SUPPORT :

How frequently it occurs in the data. So the data can be taken from either in supermarket/Hospital.

TRANSACTION ID	ITEMS PRUCHASED
1	{Flowers, Greeting card, Glucose}
2	{Toys, Flowers, Balloons, Candy bar}
3	{Greeting card, Candy bar, Flowers}
4	{Toys, Balloons , Glucose}
5	{Flowers, Greeting cards, Glucose}

Let us calculate support for the {Greeting card and Flower}

Its nothing but P(A ∩ B) = No of items combinations / Total

                    = 3/5   --------> Support ----> 60% of transactions contains of this combination.

Indirectly, No of transactions is called Sample space.

Similarly, p(Greeting card) = 3/5
          p(Candy bar) = 2/5

CONFIDENCE :

It is a measure of accuracy and predictive power.

It is nothing but conditional probability.

Confidence (A   -----> B) = P(B / A)
                    In the presence of A what is the chance of purchasing B

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

Similarly I calculate

Confidence (B -----> A) = P(A / B)

In the presence of B what is the chance of purchasing A

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

Therefore   Confidence (A -----> B) is not equal to Confidence (B -----> A)

But Support (A -----> B) = Support (B -----> A)

What actually confidence do, Confidence (B -----> A)
If I Purchase B what is the chance of purchasing A as well.

So, When can we called a Rule is Strong?

Strong Rule: High Support and High Confidence.

Ex1 :

Confidence (g. card -------> Flower) = P (Flower / g. card)

If I purchase g. card , what is the chance of Purchase Flower as well.

Ex2 :

Confidence (g. card, Flower -------> Candy Bar) = P (Candy Bar / g. card, Flower)

If I purchase g. card and Flower, what is the chance of Candy Bar as well.

So, Confidence $= \dfrac{P\ (G \cap F \cap C)}{P\ (G \cap F)}$ ------> Support

$= P\ (\ C\ /\ G \cap F)$ ---- > In presence of G and F what is the chance of purchasing C

LIFT :

It is a measure of how much more likely one item is to be purchased relative to its Normal purchase rate. Given that you know another item has been purchased.

$$\text{Lift (X } \longrightarrow \text{Y) } = \frac{\text{Confidence (X } \longrightarrow \text{Y)}}{\text{Support (Y)}}$$

Ex:
Generally, Purchasing of cool drinks will be less in winter season, so what this people will do they will target the customers of who are habituate with the cool drinks, so what they will do they give offers for buying two bottles at a time will have some discount price.

So, the point is purchasing of one item is a normal but it is leading purchasing more than 1 item.
So, Its nothing but **Lifting** the sales.

Ex: { BREAD} ----------------> {MILK}

Assume that we got some calculation as Lift = 1.565
So, the conclusion will be like this

People who buy bread are nearly 1.6 times more likely to buy milk than normal purchase of milk.

These rules are going to be worked on some algorithm called as **" APRIORI"**