

### Task 1: Exploiting a threading capability for proof of work

Each thread needs to have its own nonce to do its mining in parallel trying to get to arrive at a string with the right number of zeros preceding the hash of the block, but each thread needs to use its own nonce to avoid duplication of results ... we have said there is such a thing as an “enonce” (extra nonce), and each thread could have its extra nonce assigned i.e. own distinct one-time-token (number) to keep incrementing to use in each cycle of mining - *enonce* (type *long*). In this way as a distinct number shall be used for each enonce of each thread in each cycle of hash composition, no duplicated effort could occur.

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### Task 2: Adjusting the Difficulty Level in Proof-of-Work

In our current implementation increasing the difficulty by one would increase the amount of work by a factor of 16. This is not suitable for a dynamic difficulty. You are going to need to think of another approach, consider researching existing approaches.

In your report, please detail how you implemented dynamic difficulty and why you chose that approach while also providing evidence that it works. Also mention the length of your ‘Block Time’ and justify why.

**Note:** Any ‘Block Time’/implementations is OK as long as you feel it has been fairly justified (and it works).

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### Task 3: Selection of Transactions to Mine

A Miner may consider picking the transaction with lowest fees which tend to be also amongst the ones that may have been waiting to be mined the longest (Altruistic Approach) or picking the largest transactions with the largest fees first as most Miners tend to go for as the most profitable approach (Greedy Approach). You will be able to add buttons for each of the above approaches to select the transactions according to the Miner’s Approach - your approach as you wish but you need to reflect on the side-effects of an approach on the Blockchain as a whole....

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**Task 4: up to you to choose** instead of any one of the three tasks above or in combination if you would like to submit 4 task – max available mark is 35 which can be obtained with reasonably complete solutions to the three tasks set.

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