Black Scholes Equation

by

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Importing the necessary libraries

In [15]:
```
import numpy as np
import scipy.stats as si
```

Defining the equation

In [16]:
```
def BlackScholes(S, K, T, r, sigma, option = 'call'):

    #S: spot price
    #K: strike price
    #T: time to maturity
    #r: interest rate
    #sigma: volatility of underlying asset

    d1 = (np.log(S / K) + (r + 0.5 * sigma ** 2) * T) / (sigma * np.sqrt(T))
    d2 = (np.log(S / K) + (r - 0.5 * sigma ** 2) * T) / (sigma * np.sqrt(T))

    if option == 'call':
        result = (S * si.norm.cdf(d1, 0.0, 1.0) - K * np.exp(-r * T) * si.norm.cdf(d2,
    if option == 'put':
        result = (K * np.exp(-r * T) * si.norm.cdf(-d2, 0.0, 1.0) - S * si.norm.cdf(-d1

    return result
```

Defining the option

- Strike Price (S) = 50 U.S.D
- Spot Price (K) = 100 U.S.D
- Time to maturity (T) = 1 year
- Interest Rate (r) = 0.05
- Volatility (sigma) = 0.25

In [17]:
```
S = 50
K = 100
T = 1
r = 0.05
sigma = 0.25
```

Calculating the price of Call Option

In [18]:
```
call_option_price = BlackScholes(S, K, T, r, sigma, option = 'call')
call_option_price
```

Out[18]:
```
0.027352509369436617
```

Calculating the price of Put Option

In [19]:
```
put_option_price = BlackScholes(S, K, T, r, sigma, option = 'put')
put_option_price
```

Out[19]:
```
45.15029495944084
```