

Assumptions

- Each item has its own ID, which is scannable using a barcode scanner
- Tax is 8.25% for every item
- Card numbers are always 16 digits long
- PINs are always 4 digits long
- The 0's at the beginning of the card numbers and PINs are omitted, e.g., PIN "0001" is represented as "1"
- Cards are identified as credit cards if their first digit starts with 5-9
- Cards are identified as debit cards if their first digit starts with 0-4
- If the card is automatically recognized as a debit card, the customer is asked to confirm if the card is a debit card
- Only \$1, \$5, \$10, \$20, \$50, \$100 bills are used
- Only pennies, nickels, dimes, and quarters are used
- Cash dispensers start with 10 of every kind of expected bill and coin
- Newly stocked items are already assigned an ID
- There are four error codes sent by the authorization service center (represented by negative integers): "insufficient funds" (-1), "bad PIN number" (-2), "card not recognized" (-3), and "deactivated/expired cards" (-4)
- The authorization service center sends 8-digit positive integers which represent authorization numbers to indicate authorization success
- Credit and debit card expiration dates and security codes are sent along with their numbers, and are always expected to be correct
- Discounts for items are represented in percentage format, e.g., 0.10 is a 10% discount and -0.30 is a 30% price hike
- The network connection between clients and servers will be 100% reliable, and neither will ever need to be restarted
- The database, output devices, and input devices will be 100% reliable.
- At least two items are in database: 'tomato juice' with ID#1, and 'vodka' with ID#2.