(a) Input Text

When the device is started, it should first perform SIM card authentication to verify the validity and legitimacy of the SIM card. If the SIM card is invalid or not recognized, the user will be prompted and subsequent operations will be blocked. After the authentication is passed, the device should start the multi-factor authentication process (such as password, fingerprint, facial recognition), and at least two authentication methods must be passed according to the security level set by the user. Each authentication step should include a timeout and error handling mechanism. If multiple authentications fail (such as more than 3 times), the device should lock the user account and issue a warning notification. After successful authentication, the device should record detailed information about the authentication event, including time, authentication method, and results, for subsequent security review and log analysis.

(b) Level 1

```
1.  LEVEL 1 Begin:
2.  [Condition]{
3.  Branch I:
4.     prompt user
5.     →block operation
6.  Branch II:
7.     multi-factor authentication
8.     →
9.  LEVEL 2 Begin:
10. [Loop]{

         'yet to decompose'


11. }
12. LEVEL 2 End.
13. authentication succeed→
14. record details}
15. LEVEL 1 End.
```

(c) Level 2

```
1.  LEVEL 1 Begin:
2.  [Condition]{
3.  Branch I:
4.     prompt user
5.     →block operation
6.  Branch II:
7.     multi-factor authentication
8.     →
9.  LEVEL 2 Begin:
10. [Loop]{
11. Loop start→ ... →
12. LEVEL 3 Begin:
13. [Fork]{

         'yet to decompose'


14. }
15. LEVEL 3 End.
16. →authentications fail
17. →LEVEL 3[ ... ]}
18. LEVEL 2 End.
19. authentication succeed→
20. record details}
21. LEVEL 1 End.
```

(d) Level 3

```
1.  LEVEL 1 Begin:
2.  [Condition]{
3.  ...
4.  LEVEL 2 Begin:
5.  [Loop]{
6.  Loop start→ ... →
7.  LEVEL 3 Begin:
8.  [Fork]{
9.  Branch I: password→
10. LEVEL 4 Begin:
11. [Condition]{

         'yet to decompose'

12. }
13. LEVEL 4 End.
14. Branch II: fingerprint
15.    →LEVEL 4[ ... ]
16. Branch III: facial
17.    →LEVEL 4[ ... ]}
18. }
19. LEVEL 3 End.
20. ... →LEVEL 3[ ... ]}
21. LEVEL 2 End.
22. ...}
23. LEVEL 1 End.
```

(e) Level 4

```
1.  LEVEL 1 Begin:
2.  [Condition]{
3.  ...
4.  LEVEL 2 Begin:
5.  [Loop]{
6.  Loop start→ ... →
7.  LEVEL 3 Begin:
8.  [Fork]{
9.  Branch I: password→
10. LEVEL 4 Begin:
11. [Condition]{
12. Branch I: ...
13. Branch II:
14.    timeout & error}
15. LEVEL 4 End.
16. Branch II: fingerprint
17.    →LEVEL 4[ ... ]
18. Branch III: facial
19.    →LEVEL 4[ ... ]}
20. }
21. LEVEL 3 End.
22. ... →LEVEL 3[ ... ]}
23. LEVEL 2 End.
24. ...}
25. LEVEL 1 End.
```