FourBitTwoDisclosureDeviceUnlocker Algorithm

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Parameters and Constants

These should be private, global variables (fields) and constants.

1.1. "unlockValue:" this value indicates whether we will be setting all the bits to true or false to unlock the device. This will be initialized to true but it may be flipped with the toggleUnlockValue() method.

1.2. "spinCount:" this value counts the number of times the spin() method was called by this class. This begins at zero and continues counting until either spin() returns true or MAX_SPIN_COUNT is reached.

1.3. "MAX_SPIN_COUNT:" this value is the maximum number of times spin() may be called. Once spinCount reaches this maximum, unlock() must return false if we have not yet received a true from spin(), indicating that the device is unlocked.

1.4. "PATTERN:" this value contains our peek pattern "??--."

1.5. "unlockValue:" this value contains either 'T' or 'F,' which is what all the bits will be set to in order to unlock the device.

1.6. "pokePattern:" this value contains either "TT--" or "FF--" depending upon the whether unlockValue is true or false.

1.7. "traceValue:" this will contain the returned String from calling the showTrace() method.

Summary

2.1. Class Setup and init() Method

The ForBitTwoDiscolsureDeviceUnlocker instance is initialized and tied to a valid Device instance, which would have four bits total with two bits discloseable at a time. When the unlock() method is called, a private init() method is immediately called.

The init() method will call spin() and increment spinCount. The local variable unlocked will be used to hold the return value of init(). Once the value of unlocked is obtained. The log() method will be called with the following

string: “spin(): spinCount = [spinCount].” It will then see if the Device instance is unlocked.

- If spin() returns true, the device is unlocked. From there, init() returns true and unlock immediately returns true. If spin() returns false, the device is locked. From there, peek() will be called with the string argument “??--” and log() will be called with the following string: “peek(): [??--].” The value of the two bits is checked.
  - If both bits are false, unlockValue is set to false.
  - Otherwise, unlockValue is set to true, the unlockValue will be changed from ‘T’ to ‘F,’ and the pokePattern will be set to “FF--.”

  Either way, init will return false.

2.2. The unlock() Method Loop

If init() returns true, unlock() returns true. This will end the method’s execution. If init() returns false, spin() will be called again, spinCount will be incremented, and log() will be called with the following string: “spin(): spinCount = [spinCount].” Then spinCount will be checked against MAX_SPIN_COUNT.

- If spinCount is less than (<) MAX_SPIN_COUNT, then we will see what spin() returned.
  - If spin() returns true, the device is unlocked. From there, unlock() immediately returns true.
  - If spin() returns false, peek() will be called with PATTERN as an argument and log() will be called with the following string: “peek(): [??--].” The value of the two bits is checked.
    - If both bits are equal to the unlockValue set during init(), then we do nothing.
    - Otherwise, poke() will be called, passing pokePattern as an argument. Then log() will be called with the following string: “poke(): pokePattern.”

    Once there, spin() will be called, spinCount will be incremented, and log() will be called with the following string: “spin(): spinCount = [spinCount].”
    - If spinCount is less than (<) MAX_SPIN_COUNT, then the loop continues.
    - If spinCount is greater than (>) or equal to (==) MAX_SPIN_COUNT, then the unlock() method will return the value returned by spin(), whether it is true or false.

2.3. The checkSpinCount() and retrieveAndDisplayTrace()

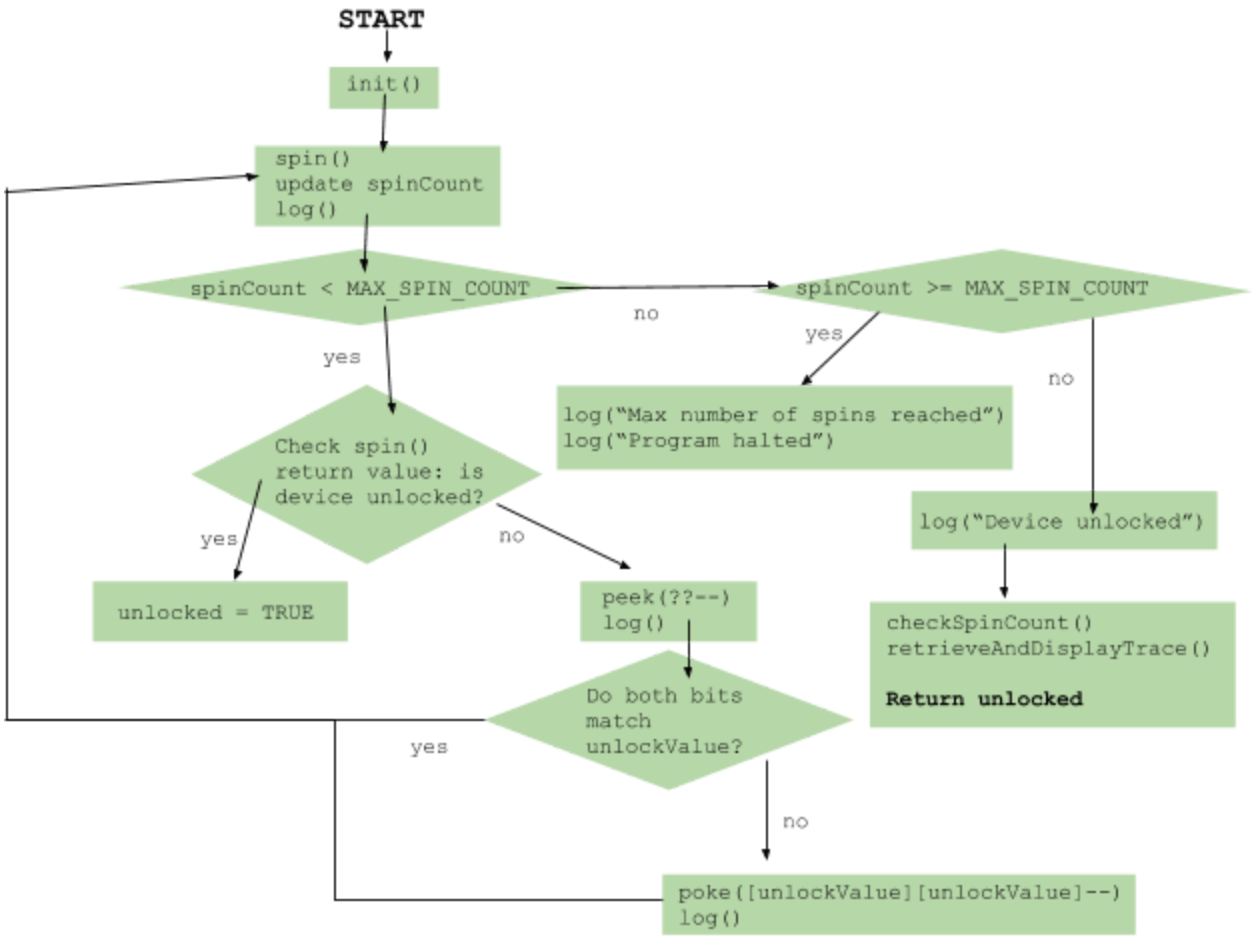
- The checkSpinCount() method is called. If spinCount is greater than (>) or equal to (==) MAX_SPIN_COUNT, then the log will have entries added that reflect that the MAX_SPIN_COUNT was reached and program has halted without successfully unlocking the Device. Otherwise, the log will reflect that device has been successfully unlocked.

- The retrieveAndDisplayTrace() method will be called. The traceValue field will be used to hold a return value for showTrace(). The contents of traceValue will then be printed out onto the console.
- In the retrieveAndDisplayTrace() method, the following variables will be reset to their original values to ensure correct operation:
  - traceValue reset to "".
  - spinCount reset to 0.

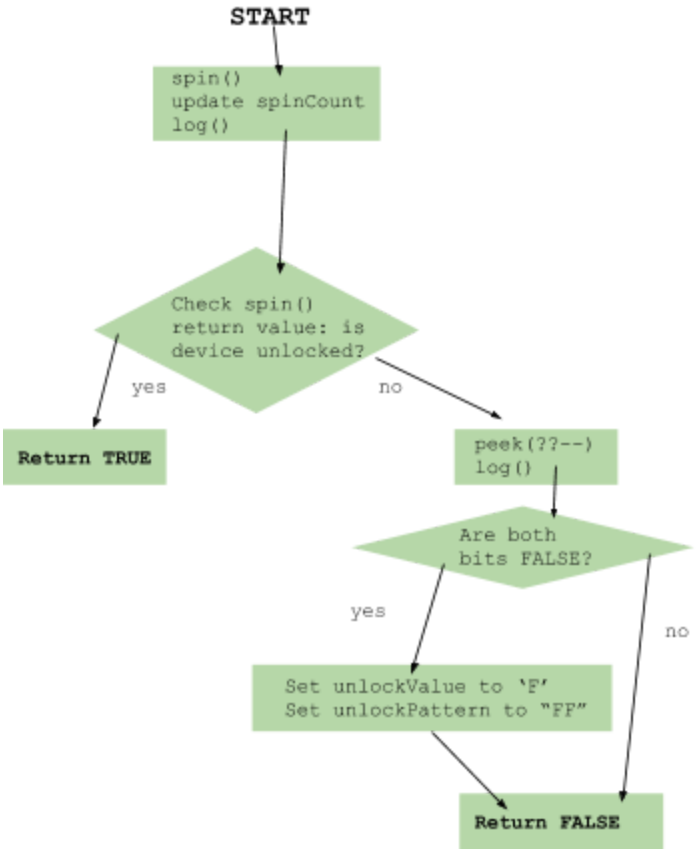
  Furthermore, log(null) will be called to clear the log.
- The value of unlocked will be returned, regardless of whether that value is true or false.

Flowcharts

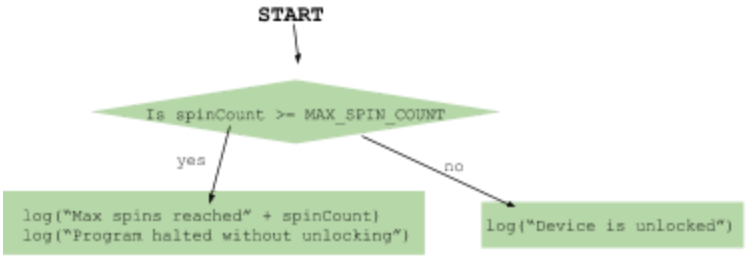
2.1. The public unlock() method.



2.2. The private init() method.



2.3. The private checkSpinCount()



2.4. The private retrieveAndDisplayTrace()