OPTIONS

Option

- A contract between buyer and seller of an option, which gives the buyer the right but not the obligation to buy or sell an asset at a later date, for a price agreed upon at the time the contract is struck.
- Call option : The right to buy the asset
- Put option: The right to sell the asset

Definitions

- Underlying Asset : The asset stated in the contract
- Option Premium: Option price/ premium is the price which the option buyer pays to the option seller.
- Strike Price/ Exercise Price: The price stated in the contract (generally denoted by X)
- Expiration date: The date specified in the options contract (strike date or the maturity).

Definitions

- American Option :Can be exercised on or before the expiration date
- European Option: Can only be exercised on the expiration date
- Option Holder The person buying the contract (Long position)
- Option Writer The person selling the contract (Short position)

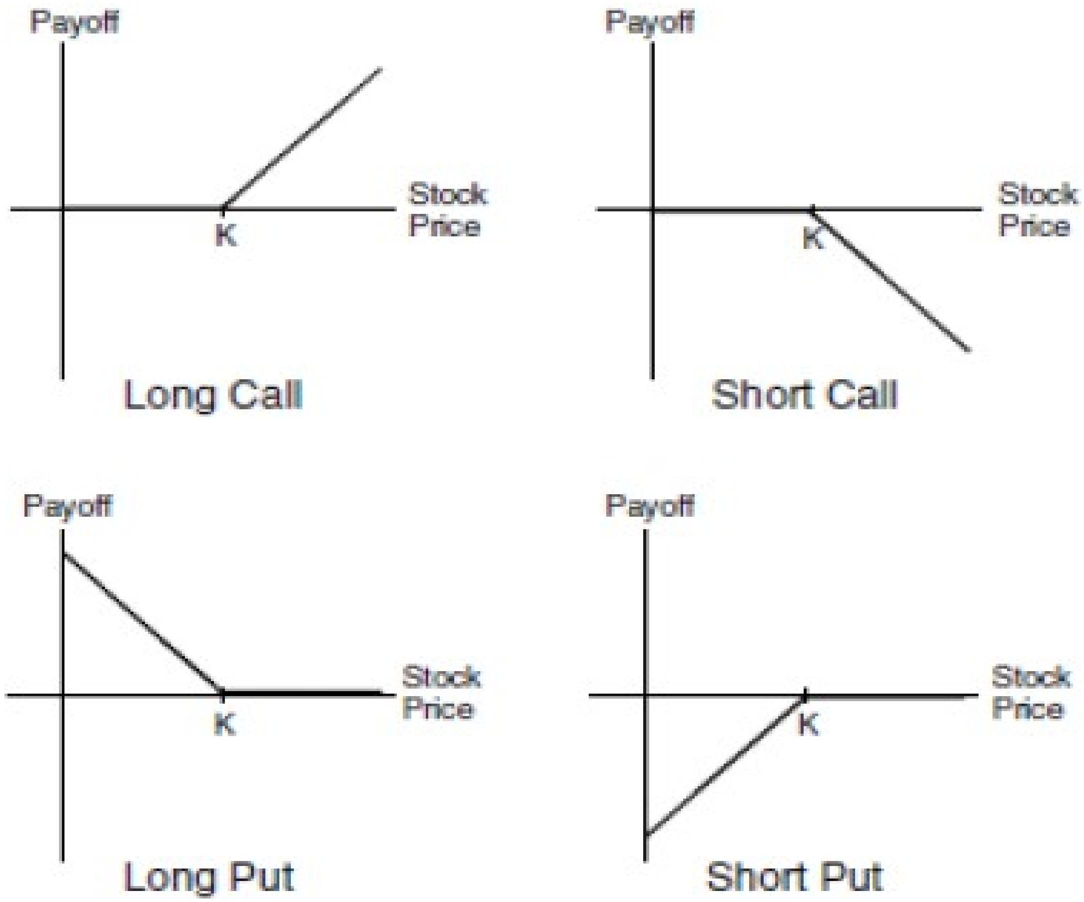
Moneyness of an Option

	Call Option	Put Option
In the Money (ITM)	Spot Price > Strike Price (S>X)	Spot Price < Strike Price (S<X)
At the Money (ATM)	Spot price = strike price	Spot Price = Strike Price
Out of the Money (OTM)	Spot Price < Strike Price	Spot Price > Strike Price

Spot Price - S **Strike Price –X**

Option shall be exercised if it is ITM at expiry

Option Payoff



Payoff for buyer of call option

- Call option gives the buyer the right to buy the underlying asset at the strike price specified in the option
- At expiry, if spot price > the strike price – profit for the buyer
- If spot price < the strike price –option expire un-exercised. Loss is limited to the premium paid

Payoff for seller (writer) of call option

- At expiry, if $S>X$– loss for the seller
- If $S< X$ – option expire un-exercised. Gain is limited to the premium

Payoff for buyer of Put option

- Put option gives the buyer the right to sell the underlying asset at the strike price specified in the option.
- At expiry, if the spot price < strike price, the buyer of the option makes a profit.
- If the spot price > strike price, the buyer lets his option expire un-exercised and the loss is limited to the premium paid.

Payoff for Seller of Put option

- At expiry, if $S<X$, the buyer will exercise the option on the writer and the writer shall incur loss
- If the $S> X$, the buyer lets his option un-exercised and the writer gains the premium.

Intrinsic Value

- Intrinsic value of an option is the difference between the underlying asset's spot price (St) and an option's exercise price (k)
- Intrinsic value implies the extent to which the option is In The Money.
- Deeper in the money means more is the intrinsic value.
- Option which is OTM or ATM has zero intrinsic value.
- For a call option intrinsic value is

  Max (0, (St – K)) and
- For a put option intrinsic value is

  Max (0, (K - St))
- Thus, Intrinsic value can only be positive or zero.

Time Value of Option

- Time Value of an option: Difference between option premium and intrinsic value.
- It comprises of
  - **Risk free rate**
  - **Volatility**
  - **Time to Expiry**
- The time value of an option is always positive and declines exponentially with time, reaching zero at the expiration date.
- At expiry, the option value is simply its intrinsic value and the time value becomes zero.
- Time Value = Option Premium - Intrinsic Value

Implication of Intrinsic and Time Value

- Intrinsic value and time value of an option help investors understand what they are paying for if they decide to purchase an option.
- The intrinsic value of the option represents what it would be worth if the buyer exercised the option at the current point time.
- The time value indicates the chance that the value of the option will increase before its expiration date.
- These concepts helps the investors to understand the risk and reward of an option.