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Highnote Coding Interview

We would like you to implement a “Transaction Processor” that processes an array of Transaction messages that each represent an operation to be performed on virtual bank accounts. **After processing all inputs, you should provide a way to validate all accounts and their balances.**

It is recommended that you first handle the message parsing before managing the accounts and their balances. **Unit tests are expected and should help guide you to building your solution incrementally.**

Reminder, any AI/LLM coding assistant tools should be disabled on your IDE before starting. Eg. Github Copilot, JetBrains AI Assistant.

Transaction Message Specifications

Each Transaction message is formatted in the following way:

- The first four characters represent the type of Transaction Operation being requested.
- You will need to parse each message based on the message type format.
 - Note the `LLVAR` type - This is an alphanumeric field of variable length. It has a 2-digit field header at the beginning, indicating the length of the rest of the field, which can be 0 to 99.
- Depending on the type of transaction, there may be different data to be parsed.
- Depending on the type of transaction, different operations must be performed.
- **Any Money amount is represented in cents.**
- **You can assume any input data provided is well formatted according to the above specifications.**

Operations

Deposit Request:

For the given account, add to its existing balance.

- Transaction Request Code: 1010
- Format: `1010<LLVAR-ACCOUNT-NUMBER><AMOUNT-IN-10-DIGITS>`
 - Sample Input: `10101088888888880000010000`
 - `1010` - Deposit Request
 - `10` - Length of Account Number
 - `8888888888` - Account Number



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- 0000010000 - Deposit amount in Cents (100.00 USD)

Withdrawal Request:

For the given account, debit the requested amount from the balance.

- Transaction Request Code: 1020
- Format: 1020<LLVAR-ACCOUNT-NUMBER><AMOUNT-IN-10-DIGITS>
 - Sample Input: 10201088888888880000010000
 - 1020 - Withdrawal Request
 - 10 - Length of Account Number
 - 8888888888 - Account Number
 - 0000010000 - Withdrawal amount in Cents (100.00 USD)

Restrictions

Deposits

- The maximum amount allowed to be loaded in a single transaction is 1000.00 USD. If the amount requested to be loaded is greater than 1000.00 USD, then the transaction should be denied.
- If the account doesn't already exist, then create the account with the requested deposit amount, but only if the transaction amount isn't greater than the above mentioned deposit limit.

Withdrawals

- Only allow the withdrawal If the account exists and has appropriate funds for the withdrawal - otherwise, do not perform any updates.

Sample Inputs/Outputs:

Deposits Only

Input

Unset

```
10100712345670000200000
1010064447770000100000
10100712345670000080000
1010062345910000040000
1010064447770000050000
```



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1010061111110000200000

Expected Outcome

| Account Number | Balance in Cents |
|----------------|------------------|
| 444777 | 150000 |
| 234591 | 40000 |
| 1234567 | 80000 |

Deposit and Withdrawals

Input

Unset

10100712345670000200000
1010064447770000100000
10100712345670000080000
1010062345910000040000
1010064447770000050000
1010061111110000200000
1020064447770000020000
1020064447770000020000
10200712345670000020000
10200712345670000020000
10200712345670000015000
1020062345910000030000
1020061111110000010000

Expected Outcome

| Account Number | Balance in Cents |
|----------------|------------------|
|----------------|------------------|



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| | |
|---------|--------|
| 444777 | 110000 |
| 234591 | 10000 |
| 1234567 | 25000 |