LABORATORY 1 : Flowchart / Pseudocode / Test cases

OBJECTIVES

- to understand how to express thoughts/algorithms in flowchart and pseudocode
- to be able to write test cases for simple programs

BACKGROUND

1. Flowchart
   - https://dyclassroom.com/flowchart/introduction
   - https://youtu.be/vOEN65nm4YU
2. Pseudocode
   - https://blog.usejournal.com/how-to-write-pseudocode-a-beginners-guide-29956242698
   - https://youtu.be/r1BpraNa2Zc
3. Whitebox testing – logic coverage
   - https://www.softwaretestinghelp.com/white-box-testing-techniques-with-example/
   - https://www.guru99.com/code-coverage.html
   - The Art of Software Testing (book) by Glenford J. Myers (chapter 4)

LABORATORY 1: Pre-lab, In-lab, Post-lab

Work in pair
For each scenario,

1. write a flowchart
2. write a pseudocode
3. design test cases
   indicate type(or types) of coverage (statement, branch, condition or path) given by your test cases

test case	inputs	expected results	coverage
1. test case description	all inputs to the test case	expected results	line numbers in your pseudocode or path IDs in your flowchart
2. …	…	…	…

Scenarios

1. Login attempt
   - username and password are required to login
   - only when username and password are matched, an access is granted
   - secret question is asked after the 3rd unsuccessful login attempts
   - if the answer to the secret question is correct, an access is granted and the login info (username and password) is sent to user's email.

2. Money transfer
   - transfer money from account A to account B
   - fee is charged according to the following rules
     - same bank : transferred amount > THB10,000, fee 1%
     - different bank : fee THB50 + 1%

3. Sales promotion

SAMPLE OF A SALES PROMOTION POLICY

- Preferred customers who order more than $1,000 are entitled to a 5% discount, and an additional 5% discount if they used our charge card.
- Preferred customers who do not order more than $1,000 receive a $25 bonus coupon.
- All other customers receive a $5 bonus coupon.

4. Find all pairs of numbers in a given list that sum to a given value
   Example:
   [1, 2, 3, 4, 5] sum = 6
   result : [1, 5] , [2, 4]

5. Combine two lists by alternatingly taking elements
   Example:
   List 1 : [1, 2, 3]
   List 2 : [a, b, c]
   result : [1, a, 2, b, 3, c]

   Note that list lengths may differ

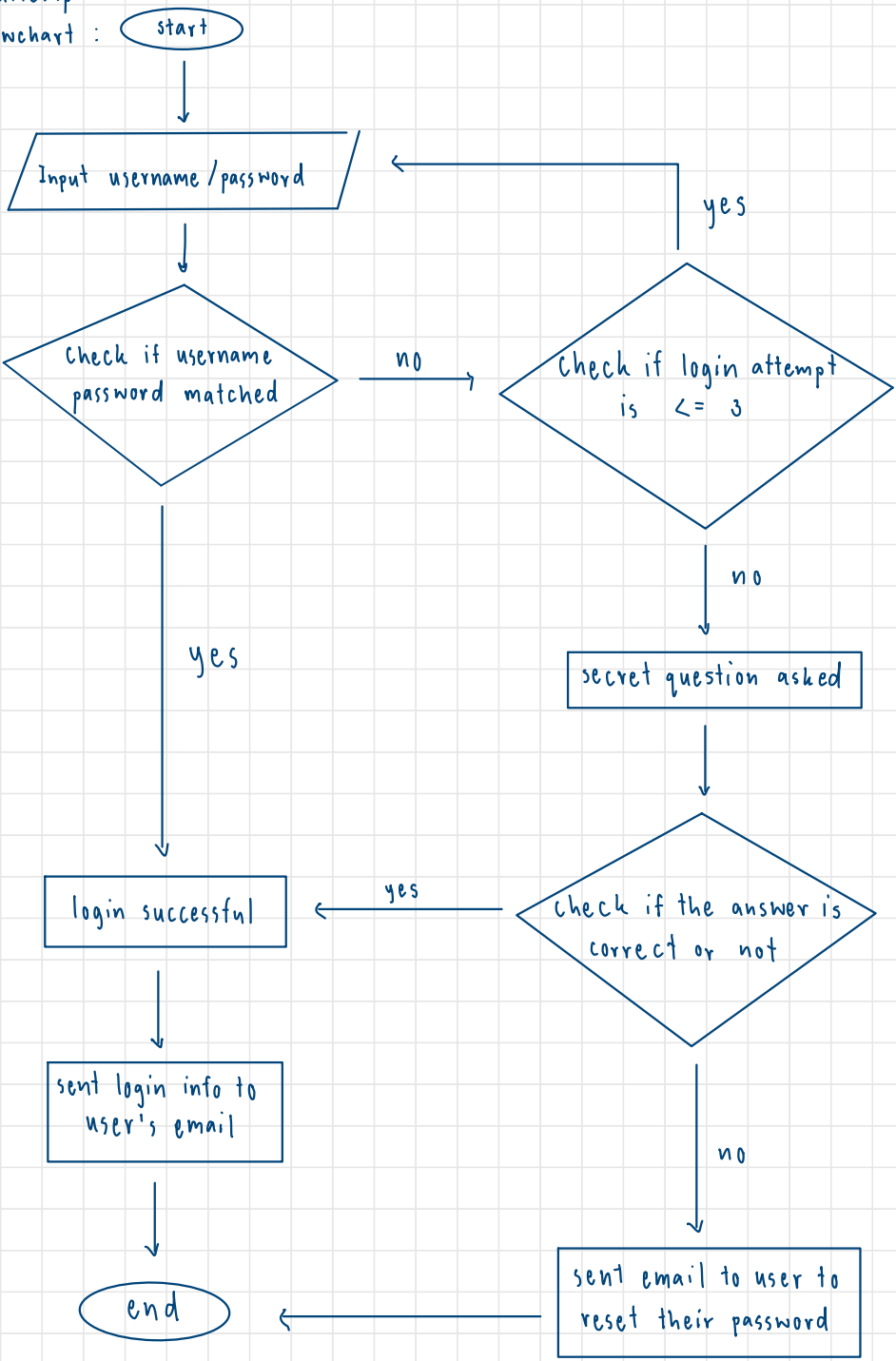
Submission:

via Canvas

details are posted in Canvas.

You are to review your work with the TAs during lab session.

1. login attempt flowchart :

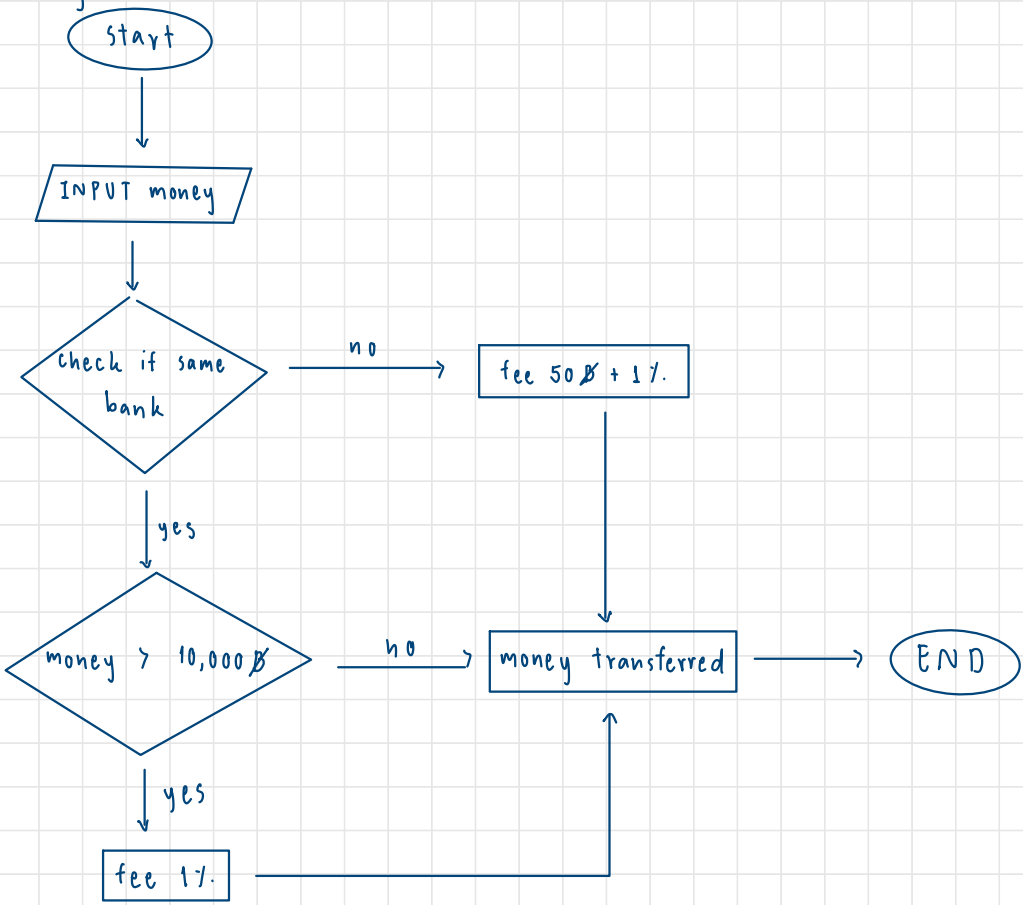


pseudocode :

```
1    START
2
3    logincount = 0
4    INPUT username and password
5    IF username & password matched :
6        print ( " login successful " )
7        sent login info to user's email
8    ELSE :
9        logincount += 1
10       IF logincount <= 3 :
11           keep login
12       ELSE :
13           sent secret question
14           IF answer matched :
15               login successful
16               sent login info to user's email
17           ELSE :
18               sent mail to reset password
19
20   END
```

Test Case	Input	Expected Result	Coverage
1. Login with matched username and password	Matched username and password	Login successful Sent login info to user's email	Line 1-5
2. Login with unmatched username or password 1st – 3rd time	-Correct username Wrong password -Correct password wrong username -Wrong username and password	Increment Count User retry enter in username and password	Line 1-9
3. Login with unmatched username or password more than 3 time	-Correct username Wrong password -Correct password wrong username -Wrong username and password	Increment Count Sent secret question	Line 1-11
4. Matched answer for secret question	Correct answer given	Login successful Sent login info user's mail	Line 1-14
5. Incorrect answer for secret question	Incorrect answer given	Sent mail to reset password	Line 1-16

9. Money transfer :

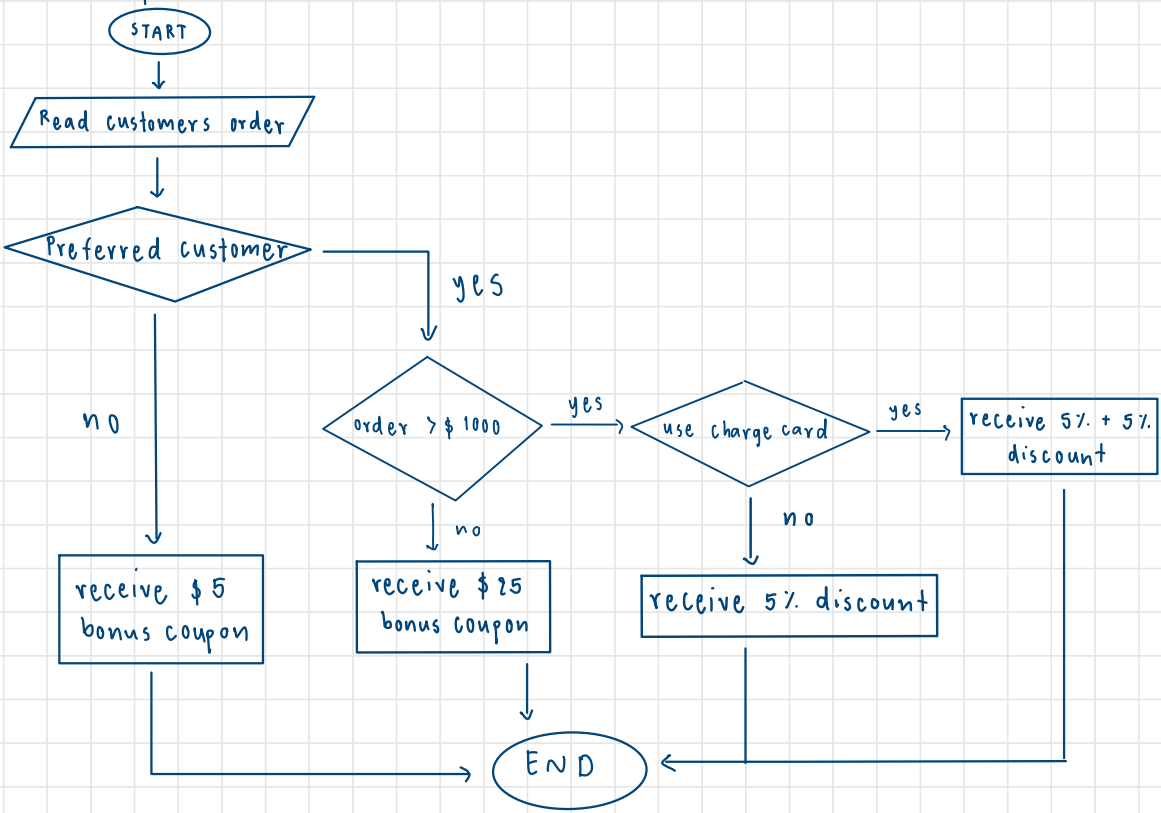


Pseudocode :

```
1     START
2     READ amount of money transferred (type: positive integer)
3     IF money is transferred within same bank :
4         IF money > 10,000 ฿ :
5             transfer = money * 101
6             money transferred
7         ELSE :
8             money transferred
9     ELSE :
10        transfer = (money * 101) + 50
          money transferred
      END
```

Test Case	Input	Expected Result	Coverage
1. Money is transferred between the same bank and over THB10000	A -> B are the same bank Money = THB11,000	Calculate money transfer including fee Transfer money	Line 1-5
2. Money is transferred between the same bank and money is = THB10000	A -> B are the same bank Money = THB10,000	Transfer money (no fee added)	Line 1-7
3. Money is transferred between the same bank and less than THB10000	A -> B are the same bank Money = THB500	Transfer money (no fee added)	Line 1-7
4. Money is transfer between different bank	A -> B are different bank	Calculate money transfer with fee and additional THB50 Transfer money	Line 1-10
5. Incorrect data type	Money = -6THB	ERROR incorrect data type	Line 1

3. Sales promotion :



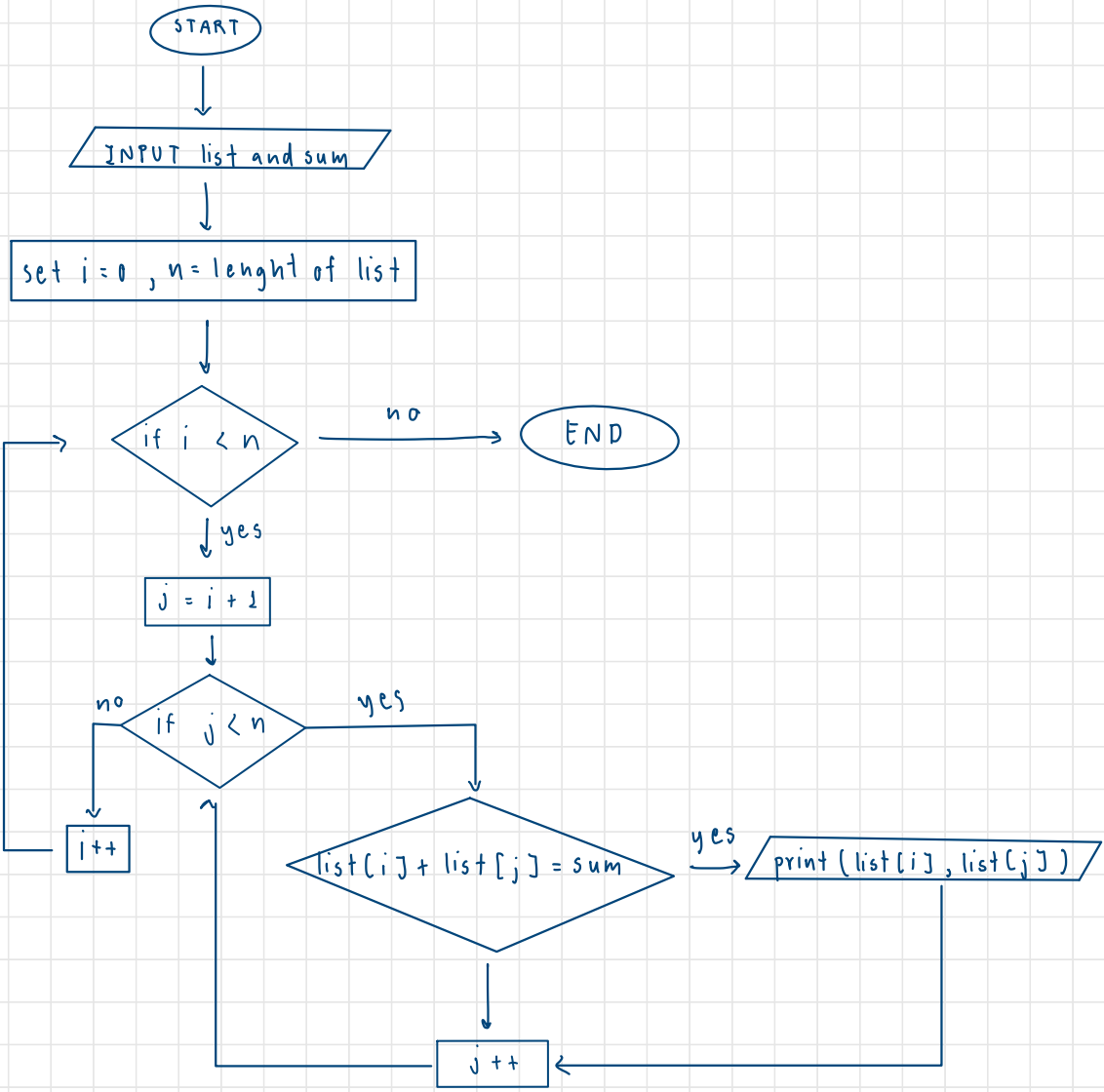
Pseudocode :

```
START
READ  money from customers
IF  promotion is preferred :
        IF money > $ 1000  :
                IF charge card  == True  :
                        discounted price  =  (0.95 * money ) * 0.95
                ELSE :
                        discounted price  =  0.95 * money
        ELSE :
                discounted price  =  money - 25
ELSE :
        discounted price  =  money - 5
return  discounted price

END
```

Test Case	Input	Expected Result	Coverage
1. Customers do not prefer promotion	Promotion is preferred	Discount price = price - $5 Return discounted price	Line 1-12
2. Promotion is preferred Order is over $1000 and charge card is preferred	$1100	Discounted price = (0.95*price) * 0.95 Return discounted price	Line 1-5
3. Promotion is preferred Order is over $1000 and charge card is not preferred	$2000	Discounted price = 0.95*price Return discounted price	Line 1-7
4. Promotion is preferred Order is less than $1000	$500	Discounted price = price – 25	Line 1-9

A. Find all pairs of number :

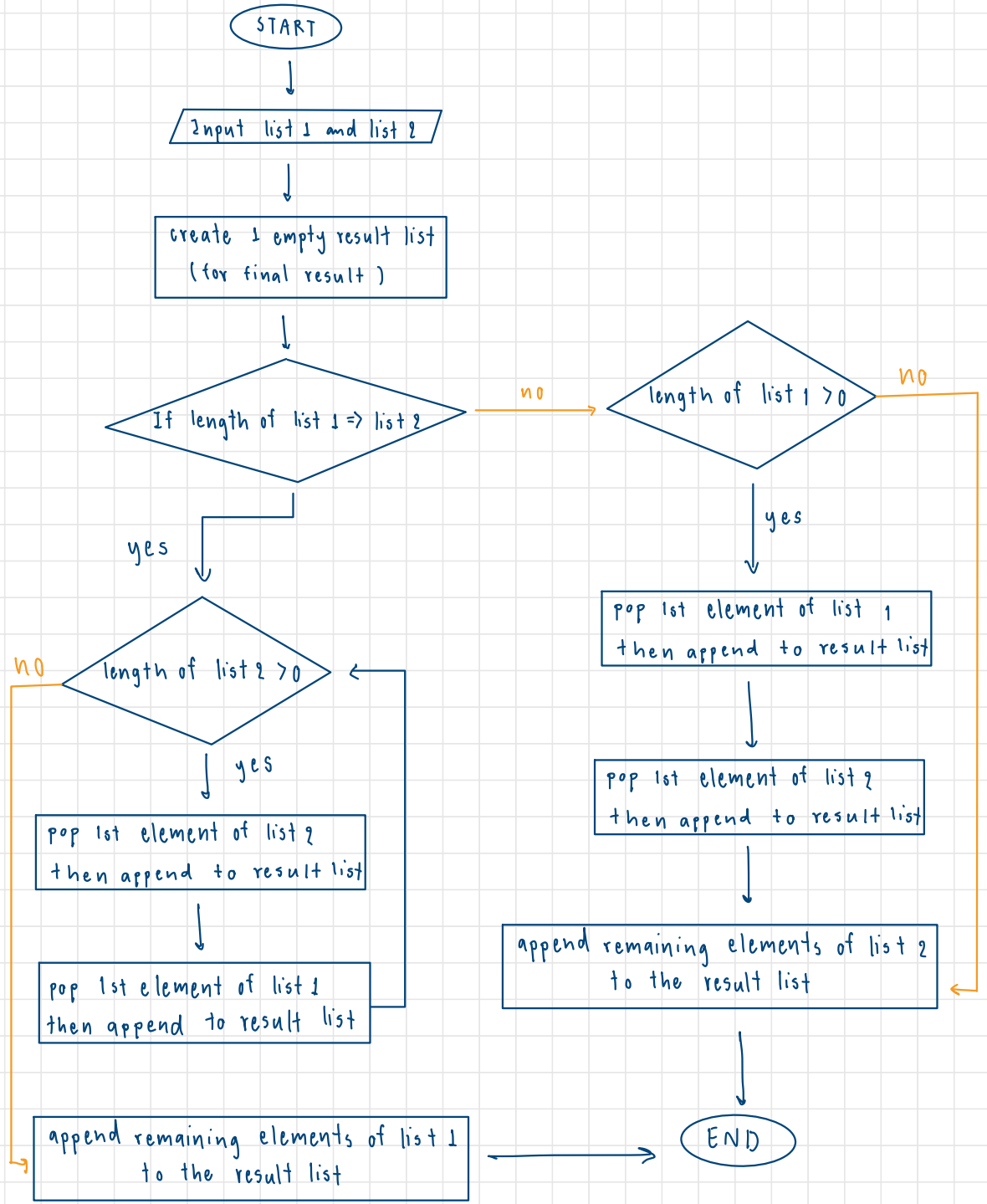


Pseudocode :

```
START
    Input   list
    Input   sum
    SET  n  equal length of list
FOR i in range(0, n):
    FOR j in range(i+1, n):
        IF list[i] + list[j] == sum:
            print(list[i], list[j])
```

Test Case	Input	Expected Result	Coverage
Lst1 and lst2 are not empty Length of lst1 is equal to lst2	Lst1=[1,2,3] Lst2=[a,b,c]	Result = [1,a,2,b,3,c]	Line 1-17
Lst1 and lst2 are not empty Length of lst1 is longer than lst2	Lst1=[1,2,3,4,5] Lst2=[a,b,c]	Result = [1,a,2,b,3,c,4,5]	Line 1-9
Lst1 and lst2 are not empty Length of lst1 is shorter than lst2	Lst1=[1,2] Lst2=[a,b,c,d,e]	Result = [1,a,2,b,c,d,e]	Line 1-17

5. Combine two lists by alternatingly taking elements :



```
Pseudocode :   START
1              INPUT    lst 1
2              INPUT    lst 2
3              SET      result list
4
5              IF length of list 1 is more than list 2 :
6                   WHILE length of list 2 > 0 :
7                         pop 1st element of list 2 and append to result list
8                         pop 1st element of list 1 and append to result list
9                   append remaining elements of list 1 to result list
10
11             ELSE :
12                  WHILE length of list 1 > 0 :
13                        pop 1st element of list 1 and append to result list
14                        pop 1st element of list 2 and append to result list
15                  append remaining elements of list 2 to result list
16
17             print result list
```

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