Assignment 2

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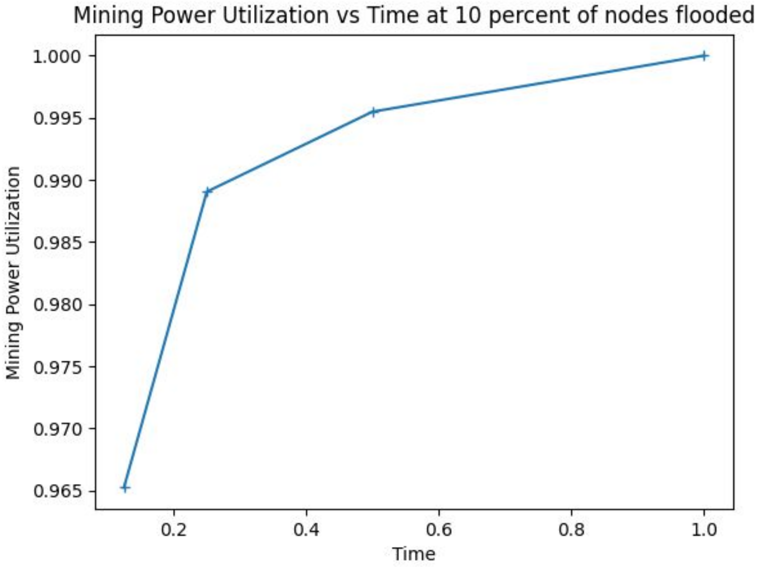
Mining Power Utilization vs Inter arrival time:

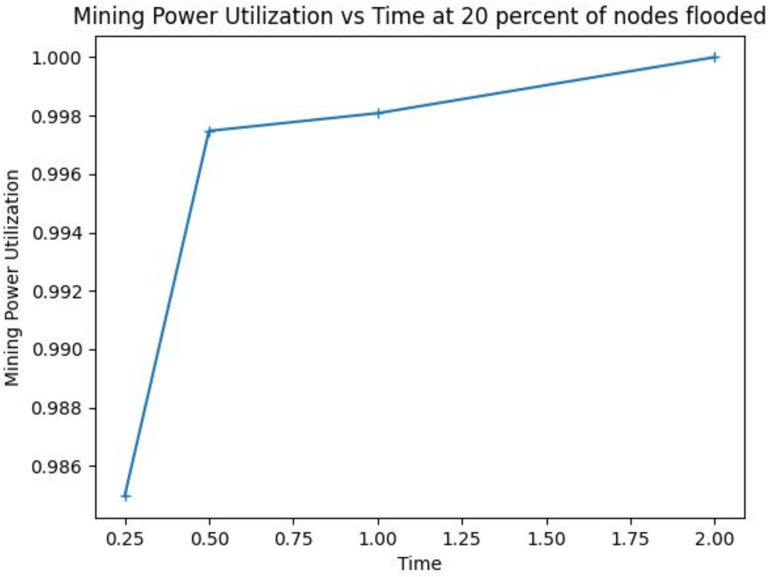
Algo:

```
1. Mining_power = []
2. For_each db
    a. Calculate max_height
    b. Calculate total_blocks
    c. Mining_power.append(max_height/total_blocks)
3. End_for
4. Return mean(Mining_power)
```

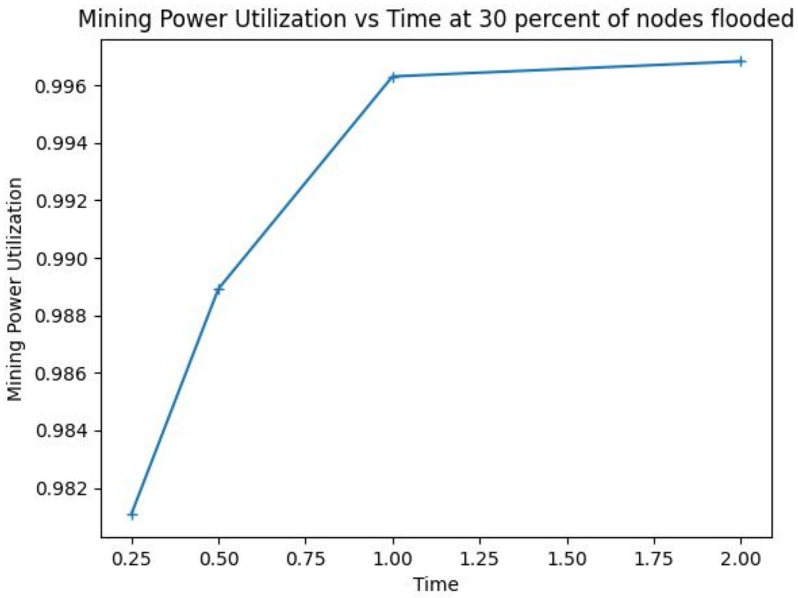
10% of nodes flooded in the network



20% of nodes flooded in the network



30% of nodes flooded in the network



From the graphs, we can observe that as inter-arrival time increases, the mining power utilization also increases

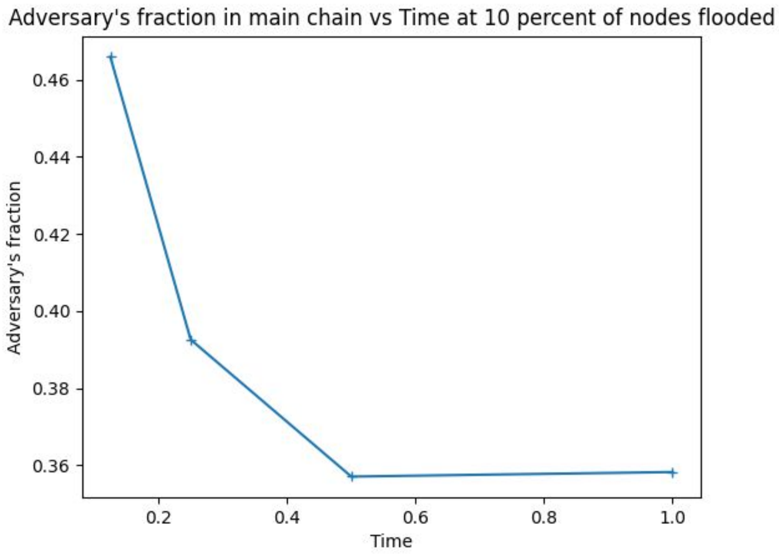
As inter-arrival time increases, the ratio between processing time(including network delays) and inter-arrival time decreases. Hence, the probability of forks happening decreases, henceforth mining power utilization increases

The fraction of main chain blocks mined by adversary vs Inter arrival time:

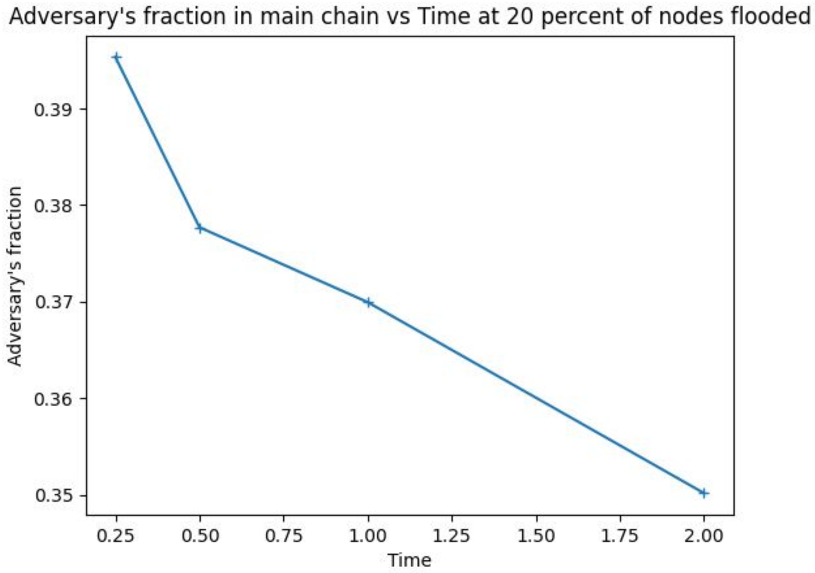
Algo:

```
1. Fraction = []
2. For_each db_mining:
    a. SetA: Identify blocks in the longest chain
    b. Fraction1 = []
    c. For_each db_adversary:
        i. SetB: All blocks of db_adversary mined by the adversary
        ii. Common_blocks = SetA intersection SetB
        iii. Fraction1.append(Common_blocks/len(SetA))
    d. End_for
    e. Fraction.append(mean(Fraction1))
3. End_for
4. Return mean(Fraction)*num_adversary
```

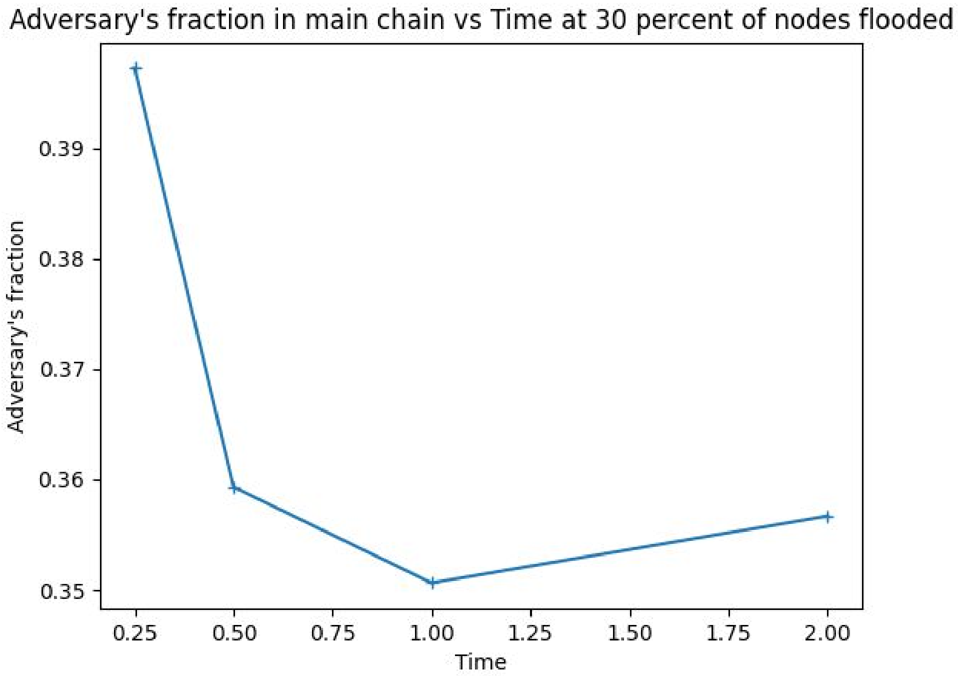
10% of nodes flooded in the network



20% of nodes flooded in the network



30% of nodes flooded in the network



From the graphs, we can observe that the adversary’s fraction in the main chain decreases, as inter-arrival time increases

As inter-arrival time decreases, the processing time(including network delays) dominates inter-arrival time, and the processing time is mainly due to the adversary’s flooding attack. Hence, as inter-arrival time decreases, adversary’s flooding dominates, henceforth increase in the adversary’s fraction of blocks in the main chain

Criterion determining the longest chain from the blocks stored in your database:

When a new block is inserted into the database, it’s height is automatically calculated and stored in the local database

Height of new block = height of the block in the local database with prev_hash + 1

Whenever a new block to be mined, it will be mined on the block with maximum height observed in the local database maintained. So the longest chain is the chain with the max_height