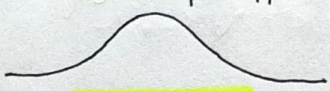
MAXIMUM LIKELIHOOD

→ The goal of maximum likelihood is to find the optimal way to fit a distribution to the data.

→ The are lots of different distributions for different type of data.



NORMAL

Exponential

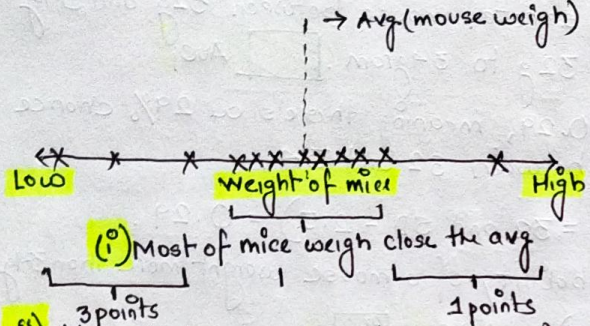
Gamma

and many more

→ The reason you want to fit a distribution to your data is it can be easier to work and it is also more general - it applies to every experiment of the same type.

Example - Let say we weighed a bunch of mice.

In this case, we think the weight might be normally distributed.



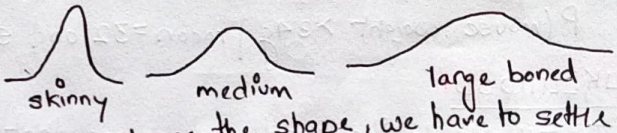
(ii) Although the measurement (3 & 1 points) are not perfectly symmetrical around mean, they are not crazy skewed to one side either.

Normally distributed means a lot of things

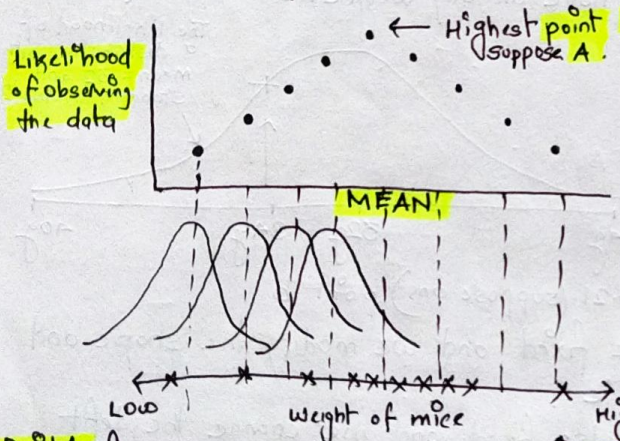
i) we expect most of the measurements (mouse weight) to be close to mean (average)

ii) we expect the measurement to be relatively symmetrical around the mean.

iii) Normal distribution come in all shapes and sizes.



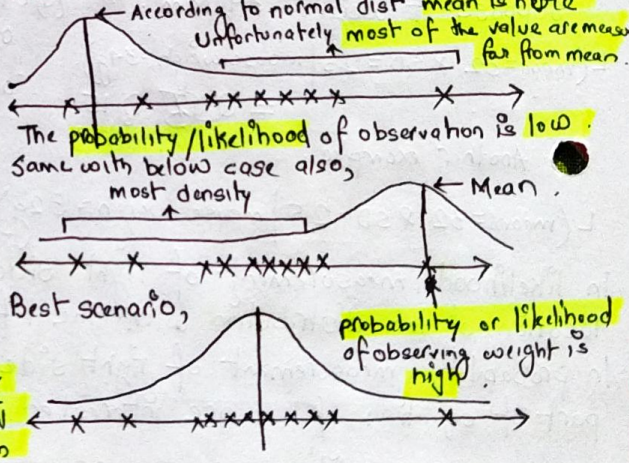
iv) Once we choose the shape, we have to settle out where will be the center thing ie. most of the value should be near the average.



Point A from above graph.

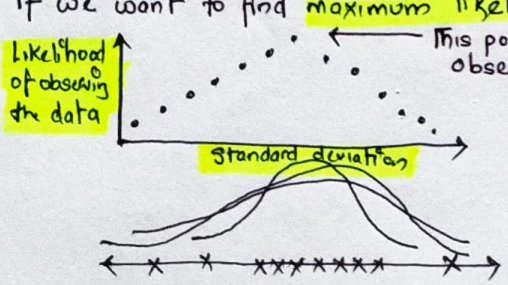
→ We want to locate "maximize the likelihood" of observing the weight are measured.

Plotting for every normal distribution



→ Thus it is the "maximum likelihood estimate for the mean".

If we want to find maximum likelihood of standard deviation →



← This point that standard deviation that maximize the likelihood of observing the weight that are measured.

Now if someone say that maximum likelihood estimates for the mean or standard deviation or anything else we known that they found the value of mean or standard deviation that maximizes the likelihood that we observed the things we observed.