

## Case Study

Suppose you are given a dataset, which describe the failure times of 133 devices of similar kinds.

### Task for the week 1:

- A. Present the descriptive statistics of the failure times such as mean, median, mode, maximum value, minimum value.
- B. Construct the frequency table for the sample indicates failure times by arranging  $n$  number of classes/bins.  $n$  has to be justified at the time of viva.

### Task for the week 2:

Consider the CDFs

- i.  $F(x; \alpha, \lambda) = (1 - e^{-\lambda x})^\alpha, x > 0, \alpha > 0, \lambda > 0.$
- ii.  $F(x; \alpha, \lambda) = 1 - (1 - e^{-\lambda/x})^\alpha, x > 0, \alpha > 0, \lambda > 0.$

Where  $x$  represents the failure times mentioned in the dataset.

- A. Observe the best fitted population distribution (among the aforesaid CDFs), based on your knowledge. (*Hint*: You have to estimate the parameters).
- B. Construct the 95 % confidence intervals for the respective parameters.
- C. How can you create a symmetric interval, so that 95 % , sample will lie in the same.

### Note:

- You must solve this case study collaboratively within your assigned group. The datasets specific to each group and batch are available [here](#). You are advised to visit the [url](#) (mentioned earlier), identify your group members and work collaboratively with them.
- There is no formal submission required for this assignment. You are expected to write the necessary codes and explain your methodologies during the viva session.
- Your evaluation will be based on your group's overall performance during the viva. Individual scores will reflect the collective preparation and understanding of the group.
- Week 1 starts from 29<sup>th</sup> April 2025 to 2<sup>nd</sup> May 2025, and week 2 starts from 6<sup>th</sup> May 2025 to 9<sup>th</sup> May 2025, as per the respective batch schedules.

————— End —————