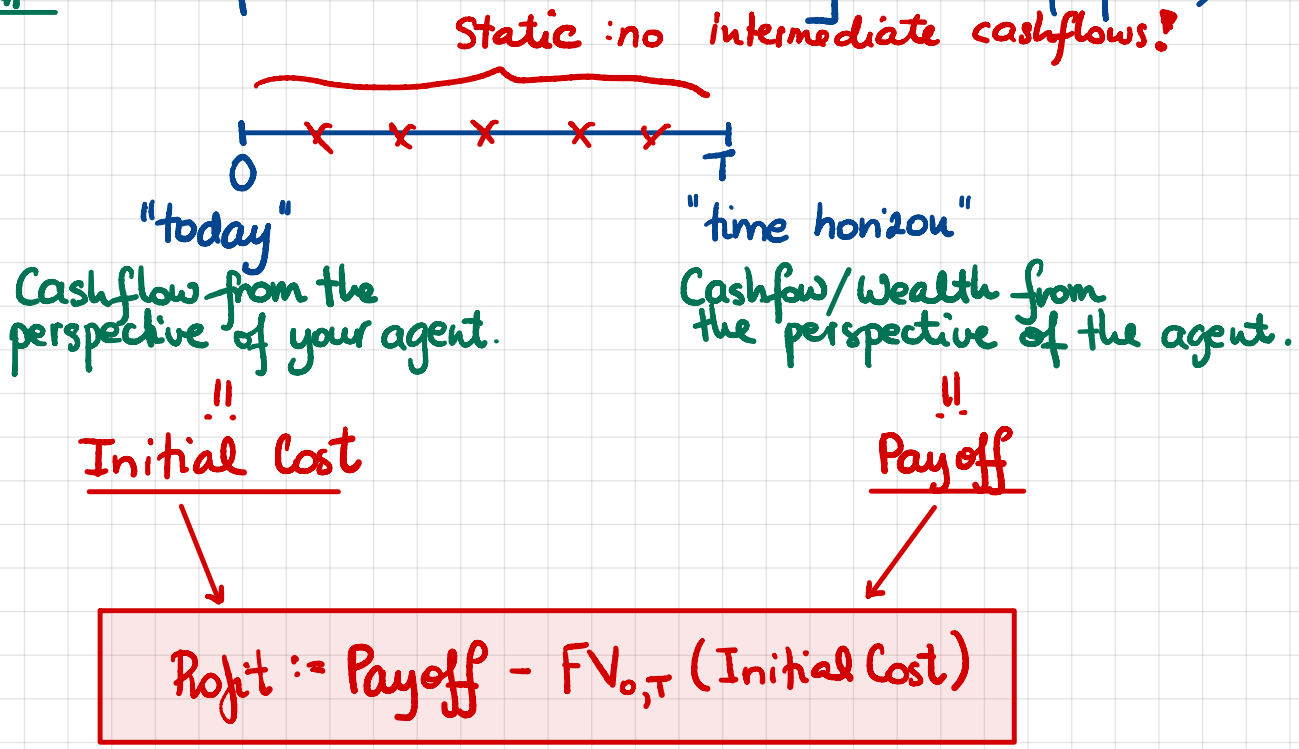
M339D: January 25th, 2023.

Static Portfolios.

Step #1. Decide who your protagonist is!

Step #2. Set up the time-line (mentally or "on paper")!



If Profit >0, we call it a **gain**.

If Profit <0, we call it a **loss**.

If Profit $=0$, we say that we **break even**.

Example. [Investing in a zero-coupon bond]

(r)... continuously compounded, risk-free interest rate

Initial Cost: the bond's price

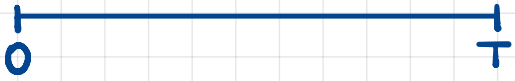
Payoff:

Ce^{-rT}
C

$$\text{Profit} = \text{Payoff} - FV_{0,T}(\text{Initial Cost})$$
$$= C - e^{rT}(e^{-rT} \cdot C) = 0$$

Example. [Taking a Simple loan] (r)... ccrfir

L... loan amount, i.e., the amount borrowed @ time-0



T... the loan's term, i.e., the time @ the which the loan must be repaid in full

Initial Cost: $-L$ (the negative sign is because the agent is RECEIVING L @ time-0)

Payoff: $-Le^{rT}$ (the negative sign is because the agent is GIVING UP Le^{rT} @ time-0)

$$\text{Profit} = \text{Payoff} - FV_{0,T}(\text{Initial Cost})$$
$$= -Le^{rT} + e^{rT}(+L) = 0$$

□

Example. [Outright Purchase of Stock]

"stock bought" "stock sold"

Initial Cost: $S(0)$

Payoff: $S(T)$ a random variable