QIS Platform Developer Coding Resource

We will use this code as the basis for some tasks in the interviews. Please familiarize yourself with it as this will help you to do the tasks more quickly.

Please do not publish or share these materials or your work on the tasks.

The Context

In the Quantitative Investment Strategy business, we publish *indices* which are calculated by following a prescribed investment *strategy*. We have provided a very small and simple framework for calculating indices, a simple strategy, some base data, and some tests.

The Strategy

The code in `rule.py` implements a simple version of an Equal Weight Strategy. Essentially, we start by taking equally valued positions in some assets. Each day, the assets change in value as the market moves and at the end of each month, we rebalance our holding back to being equally valued. Our index moves each business day, proportionally to the change in value of our holdings from the previous business day.

- Basket: ["SPX", "SX5E", "HSI"]
- Calendar: common business days between 2023-01-02 and 2023-06-29 with weekends and holidays removed.
- Currency: a single currency for the index and all assets (irrelevant for the task)

1. Initialization: set the index base $I_0 = 100.0$; the initial weights $w_{i,0} = \frac{1}{N}$, where N is the number of assets.
2. Compute the asset returns: $r_{i,t} = \frac{P_{i,t}}{P_{i,t-1}} - 1$.
3. Compute the portfolio return: $r_{p,t} = \sum_i w_{i,t-1} * r_{i,t}$, using yesterday's end of day weights.
4. Update the index level: $I_t = I_{t-1} * (1 + r_{p,t})$.
5. Rebalance (monthly):
   - If t is the last business day of the month, rebalance after the close to equal weights:
   $$w_{i,t} = \frac{1}{N}$$
   - Otherwise, the weights equal to the drifted weights:
   $$w_{i,t} = \frac{w_{i,t-1}(1 + r_{i,t})}{\sum_i w_{i,t-1}(1 + r_{i,t})}$$

Setup Instructions

On Windows:

```
python -m venv .venv
.venv\Scripts\activate
pip install -r requirements.txt
```

On macOS or Linux:

```
python -m venv .venv
source .venv/bin/activate
pip install -r requirements.txt
```

Usage instructions are in the `README.md` file.