ATMA RAM SANATAN DHARM COLLEGE

Course Title: Discrete Mathematical Structure Practical

Submitted To:

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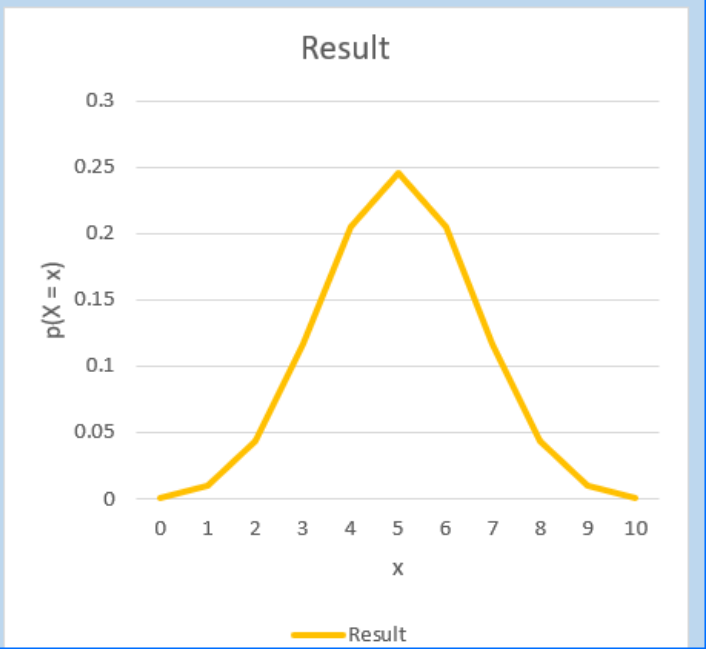
Course : B.Sc. Computer Science Hons.

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

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

Probability of Success	Number of Success	Result
0.5	0	0.00097656
0.5	1	0.00976563
0.5	2	0.04394531
0.5	3	0.1171875
0.5	4	0.20507813
0.5	5	0.24609375
0.5	6	0.20507813
0.5	7	0.1171875
0.5	8	0.04394531
0.5	9	0.00976563
0.5	10	0.00097656

Trials 10



Formula Used	=BINOM.DIST(B3,G2,A3, FALSE)	Binomial distribution

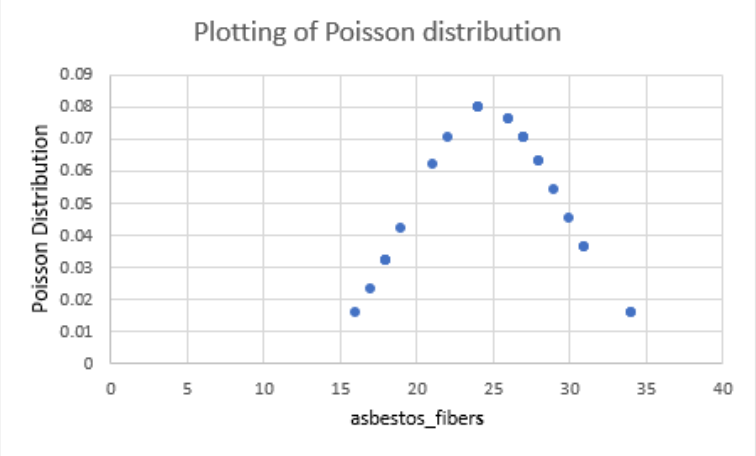
Here, B3, G2 and A3 contain number of success, trials and A3 probability of success respectively.

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

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

asbestos_fibers	Poisson Distribution
31	0.036257244
29	0.054131065
19	0.04195029
18	0.031935446
31	0.036257244
28	0.062896864
34	0.015699965
26	0.076334282
27	0.070562091
34	0.015699965
30	0.045034039
16	0.015687844
18	0.031935446
26	0.076334282
27	0.070562091
27	0.070562091
18	0.031935446
24	0.079652942
22	0.070584564
28	0.062896864
24	0.079652942
21	0.062218113
17	0.023031908
24	0.079652942

Mean	24.9583



Formula Used	=POISSON.DIST(A3,G4,FALSE)	Poisson distribution
	=AVERAGE(A2:A26)	Mean

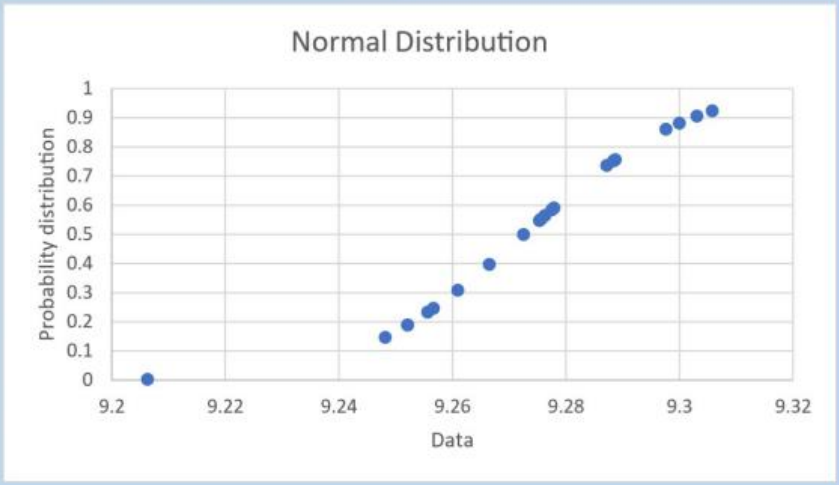
Here, A3:A26 contains the data (i.e. from 31 to 24).
G4 contains mean and A3 is the first data (i.e. 31).

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

Plotting and fitting of Normal 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:	Normal Distribution		
9.206343	0.002132262	Mean	9.272620095
9.299992	0.881057614	Standard Deviation	0.023190824
9.277895	0.589965623		
9.305795	0.923715883		
9.275351	0.546870291		
9.288729	0.756354541		
9.287239	0.735775215		
9.260973	0.307753361		
9.303111	0.905708605		
9.275674	0.552383635		
9.272561	0.49898341		
9.288454	0.752622623		
9.255672	0.232447486		
9.252141	0.188599525		
9.29767	0.859965533		
9.266534	0.396492857		
9.256689	0.246054962		
9.277542	0.584038153		
9.248205	0.146218351		
9.252107	0.188203741		
9.276345	0.563803558		



Formula Used	=NORM.DIST(A5,D5,D6,TRUE)	Normal distribution
	=AVERAGE(A5:A25)	Mean
	=STDEV(A5:A25)	Standard Deviation

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

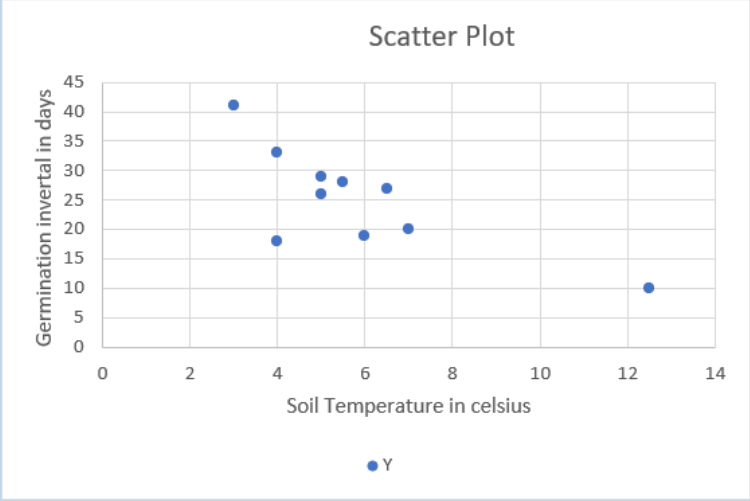
Here, A9 and B9 contain means and standard deviation of the data respectively.

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

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

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

X	Y
12.5	10
5	26
3	41
5	29
6.5	27
6	19
4	18
7	20
5.5	28
4	33
Covariance	-15.785



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.

Calculation of Karl Pearson's correlation coefficients.

X	Y
1	2
2	4
3	8
5	8
5	10

Karl Pearson Correleation coefficient	0.918558654

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	
12.5	10	
5	26	
3	41	Correlation coefficient for a bivariate frequency distribution.
5	29	
6.5	27	
6	19	
4	18	-0.762788528
7	20	
5.5	28	
4	33	

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