

Description

[Ethereum Staking](#) is a process that will allow Ethereum (ETH) blockchain to validate transactions using a proof-of-stake consensus mechanism. This will replace proof-of-work consensus which requires a lot of computing power and energy to work. Imagine you are a developer who works at a cryptocurrency exchange and you received a task to **write a simplified Ethereum Staking profit calculator**.

- Input data you receive are:
 - Initial investment amount of ETH (e.g. 10 ETH);
 - **Yearly** staking reward rate in % (e.g. 7%);
 - Staking start date (e.g. 2020-11-10);
 - Staking duration (e.g. 24 months);
 - Reward payment day (e.g. every 15th day of the month);
 - Yes/No option if the customer decides to reinvest staking rewards once they receive them or not (e. g. yes).
- After you receive input data, your program must generate an **Ethereum Staking monthly profit schedule**. A comma-separated (.csv) file where each line shows monthly rewards starting from the staking start date. Each line must provide data below:
 - Line (Reward) number for each time customer receives it;
 - Reward date when the customer received it;
 - Investment amount at that time;
 - Reward amount for a specific month;
 - Total reward amount received so far;
 - Yearly staking reward rate.

To calculate the reward amount for a specific month, use '**Actual/365**' day count convention method that is popularly used in calculating interest amounts for loans. More information can be found [here](#). An example of described profit schedule is attached: *example_schedule.xlsx*.

Note: For your task, you don't have to display input data values in your output .csv file.

Main Task

- In 2024-04-15 customer started to stake 25 ETH and plans to do it for the next 2 years;
- Cryptocurrency exchange offers a 10% yearly reward rate;
- Cryptocurrency exchange provides monthly staking rewards every 23rd day of the month;
- Customer decided to reinvest the staking rewards on the same day when they are provided;
- Your task:
 - Figure out an algorithm to calculate staking rewards;
 - Calculate an **Ethereum Staking profit schedule** using provided input data;
 - Generate output .csv file to display profit schedule. All columns shown in the example must be present.

Bonus Task 1

- The input data from **Task 1** is the same, but starting from 2025-04-15 cryptocurrency exchange decided that yearly reward rates will be lowered to 8% from initial 10%
- Your task:
 - Calculate an additional **Ethereum Staking profit schedule** where described reward rate adjustment is included;
 - Generate output .csv file to display profit schedule. All columns shown in the example must be present.

Bonus Task 2

- Write a program that allows entering input data described above;
- After input data is entered, the program must calculate and generate an output .csv file.

Technical Notes

- Programming language - any you are comfortable working with;
- Clean and readable code is a big plus!
- ETH is divisible up to 18 decimal places (0.000000000000000001 ETH) but for simplicity display values rounded up to 6 decimal places (0.000001 ETH);
- Your submission must contain:
 - Source code of your solution;
 - Generated .csv files;
 - Instructions on how to execute your code (in `readme.txt` or `README.md`).
- You can submit your solution in one of the following ways:
 - Publish your solution to a **private** GitHub repository and add `hjuknonis` and `SlimChonker` as collaborators;
 - Archive solution to a .zip file and send it via email to the provider of the task.