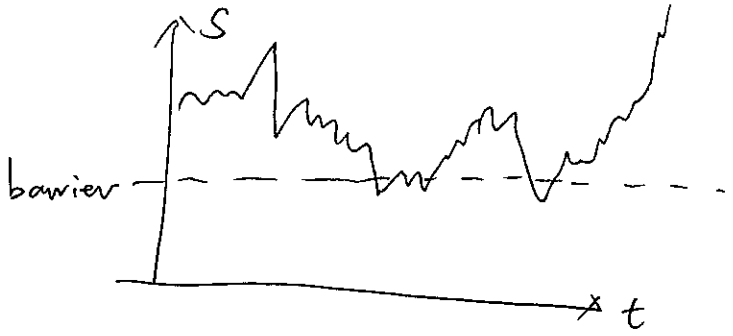
2017.3.7.

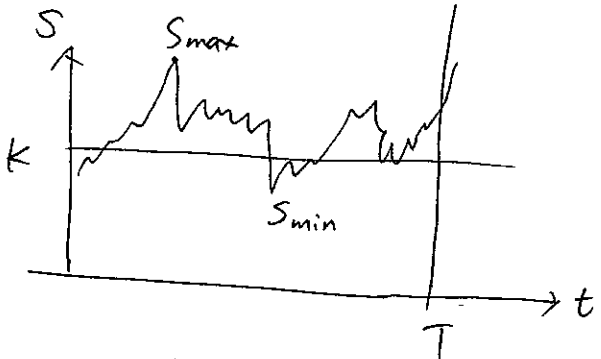
⑥ Parisian options:

A parisian option is a barrier option where the barrier option applies only once the price of the underlying instrument has spent at least a given period of time on the wrong side of the barrier.



⑦ Lookback option:

Lookback option has payoff that depends on the maximum or minimum value of the stock



Lookback rate call option

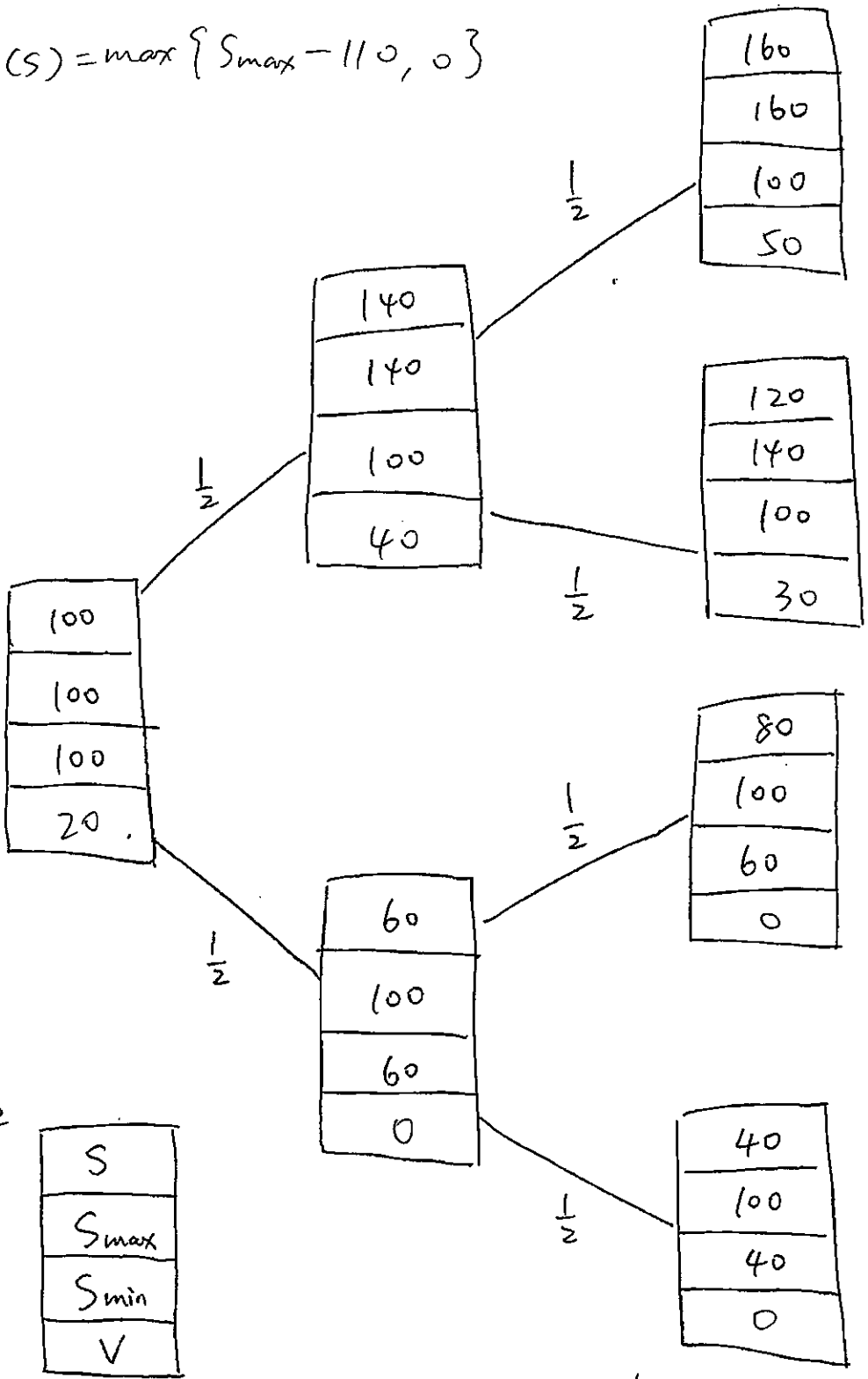
$$F(S, S_{max}, k) = \max\{S_{max} - k, 0\}$$

$$F(S, S_{min}, k) = \max\{S_{min} - k, 0\}$$

Lookback rate Call

$k = 110$

$F(S) = \max\{S_{max} - 110, 0\}$



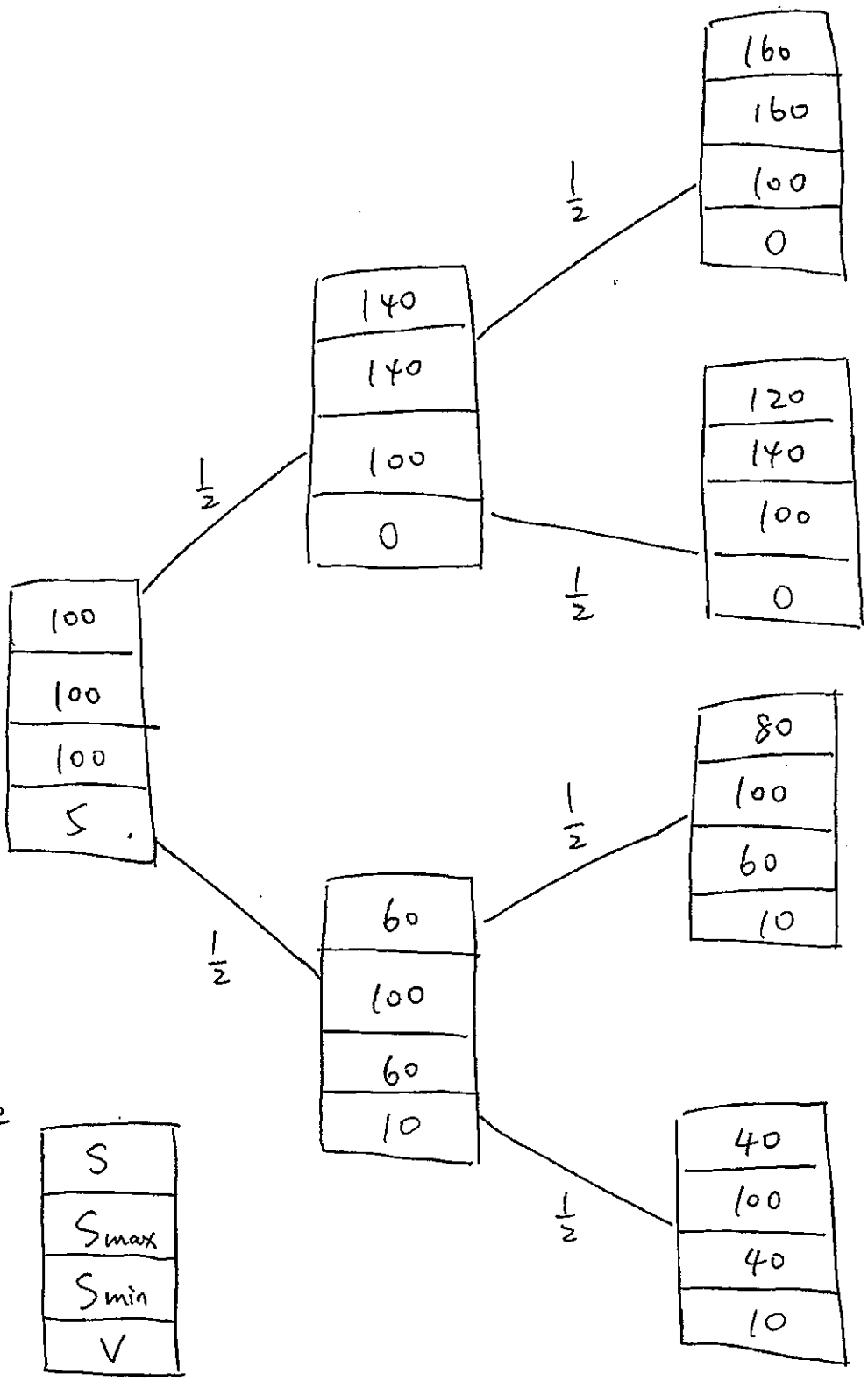
where

S
S_{max}
S_{min}
V

The price at the node is not only a funtion of t and S, but also a function of S_{max}.

Lookback rate put option

$F(s) = \max\{110 - S_{max}, 0\}$

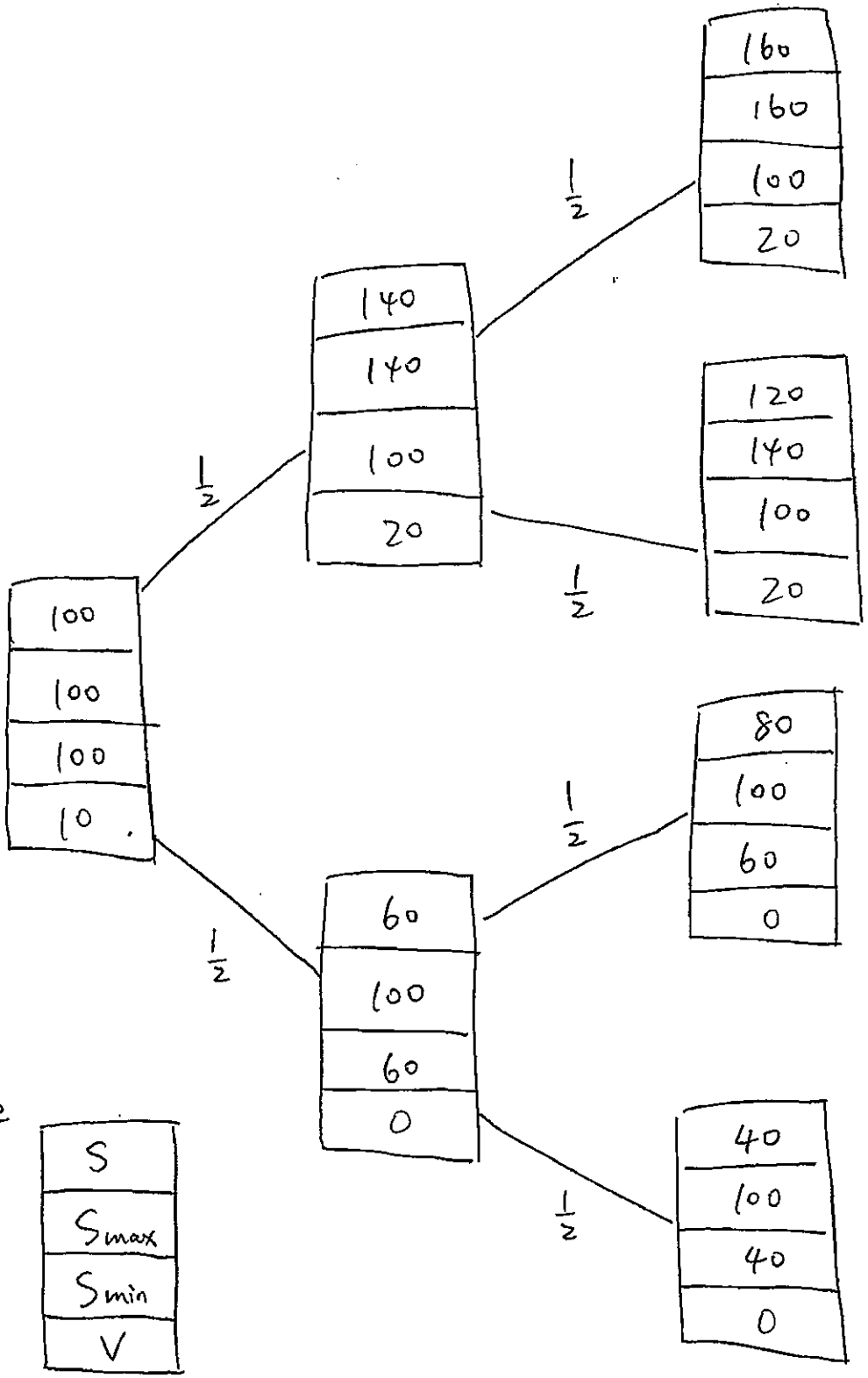


where

S
S_{max}
S_{min}
V

Lookback rate call with S_{min}

$F(S) = \max\{S_{min} - 80, 0\}$

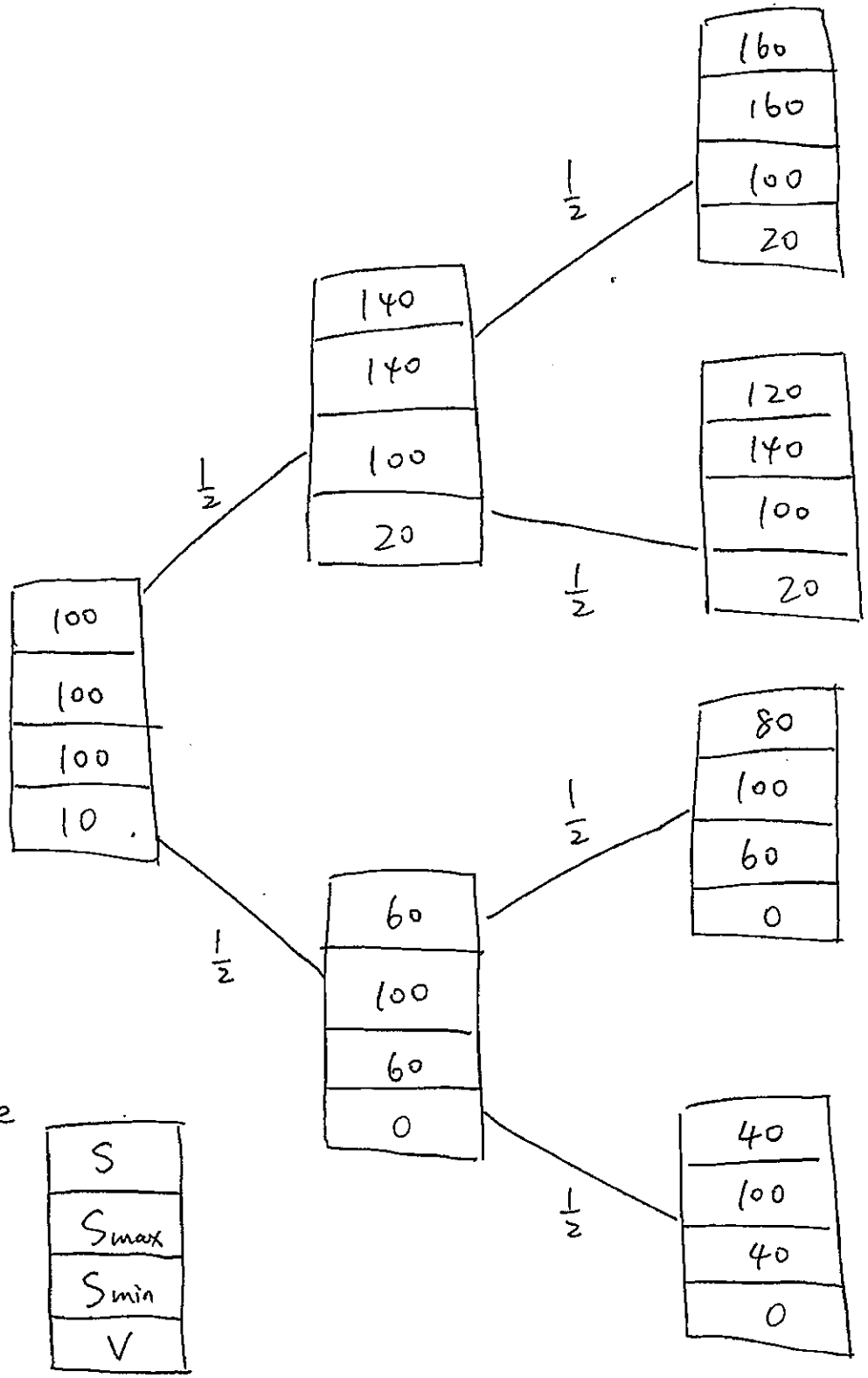


where

S
S_{max}
S_{min}
V

Lookback rate put with S_{min}

$F(S) = \max\{S_{min} - 80, 0\}$



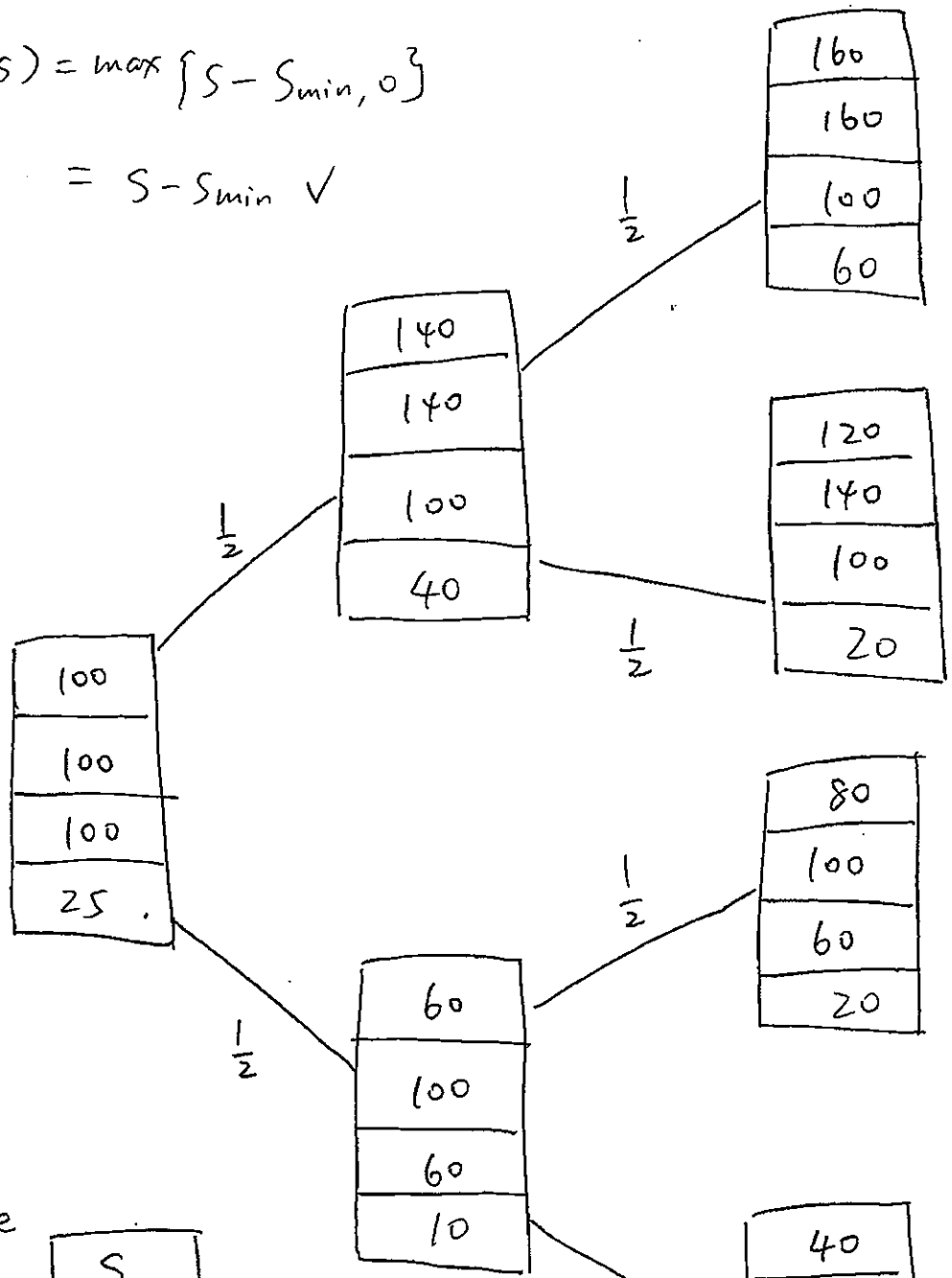
where

Lookback strike call

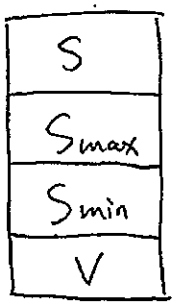
if $F(S) = \max\{\underbrace{S - S_{max}}_{\leq 0}, 0\} = 0$, no meaning.

$F(S) = \max\{S - S_{min}, 0\}$

$= S - S_{min}$ ✓



where

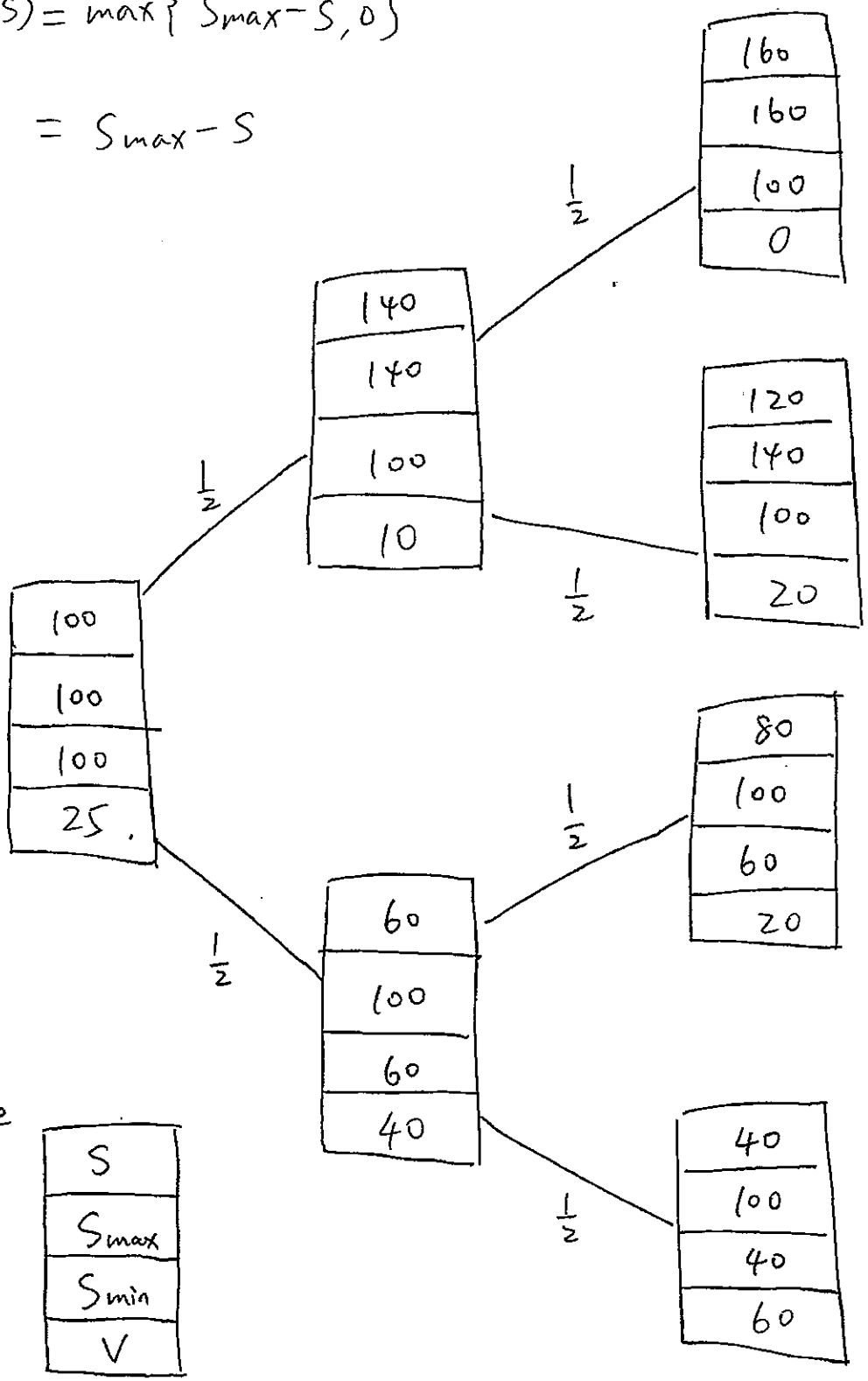


Lookback strike put

If $F(S) = \max\{S_{min} - S, 0\} = 0$, no meaning.

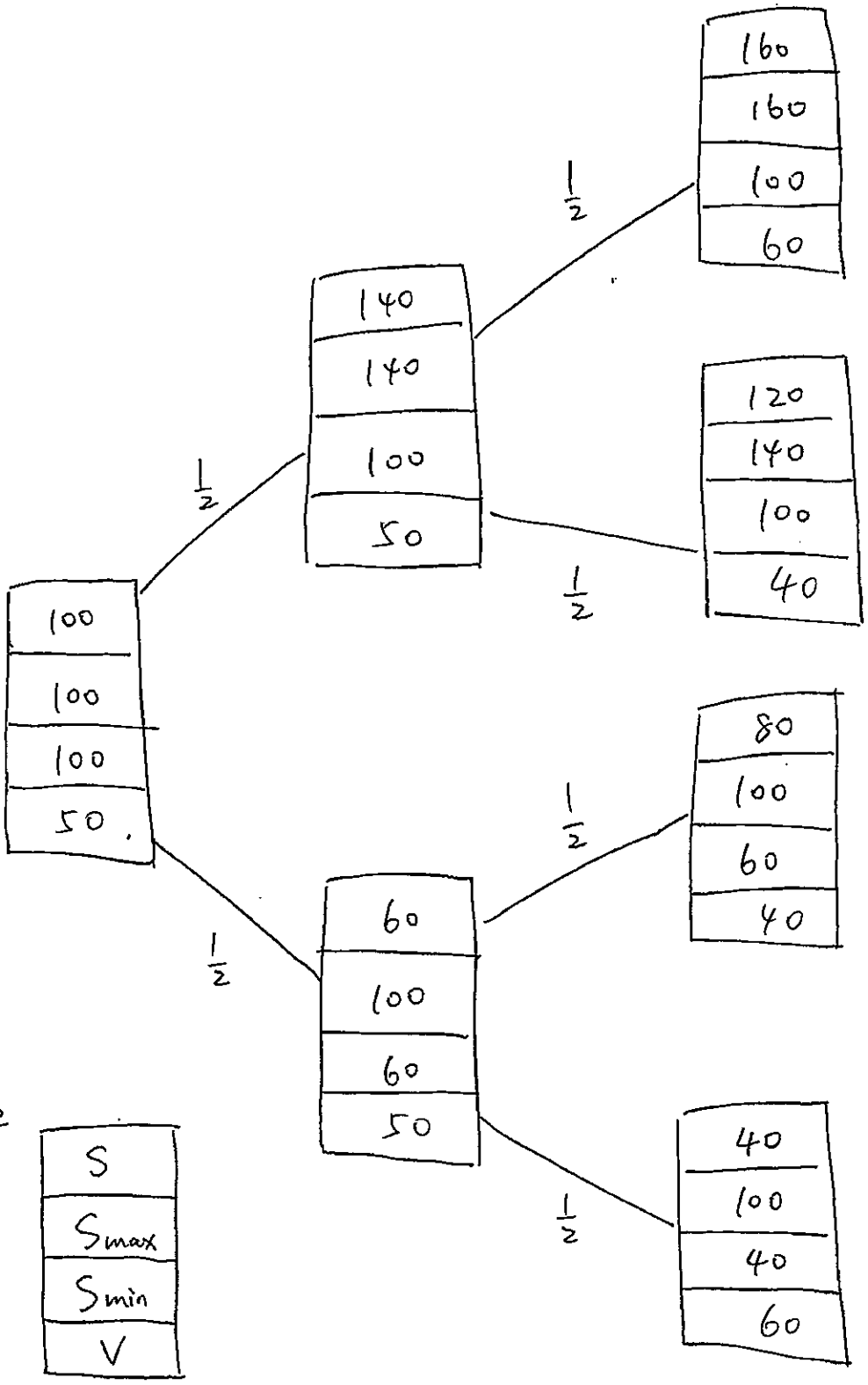
$F(S) = \max\{S_{max} - S, 0\}$

$= S_{max} - S$



where

$F(S) = S_{max} - S_{min}$



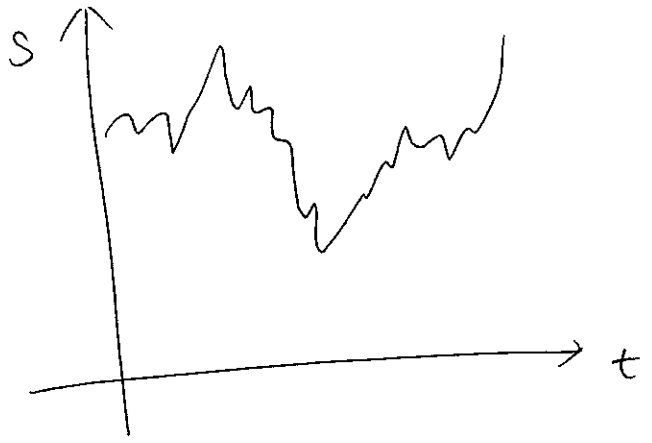
where

S
S_{max}
S_{min}
V

Lookback option is path-dependent option.

⑧ Asian option

Asian option are options with payoff depending on the average value of the stock price. (Starts in Hong Kong, Japan)



$$\bar{S}_T = \frac{1}{T}\int_0^T S(t)\,dt$$

$$\overline{S_t} = \frac{1}{t}\int_0^t S(t')\,dt'$$

$$= \frac{1}{k+1}\sum_{i=0}^{k} S_i$$

Average rate call

$$F(S) = \max\{\bar{S}-k, 0\}$$

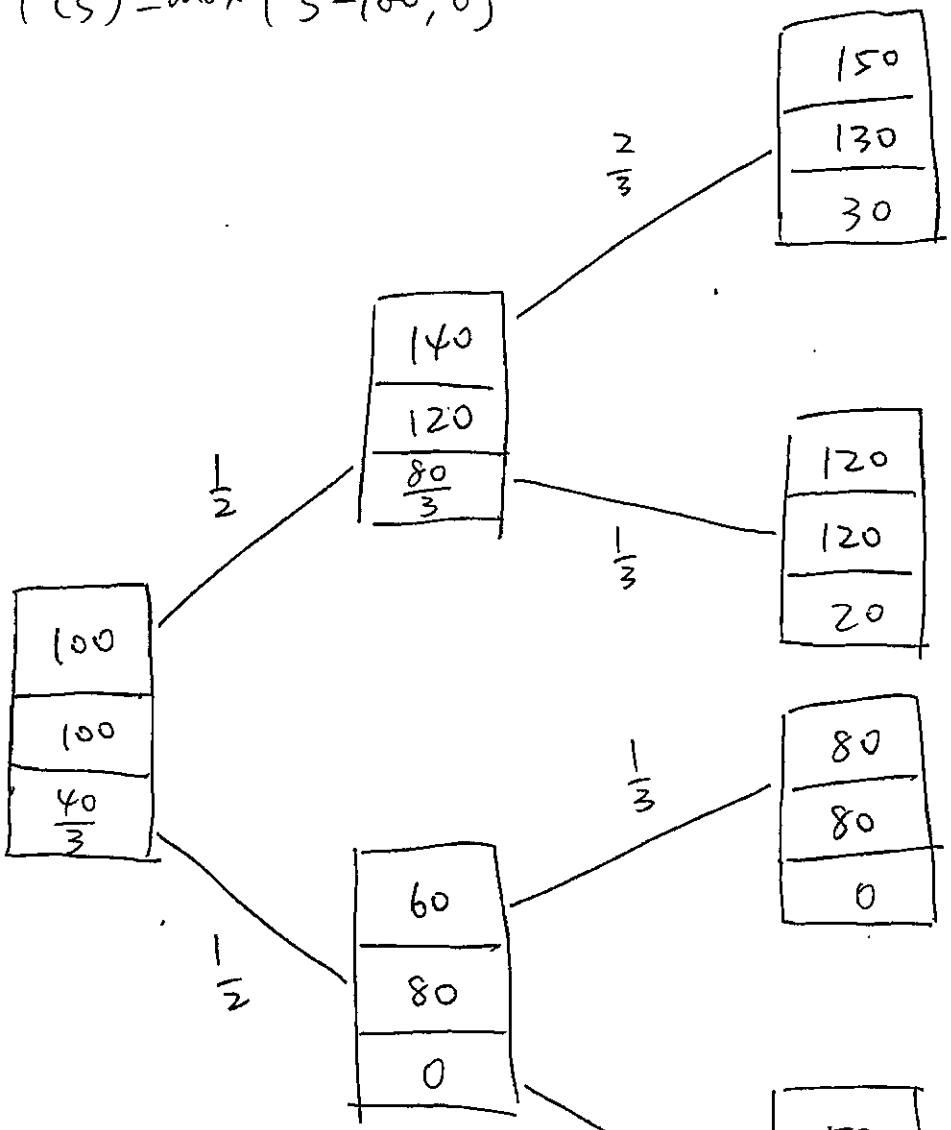
Geometric average:

$$\bar{S}_{geo} = e^{\frac{1}{k+1}\sum_{i=0}^{k}\ln S_i} = (S_0 S_1 \cdots S_k)^{\frac{1}{k+1}}$$

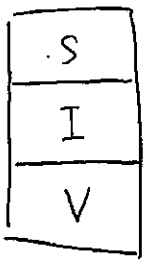
Average rate call

$k = 100$

$F(S) = \max\{\bar{S} - 100, 0\}$

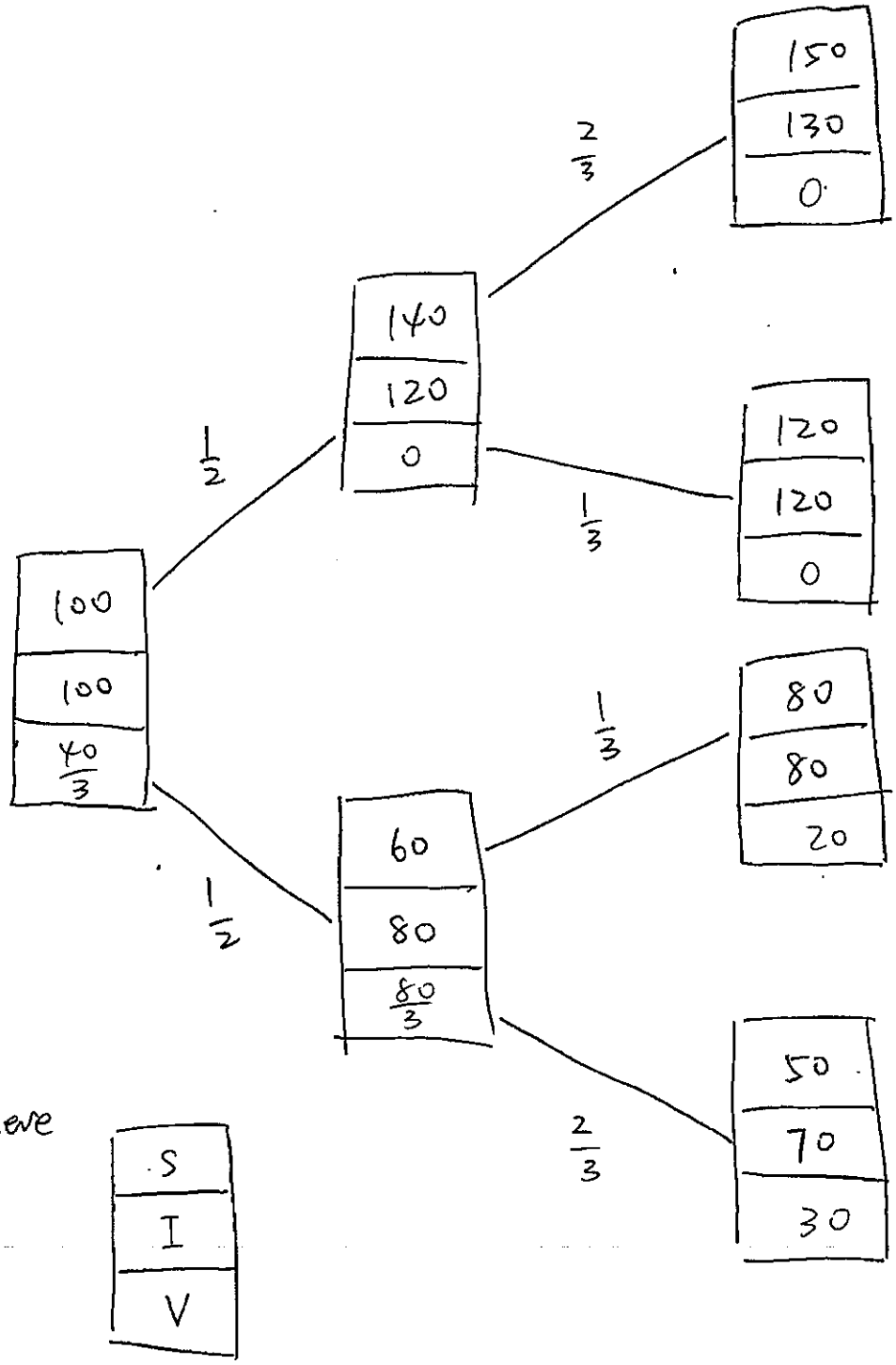


where



Average rate put

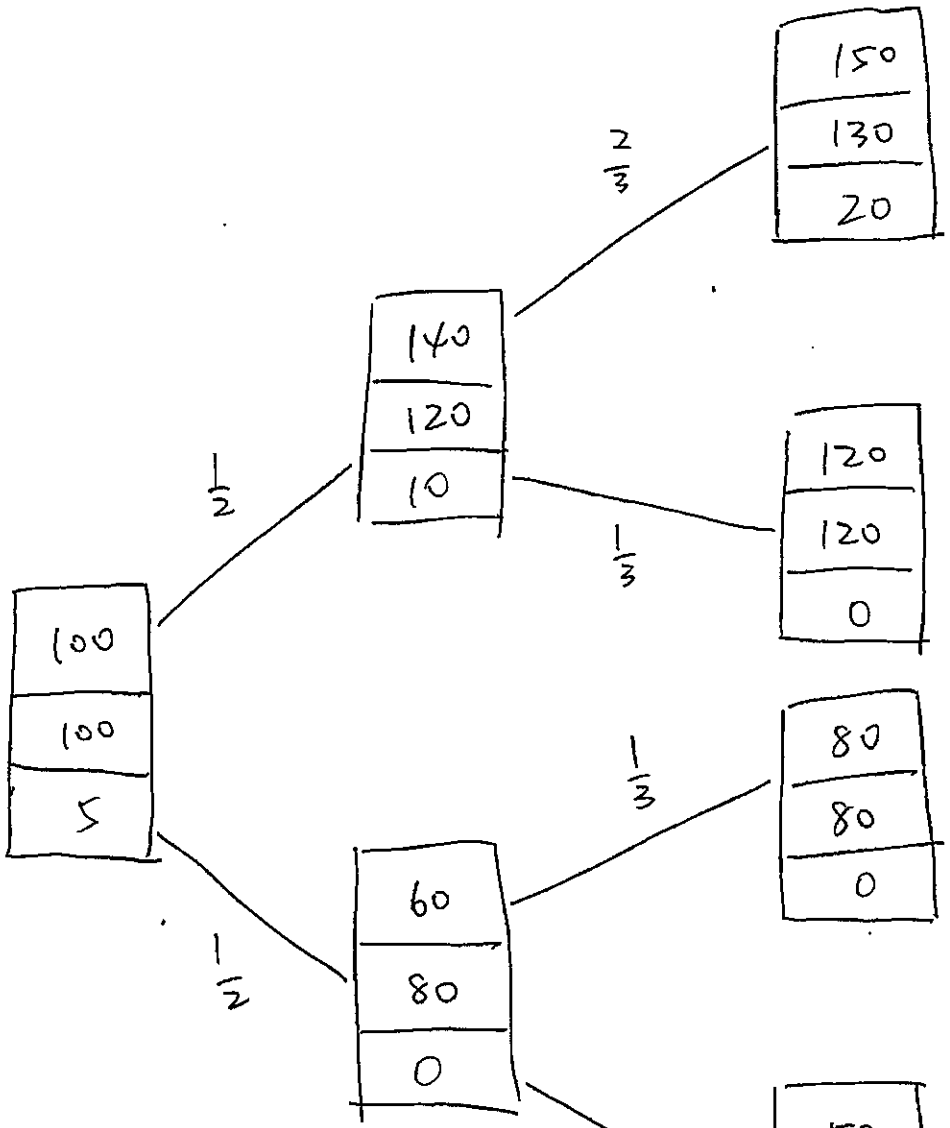
$F(s) = \max\{100 - \bar{S}, 0\}$



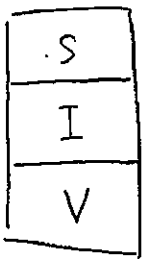
where

Average strike call

$F(S) = \max\{S - \bar{S}, 0\}$

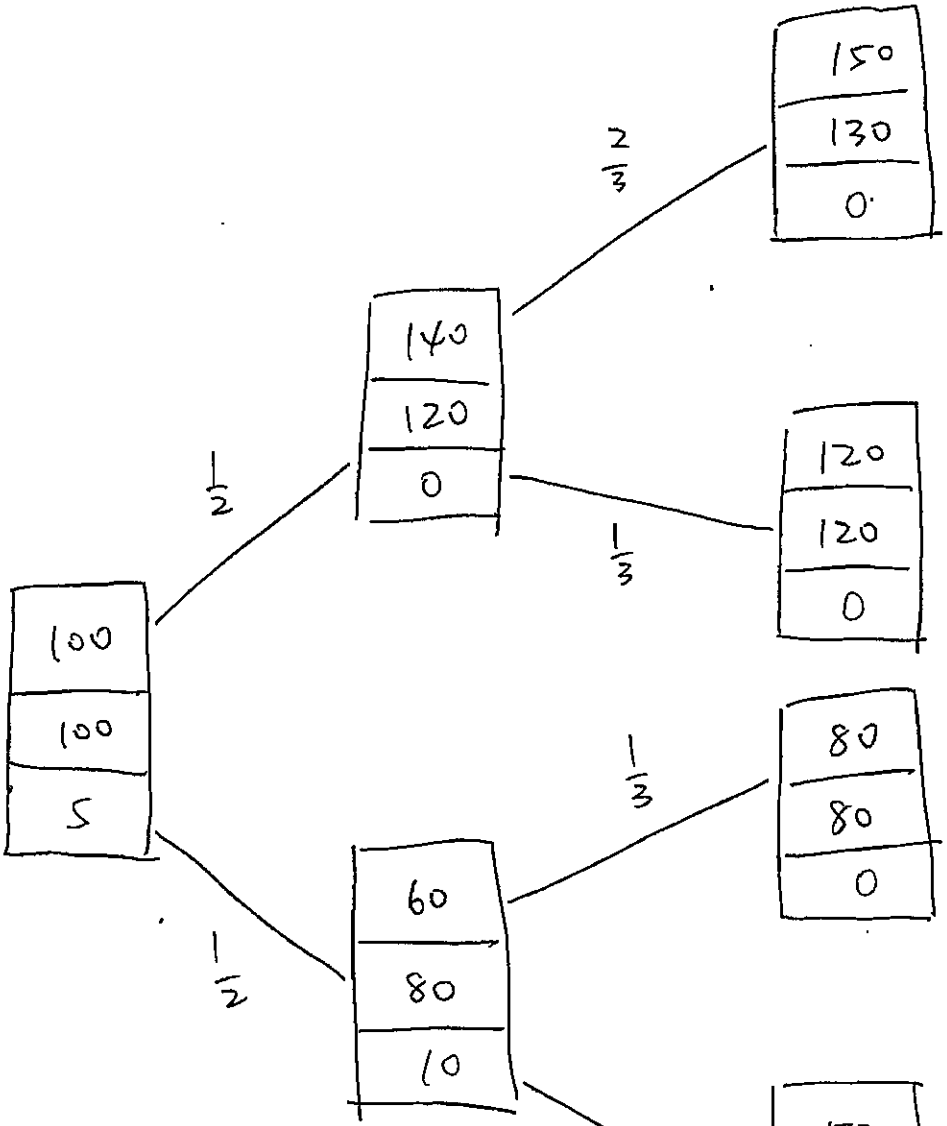


where



Average strike put

$F(S) = \max\{\bar{S} - S, 0\}$



where

S
I
V

⑨ Forward start option:

Forward start option has strike price determind by the stock price some specified time later on.