

Instructions:

- Download and install R and RStudio on your computers.
- Install the package `alr4` in R, and access its library by typing: `library(alr4)`.
- Use the data `UN11` within `alr4`. You can learn more about this data set by typing in the R console: `help(UN11)`.
- Present the R command used for every question in addition to any output, if required.
- Submit your final solutions as a single PDF document in Canvas.

Assume that your data is the entire population of interest, i.e., let $S = \{\text{set of all UN members}\}$ (you can assume all the data entries correspond to all UN members), and $X : S \rightarrow R$ a function that assigns to each country its corresponding female life expectancy in years (rounded to the nearest integer), e.g. $X(\text{Argentina}) = 80$.

1. Is X a random variable? Explain why or why not.
2. Write down the mathematical expression of the following sets
 - a) Countries with female life expectancy less than or equal to 80 years.
 - b) Countries with female life expectancy equal to 75.
 - c) Countries with female life expectancy between 65 and 70 years.
3. Write down the probabilities of the previous expressions using only CDFs.
4. Obtain those probabilities.
5. Draw the empirical CDF and pdf for “LifeExpF” (without rounding). Does the variable seem to follow a normal distribution? Explain.