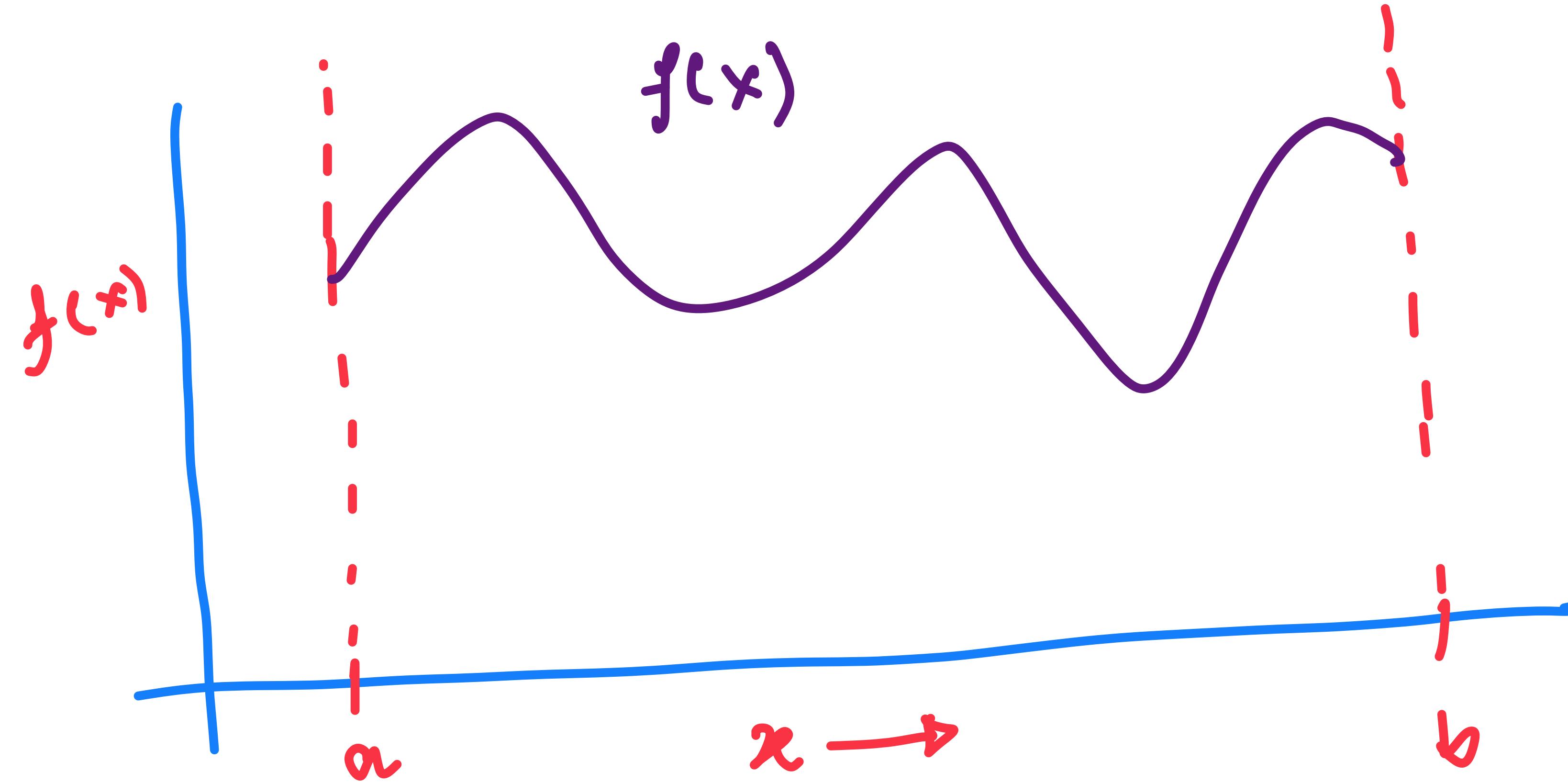
Data Sampling

Statistical analysis

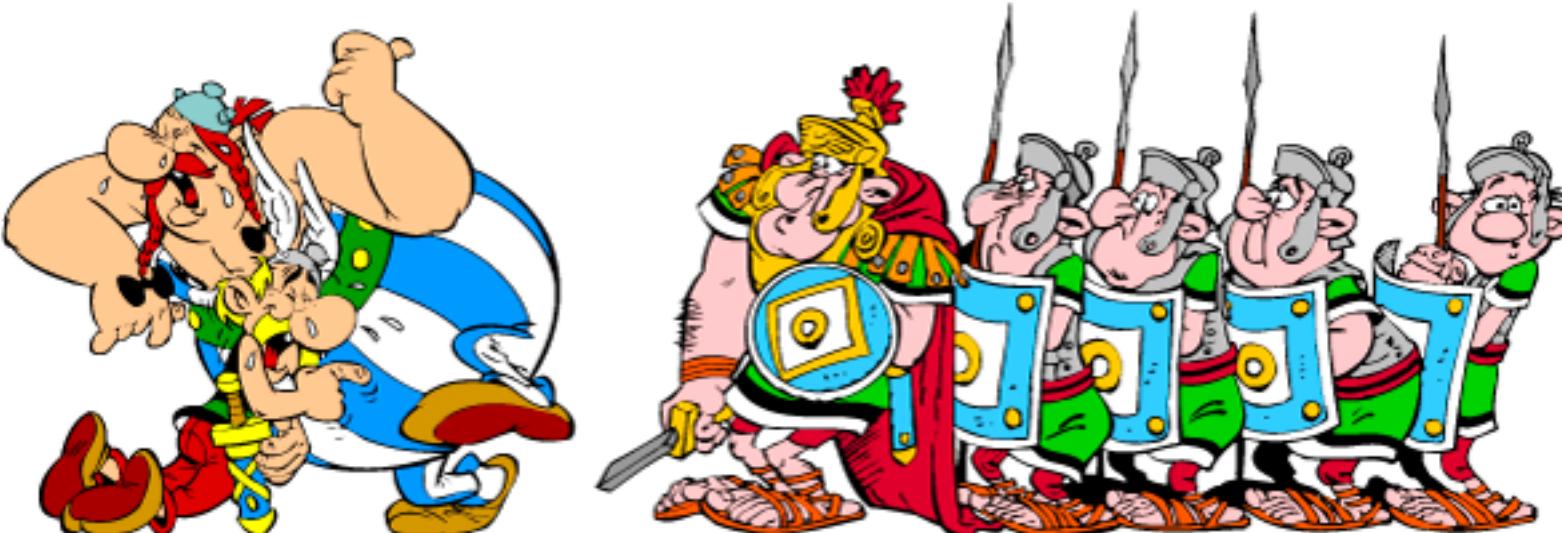


Data analytics

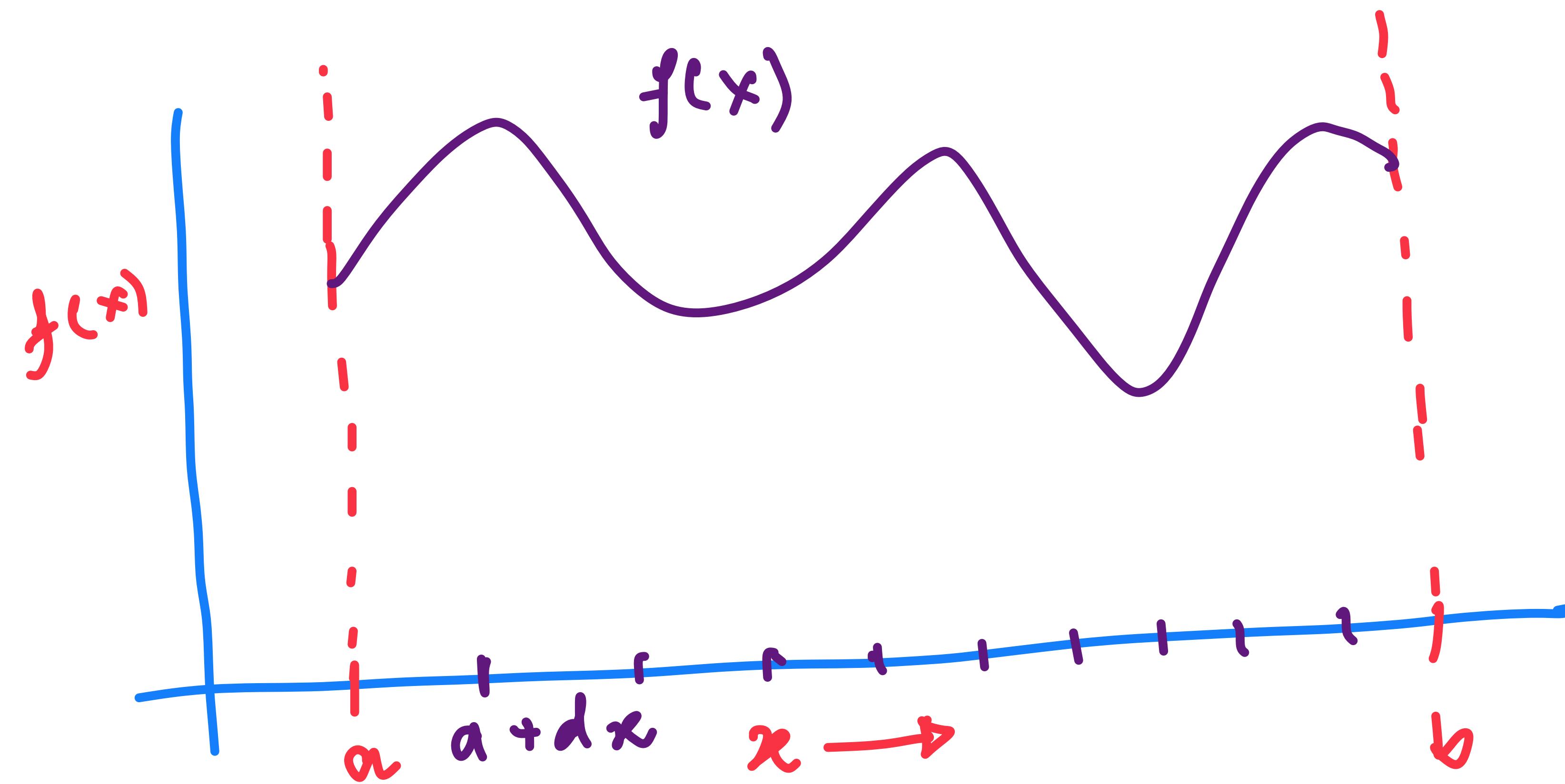




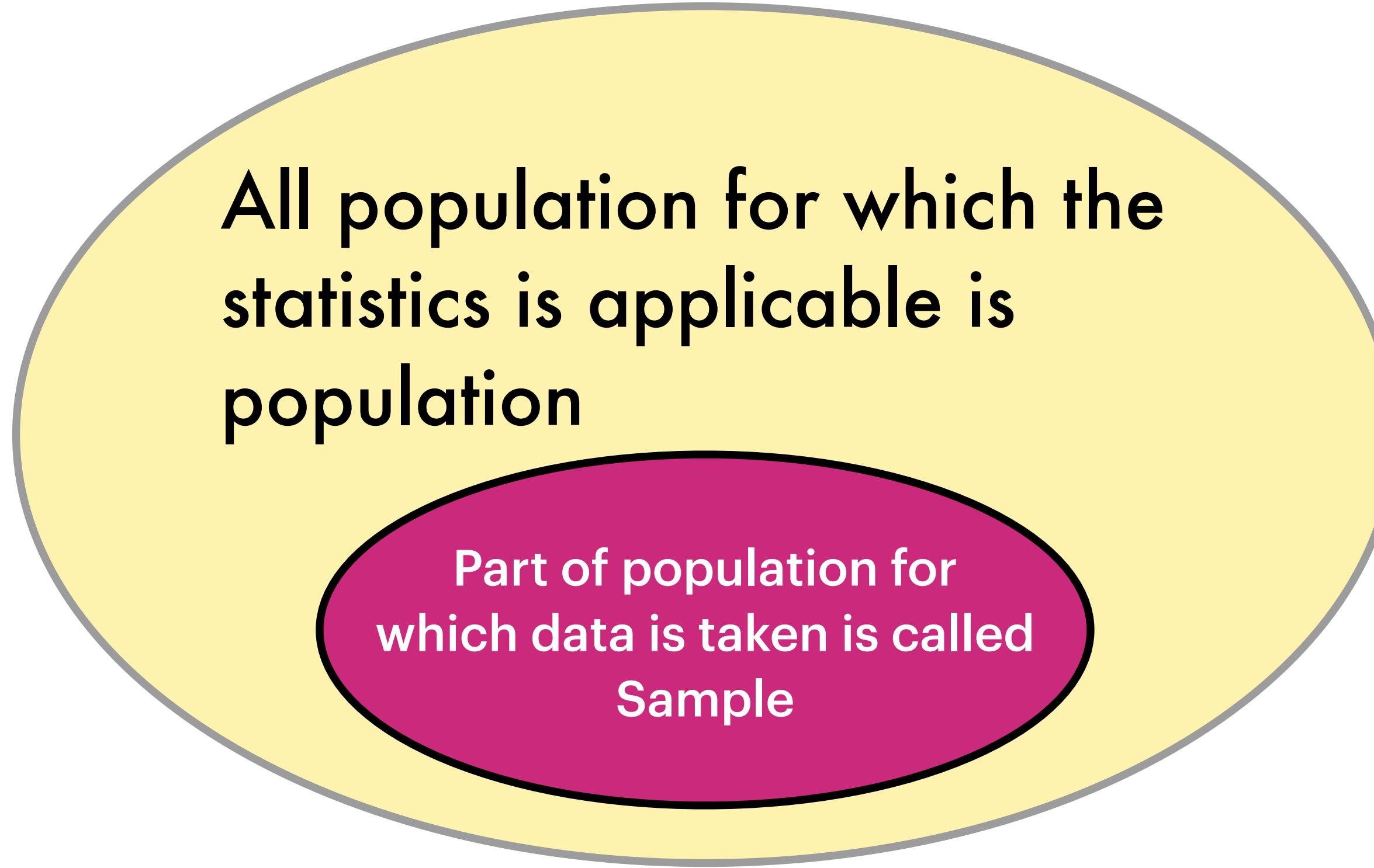
find the average of function between a
an



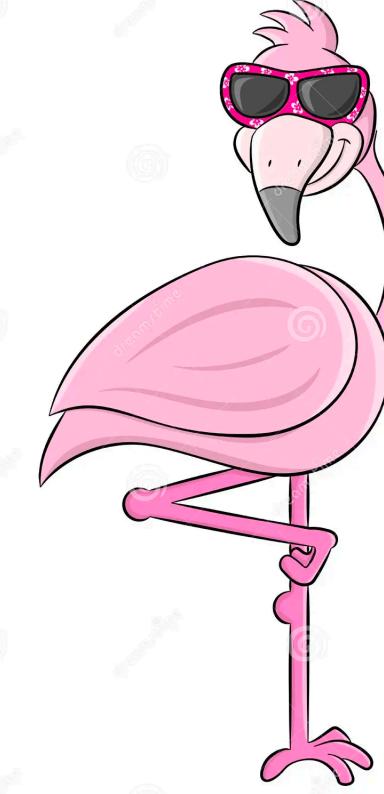
Grid based sampling ! since $f(x)$ defined for real number, we can start at $x = a$ take a interval dx and sample data at $x = a + ndx$



Population and Sample



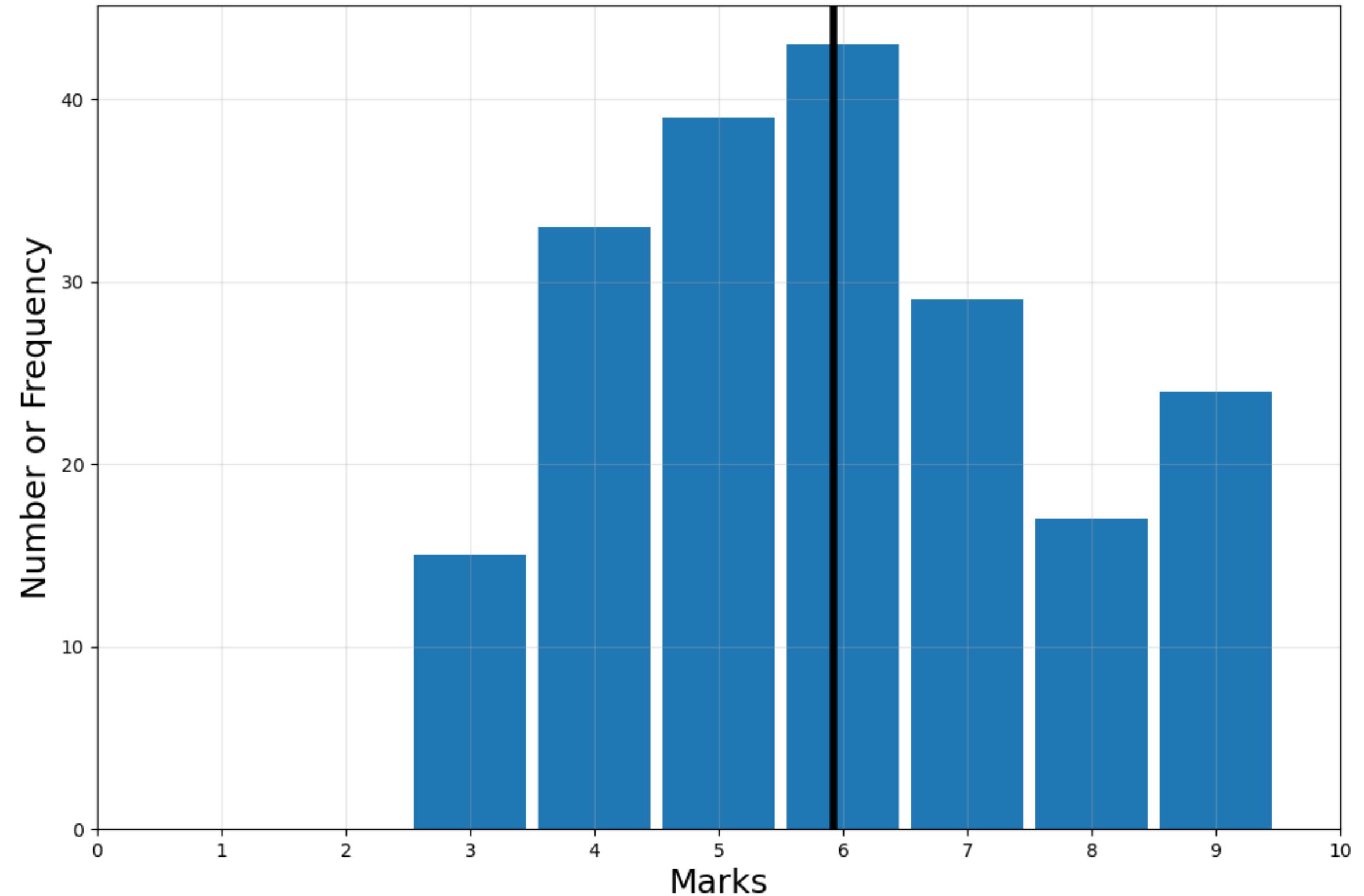
All the flamingos with one leg i.e All the flamingos in the world



Sample is taken from Kolkata, so sample space is All the flamingos with one leg in the Kolkata

For a complex problem it is impossible to take census, we have to limit to smaller sample space

Sample should be such that the inference should not be effected too much!



Let's take class test example.
This is the distribution of the class or population.
A smaller set of sample should give same distribution will be ideal
We should avoid possible relations / correlation between the sample
Here the idea of random sample come into picture

Random numbers

Random number are numbers with no relation between them!

Random numbers are characterised by the distribution

Example :

Tossing a coin

Rolling a dice!

A random number is a number chosen as if by chance from some specified distribution

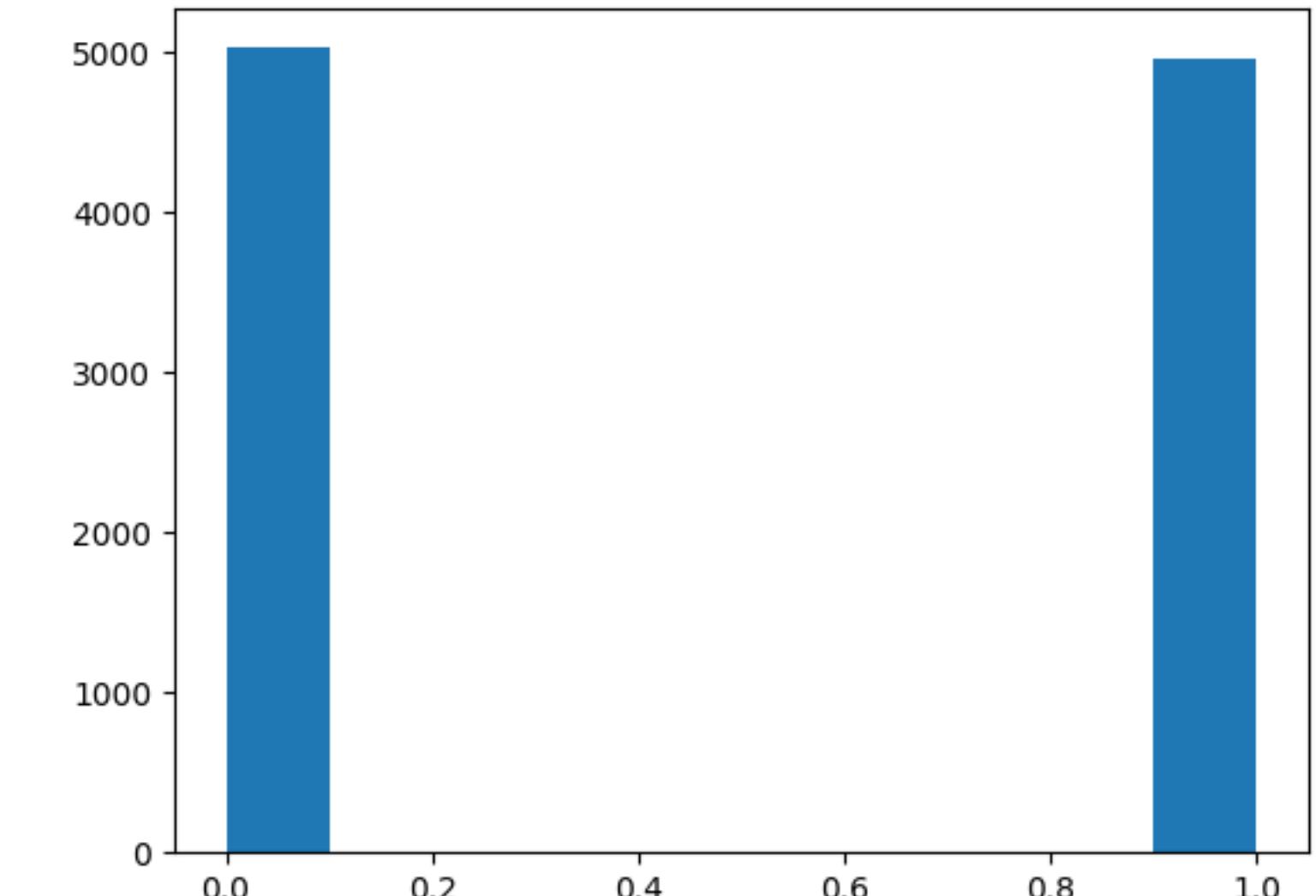
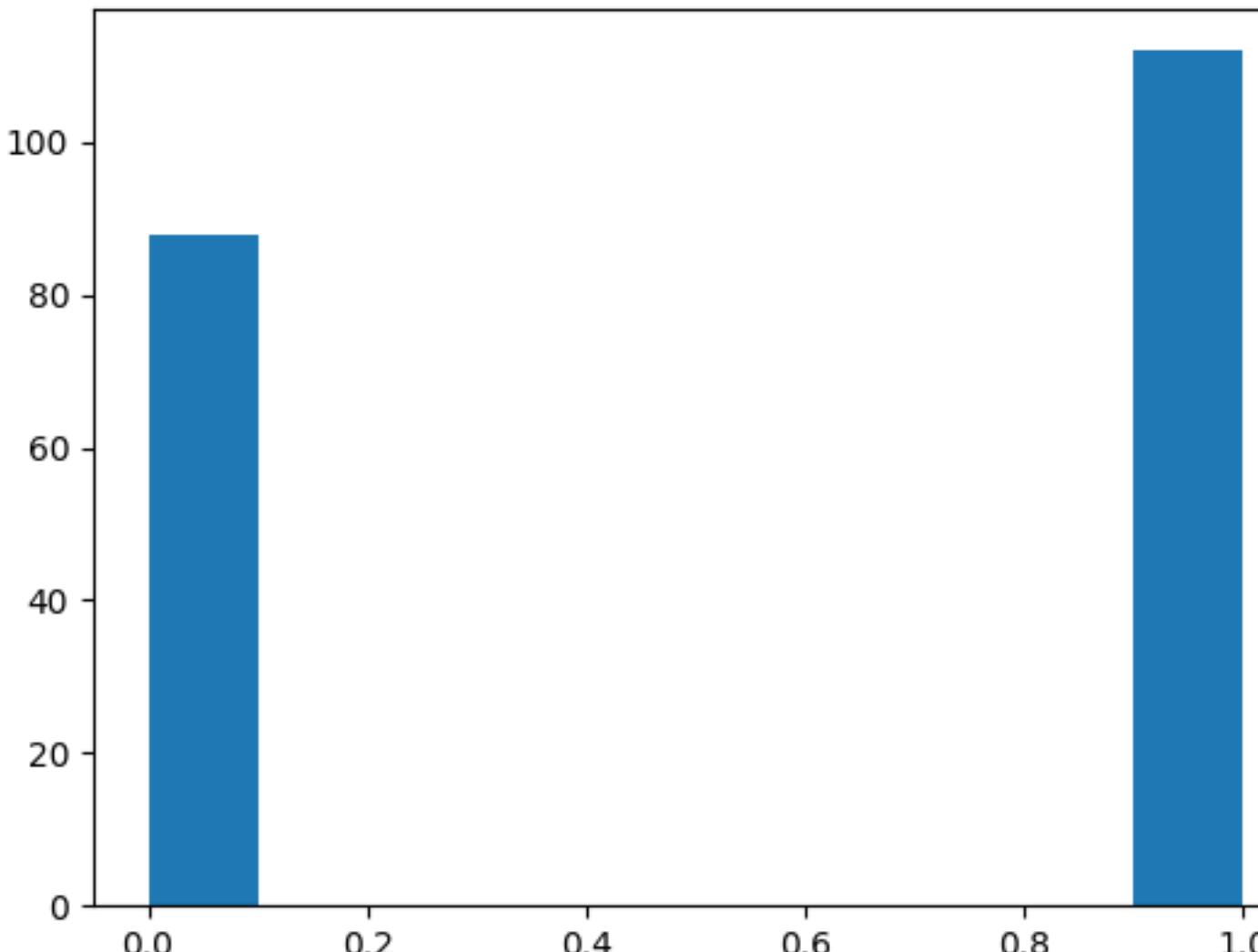
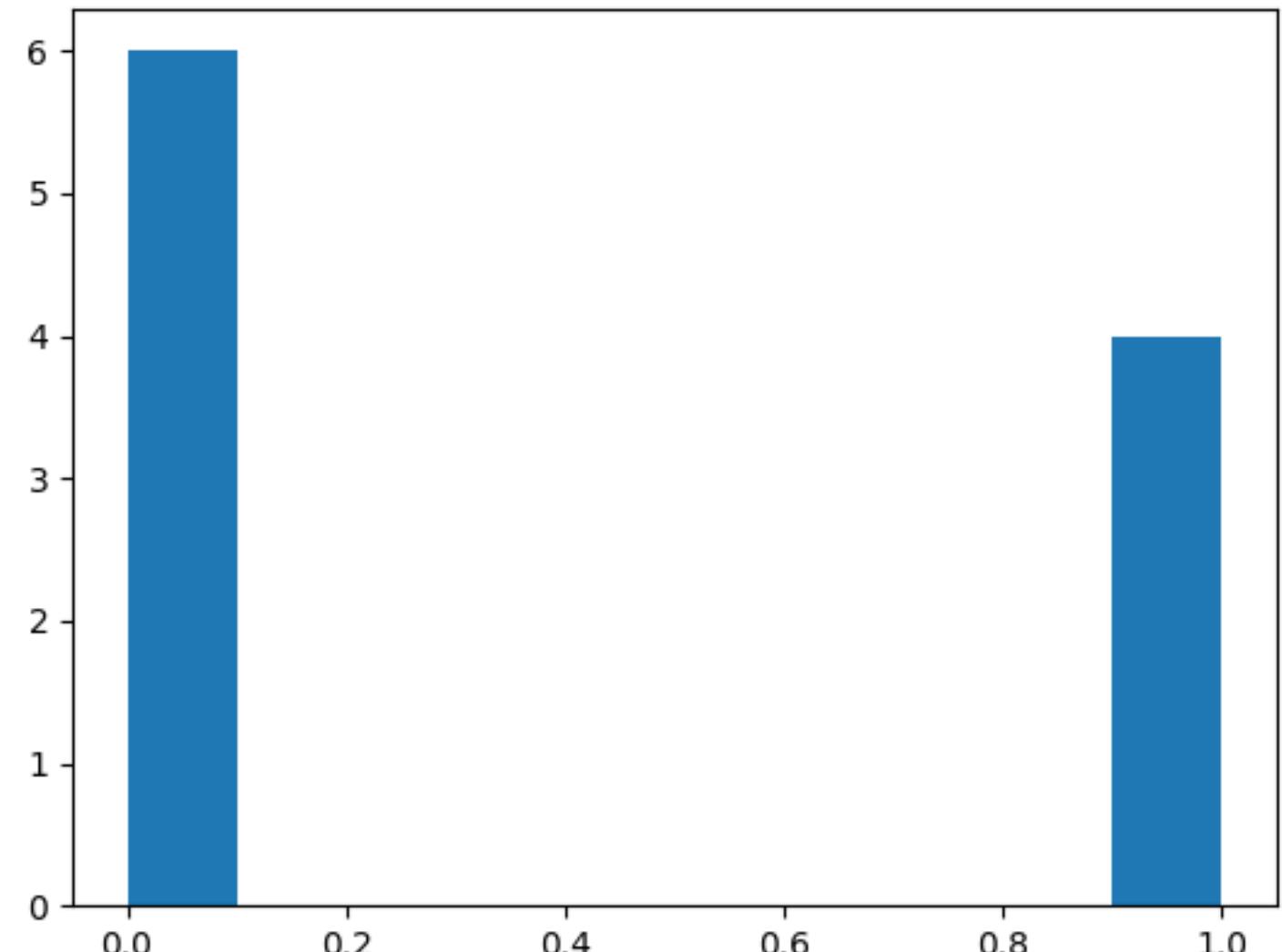
Uniform Random number

In this case all the possibilities are equally likely!

Single coin toss :

total number possibility is {H, T} both are equally likely find the probability of any one is 0.5

Let's look at coin toss experiment



Uniform Random number

Let's look at coin toss experiment with a biased coin

