Q1 - Successful maximum allowed cash amount withdrawal

**Preconditions:**

* The ATM must be on and in working condition.
* The ATM has more than the maximum allowed amount of cash that can be withdrawn
* The ATM only takes debit or credit type of cards
* The banknotes in the ATM can be add up to the maximum allowed amount (in case the max amount is 25000$, but there are 13 2000$ banknotes in the ATM)
* The user has a valid credit/debit card
* The user has at least the maximum allowed amount of cash on his bank account
* The user enters a valid amount that can be summed up from the available banknotes

**Use Case:**

A = Actor; S = System.

For the purpose of this use case, we assume that the user is using an ATM from Stopanska Banka - Skopje ( since the order of the steps is different for different ATMs ). The ATM has a **card reader**, a **display**, **screen buttons**, a **keypad**, a **speaker**, a **receipt printer**, and a **cash dispenser**.

1. A: Inserts Card.
2. S: Gets card info, validates card info and displays the language selection screen.
3. A: Clicks one of the screen buttons with the language options.
4. S: Emits a sound when the screen button is clicked and displays the “Enter a PIN” screen with the message typed in the selected language.
5. A: Clicks the first number of the PIN on the keypad.
6. S: Emits a sound when the number on the keypad is clicked and types the first number as encrypted on the display.
7. A: Clicks the second number of the PIN on the keypad.
8. S: Emits a sound when the number on the keypad is clicked and types the second number as encrypted on the display (next to the first number).
9. A: Clicks the third number of the PIN on the keypad.
10. S: Emits a sound when the number on the keypad is clicked and types the number as encrypted on the display (next to the second number).
11. A: Clicks the fourth number of the PIN on the keypad.
12. S: Emits a sound when the number on the keypad is clicked and types the number as encrypted on the display (next to the third number).
13. A: Clicks the Accept button on the keypad.
14. S: Emits a sound when the Accept button on the keypad is clicked.

Compares the PIN typed by the user with the PIN extracted from the card info.

Displays the action option selection screen ( options are: Cash withdrawal, check balance, etc.).

1. A: Clicks the Cash withdrawal screen button.
2. S: Emits a sound when the screen button is clicked.

Displays different amounts as options, selectable by clicking the screen buttons.

The options contain the “Other amount” option.

1. A: Clicks the screen button to select the “Other amount” option.
2. S: Emits a sound when the screen button is clicked.

Displays the “Other amount” screen.

(Note: The “Other amount” screen has: A field where the numbers typed on the keypad appear as the amount of cash; Two screen options - “Correct” and “Incorrect”, that can be selected with the screen buttons; Two strings;).

1. A: Clicks a number on the keypad until the amount is typed on the screen.
2. S: Each time a number is clicked, a sound is emitted and the number clicked is typed on the display, on the right side of the previous number.
3. A: Clicks the screen button that selects “Correct”.
4. S: Emits a sound when the button is clicked.

Checks if the amount typed is larger than the amount available in the ATM and if the amount can be paid with the banknotes available.

Establishes a connection with the user’s bank by using the client name and PIN from the card info.

Checks if the daily limit of the user is reached.

Checks if the daily limit would be surpassed with the current transaction.

Checks if the user has the amount available on the account. Prepares the requested amount by sending the banknotes to the cash dispenser (by sending the largest banknotes available first?).

Displays a message, asking the user if he wants a printed receipt.

Displays two options to the user (selectable by clicking a screen button for each).

1. A: Clicks the “Don’t print a receipt” screen button.
2. S: Emits a sound when the button is clicked. Doesn’t print a receipt.

Displays a “Please take your card” message.

Pops out the card from the card reader.

Emits a sound before the money comes out.

Opens the cash dispenser and pops out the correct amount of money.

Q2 - Negative use cases frequency:

1. Card not accepted (not valid, expired, etc.)
2. User typed incorrect PIN
3. Not enough cash in ATM
4. User inserts the card incorrectly
5. ATM can’t establish connection
6. Insufficient funds on user’s account
7. User enters invalid custom amount (too large amount, or too small amount)
8. Single transaction limit exceeded
9. Daily limit exceeded
10. User typed incorrect PIN 3 times
11. Credit/debit cards from other banks not accepted
12. Not enough banknotes of the required value
13. Cash not pulled back inside the ATM after certain time interval (for security reasons, interval is 30 seconds I think)
14. Card not pulled back inside in the card reader after certain time interval (for security reasons)
15. No paper to print receipt
16. ATM is out of work

Q3 - External factors:

1. Physical damage made to the ATM (keypad, card reader, screen buttons)
2. Attrition of internal components (sensors, mechanism, processor, speaker, etc.)
3. Staff responsible for loading the cash breaks something during the process
4. Staff responsible for loading the cash forgets to turn on the ATM
5. Electrical surge
6. ATM damaged by attempt of theft
7. Changes made to the user’s account (account blocked, or card not used for a long period of time)
8. Connection can’t be established because of the provider
9. ATM’s operating system is restarting

Q4 - Test cases and Use Cases for Critical Path

1. Successful user login ( on first, second and third attempt)
2. Incorrect PIN entered
3. Incorrect PIN entered 3 times
4. Card declined (expired, blocked)
5. Debit and credit card accepted
6. Cancel process (the card comes out of the card reader)
7. Successful cash withdrawal (all amount options and other amount)
8. Successful cash withdrawal - exactly the daily limit amount
9. Unsuccessful cash withdrawal (not enough money in account, single transaction limit reached, daily limit reached)
10. Check idle time while in session
11. Card is taken out of the card reader before a time limit
12. Cash is taken out of the cash dispenser before a time limit