Experiment no. 1

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- **Problem statement -**
Write a program on conditional probability using python.

- **Theory -**
conditional probability is the probability of an event occuring given that another event has already occured. The concept of conditional probability is primarily related to Bayes theorem, which is one of the most influential theories in statistics.

Formula :

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

OR

$$P(B/A) = \frac{P(A \cap B)}{P(A)}$$

Experiment no. 2

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- **Problem statement -**

Write a program using python for the following statement - Assume a fixed probability of flipping heads and stimulate a flipping head (H) or Tails (T) by using a choice function in the numpy module to randomly select one of these two outcomes. Display simulated flip, accumate the number of heads and ratio of heads to total flip as a probability drives from the frequency of occurences.

- **Theorey -**

Probability $P(E) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of outcomes}}$

Being able to generate random no. effeciently when working with a programming language is very imp.

To get a coin flip, we can use the python random module. In python random module, we can use python random() function, or the python choice functn

e.g.
```
import random
mylist = ["apple", "banana", "cherry"]
print (random.choice (mylist))
```

Experiment no. 5

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- Problem statement -
Implement binomial distibution using python.

- Theory -
Binomial distribution is one of the most popular distribution is statistics, along with normal distribution. Binomial distribution is a discreate probability distribution of a number of success (x) in a sequence of independent experiment (n). Each experiment has two possible outcomes - success & failure

i.e. success probability = p
failure probability = q = 1-p

$$P(x : n, p) = {}^{n}C_{x} \cdot p^{x} \cdot q^{n-x}$$

n = Total no. of events
r (or) x = total no. of successful events.
p = probability of success on single trial.
${}^{n}C_{r} = [n! / r! (n-r)!]$
q = probability of failure

Experiment no. 7

- **Problem statement-**

Write a python program for pearson correlation test between two variables.

- **Theory -**

The pearson correlation coefficient measures the linear association between variables its values can be interpreted like so-

+1 = complete positive correlation
-1 = complete negative correlation.
+0.8 = strong positive correlation.
-0.8 = strong negative correlation.
0 = no correlation
+0.6 = moderate positive correlation
-0.6 = moderate negative correlation.

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$

Experiment no. 8

- Problem statement-
study of simple regression model using python.

- Theory -
Regression searches for relationships among variables

$Y = a + bx$ is interpreted as 'a' is the average value of Y when x is zero.

$x = c + dy$, value c is the average value of x, when Y is zero.

slopes of x on x is $b_{yx} = \frac{cov(x,y)}{var(x)}$

equation is $Y - \bar{Y} = b_{yx}(x - \bar{x})$

slopes of x on Y is $b_{xy} = \frac{cov(x,y)}{var(Y)}$

equation is $x - \bar{x} = b_{xy}(Y - \bar{y})$

Experiment no. 11

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- Problem statement -

study different types of correlation and implement anyone using python programming

- Theory -

correlation is a statistical calculation that indicates that two variables are parallely related. It is a simple and popularly used tool for defining relationship without delivering a statement concerning the cause effect.

A positive and perfect correlation indicater that the coefficient correlation is exactly one. It indicater that when one variable move upward or downward. The another variable moves in the same direction.

However, a negative and perfect correlation indicater that the variabler move in the opposite directionr when there is a zero correlation. It means that there is no relationship at all.