

## CS 5413 Assignment

### Algorithms for NFT Transaction Data Analytics

1. Data collection: download daily first 120 blocks of NFT transactions data (in CSV format, primarily on ERC721) for three months (07-01-2022 to 09-30-2022) from <https://etherscan.io/exportData?type=nfttracker-trade>.  
The full information can be viewed at <https://etherscan.io/nfttracker>.  
Notice that the data download is limited by Etherscan and we will be studying within the limit of downloadable data.
2. Five queries will be assigned to each team so two people can pair to work on a query. In case there are 9 people in your team, discuss with Dr. Park the scope of a query on which only one person to be assigned.
3. Write a program with a composite of algorithms to fulfill each of the following five queries. Then, evaluate its asymptotic run time and the average of 1000 actual run times.

Txn	Date					Token				
Hash	UnixTimestamp	Time (UTC)	Action	Buyer	NFT	ID	Type	Quantity	Price	Market

- Query 1: Sort down “Token ID’s” by the frequency of the transactions (“Txn Hash”).  
Input: q1  
Output: Token hash (frequency = ?)  
Token ID: Txn hash, Date Time (UTC), Buyer, NFT, Type, Quantity, Price
- Query 2: Sort down “Token ID’s” by the average price of the token (“Price”).  
Input: q2  
Output: Token hash (average price = ?)  
Token ID: Txn hash, Date Time (UTC), Buyer, NFT, Type, Quantity, Price
- Query 3: Sort down “Buyer” by the frequency of the transactions (“Txn Hash”).  
Input: q3  
Output: Buyer (frequency = ?)  
Buyer: Txn hash, Date Time (UTC), NFT, Type, Quantity, Price
- Query 4: Sort down “Token ID’s” by the number of different buyers (“Buyer”).  
Input: q4  
Output: Token hash (number of different buyers = ?)  
Token ID: Txn hash, Date Time (UTC), Buyer, NFT, Type, Quantity, Price
- Query 5: Sort down "buyer"s by the number of different NFT's bought, and if there is a tie then further sort those "buyer"s by the number of transactions (Txn ID).  
Input: q5  
Output: Token hash (most recent date/time=?, frequency=?, average price=?)  
Token ID: Txn hash, Date Time (UTC), Buyer, NFT, Type, Quantity, Price

- A new query to be developed by your team. Note that you **MUST** use the queries above 1-5 and any new queries of your own.