Discrete Probability Distributions.

The probability distribution of a discrete random variable can always be represented by a table. For example, suppose you flip a coin two times. This simple example, supp you flip a coin two times. This simple ~~experiment~~ exercise can have four possible outcomes: HH, HT, TH and TT

P(H)	P
0	$\frac{1}{4}$
1	$\frac{2}{4}$
2	$\frac{1}{4}$
	$P(\Sigma) = 1$

Cumulative Probability

No of heads	Probability P(X)
0	0.25
1	0.50
2	0.25

1	1
2	3
3	6
4	10

$$P(X \leq 1) = P(X=0) + P(X=1)$$
$$= 0.25 + 0.50$$
$$= 0.75$$

Cumulative Probability

0.25
0.75
1.00

Continuous probability Distribution

The probability density function (PDF) is the probability function which is represented for the density of a continuous random variable lying between a certain range of values. It is also called a probability distribution function or just a probability function.

The probability density function is defined in the form of an integral of the density of the variable or density over a given range. It is denoted by $f(x)$. This function is positive or non-negative at any points of the graph and the integral of PDF over the entire space is always equals to one.

Probability Density function Formula

⊙ In case of a continuous random variable, the probability taken by x on some given value x is always 0. In this case, if we find $P(X=x)$, it does not work. Instead of this, we require to calculate the probability of x lying in an interval (a,b). Now, we have to calculate it for $P(a<X<b)$. This can be done by using a PDF. The Probability distribution function formula is defined as

Probability Density function

$$F(x) = P(a \leq x \leq b)$$

$$= \int_a^b f(x)\,dx \geq 0$$