A Recollection on Probability

Average Value

- The Average Value (or Mean Value) of a set of **'N'** values $x_1, x_2, \ldots x_n$ of **'x'** is denoted by either **x** or **<x>** and is given by

$$\bar{x} = \langle x \rangle = \frac{x_1 + x_2 + \ldots\ldots + x_N}{N} = \frac{1}{N}\sum_{j=1}^{N} x_j$$

- The Summation is over all the **'N'** values of x_j's.

- For example, if the values x_j, are 6,7,6,7,7,8,9,7,5,8 the average value of **'x'** is

$$\bar{x} = < x > = \frac{(6+7+6+7+7+8+9+7+5+8)}{10} = 7$$

- Since there are **five, two sixes, four sevens, two eights** and ***one nine***, the expression for **'x'** can be written in the form

$$\bar{x} = \frac{(1\times 5 + 2\times 6 + 4\times 7 + 2\times 8 + 1\times 9)}{10}$$

$$= \frac{1}{10}\times 5 + \frac{2}{10}\times 6 + \frac{4}{10}\times 7 + \frac{2}{10}\times 8 + \frac{1}{10}\times 9$$

$$\text{Probabilit y of getting a } 5 = \frac{1}{10}$$

$$\text{Probabilit y of getting a } 6 = \frac{2}{10} \ldots\ldots \textit{and so on}$$

$$\therefore \bar{x} = < x > = \sum_i x_i P_i$$

P_i: Probabilit y of getting the value of x_i

Microstates and Macrostates

Microstates	Possible arrangement in compartment 1	Possible arrangement in compartment 2	No. of Microstates
(0,4)	0	abcd	1
(1,3)	a b c d	bcd acd abd abc	4
(2,2)	ab ac ad bc db cd	cd bd bc ad ac ab	6
(3,1)	bcd acd abd abc	a b c d	4
(4,0)	abcd	0	1