TU Clausthal

# Exercise – 9

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**Deadline:** 10.07.2023 – 1:59pm

**Task(s):**

- Download the assignment zip archive here: https://sync.academiccloud.de/index.php/s/yKQzLTnmkVjmIJz
  - Programming language: Python 3.10
  - You can use this Virtual Machine for a pre-installed environment: Link (Password: `5cnN59dzVEm5atc`)
  - Please watch the "Python-Exercise-Tutorial" summarizing how to do the python programming exercises.
  - General Instructions
    - Unzip the handout zip archive
    - The handout contains a Pipfile. You can install the dependencies for the exercises by running `pipenv install`. (You might have to install pipenv and pyenv first)
    - Activate the python virtual environment using `pipenv shell`.
    - In the E09 directory, you will see the following:
      - 1. solution.py
      - 2. driver.py
      - 3. ETCE/blockchain.py
    - **You only need to modify the „solution.py“ file**. More detailed instructions on where you need to insert your code can be found in this file **and in the ETCE/blockchain.py** file. The automated grading mechanism can grade your solution only if you follow the structure provided in the „solution.py“ file.
    - You can use „driver.py“ to verify whether your program would pass the grading: `python3 driver.py`.
    - This file will give you feedback on your solution.
  - Create a **zip** file of your submission:
    zip -r E09-<Your StudIP Username>.zip E09 Makefile Pipfile
    - *Remember that your solution zip file should have **exactly** the same file format as the handout zip file.*
- To make it easier, you can just run `make zip` in the top-level handout folder to automatically create a zip archive with the correct directory structure.

- Upload your submission to the StudIP folder **„E09-Submissions“** ONLY. We will not accept submissions uploaded to any other folder.

Task Description – Blockchain Consensus

In E08, you implemented the basic data structures of a blockchain, e.g., transactions, blocks, and chaining blocks together. However, so far, you have not implemented any consensus mechanism; one of the most important parts of any blockchain. In this exercise, you are supposed to implement a Proof-of-Work consensus mechanism.

This assignment extends E08 by adding a consensus mechanism. However to make sure we only grade E09 based on the tasks of E09, we have “correctly” implemented the E08 tasks in the ETCE/blockchain.py file. Hence, even If your solution for E08 did not get a perfect score, E09 by default uses the correct solution for E08.

Task(s):

Implement the classes where indicated in the space provided in the **solution.py** file.

Also implement the scenario() function in **solution.py**.