Digital Wave Finance - Round 1 Interview Questions

The solutions must be provided in C / C++. Please mention all your steps and explain what led you to choose your solution. You can briefly comment on other solutions and ideas which you had while solving this task.

Part 1: Data Structures and Algorithms

Create a data-set of words from the book https://www.gutenberg.org/files/98/98-0.txt. Implement a fixed sized hash table by using linear probing to resolve collisions. Assume that the keys are the words from the given data-set and the hash table's values are integers. You need to implement the following functions with O(1)-complexity:

◦ insert(key, value): inserts a new key-value pair or replaces a key's existing value,
◦ remove(key): removes the corresponding key-value pair,
◦ get(key): returns the value of the corresponding key,
◦ get_last(): returns the most recently inserted or changed key-value pair,
◦ get_first(): returns the least recently inserted or changed key-value pair

Part 2: Trading Specific Algorithms

Review the API of Binance USD(S)-M Futures that can be found in https://binance-docs.github.io/apidocs/futures/en/#change-log. Then

◦ implement connectivity to the end-point GET /fapi/v1/aggTrades,
◦ receive a stream of trades. Write a parsing algorithm to parse the incoming stream of trades and print each trade in the form:

```
[
  {
    "a": 26129,         // Aggregate tradeId
    "p": "0.01633102",  // Price
    "q": "4.70443515",  // Quantity
    "f": 27781,         // First tradeId
    "l": 27781,         // Last tradeId
    "T": 1498793709153, // Timestamp
    "m": true,          // Was the buyer the maker?
  }
 ].
```

◦ measure the speed at which singular trades are parsed and comment on the algorithmic complexity of your parsing algorithm.