Ramakrishna Mission Vivekananda Educational and Research Institute
(Deemed to be University under Sec. 3 of the UGC Act 1956)
PO Belur Math, Howrah, West Bengal 711202

Department of Computer Science

CS111 - Foundations of Statistical Learning: Probability
Assignment 1

Batches: MSc CS/BDA 2019-21 *Due Date: 08.07.2019*
Semester: Jul-Dec 2019 *Maximum Marks: 20*
Assignments are due before 10:00 am on due date

---

1. Compute how many ways 10 people can be arranged in a row, given the following conditions.
   (a) There is no restriction on seating arragement. (1)
   (b) Persons 1 and 2 must always sit next to each other. (1)
   (c) There are 5 men and 5 women, and no 2 men or 2 women are neighbours. (1)
   (d) There are four women, and they sit next to each other. (1)
   (e) There are 5 married couples, and each couple sits together. (1)

2. A tennis academy has 19 students, of which 10 are *righties* (right-handers) and 9 are *lefties*. If 4 lefties and 4 righties are to be chosen and paired off, how many results are possible? (1)

3. Partitioning problems -
   (a) 12 people are to be divided into 3 committees of respective sizes 3, 4, and 5. How many divisions are possible? (1)
   (b) 12 distinguishable sweets are to be given away to children. If there are 3 children in total, how many outcomes are possible? (1)
   (c) $m(> 3)$ distinguishable sweets are randomly distributed among n children. How many distributions are there in which the first child gets exactly 3 sweets? (2)

4. A person has saved Rs. 25 lakhs and is thinking of investing it in 5 startup companies. Investments are made in units of 1 lakh, and the 5 startups accept a minimum investment of Rs. 2, 3, 4, 4 and 5 lakhs respectively, how many different ways of investment are possible if
   (a) There should be an investment in each company; (3)
   (b) There should be an investment in *at least* 4 companies. (2)

5. The South Asian Association for Regional Cooperation (SAARC) consists of 8 nations. In a SAARC meeting, one delegate from each nation is to be seated in a row. How many arrangements are possible if Indian and Pakistani delegates *must not* be seated next to each other, whereas Indian and Nepali delegates *must* be seated next to each other. (3)

6. How many different letter arrangements can be made by rearranging the letters of "Assassination"? (2)