Normal Distribution

Prompt-1:
give me 100 random numbers using normal distribution in python
Note:
if don't mention the mean and variance, it will follow standard normal distribution.

Prompt-2:
give me 100 random numbers using normal distribution with mean 5 and variance 0.1 in python

Prompt-3:
now show a graph with 5 line graphs for 5 different mean and standard deviation using normal distribution

Binomial Distribution

Prompt-1:
generate a python script which will give me 100 random numbers from binomial distribution with probability 0.5 and no of trails 40. show it in a graph

Prompt-2:
increase the graph size

```
# Set the figure size
plt.figure(figsize=(12, 8))
```

Prompt-3:
give me 5 different lines for 5 different probability in a same graph in python using binomial distribution

Poisson Distribution

Prompt-1:
generate 100 random numbers using poisson ditribution in python

Prompt-2:
show me a bar graph for 1000 random numbers getting from poisson distribution

Prompt-3:
show me 5 different line graphs for 5 lamdas in the same graph using poisson distribution

Beta Distribution

Prompt-1:
generate a python script which will give me 100 random numbers from beta distribution with alpha 2 and beta 5. show it in a graph

Prompt-2:
give me 5 line graphs in the same graph for different alpha and beta using beta distribution

Prompt-4:
give me the value of alpha and beta of beta distribution if mean 0.4, variance 0.01

Prompt-5:
using these alpha beta give me 1000 random numbers of beta distribution

Confidence Intervals

Prompt-1:
why do we use confidence interval? explain me with an easy example

Prompt-2:
how to calculate ci in python

Prompt-3:
Relative Half-Width of 95% CI

Prompt-4:
take no of cases 2500, 3 probabilities such as 0.1, 0.25, 0.5 and 5 iterations with no of simulations (200, 500, 1000, 2000, 5000, 10000). for each probability and iteration generate random numbers using binomial distribution individually for size =no of simulations. then calculate the confidence interval and Relative Half-Width of 95% CI for each probability and no of simulations

Prompt-5:
now show me 3 line plots for each probability with x axis = no of simulations and y axis = relative half width 95% ci

Simulation: Using Total Cases

For total case:

Using the inputs
cases = 201, a1 = 0.59, a2 = 0.723, a3 = 0.128, population = 1019847, n_iter = 10
Calculate the true incidence, create random numbers for making case distribution using binomial with true incidence and population.

Afterwards, call a function whose input will be mean and varience and output will be alpha and beta. Then create random numbers for making a1, a2, a3 using beta distribution. Finally, Calculate the crude and adjusted rate distribution.

Simulation: Bangladesh inpatient (DSH) for typhi

The Supplementary link is here

For Bangladesh inpatient (DSH) the table is given below:

Age Group	A1	A2	A3	Cases	Population
< 2 years	0·59	0.989	0.613	35	77,958
2 - 4 years	0·59	0.988	0.613	80	1,73,878
5 - 15 years	0·59	0.991	0.613	85	5,88,070