LAB 04: Decision Making Statements

1. Scope of Knowledge:

- ➢ Understand and proficiently use input and output functions
- ➢ Use decision making statements (if, if…else, multiple if, nested if, switch…case)
- ➢ Know when to use switch statement
- ➢ Know how to switch between switch and if
- ➢ Understand careful and good structured coding skills

2. Marterials/Softwares/Tools:

- ➢ Visual Studio Code
- ➢ Draw IO (online) or Microsoft Word

3. Coding Convention:

- ➢ All identifiers must be in English and lower case
- ➢ Follow the valid identifers naming rules in C
- ➢ Tab is 4 characters
- ➢ Curly braces must be aligned
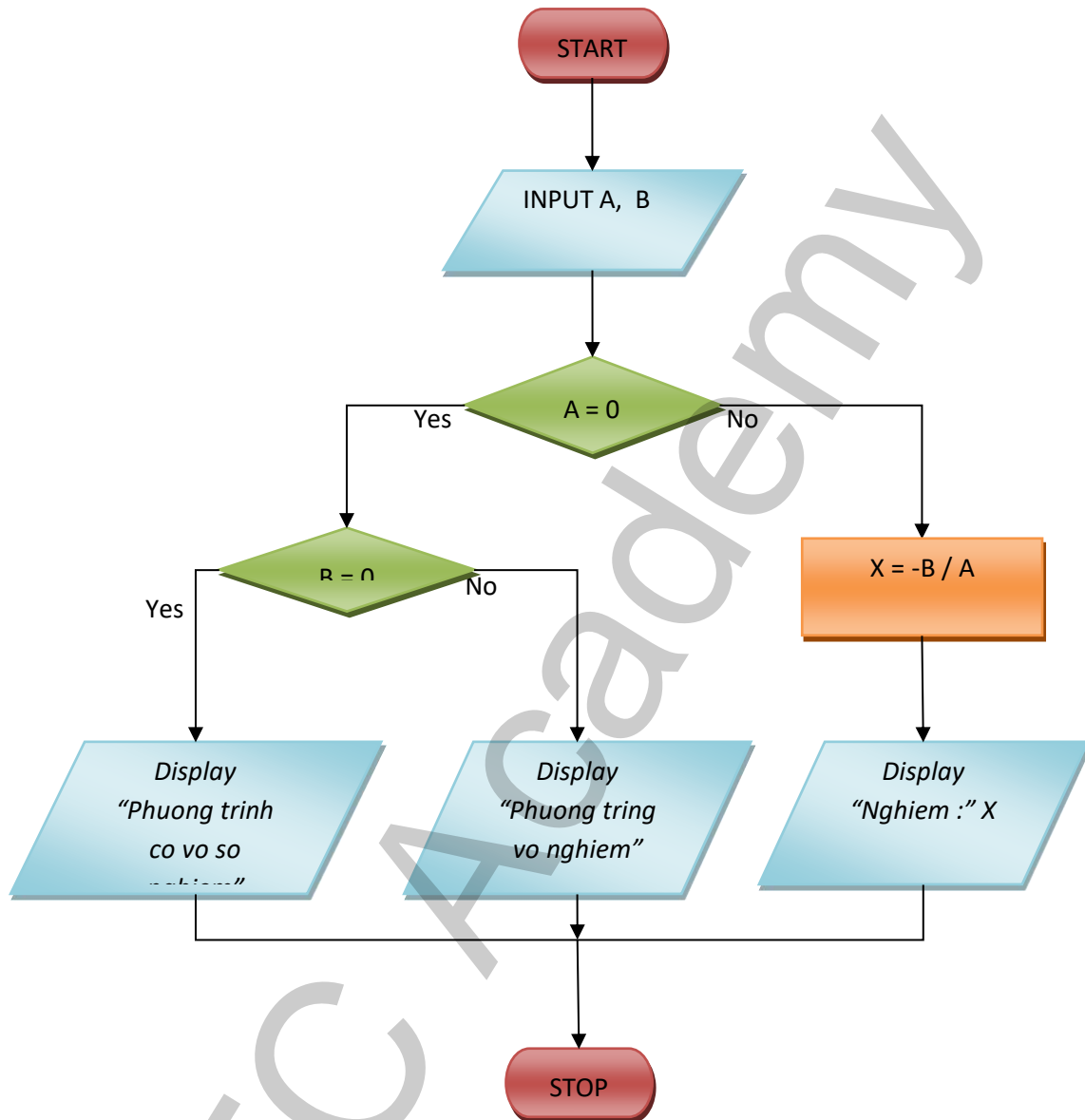- ➢ Statements in curly brackets must be indented by 1 tab

4. Exercise:

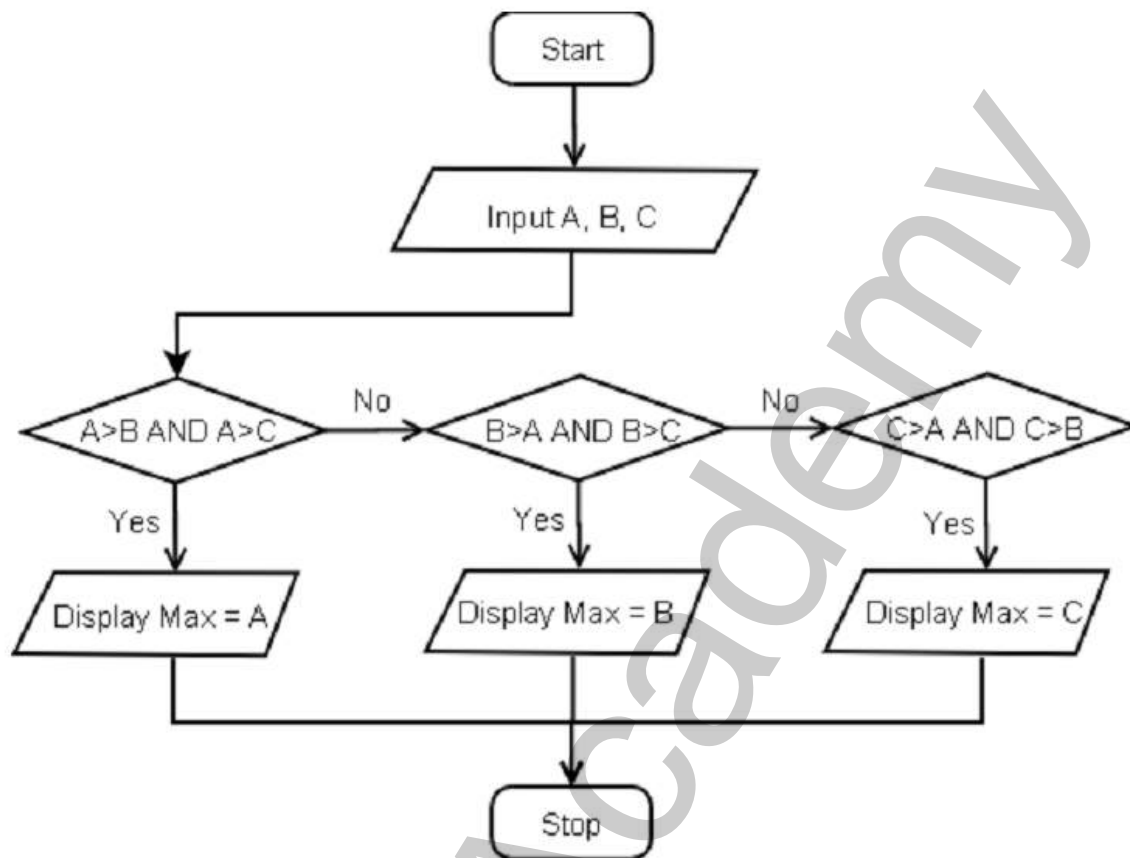**Note:** Students must draw a flowchart describing the algorithm before programming for each problem.

Exercise 1:

Write programs based on the following flowcharts:

1. Flowchart 1:


```
                    START
                      |
                      v
               INPUT A,  B
                      |
                      v
        Yes  /  A = 0  \  No
            /    \      \
           v      \       v
      / B = 0 \ No          X = -B / A
     / Yes  \   \              |
    v        \    v            v
  Display    Display        Display
  "Phuong    "Phuong        "Nghiem :" X
  trinh co   tring vo
  vo so      nghiem"
  nghiem"
       \       |           /
        \      v          /
            STOP
```

2. Flowchart 2:

Exercise 2:

Write a program to solve quadratic equations using the flowchart drawn in Lab1.

Exercise 3:

Draw a flowchart and write a C program to input 4 real numbers a, b, c, d, then calculate and print the largest (max) and smallest (min) results on the screen.

Exercise 4:

Draw a flow chart and write a C program to solve the problem of inputting three numbers a, b, c. Check if it is three sides of a triangle.

Exercise 5:

Draw a flow chart and write a program:

Enter the coordinates of three points A(xA, yA), B(xB, yB) and C(xC, yC) check if the three points are collinear.

Exercise 6:

Write a program that allows input of an Alphabet(AZ, az) character from the keyboard:

- If the character is not in the Alphabet, the message is not in the alphabet.

- If the character is in the alphabet, determine if it is Vowels (A, E, I, O, U, a, e, i, o, u) or Consonants (remaining letters).

Exercise 7:

Draw the flowchart and write the following MENU program:

```
Console setup
------------

1) Configure Network Interfaces
2) Configure Link Aggregation
3) Configure VLAN Interface
4) Configure Default Route
5) Configure Static Routes
6) Configure DNS
7) Reset Root Password
8) Reset to factory defaults
9) Shell
10) System Update (requires networking)
11) Create volume backup
12) Restore volume from a backup
13) Reboot
14) Shutdown

You may try the following URLs to access the web user interface:

http://10.20.1.63

Enter an option from 1-14: █
```

Notice to the screen of the subject of menu item corresponding to the selection (select 1-14 from the keyboard), if the user enters other than 1-14, the error message will be displayed.

Exercise 8:

Draw a flowchart and write a program to input 2 integer numbers (number1 and number2). Then program will show the following menu:

```
Input number 1:
Input number 2:
        MENU

=================
+

-

*

/

=================
Choose operator:
```

Depending on the user's choice (+, -, *, :), program will display the corresponding results for (number1 + number2) or (number1 - number2), ...

Exercise 9:

Draw a flow chart and write a program: Input the coordinates of four points A(xA, yA), B(xB, yB), C(xC, yC) and D(xD, yD) to check if three points A, B, C are a triangle or not, and determine the point D lies inside the triangle, on which side of the triangle and outside the triangle ABC.

Exercise 10:

Draw a flow