

## # Forward & Future

- customized agreement b/w 2 parties

- buy the contract
- sell the contract

→ @ predetermined date

@ predetermined price ( $K$ )  $\leftarrow$  strike price

→ DTC

# long position =  $S_T - K$

# short posn =  $K - S_T$

→ standardized agreement b/w 2 parties to buy or sell the underlying asset  
 @ pred. date  
 @ pred. price  
 → Exchange.

long  $\xrightarrow{\text{opposite}}$  short  
 (buy) (sell)

## # Why do we use Derivatives 2

- 1) Risk Management
- 2) Speculation
- 3) Arbitrage

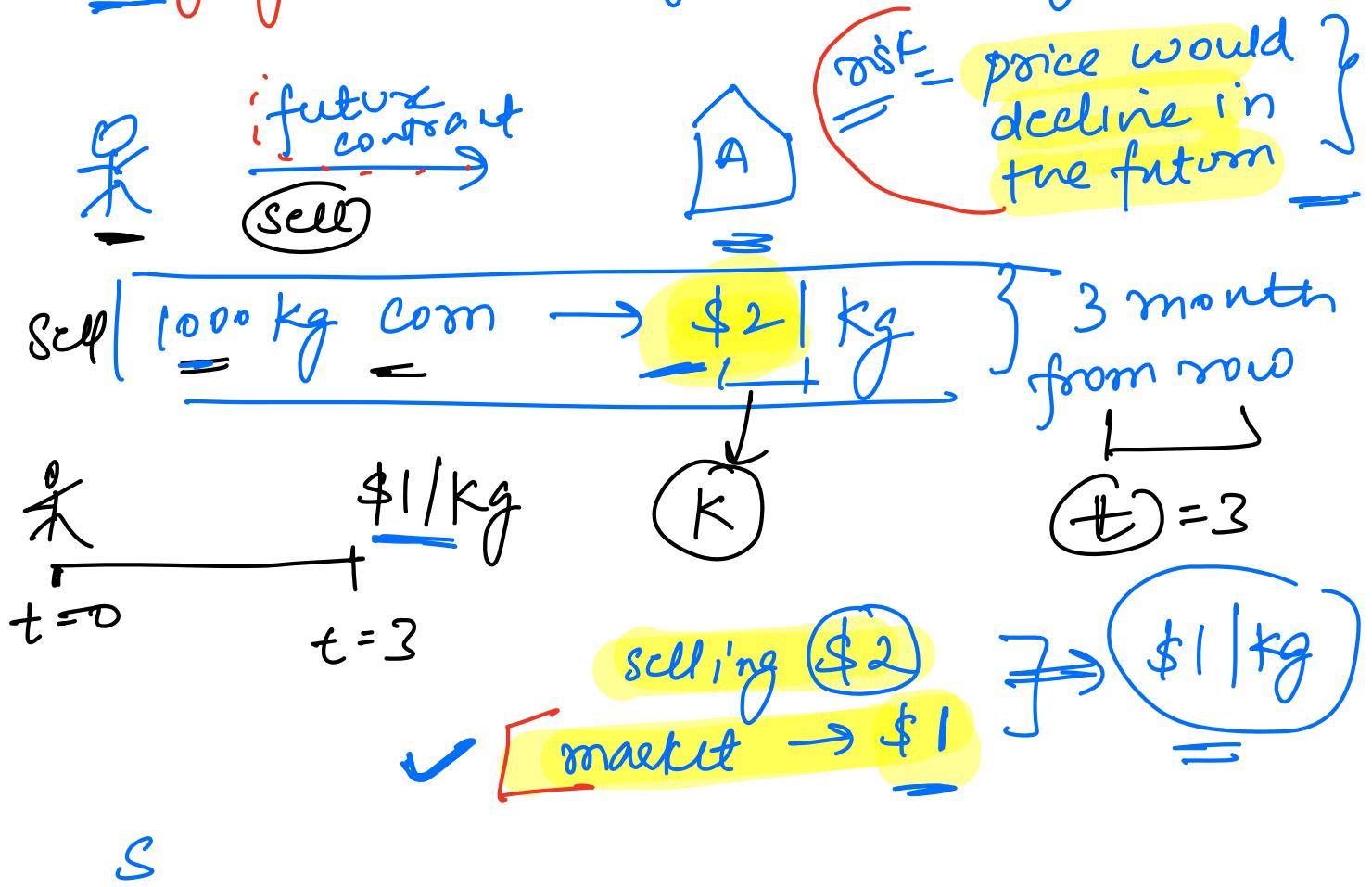
(Hedging)

Form  
 Form  
 Option  
 Swap

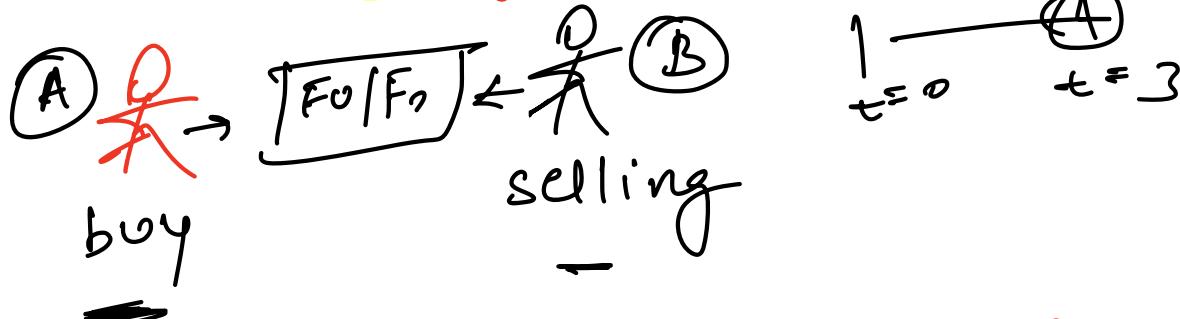
hedge the risk  
 risk management

#### 4) Leverage:

i) Hedging  $\rightarrow$  manage or mitigate risk.



- Forward Future  $\rightarrow$  Both the parties are Obligated



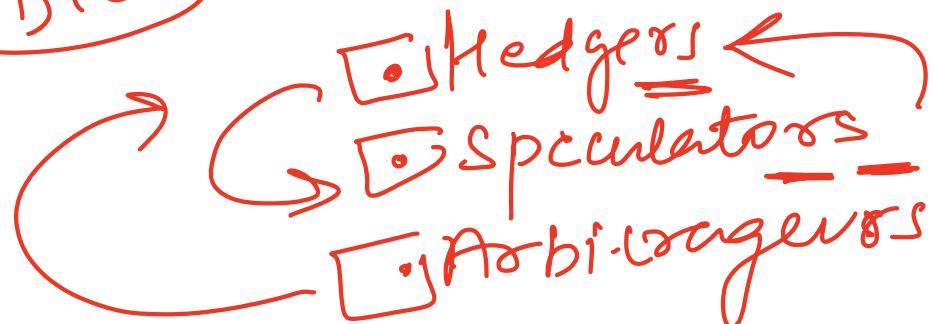
Option,  $\rightarrow$  buy has an option  
Buyer isn't obligated

② Speculation → Investors & Traders  
use derivative to speculate on the  
future price movement of the asset.  
This allows for potential profit if  
the price moves in their favor  
though it also carries a high  
level of risk

→ you are betting  
for a certain  
posn

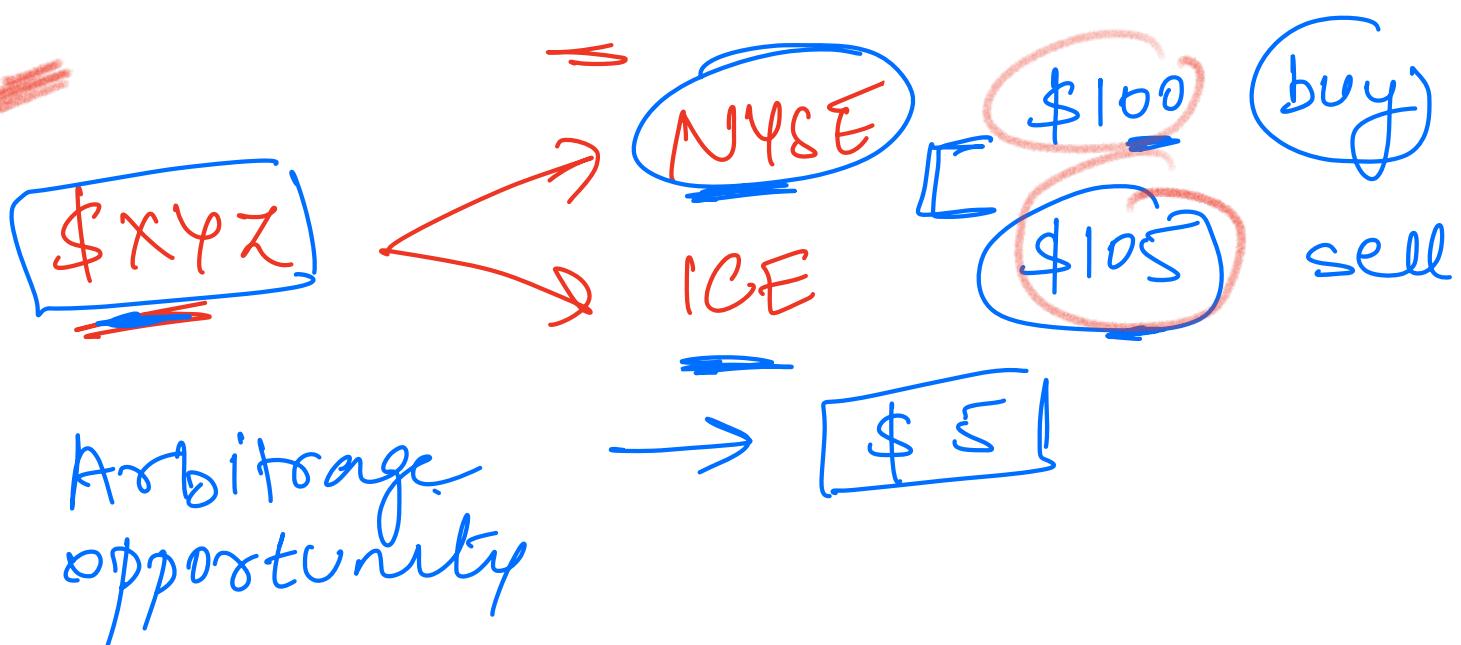


↓ It



Hedgers → risk management  
Speculation → betting for a  
certain position

③ Arbitrage: price discrepancies  
below the underlying  
asset & the derivative

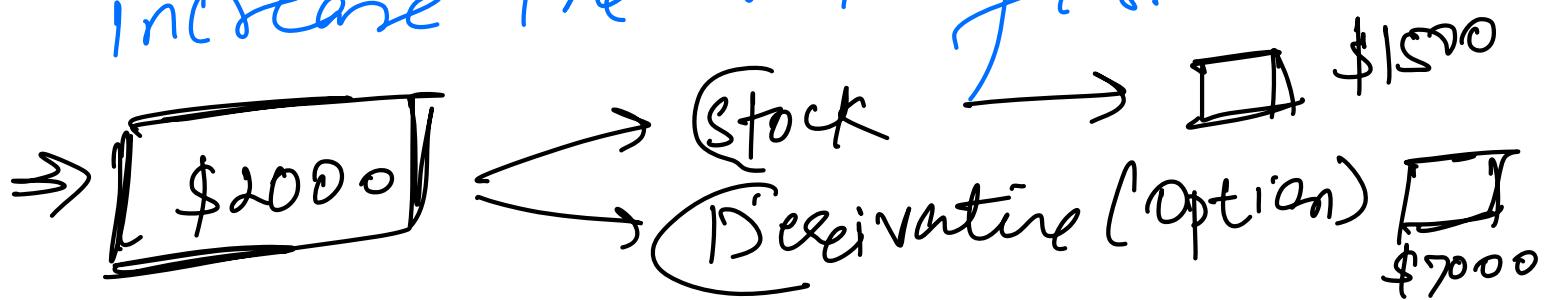


Trade → Arbitrage  
→ find out price  
discrepancies



④ Leverage → Derivative allow  
Investor to gain a large exposure  
to an asset with a relatively  
small initial investment

which is also known as leverage. This can amplify potential returns but can increase the risk of losses.

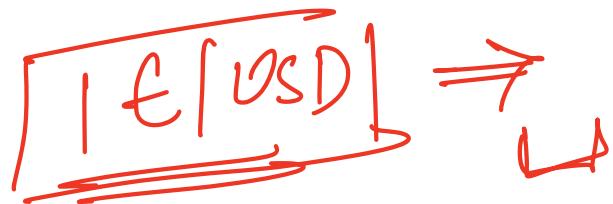
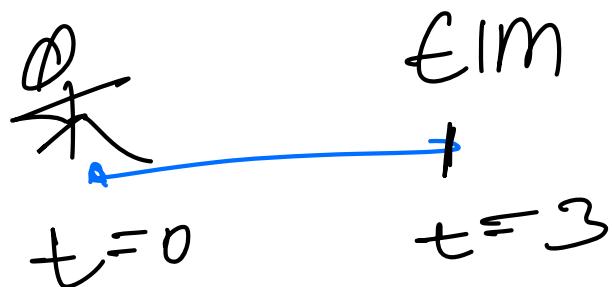


## # Derivatives

- 1) Hedging
  - 2) Speculation
  - 3) Arbitrage Opportunities
  - 4) Leverage
- x

Q Hedging Forward  
Contract

US Based Comp → expects to receive EIM in 3 months



Risk: Euro might weaken against the Dollar

Comp → forward contract → lock the price  
↓  
eliminate the uncertainty of the exchange rate movement.

1 USD  $\rightarrow$  Rs 84

₹

1000 USD

Rs might weaken

In the future

1 USD  $\rightarrow$  Rs 80

Recover		USD	Rs
84		1000	$84 \times 1000 =$ 84000
80		1000	$80 \times 1000 =$ 80,000

Future / forward

$1 \text{ USD} / \text{Rs} = 83.5$

$$\Rightarrow 83.5 \times 1000 = \text{Rs } 83,500$$

( 1 USD  $\rightarrow$  Rs 84 )  
G 1 USD  $\rightarrow$  Rs 85 )

Buy  
Selling

8

1 USD → 85



CI USD → 84

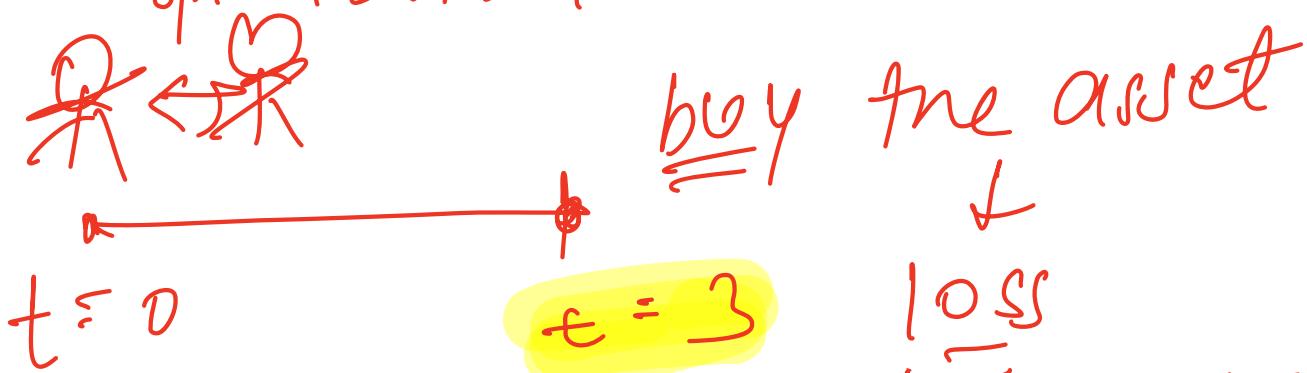
CI USD → RS 90  
= weak

= 1000

# Options

↳ Option is a type of financial derivative which gives the holder the right but not the obligation to buy or sell the

Underlying asset @  
predetermined price  
@ predetermined date  
option contract



I do not want to execute  
the deal

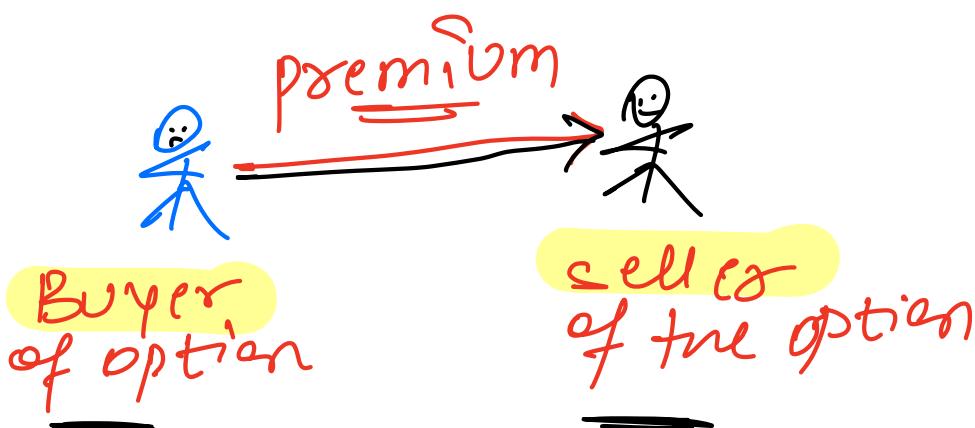
$t = 3$   $\rightarrow$  option to buy  
but not an  
obligation  
to buy

~~profit~~  $\rightarrow$  buy ✓  
~~loss~~  $\rightarrow$  I will not exercise  
the contract

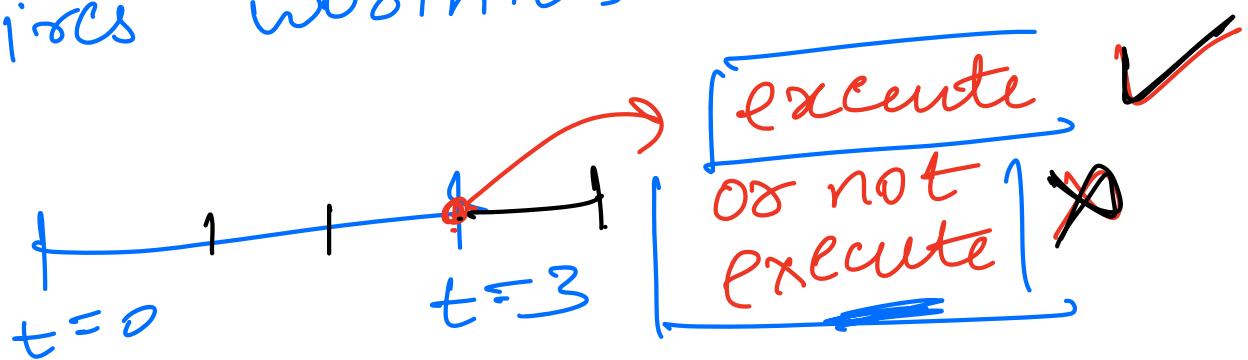
# # Key characteristic of Option Contract

- a) Underlying Asset -
  - b) Strike Price -
  - c) Premium -
  - d) Expiration Date -
  - e) Exercise Style. =
- 
- a) Underlying Asset → stocks, commodities, currencies, bonds etc
  - b) Strike Price → price at which the holder can buy or sell the underlying asset
  - c) Premium → It is the price

paid by the buyer (long pos<sup>n</sup>)  
to the seller (short pos<sup>n</sup>)



d) Expiration Date → The date at which option must be exercised otherwise it expires worthless

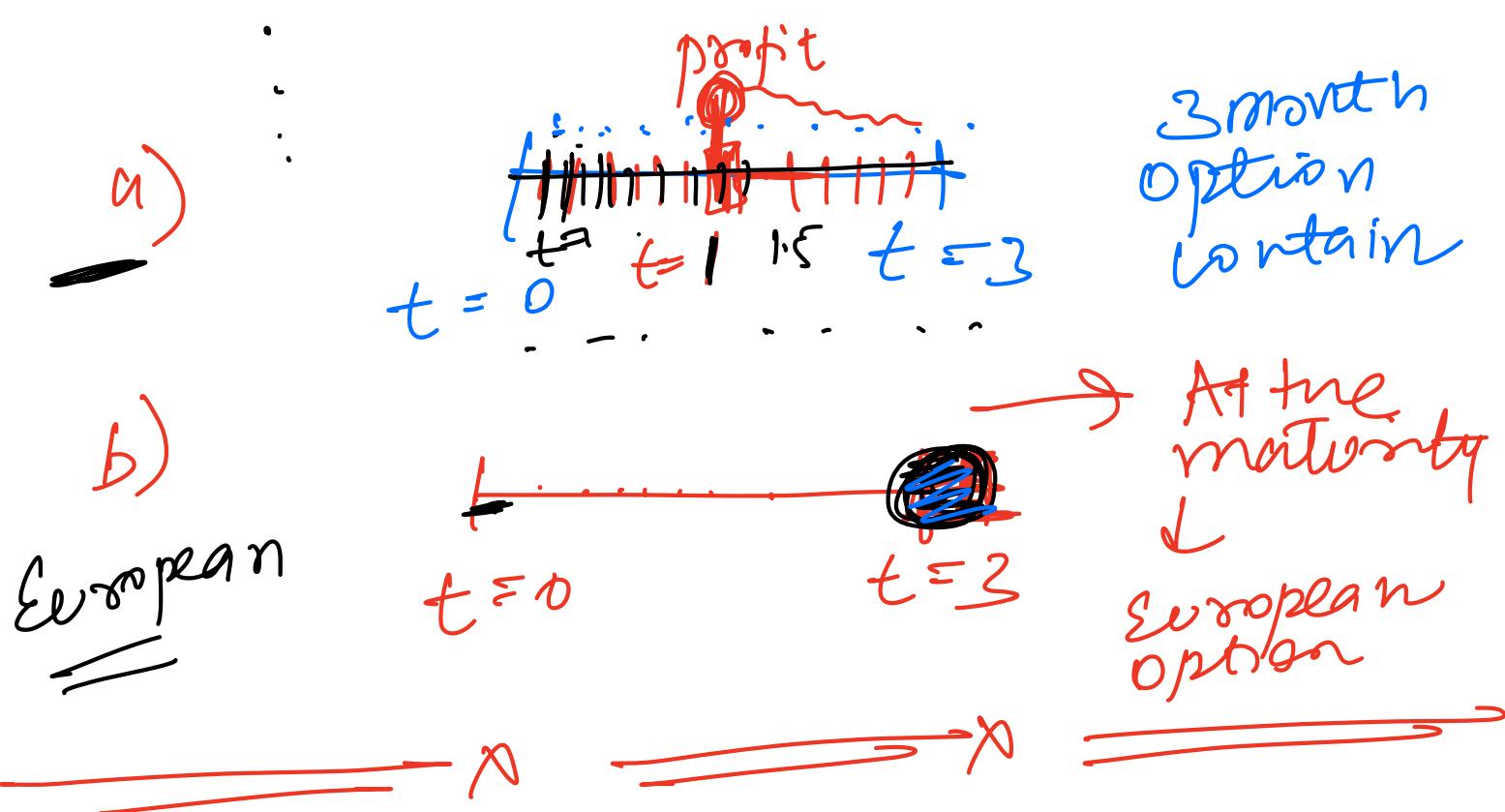


Forward Future → No concept of not executing  
↳ Obligation ↳ execute the contract

Choice  
✓ X

e) Exercise Style

- a) American Option → Option can be exercised at any point of time
- b) Euro. plan Option → Option can be exercised only at the Maturity
- c) Asian Option



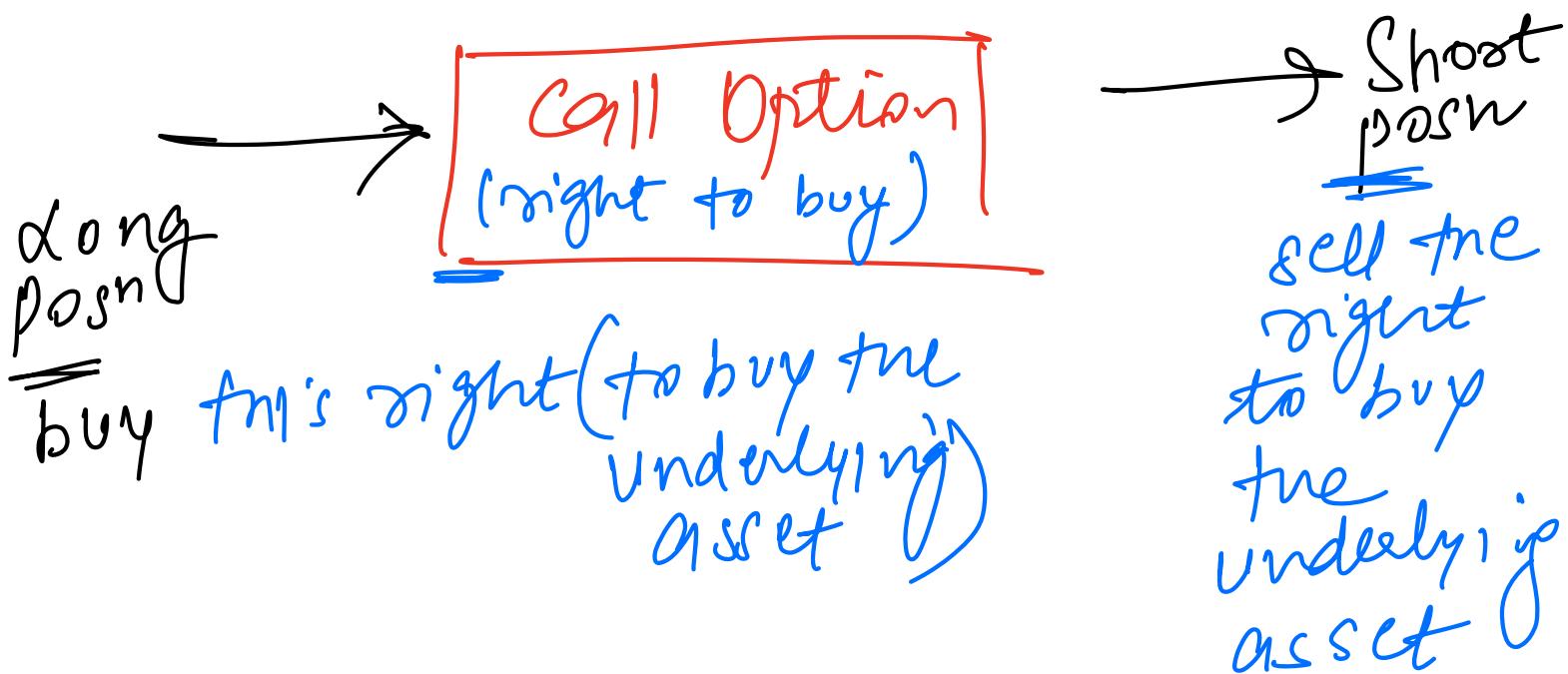
## # Types of Option

- 1) Call Option
- 2) Put Option

① Call Option → It gives the holder the right to buy the underlying asset ~~at~~ <sup>at</sup> a predetermined date.

long Position → buy  
short Position → selling

long Call Option → buying the call option



call option

right to buy the asset

price of the asset will go up

bought

long call option

price will go up of the asset

right

sold

short call option

price will go down

long call option

: exp: stock price will go up.

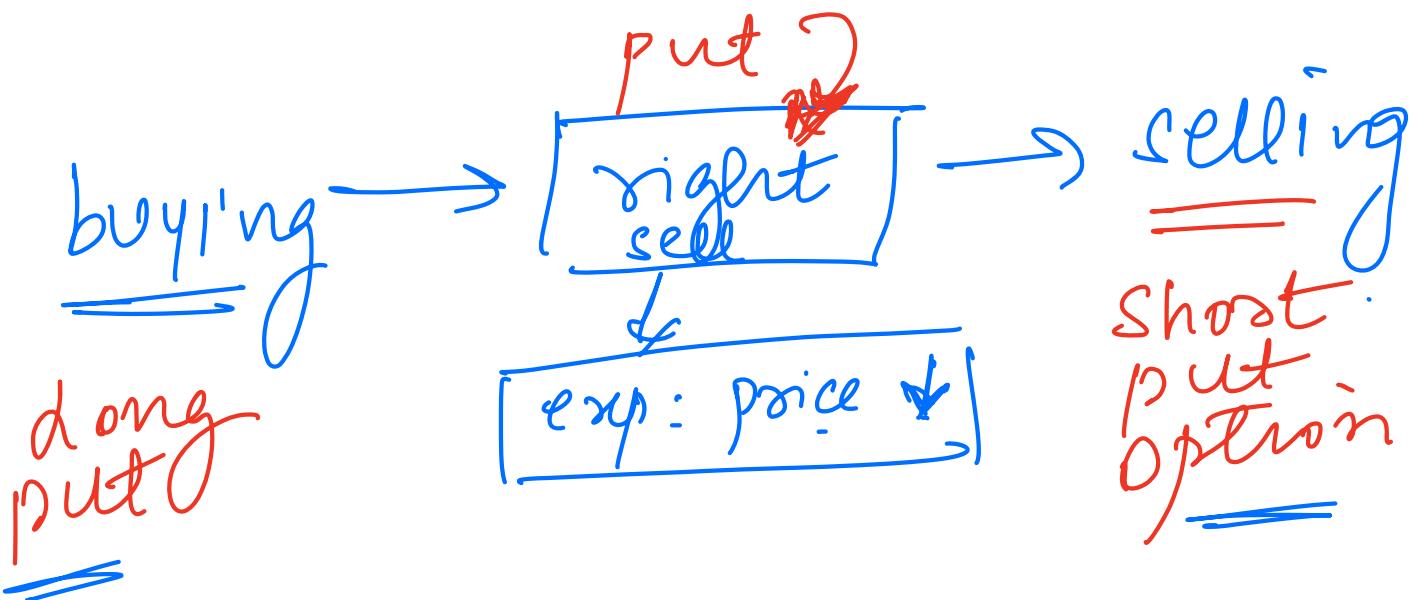
short call option

: exp → price will decline

a) call posn

→ right to buy the underlying

b) Put option → right to sell the underlying



Call opt → right to buy  
Put opt → right to sell

+  
 $t = 3$

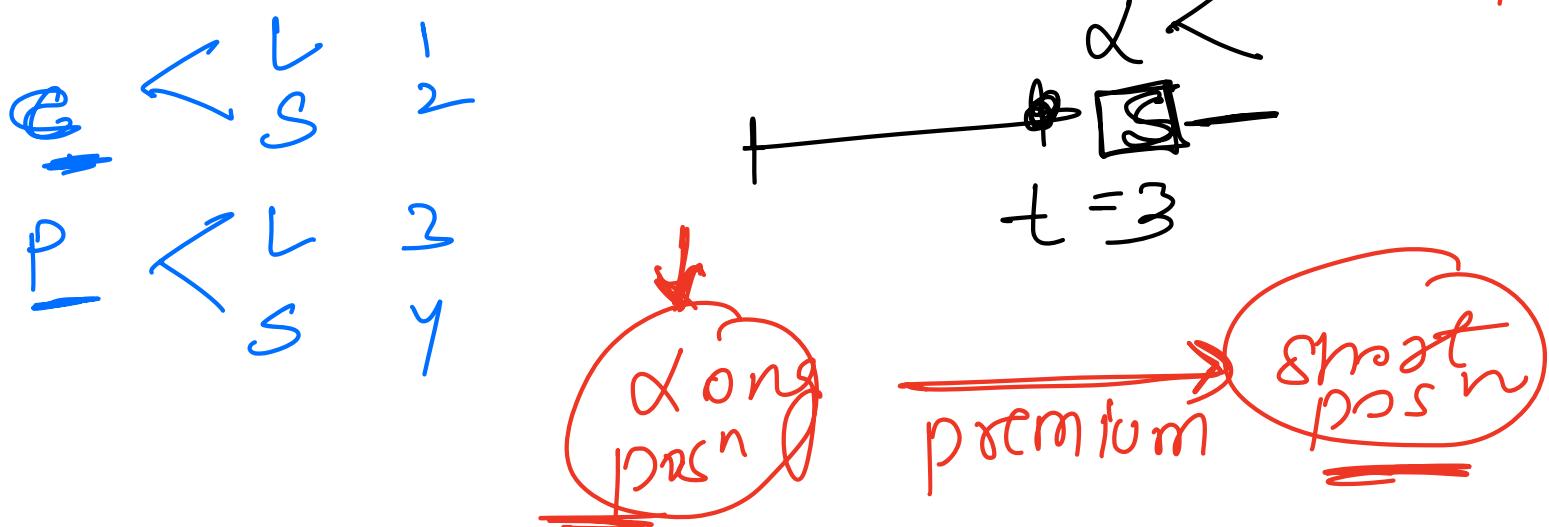
obligate / execute ✓

long posn → right to buy / sell the underlying asset

Short posn

Obligated  
to buy / sell

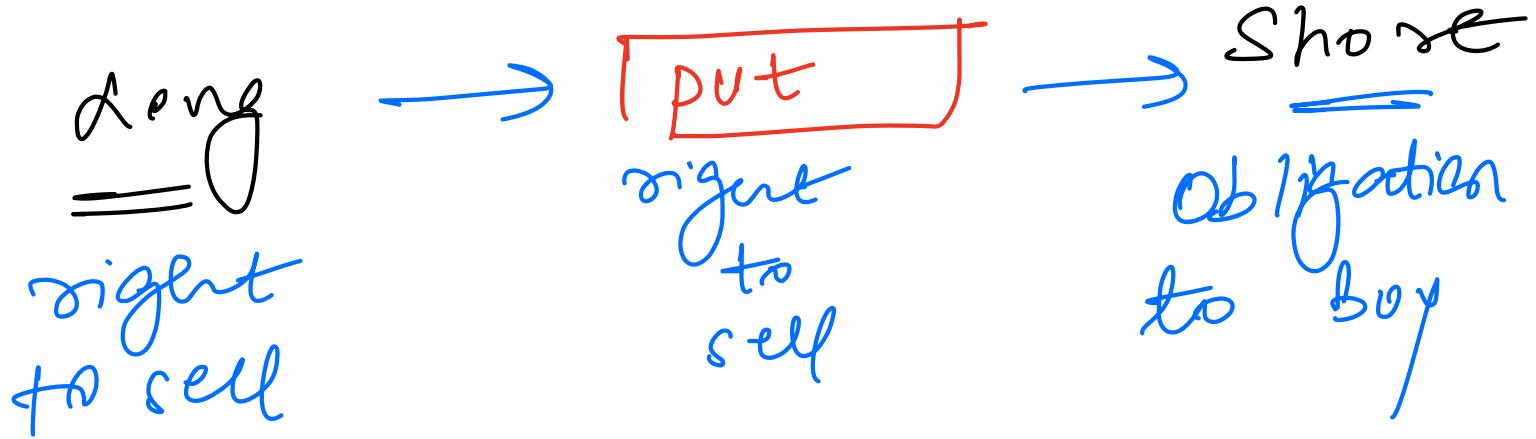
- 1) long call posn → right to buy
- 2) short call posn → obligation to sell
- 3) long put posn → right to sell
- 4) short put posn → obligation to buy



Long = right to buy

Call right to buy

Short = obligation to sell

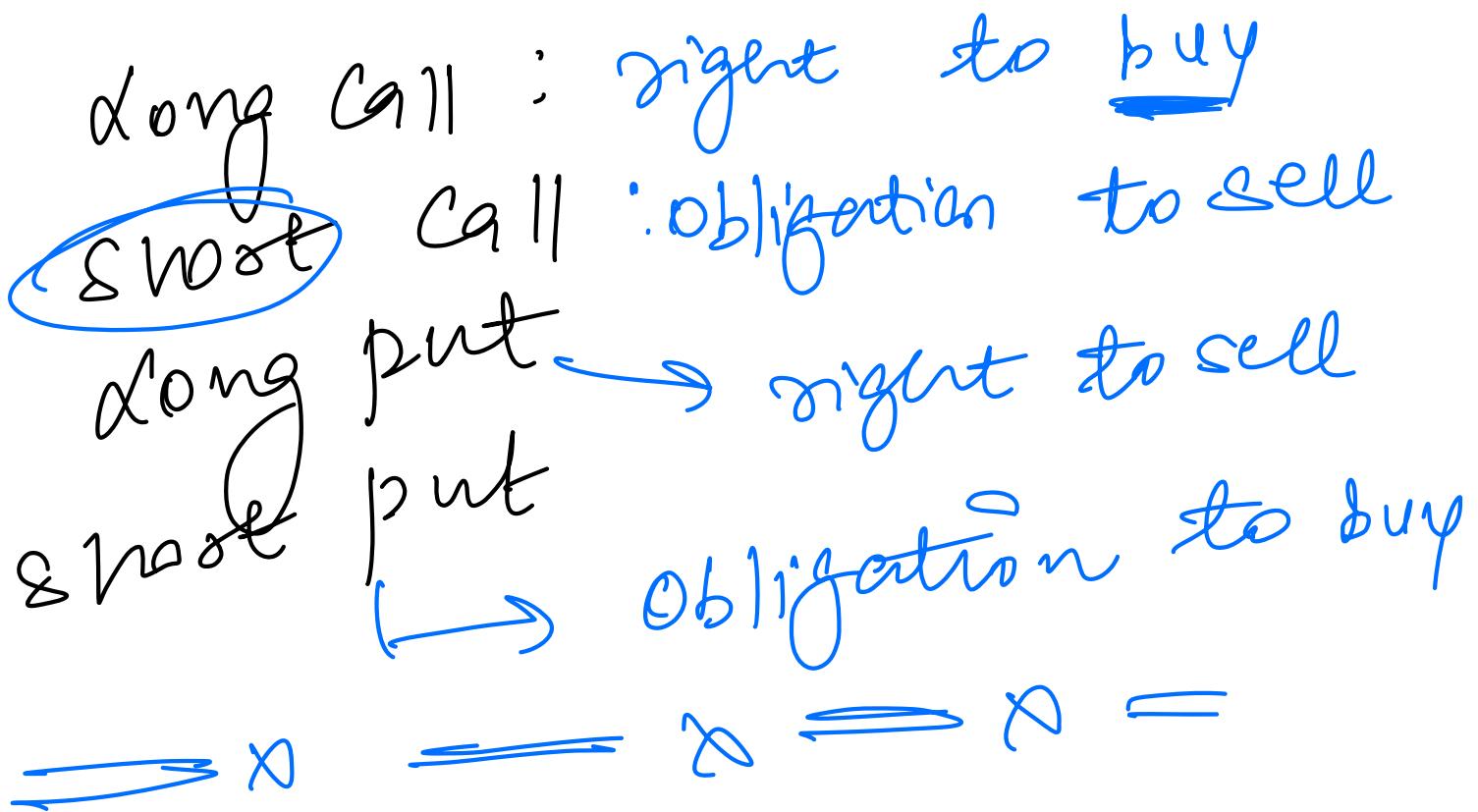


# Option → right, but holder  
 long → not own obligation  
 short → Obligated

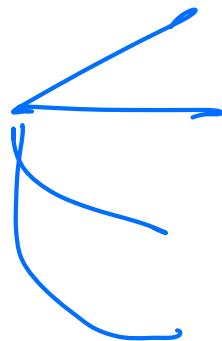
- a) Asset
- b) Strike price
- c) premium
- d) Expiration
- e) Exercise style

long → Short  
 =  
 t=3, t=6...  
 American

- # a) Call  $\begin{cases} L \\ S \end{cases}$
- b) Put  $\begin{cases} L \\ S \end{cases}$



Payoff  
diagram



Mathematics  
 cash  
 =  
 +  
 Excel implementation