→ Naive Bayes Algosithm:-

	outlook	Temp	Humity	windy	play Golf
1)	Rainy	Hot	High	False	No
	Rainy	Hot	High	True	No
	overcast	Hot	High	False	yes
	Sunny	Mild	High	False	yes
	sunny	cool	Normal	False	yes
	Sunny	cool	Normal	True	NO
	overcast	cool	Normal	True	yes
	Rainay	Mild	High	False	NO
	Rainy	cool	Normal	False	yes
	Sunny	Mild	Normal	False	yes
	Rainy	Mild	Normal	True	yes
	overcast	Mild	High	True	yes
	overcast	Hot	Normal	False	yes
	sunny	Mild	High	True	NO
	Rainy	cool	High	True	?

Sunday 8

For Play = yes

P(Play|outlook, Temp, humidty, windy)

= P(outlook, Temp, humidty, windy/Play = yes) x P(play = yes)

$= \frac{2}{9} \times \frac{3}{9} \times \frac{3}{9} \times \frac{3}{9} \times \frac{9}{14}$

= 0.005

December 2019

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

For play = No

$P(Play=No/outlook, Temp, humidity, windy)$

$= P(outlook, Temp, humidity, windy/play=No) \times P(Play=No)$

$= \frac{3}{5} \times \frac{1}{5} \times \frac{4}{5} \times \frac{3}{5} \times \frac{5}{14}$

$= 0.02$ ✓

2)

Chills	Runnynose	headache	Fever	Flu
Y	N	Mild	Y	N
Y	Y	NO	N	Y
Y	N	Strong	Y	Y
N	Y	Mild	Y	Y
N	N	No	N	N
N	Y	Strong	Y	Y
N	Y	strong	N	N
Y	Y	Mild	Y	Y
Y	N	Mild	Y	?

$P(Flu=Y/x) = \frac{3}{5} \times \frac{1}{5} \times \frac{2}{5} \times \frac{4}{5} \times \frac{5}{8}$

$= 0.024$ ✓

$P(Flu=N/x) = \frac{1}{3} \times \frac{2}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{3}{8}$

$= 0.0092$

3)

A_1	A_2	A_3	class
a	c	a	c1
c	a	c	c1
a	a	c	c2
b	c	a	c2
c	c	b	c2
a	c	b	?

$P(class = c_1|x) = \frac{1}{2} \times \frac{1}{2} \times \frac{0}{2} \times \frac{2}{5} = 0$

$P(class = c_2|x) = \frac{1}{3} \times \frac{2}{3} \times \frac{1}{3} \times \frac{3}{5} = 0.04$

Laplace smoothing:-

$= \frac{\text{Total No. of Records belonging to a pasticular class} + 1}{(\text{Total No. of Records of that class}) + (\text{Total No. of classes in the dataset})}$

$P(C_1|x) = \left(\frac{1+1}{2+2}\right)\left(\frac{1+1}{2+2}\right)\left(\frac{0+1}{2+2}\right)\left(\frac{2}{5}\right) = 0.025$

$P(C_2|x) = \left(\frac{1+1}{3+2}\right)\left(\frac{2+1}{3+2}\right)\left(\frac{1+1}{3+2}\right)\left(\frac{3+1}{5}\right) = 0.0576$ ✓

Gaussian NB:- For Continuous data
Bernolli NB:- For Binary data
Multinomial NB:- For discrete data

December 2019
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31