ATMA RAM SANATAN DHARM COLLEGE

Course Title: Probability For Computing Practical

Submitted To:

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Submitted By:

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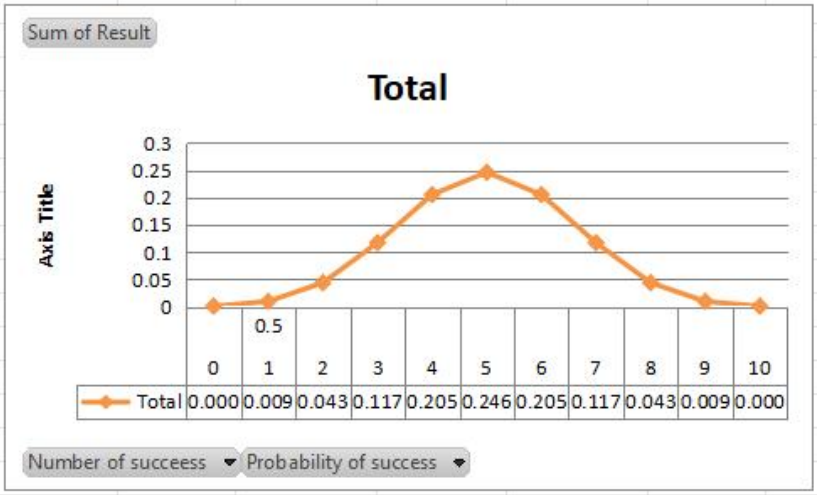
Course : B.Sc. Computer Science Hons.

1. Plotting and fitting of Binomial distribution and graphical representation of probabilities.

Probability of success	Number of succeess	Result	Trials	10
0.5	0	0.000976563		
0.5	1	0.009765625		
0.5	2	0.043945313		
0.5	3	0.1171875		
0.5	4	0.205078125		
0.5	5	0.24609375		
0.5	6	0.205078125		
0.5	7	0.1171875		
0.5	8	0.043945313		
0.5	9	0.009765625		
0.5	10	0.000976563		

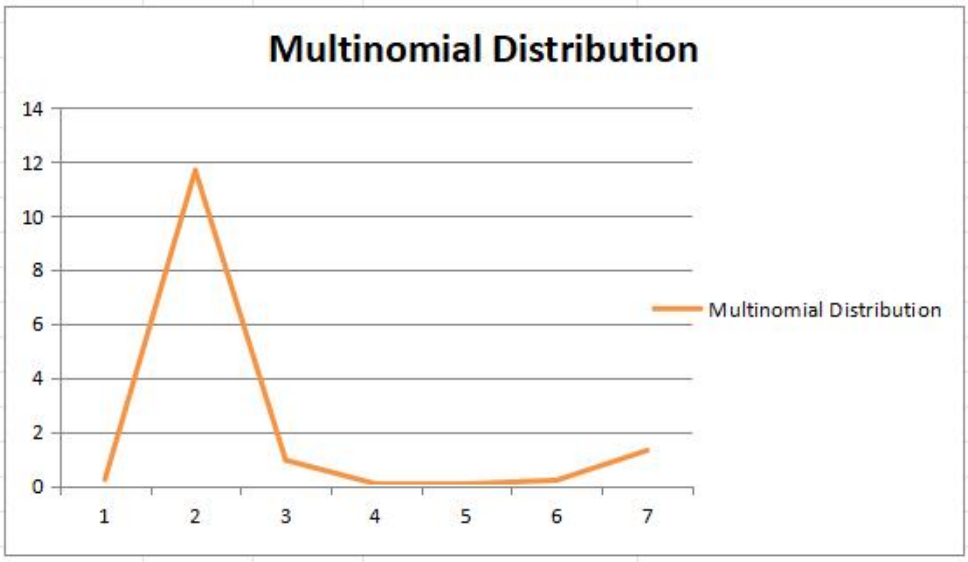


Formula Used	=BINOM.DIST(B3,E1,A3, FALSE)	Binomial distribution

Here, B3, E1 and A3 contain number of success, trials and A3 probability of success respectively.

2. Plotting and fitting of Multinomial distribution and graphical representation of probabilities.

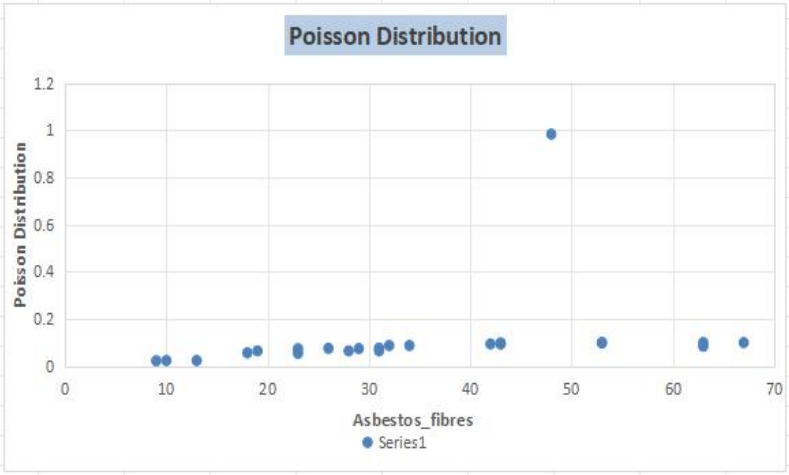
A	B	C	D	E	F	G
Category A	Category B	Category C	p(A)	P(B)	p(C)	Multinomial Distribution
1	2	2	0.6	0.4	0.5	0.2333
4	4	8	0.6	0.4	0.5	11.675664
2	1	4	0.6	0.4	0.5	0.945
0	7	3	0.6	0.4	0.5	0.065586541
5	8	0	0.6	0.4	0.5	0.065586541
3	0	7	0.6	0.4	0.5	0.2025
5	1	2	0.6	0.4	0.5	1.306368
	No. of Trials=7					



3. Plotting and fitting of Poisson distribution and graphical representation of probabilities.

Plotting and fitting of Poisson distribution and graphical representation of probabilities.

Asbestos_fibres	Poisson Distribution		Mean	35.16667
31	0.076457825			
29	0.074576574			
19	0.064576455			
18	0.056324324			
63	0.084237324			
31	0.064832446			
28	0.064654765			
34	0.087347326			
26	0.075346532			
10	0.023645673			
9	0.022734667			
48	0.983456345			
13	0.023975664			
43	0.094566457			
53	0.099465744			
63	0.099845675			
32	0.087346343			
42	0.093846324			
43	0.098364563			
23	0.073764532			
67	0.099847726			
23	0.054123313			
53	0.098924744			
43	0.094568765			

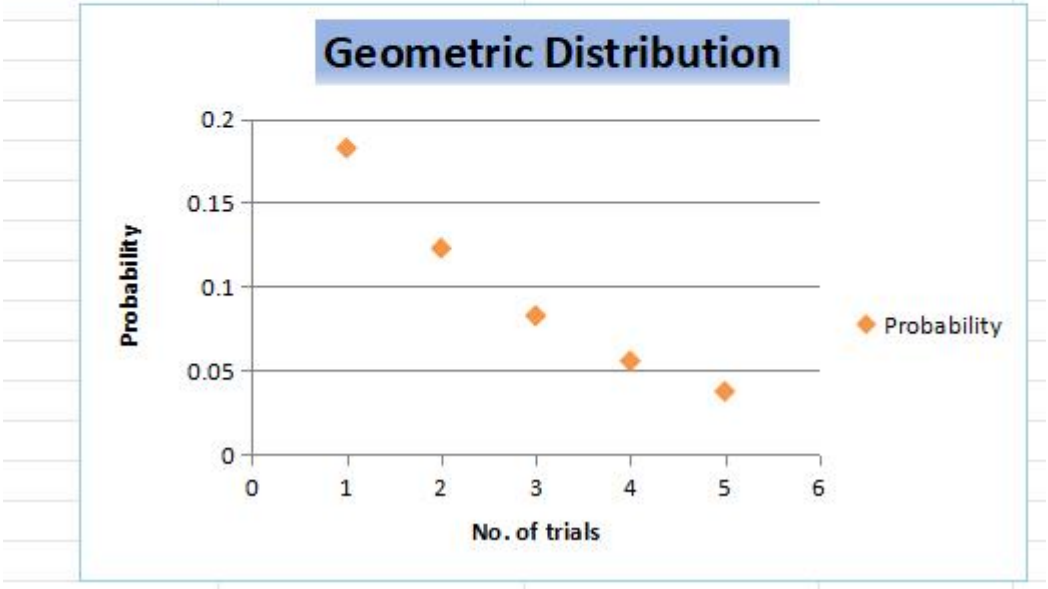


Formula Used	=POISSON.DIST(A2,F1,FALSE)	Poisson distribution
	=AVERAGE(A2:A24)	Mean

Here, A2:A24 contains the data (i.e. from 31 to 43).
F1 contains mean and A2 is the first data (i.e. 31).

4. Plotting and fitting of Geometric distribution and graphical representation of probabilities.

A	B	C	D
Trials	Probability of success	Probability of failure	Probability
1	0.182364834	0.672354681	0.182364834
2	0.182364834	0.672354681	0.12261385
3	0.182364834	0.672354681	0.082439996
4	0.182364834	0.672354681	0.055428917
5	0.182364834	0.672354681	0.037267892

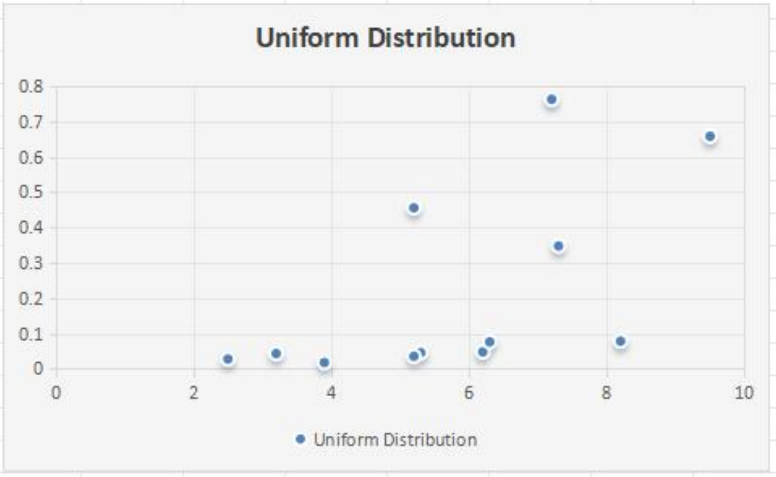


Formula Used	=POWER(C2,A2-1)*B2	Geometric distribution

Here, C2, A2 & B2 are the probability of failure, no. of trials & probability of success.

5. Plotting and fitting of Uniform distribution and graphical representation of probabilities.

Data:	Uniform Distribution		
2.5	0.02772287	Min	2.5
6.2	0.04784257	Max	3.2
5.3	0.04574765		
8.2	0.07826445		
3.9	0.01783476		
5.2	0.03545544		
7.3	0.34746324		
9.5	0.65788767		
6.3	0.07635443		
7.2	0.76235432		
5.2	0.45543453		
3.2	0.0431533		



Formula Used	=IF(AND(A2 >= D4, A2 <= D2), 1 / (D2 - D1), 0)	Uniform distribution
	=MIN(A2:A16)	Minimum
	=MAX(A2:A16)	Maximum

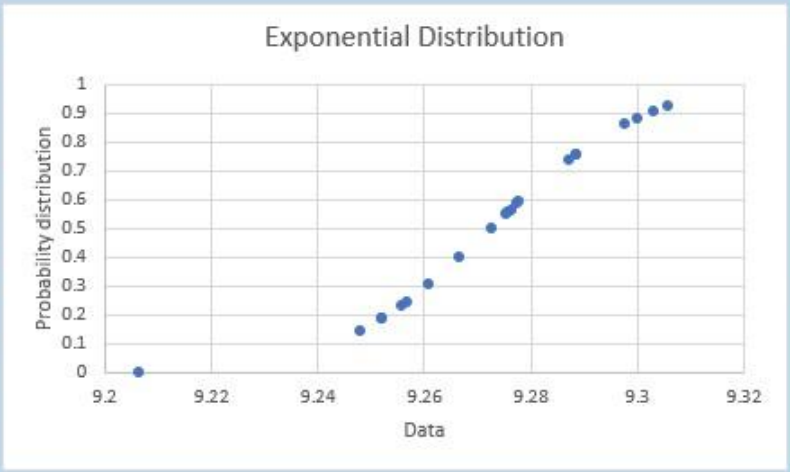
Here, A2:A16 contains the data (i.e. from 2.5 to 3.2).
D2 contains maximum and D1 has minimum.

6. Plotting and fitting of Exponential distribution and graphical representation of probabilities.

Plotting and fitting of Exponential distribution and graphical representation of probabilities.

Data: Collected by Bob Zarr of NIST in January, 1990 from a heat flow meter calibration and stability analysis.

Data:	Exponential Distribution		
9.206343	0.62948168	Mean	9.272620095
9.299992	0.633204903	λ	0.107844384
9.277895	0.632329774		
9.305795	0.633434379		
9.275351	0.632228888		
9.288729	0.632759104		
9.287239	0.632700088		
9.260973	0.631658185		
9.303111	0.63332826		
9.275674	0.632241699		
9.272561	0.632118214		
9.288454	0.632748213		
9.255672	0.63144755		
9.252141	0.631307179		
9.29767	0.633113041		
9.266534	0.631879021		
9.256689	0.63148797		
9.277542	0.632315777		
9.248205	0.631150645		
9.252107	0.631305827		
9.276345	0.63226831		

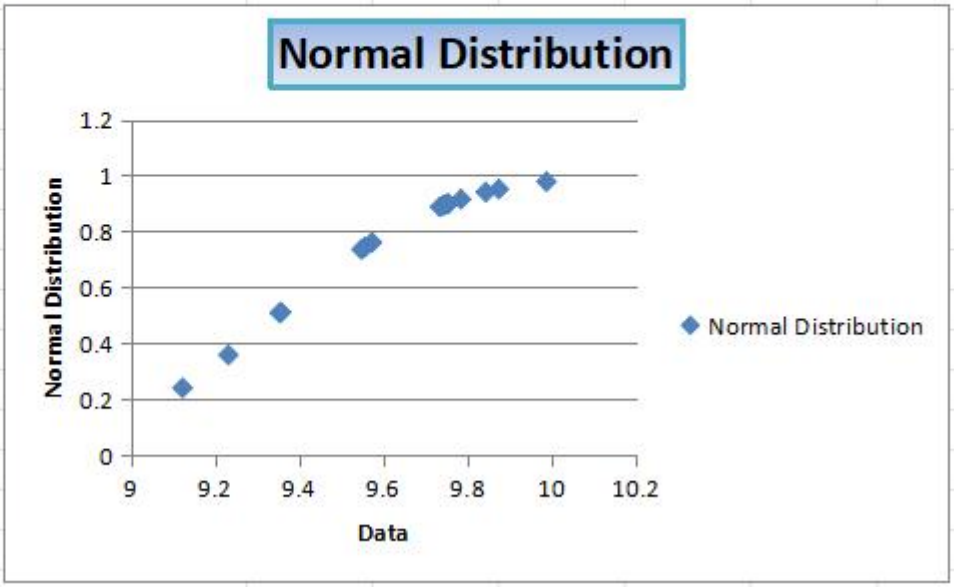


Formula Used		
	=EXPON.DIST(A5,D6,TRUE)	Exponential distribution
	=AVERAGE(A5:A25)	Mean
	=1/D5	λ

Here, A5:A25 contains the data (i.e. from 9.206343 to 9.276345).
D5 contains mean and D6 has λ.

7. Plotting and fitting of Normal distribution and graphical representation of probabilities.

Data:	Normal Distribution		
9.57346	0.760249939	Mean	9.348455
9.987569	0.977704742	Standard Deviation	0.318205
9.874558	0.95086981		
9.745346	0.893852412		
9.742559	0.892238456		
9.734549	0.887501571		
9.556364	0.743244778		
9.753485	0.898465818		
9.548234	0.73494263		
9.754548	0.899057626		
9.354656	0.507773868		
9.2324	0.35766112		
9.784586	0.914749697		
9.357236	0.511007578		
9.84356	0.940137669		
9.12345	0.239750061		



Formula Used	=NORM.DIST(A2,D2,D,TRUE)	Normal distribution
	=AVERAGE(A2:A17)	Mean
	=STDEV(A2:A17)	Standard Deviation

Here, A2:A17 contains the data (i.e. from 9.57346 to 9.12345).
D2 contains mean and D3 has standard deviation.

8. Calculation of cumulative distribution functions for Exponential and Normal distribution.

Calculation of cumulative distribution functions for Exponential and Normal distribution.	
Solution	
For Exponential distribution	λ = 0.5 x = 2
Cumulative distributive function	0.632120559
For Normal distribution	σ = 1 μ = 0 x = 1
Cumulative distributive function	0.841344746

Formula Used	=EXPON.DIST(E4, E3, TRUE)	Exponential distribution
	=NORM.DIST(E10,E9,E8,TRUE)	Normal Distribution

Here, E4, E3 contain the x and λ respectively.
E8, E9, E10 contain σ, μ and x respectively.

9. Application problems based on the Binomial distribution.

Application problems based on the Binomial distribution.

Let's say that 80% of all business startups in the IT industry report that they generate a profit in their first year.
If a sample of 10 new IT business startups is selected, find the probability that exactly seven will generate a profit in their first year.

Solution

Number of trials	10
Probability of success	0.8

probability that exactly seven will generate a profit in their first year	0.20133

Formula Used	=BINOM.DIST(7,B7,B8,FALSE)	Binomial distribution

Here, B7 & B8 contain no. of trials and probability of success respectively.

10. Application problems based on the Poisson distribution.

Application problems based on the Poisson distribution.

If electricity power failures occur with an average of 3 failures every twenty weeks, calculate the probability that there will not be more than one failure during a particular week.

Solution:

Mean
0.15

Probability that there will not be more than one failure during a particular week	0.9898

Formula Used	=POISSON.DIST(1,A8, TRUE)	Poisson distribution

Here, A8 contains means of the data.

11. Application problems based on the Normal distribution.

Application problems based on the Normal distribution.

The IQ scores of college students are normally distributed with an average IQ of 100 and a standard deviation of 15.

What is the probability that a randomly selected college student has an IQ of 120 or higher?	0.09121122
What is the probability that a randomly selected college student has an IQ of 85 or lower?	0.158655254

Solution

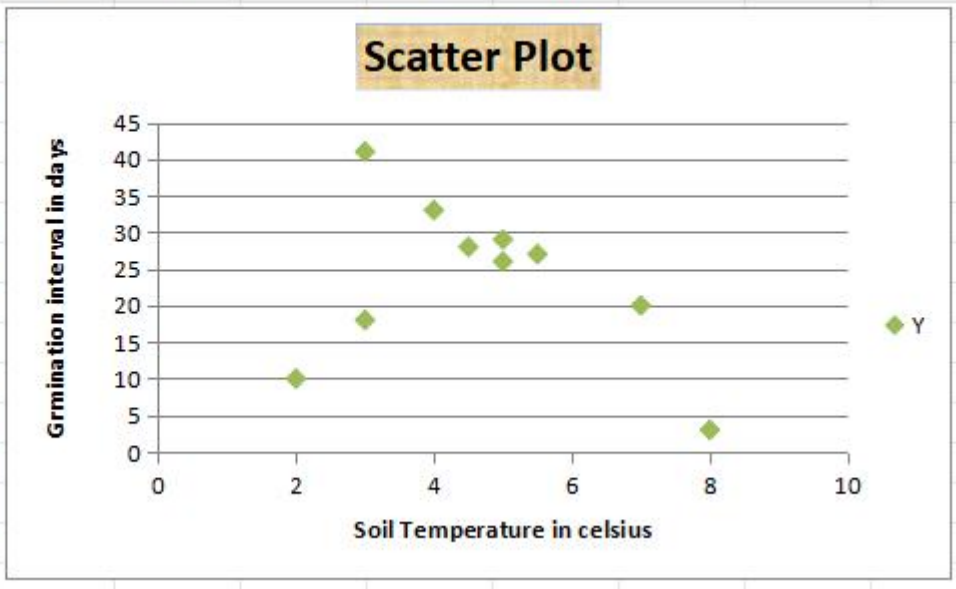
Mean	Standard deviation
100	15

Formula Used	=1-NORMDIST(120, A9 , B9, TRUE)	Normal distribution
	=NORMDIST(85, A9, B9, TRUE)	

Here, A9 and B9 contain means and standard deviation of the data respectively.

12. Presentation of bivariate data through scatter-plot diagrams and calculations of covariance.

	X	Y
	2	10
	5	26
	3	41
	5	29
	5.5	27
	8	3
	3	18
	7	20
	4.5	28
	4	33
Covarience	-6.2	



Formula Used	=COVAR(B5:B14,C5:C14)	Covariance

Here, B5:B14 and C5:C14 contain the X and Y column data respectively.

13. Calculation of Karl Pearson's correlation coefficients.

A	B	C	D	E
X	Y			
2	2			
3	4			
3	7			
6	9			
5	10			
Karl Pearson Correlation coefficient		0.878052805		

Formula Used	=PEARSON(A4:A8,B4:B8)	Karl Pearson Correlation Coefficient

Here, A4:A8 & B4:B8 contains the respective X & Y data.

14. To find the correlation coefficient for a bivariate frequency distribution.

To find the correlation coefficient for a bivariate frequency distribution.

Soil temperature (xi , in 0 C) and germination interval (yi , in days) were observed for winter wheat at 10 localities:

X	Y
10	25
3	32
12.7	10
5	27
4	39
7	42
6.4	32
8	19
5	16
3	33

Correlation coefficient for a bivariate frequency distribution.

-0.58918

Formula Used	=CORREL(A6:A15,B6:B15)	Correlation Coefficient

Here, A6:A15 & B6:B15 contains the respective X & Y data.

15.Generating Random numbers from discrete (Bernoulli, Binomial, Poisson) distributions.

16.Generating Random numbers from continuous (Normal, Uniform) distributions.

Generating Random numbers from discrete (Bernoulli, Binomial, Poisson) distributions.			
Discrete Distributions			
1 Bernoulli Distribution	1	0	0
2 Bionomial Distribution	6	7	4
3 Poisson Distribution	0.319430419	2.07E-07	3.7144E-05
Generating Random numbers from continuous (Normal, Uniform) distributions.			
Continuous Distributions			
4 Normal Distribution	0.03720173	0.049802	0.041701
5 Uniform Distribution	3	10	7

Formula Used	=IF(RAND() <= 5, 1, 0)	Random number generation using	Bernoulli distribution
	=BINOM.INV(10,0.5,RAND())		Binomial distribution
	=POISSON.DIST(1,RAND(),FALSE)		Poisson distribution
	=NORM.DIST(RAND(),5,3,FALSE)		Normal distribution
	=ROUND(1 + (10 - 1 + 1)*RAND(), 0)		Uniform distribution