CHIANG MAI UNIVERSITY
Bachelor of Science (Software Engineering)
College of Arts, Media and Technology
1st Semester / Academic Year 2019
955103 PROGRAMMING LOGICAL THINKING

Lab Assignment 08 : Program Tracing

Name ..... Student ID ..... Section.....

Objectives:

1) The student can use the trace table to debug a source code.

Program Tracing

In computer programming, the program tracing means to simulate the execution of the program or source code on paper. In other word, it is an instruction-by- instruction walkthrough the source code monitoring how the variable(s) change. The program tracing can be used to several purpose 1) to help a programmer to learn a language, and 2) to help a programming to debug a program (find errors in the program).

The main idea of the program tracing is to follow the change of the value in each variable. The program tracing can be applied to pseudo code, flowchart and source code.

Example

1. Given the following pseudocode

```
1) result = 1+2

2) result = result*2

3) result = 6/result

4) DISPLAY result
```

The manual program tracing is always done in tabular style where each statement is matched with the value of the variable. The line number is used to refer to the statement. As a consequence, some line

number can be repeated to indicate the repetition structure or can be omitted to indicate the selection structure. The example of the tracing table is shown in the following table.

Line no.	Statement	result
Initialization		
1.	`result = 1+2`	
2.	`result = result*2`	
3.	`result = 6/result`	
4.	`DISPLAY result`	

At the beginning, all the variable is initialized to the empty value at the beginning statement (line 0).

Line no.	Statement	result
Initialization		0
1.	`result = 1+2`	
2.	`result = result*2`	
3.	`result = 6/result`	
4.	`DISPLAY result`	

After each line is executed, the value is updated in the corresponding variable.

Line no.	Statement	result
Initialization		0
1.	`result = 1+2`	3
2.	`result = result*2`	
3.	`result = 6/result`	
4.	`DISPLAY result`	

This process is repeated until the program terminates.

Line no.	Statement	result
Initialization		0
1.	`result = 1+2`	3
2.	`result = result*2`	6
3.	`result = 6/result`	1
4.	`DISPLAY result`	1

Problem set

1. Given the following pseudocode

```
1.) GET num1,num2

2.) temp = num1

3.) num1 = num2

4.) num2 = temp

5.) DISPLAY num1,num2
```

Complete the following table

Line no.	num1	num2	temp
Initialization			

2. Given the following pseudocode

```
1.) GET num1,num2

2.) counter=0

3.) result=1

4.) WHILE counter<num2

4.1.)   result = result*num1

4.2.)   counter=counter+1

5.) ENDWHILE

6.) DISPLAY result
```

If the user input 2 for num1 and 3 for num2, complete the following table.

Line no.	num1	num2	counter	result
Initialization				

3. Given the following pseudo code,

```
1.) num = 2

2.) WHILE num != 1

2.1.)    DISPLAY num

4.2.)    num = num+1

5.) ENDWHILE
```

Complete the following trace table.

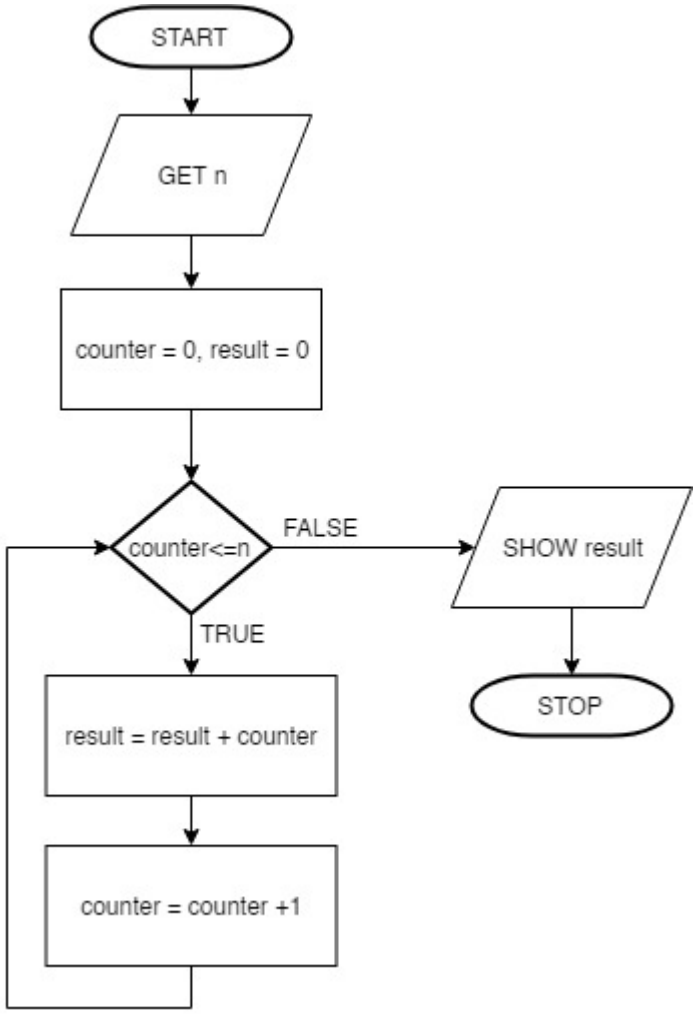
Line no.	num	Output
Initialization		

Line no.	num	Output

Identify the loop problem in the chart and explain how to solve it.

.....
.....
.....

4. Given the following flowchart,



Remark : This program should run n times. You must indicate the line no. by yourself.

Complete the following trace table if the user input 4 for n.

Line no.	n	counter	result
Initialization			

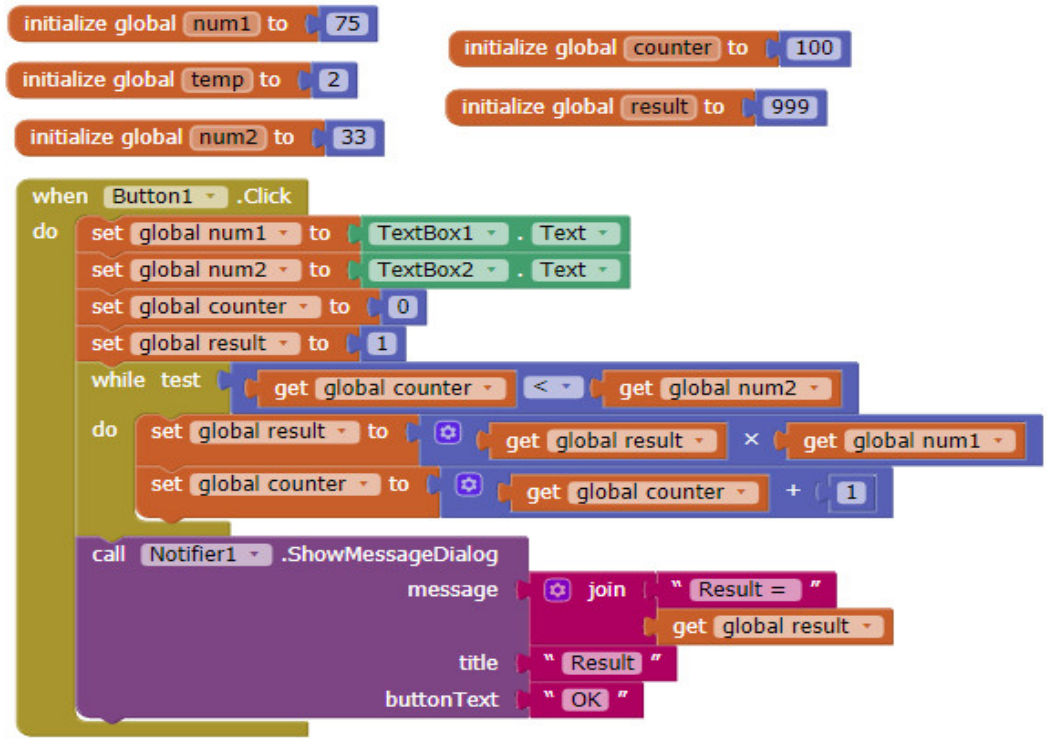
Identify the loop problem in the chart and explain how to solve it.

.....

.....

.....

5. Use the interface from earlier problem and given the following source code

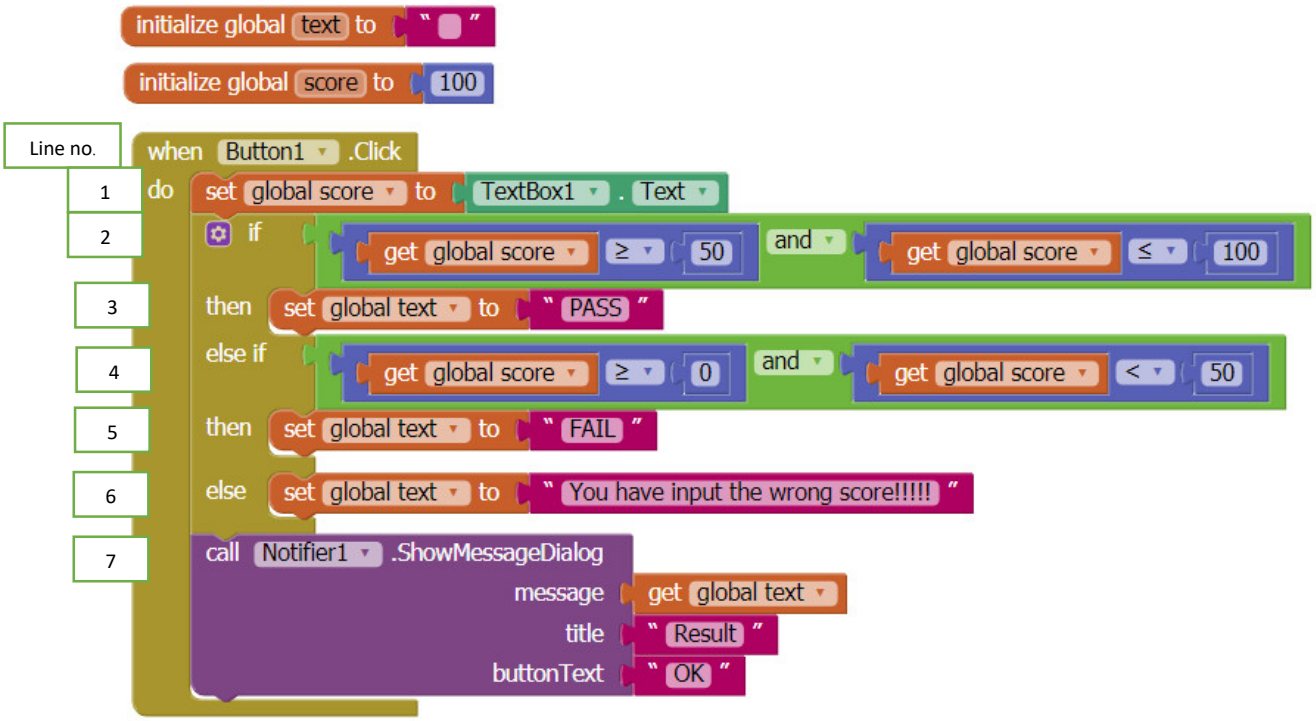


If the user input 4 for num1 and 4 for num2, complete the following table.

Line no.	num1	num2	counter	result	temp
(Initialization)					

Remark : Indicate the line no. by yourself.

5. Use the interface from earlier problem and given the following source code



For simplicity, you only have to write the line number. If you want to write the first line which is

You only have to write "Line 1"

5.1 If the user input 50 for textbox1, complete the following table.

Statement	text	score
(Initialization)	""	100
Line 1		50

Remark : Notifier is a user interface to display the message to user.

5.2 If the user input 30 for textbox1, complete the following table.

Statement	text	score
(Initialization)	""	100
Line 1		50

5.3 If the user input -3 for textbox1, complete the following table.

Statement	text	score
(Initialization)	""	100
Line 1		50