

Task:

- Compute any time series or any other relevant Outputs based on the formulae below using Python.
- Time: You have 90 minutes.

Inputs (all provided in csv file):

- $Units(i, t)$: Units of relevant Component i at time t. Units on Initial and two subsequent rebalance dates are provided in the csv file;
- $Price^*(i, t)$: Price of relevant Component i at time t (or if not available use the Price of relevant Component i in respect of the immediately following Day);

Outputs (calculated per the below):

- $BasketUnit(t)$: Units of Basket at time t;
- $BasketValu(t)$: Price of Basket at time t;
- $Units^*(i, t)$: Units of relevant Component i at time t, *per unit of Basket*;

Calculations:

Initialise:

$$BasketValu(Initial)=1000.00$$

$$EquityNotionalAmount(Initial)= 7.3453215$$

$$BasketUnits(Initial) = \frac{EquityNotionalAmount(Initial)}{BasketValue(Initial)}$$

Then:

$$BasketValue(t) = BasketValue(t-1) \times \frac{\sum_i Units(i, t-1) \times Price^*(i, t)}{\sum_i Units(i, t-1) \times Price^*(i, t-1)}$$

$$BasketUnits(t) = BasketUnits(t-1) + \frac{\sum_i [Units(i, t) - Units(i, t-1)] \times Price^*(i, t)}{BasketValue(t)}$$

Decomposition of Basket:

$$Units^*(i, t) = \frac{Units(i, t)}{BasketUnits(i, t)}$$