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Project Report

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1. Introduction
Object-Oriented and State-Based Testing

The goal of this project is to test an account class that exhibits state behavior specified by the EFSM model.

Description of an account class:

An account requires a minimum balance of $500. If a balance is below a minimum balance in the account, a $20 fee is imposed on each transaction (withdraw, deposit). Before any account transactions can be performed on the account, operation login() must be issued followed by pin() operation. The pin() operation must contain the valid pin # (parameter x) that must be the same as the pin # provided in the open() operation (parameter y). It is allowed a maximum of 3 attempts to "provide" an invalid pin. An account can be locked. When an account is locked, no transaction can be performed on the account (except unlock() and balance() operations). For the simplicity of implementation, all deposit and withdraw transactions are performed in the whole dollar amounts only (no cents). The EFSM model for the account class is provided in a separate file. Notice that the EFSM model specifies the expected behavior of the account class.

The following operations are supported by the account class:

class account:
account() //constructor
int open(int x, int y, int z) //sets balance to the value of x, pin number to
// the value of y, and an account # to the value of z
int login(int x) // allows to login to the account, where x is an account #
int logout() // allows to logout from the account
int pin(int x) // provides pin # (parameter x)
int deposit (int d); // deposits amount d to the account
int withdraw (int w); // withdraws amount w from the account
int balance (); // returns the value of the account balance
int lock (int x); // locks an account where x is the lock #
int unlock (int x); // unlocks an account when x equals to the correct lock #

Unless stated differently, each method (operation) returns 0 when the operation is successfully completed; otherwise, negative value -1 is returned.

2. EFSM Diagram of Account class

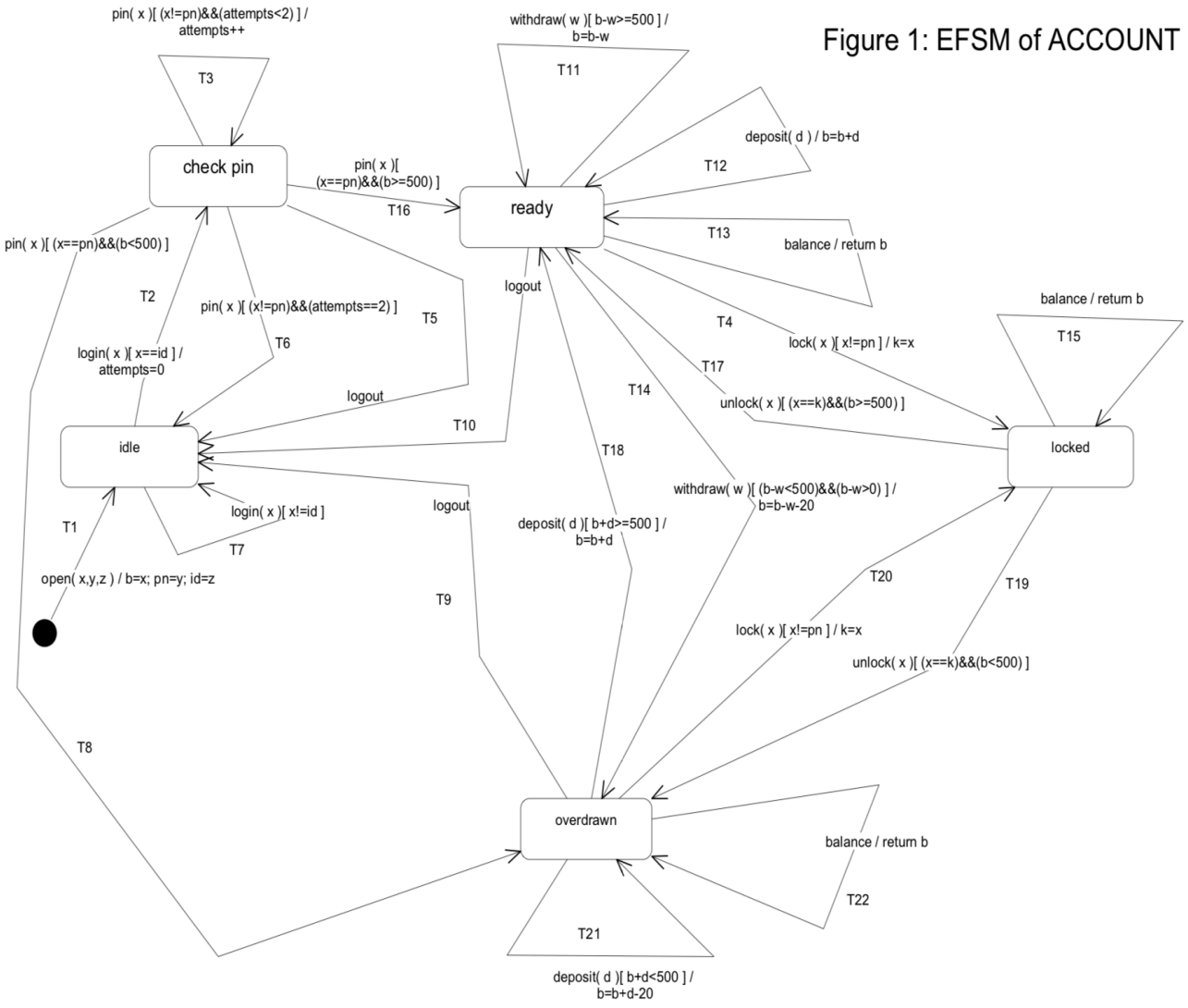

Figure 1: EFSM of ACCOUNT

3. Testing

Three types of testing have been performed which are as follows: -

3.1 Model Based Testing:

Transition Pair Testing:

A state transition diagram comprises of an arrangement of states and transitions when an Event/Action happens there happens a change from one state to other/itself. All transition pairs must be traversed once.

Following are transition pairs of each state of EFSM diagram.

Idle State:
In: T1, T5, T6, T7, T9, T10
Out: T2, T7

Transition Pairs	Test Cases
(T1, T2)	Test #2
(T1, T7)	Test #1
(T5, T2)	Test #1
(T5, T7)	Test #1
(T6, T2)	Test #1
(T6, T7)	Test #2
(T7, T2)	Test #1
(T7, T7)	Test #1
(T9, T2)	Test #3
(T9, T7)	Test #3
(T10, T2)	Test #2
(T10, T7)	Test #2

Check pin State:
In: T2, T3
Out: T3, T16, T5, T6, T8

Transition Pairs	Test Cases
(T2, T3)	Test#1
(T2, T16)	Test #2
(T2, T5)	Test #1
(T2, T6)	Not Possible
(T2, T8)	Test #3
(T3, T3)	Test #1
(T3, T16)	Test #4
(T3, T5)	Test #4
(T3, T6)	Test #1
(T3, T8)	Test #5

Transition pair (T2, T6) is non-executable, because after T2 executed, the value of attempts is equal to 0, so T6 can't be executed after T2, since T6 requires number of attempts to be 2.

Ready State:
In: T16, T11, T12, T13, T17, T18
Out: T11, T12, T13, T4, T14, T10

Transition Pairs	**Test Cases**
(T16, T11)	Test #6
(T16, T12)	Test #7
(T16, T13)	Test #8
(T16, T4)	Test #6
(T16, T14)	Test #10
(T16, T10)	Test #9
(T11, T11)	Test #6
(T11, T12)	Test #6
(T11, T13)	Test #7
(T11, T4)	Test #8
(T11, T14)	Test #11
(T11, T10)	Test #7
(T12, T11)	Test #8
(T12, T12)	Test #6
(T12, T13)	Test #6
(T12, T4)	Test #7
(T12, T14)	Test #10
(T12, T10)	Test #8
(T13, T11)	Test #7
(T13, T12)	Test #8
(T13, T13)	Test #6
(T13, T4)	Test #9
(T13, T14)	Test #10
(T13, T10)	Test #6
(T17, T11)	Test #7
(T17, T12)	Test #8
(T17, T13)	Test #9
(T17, T4)	Test #9
(T17, T14)	Test #11
(T17, T10)	Test #9
(T18, T11)	Test #10
(T18, T12)	Test #10
(T18, T13)	Test #11
(T18, T4)	Test #10
(T18, T14)	Test #11
(T18, T10)	Test #11

Locked State:
In: T4, T15, T20
Out: T15, T17, T19

Transition Pairs	Test Cases
(T4, T15)	Test #11
(T4, T17)	Test #9
(T4, T19)	Not possible
(T15, T15)	Test #11
(T15, T17)	Test #11
(T15, T19)	Test #13
(T20, T15)	Test #13
(T20, T17)	Not possible
(T20, T19)	Test #13

Transition pair (T4, T19) is non-executable because T4 can only be executed when balance b>500 therefore T19 can't be executed after T4. For T19 to be executed the balance b<500 and value of b is not changed during both transitions T4 &T19.

Transition pair (T20, T17) is non-executable because T17 can only be executed when b>500 and T20 can only be executed when b<500 and value of b is not changed during both transitions T20 &T17.

Overdrawn State:
In: T8, T14, T19, T21, T22
Out: T9, T18, T20, T21, T22

Transition Pairs	Test Cases
(T8, T9)	Test #5
(T8, T18)	Test #15
(T8, T20)	Test #13
(T8, T21)	Test #15
(T8, T22)	Test #14
(T14, T9)	Test #16
(T14, T18)	Test #10
(T14, T20)	Test #17
(T14, T21)	Test #18
(T14, T22)	Test #17
(T19, T9)	Test #13
(T19, T18)	Test #17
(T19, T20)	Test #19
(T19, T21)	Test #18
(T19, T22)	Test #17
(T21, T9)	Test #14
(T21, T18)	Test #18
(T21, T20)	Test #18
(T21, T21)	Test #14
(T21, T22)	Test #19
(T22, T9)	Test #17
(T22, T18)	Test #19
(T22, T20)	Test #17
(T22, T21)	Test #14
(T22, T22)	Test #14

Test Cases used in Transition Pair Testing:

Test#1: open(580,6848,123), login(567), login (456), login(123), logout(), login(800), login(123), logout(), login(123), pin(900), pin(789), pin(678), login(123), logout()
Test#2: open(800,6848,123), login(123), pin(123), pin(345), pin(678), login(900),login(123), pin (6848), logout(), login(900), login(123), pin(6848), logout(), login(123), logout()
Test#3: open(300,6848,123), login(123), pin(6848), logout(), login(123), pin(6848), logout(), login(890), login(123), logout()
Test#4: open(700,6848,123), login(123), pin(900), pin(6848), logout(), login(123), pin(898), logout()
Test#5: open(200,6848,123), login(123), pin(900), pin(6848), logout()
Test#6: open(700,6848,123), login(123), pin(6848), lock(900), unlock(900),logout(), login(123), pin(6848), withdraw(100), withdraw(100), deposit(100), deposit(100), balance(), balance(), logout()
Test#7: open(800,6848,123), login(123), pin(6848), deposit(100), lock(900), unlock(900), withdraw (100), balance(), withdraw(100), logout()
Test#8: open(800,6848,123), login(123), pin(6848), balance(), deposit(100), withdraw(100), lock(222), unlock(222), deposit(100), logout()
Test#9: open(900,6848,123), login(123), pin(6848), logout(), login(123), pin(6848), deposit(100), lock(900), unlock(900), balance(), lock(900), unlock(900), lock(900), unlock(900), logout()
Test#10: open(500,6848,123), login(123), pin(6848), withdraw(100),deposit(220), withdraw(100), deposit(100), withdraw(200), deposit(120), deposit(50), balance(), withdraw(150), deposit(120), lock(900), unlock(900), logout()
Test#11: open(600,6848,123), login(123), pin(6848), withdraw(100), withdraw(100), deposit(120), lock(900), unlock(900), withdraw(100), deposit(120), balance(), withdraw(100), deposit(120), withdraw(100), deposit(120), logout()
Test#12: open(600,6848,123), login(123), pin(6848), lock(900), balance(), balance(), unlock(900), logout()
Test#13: open(400,6848,123), login(123), pin(6848),lock(900), balance(), unlock(900), lock(900), unlock(900), logout()
Test#14: open(200,6848,123), login(123), pin(6848), balance(), balance(), deposit(100), deposit(100), logout()
Test#15: open(200,6848,123), login(123), pin(6848), deposit(100), logout(), login(123), pin(6848), deposit(500), logout()
Test#16: open(650,8900,456), login(456), pin(8900), withdraw(250), logout()
Test#17: open(500,6848,123), login(123), pin(6848), withdraw(100), lock(400), unlock(400), deposit(200) withdraw(200), balance(), lock(900), unlock(900), balance(), logout().
Test#18: open(500,6848,123), login(123), pin(6848), withdraw(200), deposit(120), lock(500), unlock(500), deposit(100), deposit(50), logout()
Test#19: open(300,6848,123), login(123), pin(6848), lock(450), unlock(450), lock(400), unlock(400), deposit(100), balance(), deposit(120), logout()

3.2 Default (Ghost) Transition Testing

Ghost transitions are not shown in the EFSM model. When the default/ghost transitions are executed there is no change in the state and no action is performed. The **underline** text Operations of each test case represent the Ghost transitions.

Following are test cases for each state of EFSM diagram.

Idle State:
Test#20: open (500,6848,123), login(500), open (500,6850,456), pin(900), withdraw (50), deposit (60), balance (), lock (300), unlock (300), logout().

Check Pin State:
Test #21: open (500,6848,123), login (123), open (500,6850,456), login(200), withdraw(50), deposit(60), balance(), lock(300), unlock(300).

Ready State:
Test#22: open(500,6848,123), login(123), pin(6848), open(500,6850,456), login(200), pin(456), lock (6848), unlock(300).

Locked State:
Test#23: open(500,6848,123), login(123), pin(6848), lock(100), open(500,6850,456), login(200), pin(456), lock(200), unlock(900), withdraw(400), deposit (500), logout().

Overdrawn State:
Test#24: open(400,6848,123), login(123), pin(6848), open(500,6850,456), login(200), lock(6848), pin(456), withdraw(400), unlock(200).

Start State:
Test#46: login(123), pin(6848), deposit(100), withdraw(200), balance, lock(100), unlock(400), logout()

3.3 Multiple Conditioning Testing

Testing conditions with complex predicates And, Or, Not. A perplexing predicate comprises of straightforward predicates with and, or, not. Thought is to test every one of the mixes of basic predicates.

Following are the branches/conditions of source code and their test cases.

if ((x > 0) && (x4 == -1) && (y > 0) && (z > 0)) – For open(int x, int y, int z) function
C1: (x>0)
C2: (x4==-1)
C3: (y>0)
C4: (z>0)

#	C1	C2	C3	C4	Test Cases
1	T	T	T	T	Test #26
2	T	T	T	F	Test #26
3	T	T	F	T	Test #26
4	T	T	F	F	Test #26
5	T	F	T	T	Test #25
6	T	F	T	F	Test #25
7	T	F	F	T	Test #25
8	T	F	F	F	Test #25
9	F	T	T	T	Test #26
10	F	T	T	F	Test #26
11	F	T	F	T	Test #26
12	F	T	F	F	Test #26
13	F	F	T	T	Test #25
14	F	F	T	F	Test #25
15	F	F	F	T	Test #25
16	F	F	F	F	Test #25

If (x4!=1) – For pin(int x) function
C5: (x4!=1)

#	C5	Test Case
17	T	Test #27
18	F	Test #28

if (x == x3) - For pin(int x) function
C6: (x == x3)

#	C6	Test Case
19	T	Test #7
20	F	Test #1

if (x9 >= x0) – For pin(int x) function
C7: (x9>=x0)

#	C7	Test Case
21	T	Test #1
22	F	Test #3

If ((x4 == 0) || (x2 == 1)) – For logout()function
C8: (x4 == 0)
C9: (x2 == 1)

#	**C8**	**C9**	**Test Case**
23	T	T	Not possible
24	T	F	Test #5
25	F	T	Test #23
26	F	F	Test #22

The branch '23' (T,T) for statement C8 and C9 is non-executable because for x2==1, x4 must equal to 2, and it can't be 0 and x4=0 can only happen when it is in Idle State and under Idle state x2 cannot be equal to 1.

if (x4 != 0) – For login(int x) function
C10: (x4!=0)

#	**C10**	**Test Case**
27	T	Test #22
28	F	Test #4

if (x5 == x) – For login(int x) function
C11: (x5 == x)

#	**C11**	**Test Case**
29	T	Test #5
30	F	Test #29

if (x4 != 2) – For balance()function
C12: (x4!=2)

#	**C12**	**Test Case**
31	T	Test #21
32	F	Test #14

if (x4 != 2) – For lock(int x) function
C13: (x4!=2)

#	**C13**	**Test Case**
33	T	Test #21
34	F	Test #30

If (x == x3) – For lock(int x) function
C14: (x == x3)

#	**C14**	**Test Case**
35	T	Test #31
36	F	Test #8

if (x2 == 0) – For lock(int x) function
C15: (x2==0)

#	C15	Test Case
37	T	Test #8
38	F	Test #23

if (x4 != 2) - For unlock(int x) function
C16: (x4!=2)

#	C16	Test Case
38	T	Test #32
39	F	Test #33

if ((x2 == 1) && (x == x8)) - For unlock(int x) function
C17: (x2==1)
C18: (x==x8)

#	C17	C18	Test Case
39	T	T	Test #7
40	T	F	Test #34
41	F	T	Test #35
42	F	F	Test #36

(x4 != 2) – For deposit(int d) function
C18: (x4!=2)

#	C18	Test Case
43	T	Test #32
44	F	Test #37

if (x2 == 1) – For deposit(int d) function
C19: (x2==1)

#	C19	Test Case
45	T	Test #23
46	F	Test #14

if ((x1 + d < x7) && (d>0)) - For deposit(int d) function
C20: (x1+d<x7)
C21: (d>0)

#	C20	C21	Test Case
47	T	T	Test #14
48	T	F	Test #38
49	F	T	Test #15
50	F	F	Test #39

if (d > 0) – For deposit(int d) function
C22: (d>0)

#	**C22**	**Test Case**
51	T	Test #19
52	F	Test #39

(x4 != 2) – For withdraw(int w) function
C23: (x4! =2)

#	**C23**	**Test Case**
53	T	Test #32
54	F	Test #37

if (x2 == 1) – For withdraw(int w) function
C24: (x2==1)

#	**C24**	**Test Case**
55	T	Test #23
56	F	Test #8

if ((x1 > w) && (w > 0)) – For withdraw(int w) function
C25: (x1>w)
C26: (w>0)

#	**C25**	**C26**	**Test Case**
56	T	T	Test #8
57	T	F	Test #40
58	F	T	Test #41
59	F	F	Test #42

if (x1 < x7) – For withdraw(int w) function
C27: (x1<x7)

#	**C27**	**Test Case**
60	T	Test #45
61	F	Test #43

if (x1 < x7) – For withdraw(int w) function
C28: (x1<x7)

#	**C28**	**Test Case**
62	T	Test #43
63	F	Test #44

Test Cases used in Multiple Condition Testing:

Test#1: open(580,6848,123), login(567), login (456), login(123), logout(), login(800), login(123), logout(), login(123), pin(900), pin(789), pin(678), login(123), logout()
Test#3: open(300,6848,123), login(123), pin(6848), logout(), login(123), pin(6848), logout(), login(890), login(123), logout()
Test#4: open(700,6848,123), login(123), pin(900), pin(6848), logout(), login(123), pin(898), logout()
Test#5: open(200,6848,123), login(123), pin(900), pin(6848), logout()
Test#7: open(800,6848,123), login(123), pin(6848), deposit(100), lock(900), unlock(900), withdraw (100), balance(), withdraw(100), logout()
Test#8: open(800,6848,123), login(123), pin(6848), balance(), deposit(100), withdraw(100), lock(222), unlock(222), deposit(100), logout()
Test#14: open(200,6848,123), login(123), pin(6848), balance(), balance(), deposit(100), deposit(100), logout()
Test#15: open(200,6848,123), login(123), pin(6848), deposit(100), logout(), login(123), pin(6848), deposit(500), logout()
Test#19: open(300,6848,123), login(123), pin(6848), lock(450), unlock(450), lock(400), unlock(400), deposit(100), balance(), deposit(120), logout()
Test#21: open (500,6848,123), login (123), open (500,6850,456), login(200), withdraw(50), deposit(60), balance(), lock(300), unlock(300).
Test#22: open(500,6848,123), login(123), pin(6848), open(500,6850,456), login(200), pin(456), lock(6848), unlock(300).
Test#23: open(500,6848,123), login(123), pin(6848), lock(100), open(500,6850,456), login(200), pin(456), lock(200), unlock(900), withdraw(400), deposit (500), logout().
Test#25: open(500,6848,123), open(600,6848,123), open(600,6848,-123), open(600,-6848,123), open(600,-6848,-123), open(-600,6848,123), open(-600,6848,-123)
Test#26: open(600,6848,-123), open(600,-6848,123), open(600,-6848,-123), open(-600,6848,123), open(-600,6848,-123), open(-600,6848,123), open(-600,-6848,-123), open(500,6848,123)
Test#27: open(500,6848,123), pin(900)
Test#28: open(600,6848,123), login(123), login(123), pin(900)
Test#29: open(600,6848,123), login(900), pin(900), logout()
Test#30: open(600,6848,123), login(123), pin(6848), balance()
Test#31: open(500,6848,123), login(123), pin(6848), lock(6848), logout()
Test#32: open(500,6848,123), login(123), deposit(400), withdraw(200), unlock(123)
Test#33: open(500,6848,123), login(123), pin(6848), unlock(500)
Test#34: open(700,6848,123), login(123), pin(6848), lock(567), unlock(900)
Test#35: open(500,6848,123), login(123), unlock(123)
Test#36: open(800,6848,123), login(123), pin(6848), unlock(400)
Test#37: open(500,6848,123), login(123), pin(6848), deposit(500), withdraw(200)
Test#38: open(400,6848,123), login(123), pin(6848), deposit(-100), logout()
Test#39: open(700,6848,123), login(123), pin(6848), deposit(-100), logout()
Test#40: open(600,6848,123), login(123), pin(6848), withdraw(-100)
Test#41: open(600,6848,123), login(123), pin(6848), withdraw(800), logout()
Test#42: open(-4,6848,123), login(123), pin(6848), withdraw(-3)
Test#43: open(200,6848,123), login(123), pin(6848), deposit(300), withdraw(100), logout()
Test#44: open(600,6848,123), login(123), pin(6848), withdraw(100), logout()
Test#45: open(200,6848,123), login(123), pin(6848), withdraw(100), logout()

4. Test Suit and result of its execution.

Test suite:

Test#1: open 580 6848 123 login 567 login 456 login 123 logout login 800 login 123 logout login 123 pin 900 pin 789 pin 678 login 123 logout
Test#2: open 800 6848 123 login 123 pin 123 pin 345 pin 678 login 900 login 123 pin 6848 logout login 900 login 123 pin 6848 logout login 123 logout
Test#3: open 300 6848 123 login 123 pin 6848 logout login 123 pin 6848 logout login 890 login 123 logout
Test#4: open 700 6848 123 login 123 pin 900 pin 6848 logout login 123 pin 898 logout
Test#5: open 200 6848 123 login 123 pin 900 pin 6848 logout
Test#6: open 700 6848 123 login 123 pin 6848 lock 900 unlock 900 logout login 123 pin 6848 withdraw 100 withdraw 100 deposit 100 deposit 100 balance balance logout
Test#7: open 800 6848 123 login 123 pin 6848 deposit 100 lock 900 unlock 900 withdraw 100 balance withdraw 100 logout
Test#8: open 800 6848 123 login 123 pin 6848 balance deposit 100 withdraw 100 lock 222 unlock 222 deposit 100 logout
Test#9: open 900 6848 123 login 123 pin 6848 logout login 123 pin 6848 deposit 100 lock 900 unlock 900 balance lock 900 unlock 900 lock 900 unlock 900 logout
Test#10: open 500 6848 123 login 123 pin 6848 withdraw 100 deposit 220 withdraw 100 deposit 100 withdraw 200 deposit 120 deposit 50 balance withdraw 150 deposit 120 lock 900 unlock 900 logout
Test#11: open 600 6848 123 login 123 pin 6848 withdraw 100 withdraw 100 deposit 120 lock 900 unlock 900 withdraw 100 deposit 120 balance withdraw 100 deposit 120 withdraw 100 deposit 120 logout
Test#12: open 600 6848 123 login 123 pin 6848 lock 900 balance balance unlock 900 logout
Test#13: open 400 6848 123 login 123 pin 6848 lock 900 balance unlock 900 lock 900 unlock 900 logout
Test#14: open 200 6848 123 login 123 pin 6848 balance balance deposit 100 deposit 100 logout
Test#15: open 200 6848 123 login 123 pin 6848 deposit 100 logout login 123 pin 6848 deposit 500 logout
Test#16: open 650 8900 456 login 456 pin 8900 withdraw 250 logout
Test#17: open 500 6848 123 login 123 pin 6848 withdraw 100 lock 400 unlock 400 deposit 200 withdraw 200 balance lock 900 unlock 900 balance logout
Test#18: open 500 6848 123 login 123 pin 6848 withdraw 200 deposit 120 lock 500 unlock 500 deposit 100 deposit 50 logout
Test#19: open 300 6848 123 login 123 pin 6848 lock 450 unlock 450 lock 400 unlock 400 deposit 100 balance deposit 120 logout
Test#20: open 500 6848 123 login 500 open 500 6850 456 pin 900 withdraw 50 deposit 60 balance lock 300 unlock 300 logout
Test#21: open 500 6848 123 login 123 open 500 6850 456 login 200 withdraw 50 deposit 60 balance lock 300 unlock 300
Test#22: open 500 6848 123 login 123 pin 6848 open 500 6850 456 login 200 pin 456 lock 6848 unlock 300
Test#23: open 500 6848 123 login 123 pin 6848 lock 100 open 500 6850 456 login 200 pin 456 lock 200 unlock 900 withdraw 400 deposit 500 logout
Test#24: open 400 6848 123 login 123 pin 6848 open 500 6850 456 login 200 lock 6848 pin 456 withdraw 400 unlock 300
Test#25: open 500 6848 123 open 600 6848 123 open 600 6848 -123 open 600 -6848 123 open 600 -6848 -123 open -600 6848 123 open -600 6848 -123 open -600 6848 123 open -600 -6848 -123
Test#26: open 600 6848 -123 open 600 -6848 123 open 600 -6848 -123 open -600 6848 123 open -600 6848 -123 open -600 6848 123 open -600 -6848 -123 open 500 6848 123

Test#27: open 500 6848 123 pin 900
Test#28: open 600 6848 123 login 123 login 123 pin 900
Test#29: open 600 6848 123 login 900 pin 900 logout
Test#30: open 600 6848 123 login 123 pin 6848 balance
Test#31: open 500 6848 123 login 123 pin 6848 lock 6848 logout
Test#32: open 500 6848 123 login 123 deposit 400 withdraw 200 unlock 123
Test#33: open 500 6848 123 login 123 pin 6848 unlock 500
Test#34: open 700 6848 123 login 123 pin 6848 lock 567 unlock 900
Test#35: open 500 6848 123 login 123 unlock 123
Test#36: open 800 6848 123 login 123 pin 6848 unlock 400
Test#37: open 500 6848 123 login 123 pin 6848 deposit 500 withdraw 200
Test#38: open 400 6848 123 login 123 pin 6848 deposit -100 logout
Test#39: open 700 6848 123 login 123 pin 6848 deposit -100 logout
Test#40: open 600 6848 123 login 123 pin 6848 withdraw -100
Test#41: open 600 6848 123 login 123 pin 6848 withdraw 800 logout
Test#42: open -4 6848 123 login 123 pin 6848 withdraw -3
Test#43: open 200 6848 123 login 123 pin 6848 deposit 300 withdraw 100 logout
Test#44: open 600 6848 123 login 123 pin 6848 withdraw 100 logout
Test#45: open 200 6848 123 login 123 pin 6848 withdraw 100 logout
Test#46: login 123 pin 6848 deposit 100 withdraw 200 balance lock 100 unlock 400 logout
$$

Following are test cases which covers Transition Pair testing, Default(Ghost) Transition testing and Multiple Condition Testing and are stored in TS.txt.

For each test case, the value of return variable, state, lock_state, number of attempts, account number and pin number has been displayed after each operation of test case for both expected and actual output.

Expected and Actual result will help to verify the correctness of each test result.

All the methods return 0 on successful execution of an action otherwise it results in -1.

Test#1: open(580,6848,123), login(567), login (456), login(123), logout(), login(800), login(123), logout(), login(123), pin(900), pin(789), pin(678), login(123), logout()

Expected Result:

return: 0, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: -1, balance: 580, state: Check_pin, lock_state: unlocked, attempts:2, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: unlocked, attempts:3, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual output:

return: 0, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 580, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: -1, balance: 580, state: Check_pin, lock_state: unlocked, attempts:2, account: 123, pin:6848
return: -1, balance: 580, state: Idle, lock_state: unlocked, attempts:3, account: 123, pin:6848
return: 0, balance: 580, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed –

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
580	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#2: open(800,6848,123), login(123), pin(123), pin(345), pin(678), login(900),login(123), pin (6848), logout(), login(900), login(123), pin(6848), logout(), login(123), logout()

Expected Result:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 800, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: -1, balance: 800, state: Check_pin, lock_state: unlocked, attempts:2, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: unlocked, attempts:3, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Actual Result:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 800, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: -1, balance: 800, state: Check_pin, lock_state: unlocked, attempts:2, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: unlocked, attempts:3, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed –

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
800	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#3: open(300,6848,123), login(123), pin(6848), logout(), login(123), pin(6848), logout(), login(890), login(123), logout()

Expected Output:

return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed –

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
300	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#4: open(700,6848,123), login(123), pin(900), pin(6848), logout(), login(123), pin(898), logout()

Expected Output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 700, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 700, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 700, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 700, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
700	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#5: open(200,6848,123), login(123), pin(900), pin(6848), logout()

Expected Output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: -1, balance: 200, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: -1, balance: 200, state: Check_pin, lock_state: unlocked, attempts:1, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
200	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#6: open(700,6848,123), login(123), pin(6848), lock(900), unlock(900),logout(), login(123), pin(6848), withdraw(100), withdraw(100), deposit(100), deposit(100), balance(), balance(), logout()

Expected Output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 700, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
700	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#7: open(800,6848,123), login(123), pin(6848), deposit(100), lock(900), unlock(900), withdraw (100), balance(), withdraw(100), logout()

Actual Output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Expected Output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
700	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#8: open(800,6848,123), login(123), pin(6848), balance(), deposit(100), withdraw(100), lock(222), unlock(222), deposit(100), logout()

Expected Output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 800, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
900	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#9: open(900,6848,123), login(123), pin(6848), logout(), login(123), pin(6848), deposit(100), lock(900), unlock(900), balance(), lock(900), unlock(900), lock(900), unlock(900), logout()

Expected Output:

return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 900, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 1000, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
1000	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#10: open(500,6848,123), login(123), pin(6848), withdraw(100),deposit(220), withdraw(100), deposit(100), withdraw(200), deposit(120), deposit(50), balance(), withdraw(150), deposit(120), lock(900), unlock(900), logout()

Expected Output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 550, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 550, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 550, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 550, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. **Hence Test case is passed.**

Test#11: open(600,6848,123), login(123), pin(6848), withdraw(100), withdraw(100), deposit(120), lock(900), unlock(900), withdraw(100), deposit(120), balance(), withdraw(100), deposit(120), withdraw(100), deposit(120), logout()

Expected Output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#12: open(600,6848,123), login(123), pin(6848), lock(900), balance(), balance(), unlock(900), logout()

Expected Output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848

return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#13: open(400,6848,123), login(123), pin(6848),lock(900), balance(), unlock(900), lock(900), unlock(900), logout()

Expected Output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual Output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 400, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
400	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#14: open(200,6848,123), login(123), pin(6848), balance(), balance(), deposit(100), deposit(100), logout()

Expected output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Actual output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
360	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#15: open(200,6848,123), login(123), pin(6848), deposit(100), logout(), login(123), pin(6848), deposit(500), logout()

Expected output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848

return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 780, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 780, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Actual output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 200, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 780, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 780, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
780	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#16: open(650,8900,456), login(456), pin(8900), withdraw(250), logout()

Expected output:

return: 0, balance: 650, state: Idle, lock_state: Unlocked, attempts:0, account: 456, pin:8900
return: 0, balance: 650, state: Check_pin, lock_state: unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 650, state: Ready, lock_state: unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 380, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 380, state: Idle, lock_state: unlocked, attempts:0, account: 456, pin:8900

Actual output:

return: 0, balance: 650, state: Idle, lock_state: Unlocked, attempts:0, account: 456, pin:8900
return: 0, balance: 650, state: Check_pin, lock_state: unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 650, state: Ready, lock_state: unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 380, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 456, pin: 8900
return: 0, balance: 380, state: Idle, lock_state: unlocked, attempts:0, account: 456, pin:8900

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
380	0	8900	0	456	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#17: open(500,6848,123), login(123), pin(6848), withdraw(100), lock(400), unlock(400), deposit(200) withdraw(200), balance(), lock(900), unlock(900), balance(), logout().

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 580, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 360, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 360, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
360	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#18: open(500,6848,123), login(123), pin(6848), withdraw(200), deposit(120), lock(500), unlock(500), deposit(100), deposit(50), logout()

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 380, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 460, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 510, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 510, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 280, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 460, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 510, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 510, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin:6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
510	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#19: open(300,6848,123), login(123), pin(6848), lock(450), unlock(450), lock(400), unlock(400), deposit(100), balance(), deposit(120), logout()

Expected output:

return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 300, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Check_pin, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 300, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Locked, lock_state: locked, attempts:0, account: 123, pin:6848
return: 0, balance: 300, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin:6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Idle, lock_state: unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#20: open (500,6848,123), login(500), open (500,6850,456), pin(900), withdraw (50), deposit (60), balance (), lock (300), unlock (300), logout().

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#21: open (500,6848,123), login (123), open (500,6850,456), login(200), withdraw(50), deposit(60), balance(), lock(300), unlock(300).

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	**x2**	**x3**	**x4**	**x5**	**x6**	**x7**	**x8**	**x9**	**Current State**
500	**0**	**6848**	**1**	**123**	**20**	**500**	**0**	**0**	**Check_Pin State**

Actual and Expected output are same. Hence Test case is passed.

Test#22: open(500,6848,123), login(123), pin(6848), open(500,6850,456), login(200), pin(456), lock(6848), unlock(300).

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#23: open(500,6848,123), login(123), pin(6848), lock(100), open(500,6850,456), login(200), pin(456), lock(200), unlock(900), withdraw(400), deposit (500), logout().

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	1	6848	2	123	20	500	100	0	Locked State

Actual and Expected output are same. Hence Test case is passed.

Test#24: open(400,6848,123), login(123), pin(6848), open(500,6850,456), login(200), lock(6848) pin(456), withdraw(400), unlock().

Expected output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Check_pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
400	0	6848	2	123	20	500	0	0	Overdrawn State

Actual and Expected output are same. Hence Test case is passed.

Test#25: open(500,6848,123), open(600,6848,123), open(600,6848,-123), open(600,-6848,123), open(600,-6848,-123), open(-600,6848,123), open(-600,6848,-123), open(-600,6848,123), open(-600,-6848,-123)

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#26: open(600,6848,-123), open(600,-6848,123), open(600,-6848,-123), open(-600,6848,123), open(-600,6848,-123), open(-600,6848,123), open(-600,-6848,-123), open(500,6848,123)

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848
return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: -123, pin: 6848

Actual output:

return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts: 0, account: 0, pin: 0
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts: 0, account: 123, pin: 6848

Actual and Expected output are different because in EFSM the condition ((x > 0) && (x4 == -1) && (y > 0) && (z > 0)) is not mentioned in the open method hence negative values for initial balance(x), pin(y), account number(z) can be taken as input however in the source

code the condition ((x > 0) && (x4 == -1) && (y > 0) && (z > 0)) is mentioned in open function, therefore is not possible to take negative value of initial balance(x), pin(y), account number(z) as input.

Final values of variables after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are different. Hence Test case is failed.

Test#27: open(500,6848,123), pin(900)

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#28: open(600,6848,123), login(123), login(123), pin(900)

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:1, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:1, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	1	123	20	500	0	0	Check Pin State

Actual and Expected output are same. Hence Test case is passed.

Test#29: open(600,6848,123), login(900), pin(900), logout()

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#30: open(600,6848,123), login(123), pin(6848), balance()

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#31: open(500,6848,123), login(123), pin(6848), lock(6848), logout()

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are same. Hence Test case is passed.

Test#32: open(500,6848,123), login(123), deposit(400), withdraw(200), unlock(123)

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1. balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1. balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	1	123	20	500	0	0	Check_Pin State

Actual and Expected output are same. Hence Test case is passed.

Test#33: open(500,6848,123), login(123), pin(6848), unlock(500)

Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: -1, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#34: open(700,6848,123), login(123), pin(6848), lock(567), unlock(900)

Expected output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

return: -1, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

return: -1, balance: 700, state: Locked, lock_state: locked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
700	1	6848	2	123	20	500	567	0	Locked State

Actual and Expected output are same. Hence Test case is passed.

Test#35: open(500,6848,123), login(123), unlock(123)
Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	1	123	20	500	0	0	Check_Pin State

Actual and Expected output are same. Hence Test case is passed.

Test#36: open(800,6848,123), login(123), pin(6848), unlock(400)
Expected output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 800, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 800, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 800, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
800	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#37: open(500,6848,123), login(123), pin(6848), deposit(500), withdraw(200)
Expected output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 1000, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 1000, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 800, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
800	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#38: open(400,6848,123), login(123), pin(6848), deposit(-100), logout()

Expected output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 280, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 280, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Expected output:

return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 400, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 400, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual and Expected output are different because in EFSM the condition (d>0) while depositing is not mentioned hence negative value of ‘d’ is accepted as deposit input however in the source code, condition (d>0) is mentioned in the deposit function therefore it is impossible to take negative deposit from the user.

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
400	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are different. Hence Test case is failed.

Test#39: open(700,6848,123), login(123), pin(6848), deposit(-100), logout()

Expected output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual and Expected output are different because in EFSM the condition (d>0) while depositing is not mentioned hence negative value of 'd' is accepted as deposit input however in the source code, condition (d>0) is mentioned in the deposit function therefore it is impossible to take negative deposit from the user.

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
700	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output are different. Hence Test case is failed.

Test#40: open(600,6848,123), login(123), pin(6848), withdraw(-100)

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 700, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual and Expected output are different because in EFSM the condition(w>0) is not mentioned in the withdraw method and also in withdraw method the condition (b=b-w) add the user inputted withdrawal amount to the balance because of negative value of 'w'. In the source code, since the condition(w>0) is mentioned, therefore it cannot take negative value of 'w' as input.

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	2	123	20	500	0	0	Ready State

Actual and Expected output are different. Hence Test case is failed.

Test#41: open(600,6848,123), login(123), pin(6848), withdraw(800), logout()
Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
600	0	6848	0	123	20	500	0	0	Ready State

Actual and Expected output are same. Hence Test case is passed.

Test#42: open(-4,6848,123), login(123), pin(6848), withdraw(-3)
Expected output:

return: 0, balance: -4, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: -4, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: -4, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: -4, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0

Actual and Expected output are different because in EFSM the condition ((x > 0) && (x4 == -1) && (y > 0) && (z > 0)) is not mentioned in the open method hence negative values for initial balance(x), pin(y), account number(z) can be taken as input, also condition (w>0) is not mentioned in the withdraw method, therefore negative value of withdrawal input from user is accepted. However in the source code the condition ((x > 0) && (x4 == -1) && (y > 0) && (z > 0)) is mentioned in open function and condition (w>0) is mentioned in the withdraw function, therefore it is not possible to take negative value of initial balance(x), pin(y), account number(z) and withdrawal amount(w) as input.

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
0	0	0	-1	0	20	500	0	0	Start State

Actual and Expected output are different. Hence Test case is failed.

Test#43: open(200,6848,123), login(123), pin(6848), deposit(300), withdraw(100), logout()

Expected output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 380, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
380	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output is same. Hence Test case is passed.

Test#44: open(600,6848,123), login(123), pin(6848), withdraw(100), logout()

Expected output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 600, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 600, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Ready, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 500, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
500	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output is same. Hence Test case is passed.

Test#45: open(200,6848,123), login(123), pin(6848), withdraw(100), logout()

Expected output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Actual output:

return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Check_Pin, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: -1, balance: 200, state: Overdrawn, lock_state: Unlocked, attempts:0, account: 123, pin: 6848
return: 0, balance: 200, state: Idle, lock_state: Unlocked, attempts:0, account: 123, pin: 6848

Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
200	0	6848	0	123	20	500	0	0	Idle State

Actual and Expected output is same. Hence Test case is passed.

Test#46: login(123), pin(6848), deposit(100), withdraw(200), balance, lock(100), unlock(400), logout()

Expected output:

return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0

Actual output:

return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0
return: -1, balance: 0, state: Start, lock_state: Unlocked, attempts:0, account: 0, pin: 0

Final values of variable after test case is executed -
Final values of variable after test case is executed -

x1	x2	x3	x4	x5	x6	x7	x8	x9	Current State
0	0	0	0	0	20	500	0	0	Start State

Actual and Expected output is same. Hence Test case is passed.

5. Conclusion

My experience from this project is that there is no limit to designing of test-cases for a project. Though designing of test-cases is interesting at the same time it is challenging as well. What makes it challenging is that even after the code has passed all the test-cases that don't guarantee that the code is defect free.

Before editing the code, I understood the design of the EFSM model, then I made changes in the code to display state after each operation is performed to understand how operations are interlinked. Designing of test driver helped me to understand the structure of the code and all the operations however it took a longer time than I have expected.

In my opinion combination of Transition pair testing, Default (Ghost) transition testing and Multiple condition testing help to find the defects in the code but it doesn't satisfy that all the defects will be detected using these testing methods.

Automation of test-cases with the Test Suite file takes less time to generate result but it doesn't guarantee that the code is defect free. A better and a simple option would be inputting the test case file (TS.txt) to the test driver for evaluation of test cases rather than testing each test case manually.

6. Source code

account.java

```
//*********************************************
//************ CLASS ACCOUNT ******************
//*********************************************

public class account
{
	private int x0; //Predefined value as 3 for maximum number of wrong attempts while
entering pin
	private int x1; //User input Balance
	private int x2; //User input Lock Variable
	private int x3; //User input input Pin.
	private int x4; //State Id#
	private int x5; //Input Account Id#
	private int x6; //Predefined value as 20 for fine in withdrawn condition
	private int x7; //Predefine minimum balance as 500
	private int x8; //Lock pin
	private int x9; //Number of attempts while entering wrong pin.

public final int show_balance() //display user input balance.
{
	return x1;
} //testing oriented method

public account()
{
	x2 = 0;
	x4 = -1;
	x6 = 20;
	x7 = 500;
	x9 = 0;
	x0 = 3;
}
public final int open(int x, int y, int z) //open method
{
	if ((x > 0) && (x4 == -1) && (y > 0) && (z > 0))
	{
		x1 = x;
		x3 = y;
		x5 = z;
		x4 = 0;
		return 0;
	};
	return -1;
}
public final int pin(int x) //Pin method
{
	if (x4 != 1)
	{
		return -1;
	}
	if (x == x3)
	{
		x4 = 2;
		return 0;
	}
	else
	{
```

```
                x9++;
        }
        if (x9 >= x0)
        {
                x4 = 0;
        }
        return -1;
}
public final int logout() //logout method
{
        if ((x4 == 0) || (x2 == 1))
        {
                return -1;
        }
        x4 = 0;
        return 0;
}
public final int login(int x) //login method
{
        if (x4 != 0)
        {
                return -1;
        }
        if (x5 == x)
        {
                x4 = 1;
                x9 = 0;
                return 0;
        }
        return -1;
}
public final int balance() //balance method
{
        if (x4 != 2)
        {
                return -1;
        }
        return x1;
}
public final int lock(int x) //lock method
{
        if (x4 != 2)
        {
                return -1;
        }
        if (x == x3)
        {
                return -1;
        }
        if (x2 == 0)
        {
                x2 = 1;
                x8 = x;
                return 0;
        }
        else
        {
                return -1;
        }
}
public final int unlock(int x) //unlock method
```

```
{
        if (x4 != 2)
        {
                return -1;
        }
        if ((x2 == 1) && (x == x8))
        {
                x2 = 0;
        return 0;
        }
        else
        {
                return -1;
        }
}
public final int deposit(int d) //deposit method
{
        if (x4 != 2)
        {
                return -1;
        }
        if (x2 == 1)
        {
                return -1;
        };
        if ((x1 + d < x7) && (d>0))
        {
                x1 = x1 + d - x6;
                return 0;
        }
        else
        {
                if (d > 0)
                {
                x1 = x1 + d;
                return 0;
                }
        }
 return -1;
}
public final int withdraw(int w) //withdraw method
{
if (x4 != 2)
{
        return -1;
}
if (x2 == 1)
{
        return -1;
};
if ((x1 > w) && (w > 0))
{
        if (x1 < x7)
        {
                return -1;
        }
        else
        {
                x1 = x1 - w;
        };
        if (x1 < x7)
```

```
		{
			x1 = x1 - x6;
		}
  return 0;
}
return -1;
}


public int display_attempts() //display number of attempts while entering the wrong pin
{
return x9;
}

public int display_accountno() //display account number input by the user
{
return x5;
}
public int display_pin() //display account number input by the user
{
return x3;
}

public void display_lock_state() //display lock state with the help of variable x2
{
		if(x2==1) //Locked State
		{
			System.out.println("\nLOCK State");
		}
		else if(x2==0) //UnLocked State
		{
			System.out.println("\nUNLOCKED State");
		}
		else //Wrong state
		{
			System.out.println("\nWRONG State");
		}
}

public void display_states() //display current state
{
		switch(x4)
		{
		case -1:  //Start State
			System.out.println("\nSTART State");
			break;
		case 0: //Idle State
			System.out.println("\nIDLE State");
			break;
		case 1: //Check_Pin State
			System.out.println("\nCHECK-PIN State");
			break;
		case 2:
			if(x2==0)
			{
				if(x1<x7) //Overdrawn State
					//This happens when balance is less than 500
				{
					System.out.println("\nOVERDRAWN State");
				}
				else //Ready State
```

```
                        //This happens when balance is greater or equal to 500
                {
                        System.out.println("\nREADY State");
                }
        }
        else if(x2==1) //Locked State
        {
                System.out.println("\nLOCKED State");
        }
        else //Wrong State
        {
                System.out.println("\nWRONG State");
        }

        break;
    }
}


public void display_varibales()
{
        System.out.println("Displaying Varibale values");
    System.out.println("Value of x0: "+x0);
    System.out.println("Value of x1: "+x1);
    System.out.println("Value of x2: "+x2);
    System.out.println("Value of x3: "+x3);
    System.out.println("Value of x4: "+x4);
    System.out.println("Value of x5: "+x5);
    System.out.println("Value of x6: "+x6);
    System.out.println("Value of x7: "+x7);
    System.out.println("Value of x8: "+x8);
    System.out.println("Value of x9: "+x9);
}

}
```

test.java

```
import java.util.Scanner;
import java.io.IOException;
public class test {


private static Scanner sc;


public static void main(String[] args)
{
        account ac = new account(); //constructor of account class
        int bal=0; //balance variable
        int acnt=0; //account variable
        int pin=0; //pin variable
        int dep=0; //deposit variable
        int retrn=0; //return value variable
        sc = new Scanner(System.in);


        while(true)
```

```
{
    System.out.println("Please Select Operation");

    System.out.println("DRIVER for the account\n");
     //Following are operations of account class
    System.out.println("0. OPEN");
    System.out.println("1. DEPOSIT");
    System.out.println("2. WITHDRAW");
    System.out.println("3. BALANCE");
    System.out.println("4. LOCK");
    System.out.println("5. UNLOCK");
    System.out.println("6. LOGIN");
    System.out.println("7. PIN");
    System.out.println("8. LOGOUT\n");

    //Following are testing oriented methods
    System.out.println("Testing Related Methods");
    System.out.println("a. SHOW BALANCE");
    System.out.println("b. SHOW STATE");
    System.out.println("c. SHOW LOCK STATE");
    System.out.println("d. SHOW ATTEMPTS");
    System.out.println("e. SHOW ACCOUNT NUMBER #");
    System.out.println("f. SHOW PIN NUMBER #");
    System.out.println("g. SHOW VARIABLE VALUES");
    System.out.println("q. QUIT PROGRAM");


    String choice=sc.next();

    char in=choice.toCharArray()[0];
    switch(in)
    {
    case '0':      //this is open(int x, int y, int z) method
    System.out.println("\nACCOUNT CLASS - OPEN METHOD");
    System.out.println("Enter initial balance:");
    bal = sc.nextInt(); //obtaining user input balance
    System.out.println("Enter PIN number:");
    pin = sc.nextInt(); //obtaining user input pin
    System.out.println("Enter Account Number #:");
    acnt = sc.nextInt();//obtaining user account number
    //this will execute the open operation, 'retrn' is the return value
    retrn=ac.open(bal, pin, acnt);
    System.out.println("\nThe value returned by the method is: " + retrn);
    // if method is successful then it will return 0 otherwise -1
    System.out.println("Press any key to contnue");
```

```
 =break;

 case '1': //this is deposit(int d) method
 System.out.println("\nACCOUNT CLASS - DEPOSIT METHOD");
 System.out.println("Enter Deposit amount:");
 dep = sc.nextInt(); //obtaining how much user want to deposit
 //this will execute the deposit operation, 'retrn' is the return value
 retrn=ac.deposit(dep);
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
 System.out.println("Press any key to contnue");
 break;

 case '2': //this is withdraw(int w) method
 System.out.println("\nACCOUNT CLASS - WITHDRAW METHOD");
 System.out.println("Enter Withdraw amount:");
 dep = sc.nextInt(); //obtaining how much user want to withdraw
 //this will execute the withdraw operation, 'retrn' is the return value
 retrn=ac.withdraw(dep);
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
 System.out.println("Press any key to contnue");
 break;

 case '3': //this is balance method
 System.out.println("\nACCOUNT CLASS - BALANCE METHOD");
 retrn=ac.balance();
 //this will execute the balance operation, 'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
 System.out.println("Balance is: "+retrn);
 System.out.println("Press any key to continue");
 break;

 case '4':       //this is lock(int pin) method
 System.out.println("\nACCOUNT CLASS - LOCK METHOD");
 System.out.println("Enter Pin Number:");
 pin = sc.nextInt(); //obtaining lock pin from the user
 retrn=ac.lock(pin);
 //this will execute the lock operation, 'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
System.out.println("Press any key to contnue");
break;
```

```
 case '5': //this is unlock(int pin) method
 System.out.println("\nACCOUNT CLASS - UNLOCK METHOD");
 System.out.println("Enter Pin Number:");
 pin = sc.nextInt(); //obtaining lock pin from the user
 retrn=ac.unlock(pin);
 //this will execute unlock operation,'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
 System.out.println("Press any key to contnue");
 break;

 case '6': //this is login(int x) method
 System.out.println("\nACCOUNT CLASS - LOGIN METHOD");
 System.out.println("Enter Account Number:");
 acnt = sc.nextInt(); //obtaining account number from the user
 retrn=ac.login(acnt);
 //this will execute login operation,'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
System.out.println("Press any key to contnue");
break;

 case '7':      //this is  pin(x) method
 System.out.println("\nACCOUNT CLASS - PIN METHOD");
 System.out.println("Enter Pin Number:");
 pin = sc.nextInt(); //obtaining pin number from the user.
 retrn=ac.pin(pin);   //this will execute pin operation,'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
System.out.println("Press any key to contnue");
break;

 case '8':       //this is  logout() method
 System.out.println("\n ACCOUNT CLASS - LOGOUT METHOD");
 retrn=ac.logout();
 //this will execute logout operation,'retrn' is the return value
 System.out.println("\nThe value returned by the method is: " + retrn);
 // if method is successful then it will return 0 otherwise -1
 System.out.println("Press any key to contnue");
 break;

//testing oriented method


case 'a':        //show_balance() is called here
```

```
System.out.println("\nTESTING RELATED METHOD - show_balance()");
System.out.println("DISPLAYING BALANCE\n");
retrn=ac.show_balance();      //Displays current balance
System.out.println("Balance is: " + retrn);
System.out.println("Press any key to contnue");
break;

 case 'b':      //display_state() method is called here
 System.out.println("\nTESTING RELATED METHOD - display_state()");
 System.out.println("DISPLAYING CURRENT STATE\n");
 ac.display_states(); //Display current state
 System.out.println("Press any key to contnue");
 break;

 case 'c':      //display_lock_state() method is called here
 System.out.println("\nTESTING RELATED METHOD
 display_lock_state()");
 System.out.println("DISPLAYING LOCK STATE STATUS\n");
 ac.display_lock_state(); //Displays whether current state is locked or not.
 System.out.println("Press any key to continue");
 break;

 case 'd':      //display_attempts() method is called here
 System.out.println("\nTESTING RELATED METHOD -
 display_attempts()");
 System.out.println("DISPLAYING  NUM OF ATTEMPTS\n");
 retrn=ac.display_attempts(); //Display number of attempts.
 System.out.println("Number of attempts: " + retrn);
 System.out.println("Press any key to contnue");
 break;

 case 'e':      //display_account() method is called here
 System.out.println("\nTESTING RELATED METHOD - display_account()");
 System.out.println("DISPLAYING ACCOUNT NUMBER\n");
 retrn=ac.display_accountno(); //displays account number
 System.out.println("Account number: " + retrn);
 System.out.println("Press any key to contnue");
 break;

 case 'f':      //display_pin() method is called here.
 System.out.println("\nTESTING RELATED METHOD - display_pin()");
 System.out.println("DISPLAYING PIN NUMBER\n");
 retrn=ac.display_pin(); //displays pin number
 System.out.println("Pin number: " + retrn);
 System.out.println("Press any key to contnue");
```

```
                    break;

                    case 'g': //printing system variables
                    System.out.println("\nTESTING RELATED METHOD -
                    display_variables()");
                    ac.display_varibales();
                    break;
                    case 'q':  //Exits the program
                    System.out.println("Thank You for using the program !!");
                    System.out.println("Press any key to contnue");
                    return;
                    default:
                    break;
                        }
                    try {
                    System.in.read();
                        } catch (IOException e) {
                            return;
                        }
                }



        }
}
```