COEP Technogical University

Department of Mathematics
(MA- 21001) Probability and Statistics for Engineers
T.Y. B. Tech. Semester V (Computer, En TC, Electrical, Mechanical, Instrumentation Engineering)
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1 Tutorial: Week 1

1. Install R-Studio on your device and do basic mathematical operations of numbers in R.

2. Describe both the population and the observations for the following research questions:

   (a) Evaluation of the satisfaction of employees from an airline.
   (b) Description of the marks of students from an assignment.
   (c) Comparison of two drugs which deal with high blood pressure.

3. Which of the following variables are qualitative, and which are quan- titative? Specify which of the quantitative variables are discrete and which are continuous:

   Time to travel to work, shoe size, preferred political party, price for a canteen meal, eye colour, gender, wavelength of light, customer satisfaction on a scale from 1 to 10, delivery time for a parcel, blood type, number of goals in a hockey match, height of a child, subject line of an email, Number of books in the classroom, Time it takes for students to finish their quiz, Number of students that have their lunch in the canteen,Car owned by ten friends,Income of 20 employees, Size of clothes as S, M, L, XL, Education of people as High School, Graduate, PG, PhD.

4. Identify the scale of the following variables:

   (a) Political party voted for in an election (b) The difficulty of different levels in a computer game (c) Production time of a car (d) Age of turtles (e) Calender year (f) Price of a chocolate bar (g) Final ranking at a beauty contest (h) Intelligence quotient.

5. Make yourself familiar with the DNase data set from R.

   (a) First, browse through the introduction to R in Appendix A. Then, read in the data.
   (b) View the data both in the R data editor and in the R console.
   (c) Create a new data matrix which consists of the first 5 rows and first 3 variables of the data. Print this data set on the R console. Now, save this data set in your preferred format.
   (d) Add a new variable “product” to the data set which is the product of concentration and density.

6. Identify proper order of various stages in execution of the survey from beginning to end.

   - Setting up administrative organization
   - Selection, training and supervision of field investigators
   - Design of forms
   - Processing data
   - Control over quality of the field work and field edit
   - Follow up of non response
   - Preparing Report

   (Ans: Setting up administrative organization, Design of forms, Selection, training and supervision of field investigators, Control over quality of the field work and field edit, Follow up of non response, Processing data, Preparing Report)

7. Explain the difference between histogram and bar chart. Give a situation in which one is a better representation than the other.

8. Consider the marks obtained by students in Mathematics, Physics and Chemistry out of 100, 50 and 50 in their board exams in this order for 10 students:

80	45	32	78	43	28	87	42	49	95	45	47	53	32	15
67	23	19	99	50	48	79	45	35	89	39	49	85	36	42

   (i) Create a frequency distribution for the grouped data with class interval of size 10. What is relative frequency?

   (ii) Draw a pie chart,histogram and divided bar diagram for the above data to explain some salient features about the data as you feel fit.

   (iii) Calculate the mean, median and mode for the above data giving the details. Also compute 20 percent trimmed mean for above data set.

   (iv) Implement all the above in R.

9. True or False

   (i) Sample median is unchanged with respect to outliers.

   (ii) Sample median is unchanged with respect to outliers.

   (iii) Every qualitative variable is a discrete variable.

   (iv) Quantitative variables are always continuous.

   (v) Every quatitative variable is a categorical variable.

   (Vi) In R, codes written in the console window can be saved for the future reference.

   (vii) In R software, $x * y$ is the command to find the value of x raised to y.