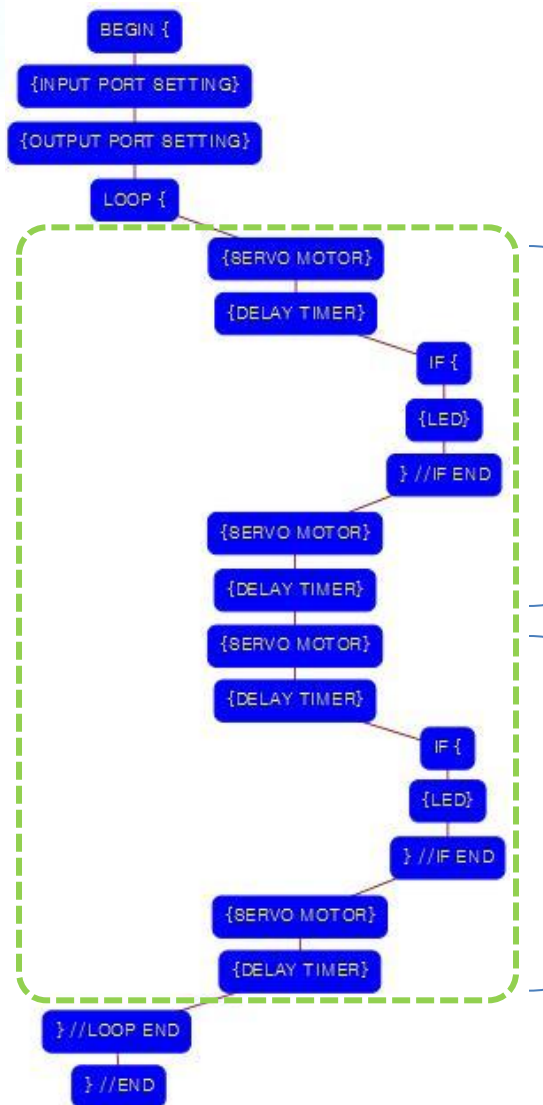




This Twinkle Robot model is for studying the Servo motor programming.

The frame which is connected to the servo motor will touch the left and right touch sensor and it makes turning on the left and right LED output modules.

Program name : eq2-2-p25\_TwinkleRobot.ufc



Program begin

Input port setting

Output port setting

LOOP starting point (Repeat the command)

Set the servo motor to the 180 degree

Delay time for moving of servo motor

### Condition 1

If right **a** touch sensor is pressed , right **1** LED module is on.

Set the servo motor to the 90 degree

Delay time for moving of servo motor

Set the servo motor to the 0 degree

Delay time for moving of servo motor

### Condition 2

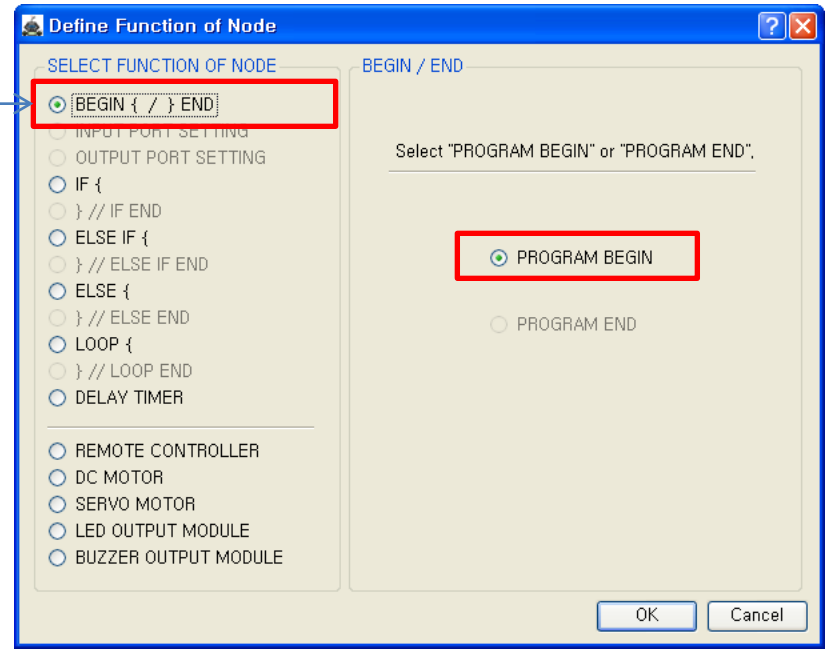
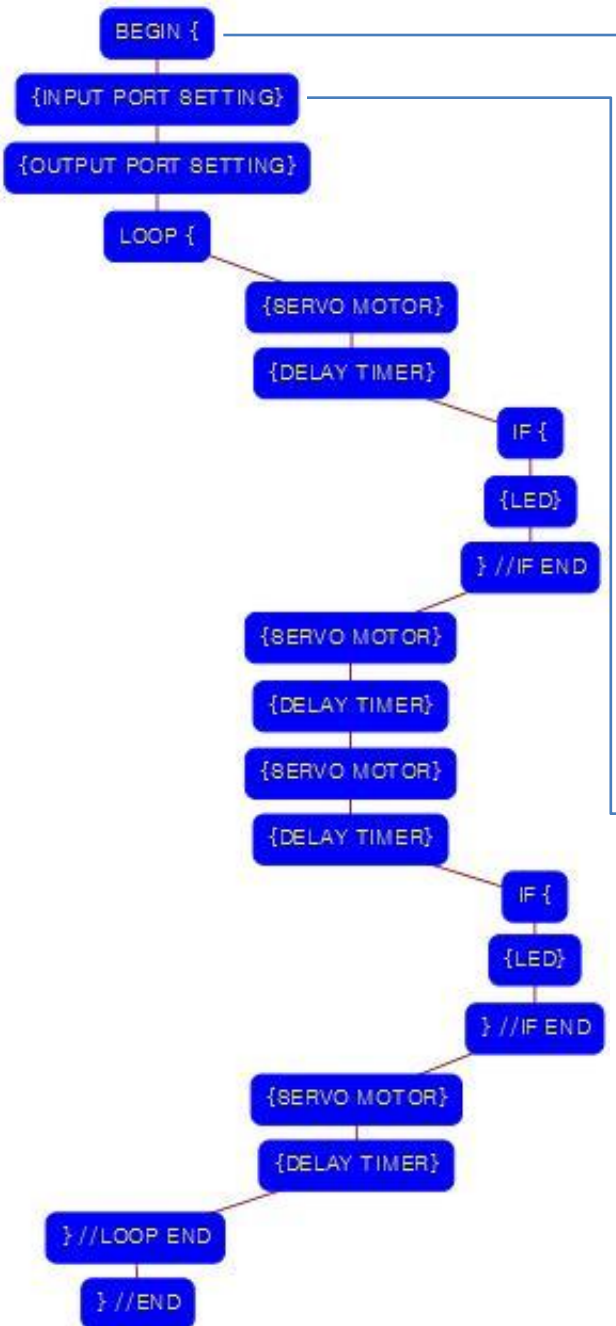
If left **b** touch sensor is pressed, left **2** LED module is on.

Set the servo motor to the 90 degree

Delay time for moving of servo motor

LOOP ending point

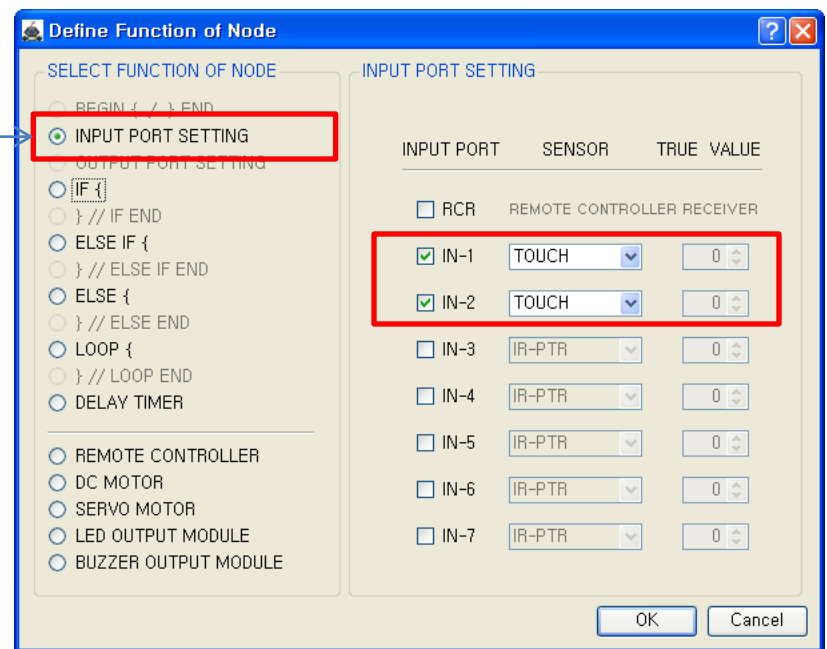
Program end



This means that program begins from here.

You have to place this node at the first of program.

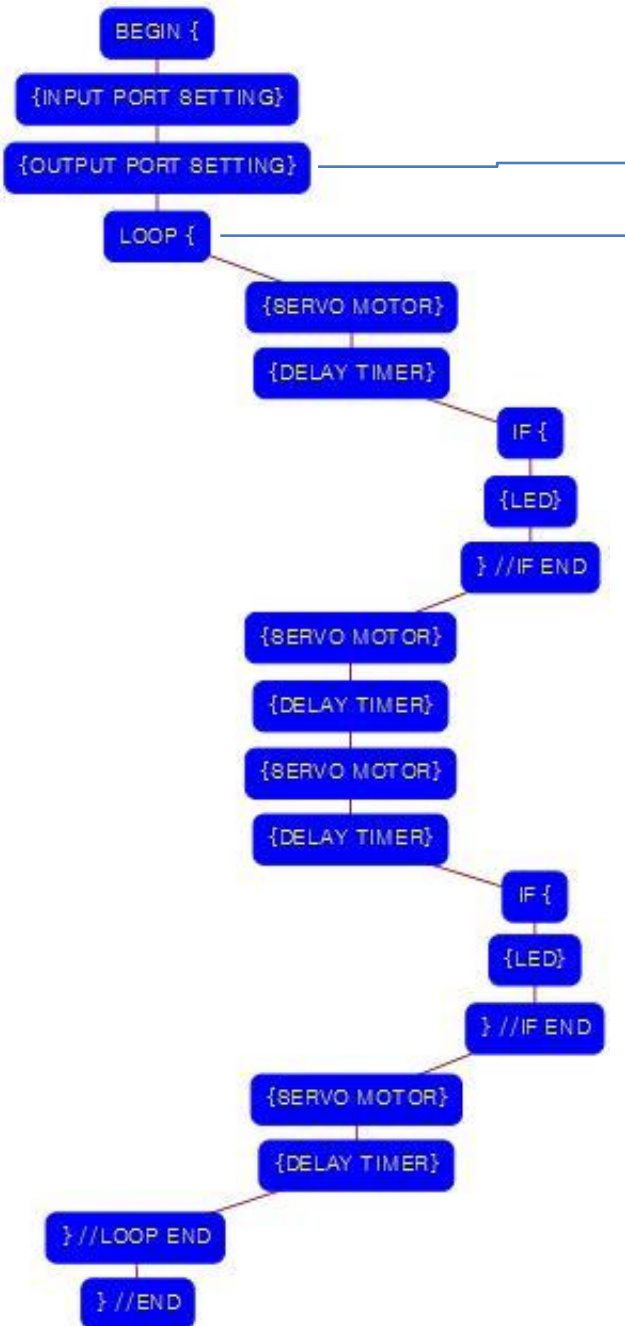
“PROGRAM END” is not active because you did not define “PROGRAM BEGIN” yet.



This model use 2 touch sensors as input device.

You have to connect the right touch sensor to the IN-1 input port and left touch sensor to the IN-2 input port of main board. And check the IN-1 and IN-2 with “TOUCH” in software.

If the real connection of sensors are different to the setting on software, it will make robot to wrong operation.



OUTPUT PORT	MODULE	INITIAL VALUE
<input checked="" type="checkbox"/> OUT-1	RED LED	0
<input checked="" type="checkbox"/> OUT-2	GREEN LED	0
<input type="checkbox"/> OUT-3	RED LED	0
<input checked="" type="checkbox"/> OUT-4	SERVO MOTOR	90
<input type="checkbox"/> OUT-5	RED LED	0
<input type="checkbox"/> OUT-6	RED LED	0
<input type="checkbox"/> OUT-7	RED LED	0

This model use 2 LED modules and 1 Servo Motor as output device.

You have to connect the right ① LED module to the OUT-1 output port and left ② LED module to the OUT-2 output port and Servo motor to the OUT-4 output port of main board. The initial value of Servo motor is to be 90.

If the real connection of output modules are different to the setting on software, it will make robot to wrong operation.

LOOP BEGIN ~

LOOP BEGIN COMMAND

[ ID ] : Sequence Number (Automatically assigned).  
[ REPEAT TIME ] : Select "REPEAT TIME".

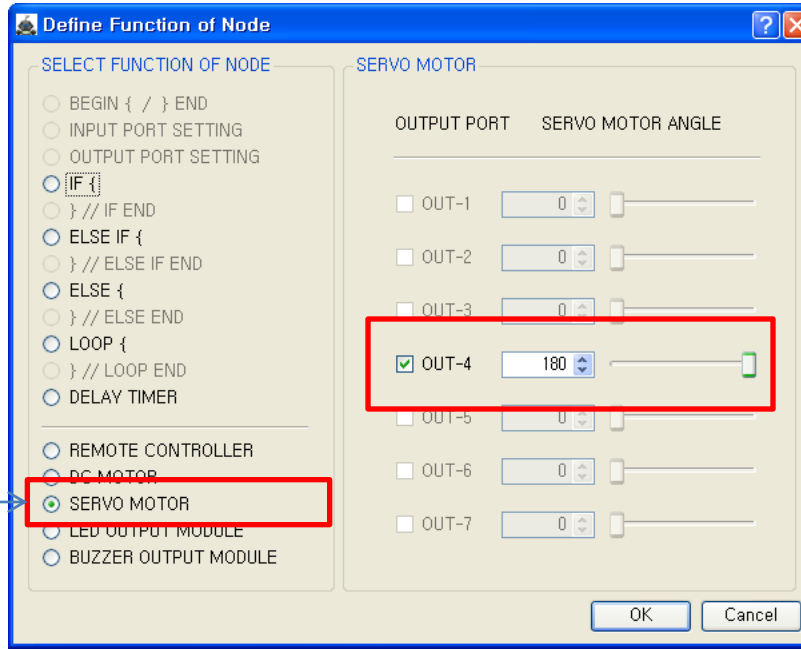
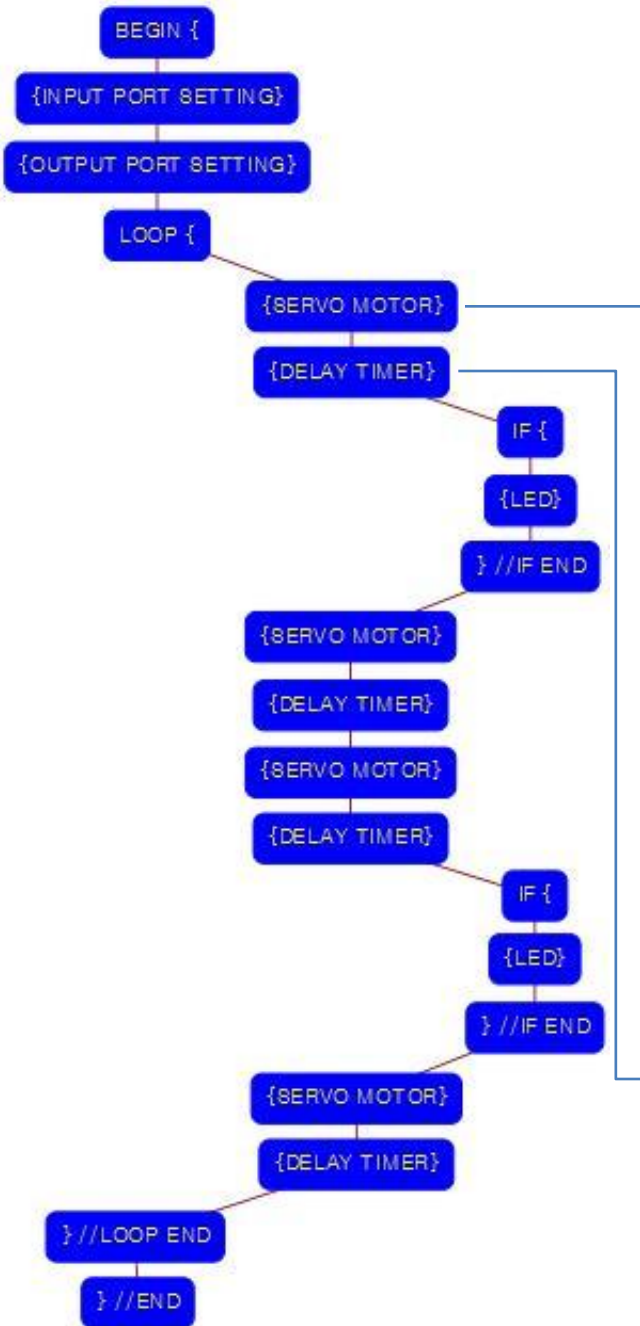
[ ID ] 4  
[ REPEAT TIME ] 0

LOOP command is used to repeat the commands.

"REPEAT TIME" is the repeat number you want. If you want permanent repetition, you have to set "0".

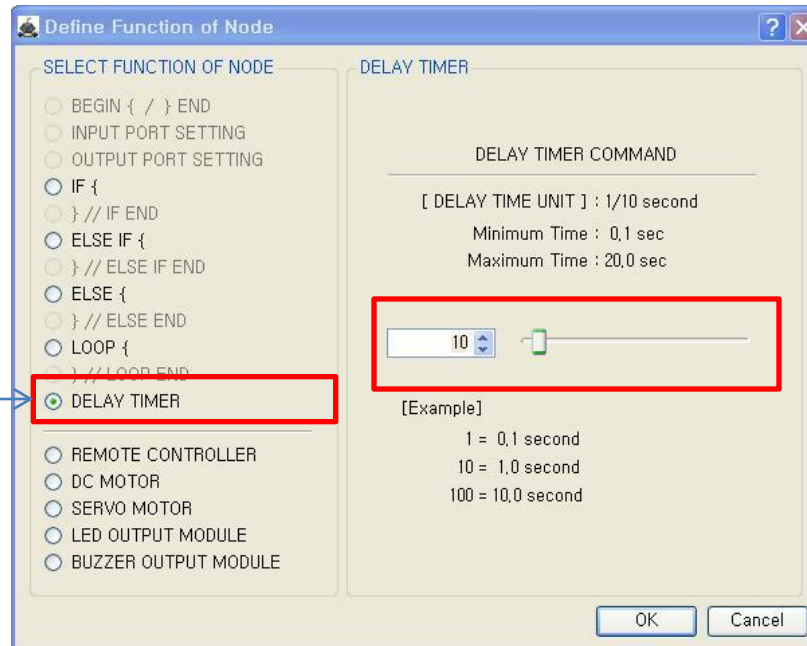
ID is automatically assigned. You have to set the same ID at "LOOP END".

Automatically assigned ID is different according to the sequence of making nodes.



Move the Servo motor of OUT-4 port to the 180 degree.

This makes the frame which is connected to the servo motor will press the right @touch sensor.



To finish moving the servo motor needs some delay time.

We give 1 second for this delay time.



**Define Function of Node**

SELECT FUNCTION OF NODE

- IF {
- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

IF BEGIN ~

IF BEGIN COMMAND

[ ID ] : Sequence Number (Automatically assigned),  
 [ CONDITION ] : Select "AND" or "OR",  
 [ INPUT ] : Select INPUT Sensors.

[ ID ] : 7 [ CONDITION ] : AND

[ INPUT ]

<input type="checkbox"/> RCR	<input checked="" type="checkbox"/> IN-1	<input checked="" type="checkbox"/> IN-2	<input type="checkbox"/> IN-3
	1	0	0
<input type="checkbox"/> IN-4	<input type="checkbox"/> IN-5	<input type="checkbox"/> IN-6	<input type="checkbox"/> IN-7
0	0	0	0

OK Cancel

1<sup>st</sup> condition

True condition is  
 ⓐ touch sensor of IN-1 :  
 pressed  
 AND  
 ⓑ touch sensor of IN-2 :  
 released

If the condition is true, the next "{LED}" command is executed, else the next {SERVO MOTOR} command is executed.

**Define Function of Node**

SELECT FUNCTION OF NODE

- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

LED OUTPUT MODULE

OUTPUT PORT	On TIME	Off TIME	REPEAT
<input checked="" type="checkbox"/> OUT-1	5	5	2
<input type="checkbox"/> OUT-2			
<input type="checkbox"/> OUT-3			
<input type="checkbox"/> OUT-4			
<input type="checkbox"/> OUT-5			
<input type="checkbox"/> OUT-6			
<input type="checkbox"/> OUT-7			

[ On TIME ] : Select the LED ON time  
 [ Off TIME ] : Select the LED OFF time  
 5 : 0.5 seconds  
 10 : 1.0 seconds  
 15 : 1.5 seconds  
 20 : 2.0 seconds

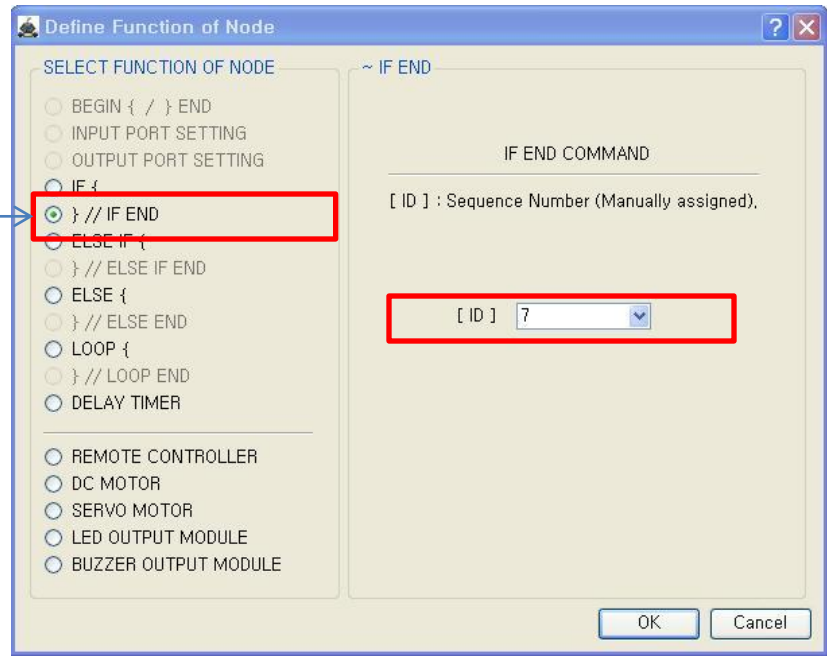
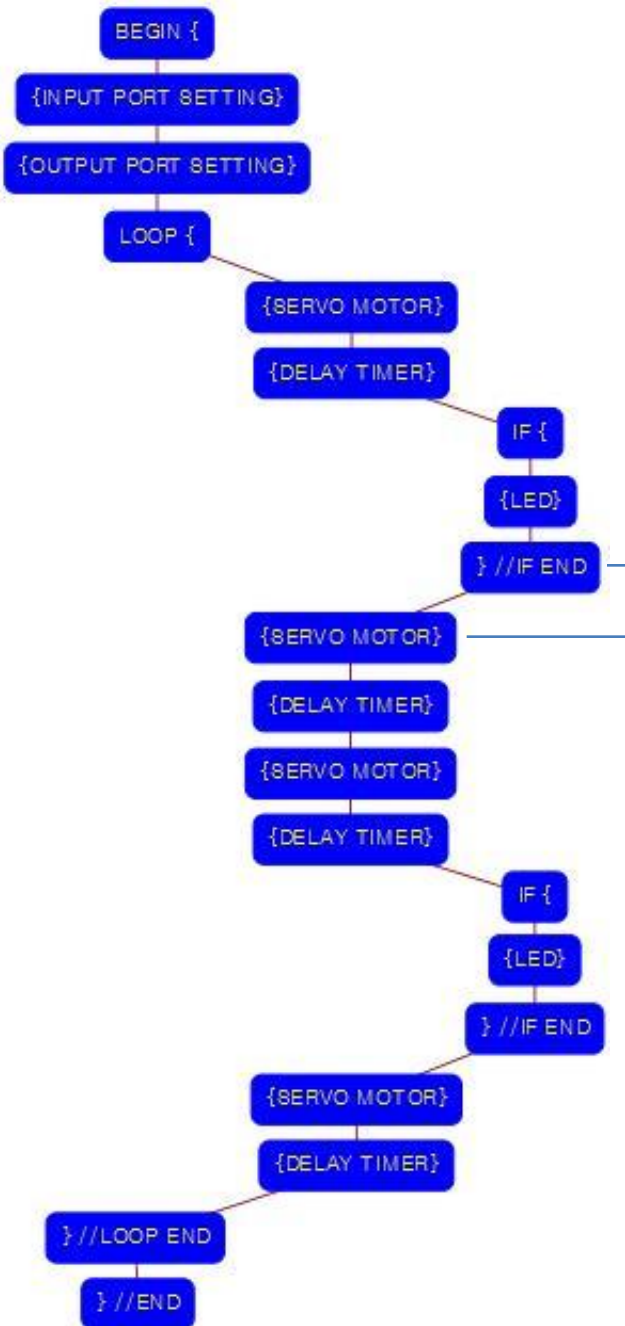
[ REPEAT ] : Select the REPEAT times ( 0 ~ 10 )

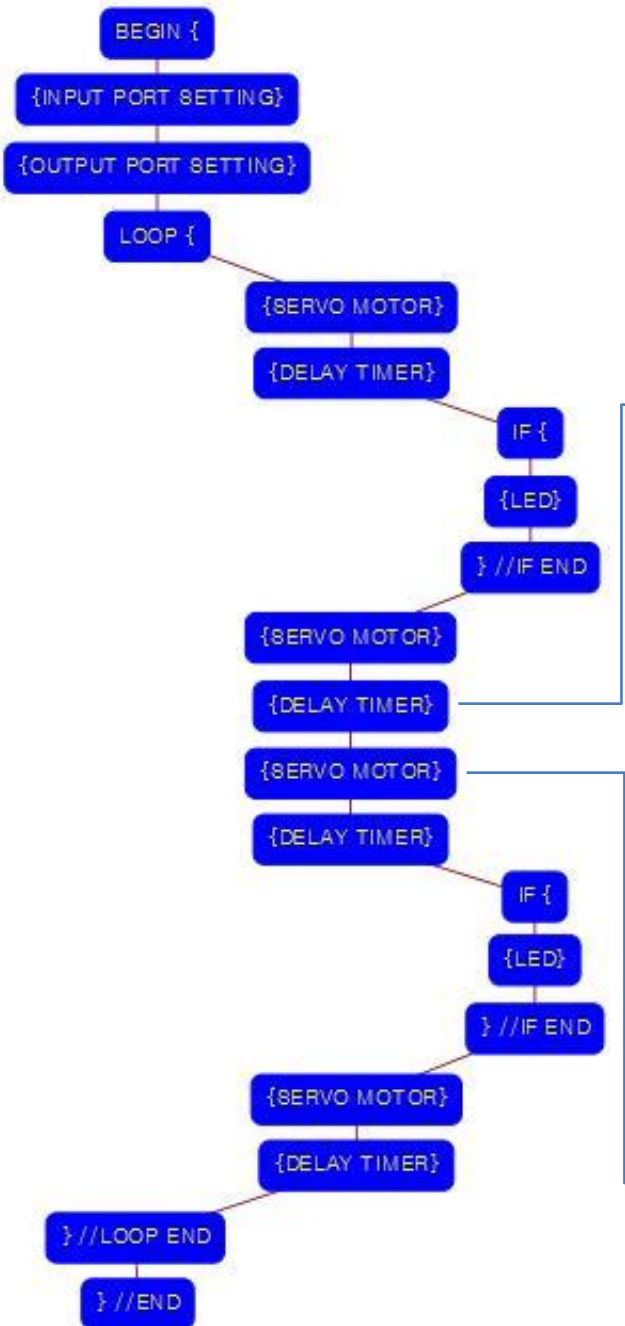
OK Cancel

This LED command is executed only if the above "IF {"condition is true.

The right LED module(OUT-1) turns on 0.5 seconds and turns off 0.5 seconds for 2 times.

On TIME : On time of LED  
 Off TIME: Off time of LED  
 REPEAT: Repetition number





**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

DELAY TIMER

DELAY TIMER COMMAND

[ DELAY TIME UNIT ] : 1/10 second

Minimum Time : 0,1 sec

Maximum Time : 20,0 sec

10

[Example]

1	=	0,1 second
10	=	1,0 second
100	=	10,0 second

OK Cancel

To finish moving the servo motor needs some delay time.

We give 1 second for this delay time.

**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

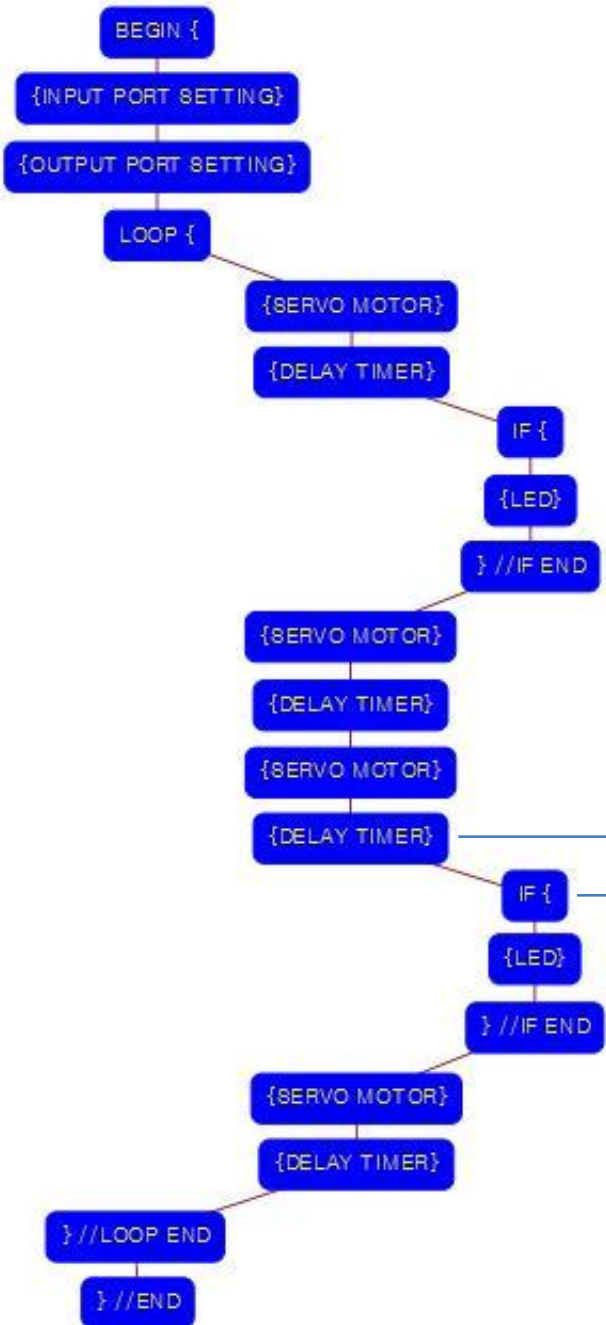
SERVO MOTOR

OUTPUT PORT	SERVO MOTOR ANGLE
<input type="checkbox"/> OUT-1	0
<input type="checkbox"/> OUT-2	0
<input type="checkbox"/> OUT-3	0
<input checked="" type="checkbox"/> OUT-4	0
<input type="checkbox"/> OUT-5	0
<input type="checkbox"/> OUT-6	0
<input type="checkbox"/> OUT-7	0

OK Cancel

Move the Servo motor of OUT-4 port to the 0 degree.

This makes the frame which is connected to the servo motor will be toward to the center position.



**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER**
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

DELAY TIMER

DELAY TIMER COMMAND

[ DELAY TIME UNIT ] : 1/10 second

Minimum Time : 0,1 sec

Maximum Time : 20,0 sec

10

[Example]

1	=	0,1 second
10	=	1,0 second
100	=	10,0 second

OK Cancel

To finish moving the servo motor needs some delay time.

We give 1 second for this delay time.

**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {**
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

IF BEGIN ~

IF BEGIN COMMAND

[ ID ] : Sequence Number (Automatically assigned),

[ CONDITION ] : Select "AND" or "OR",

[ INPUT ] : Select INPUT Sensors.

[ ID ] 14 [ CONDITION ] **AND**

[ INPUT ]

<input type="checkbox"/> RCR	<input checked="" type="checkbox"/> IN-1	<input checked="" type="checkbox"/> IN-2	<input type="checkbox"/> IN-3
	0	1	0
<input type="checkbox"/> IN-4	<input type="checkbox"/> IN-5	<input type="checkbox"/> IN-6	<input type="checkbox"/> IN-7
	0	0	0

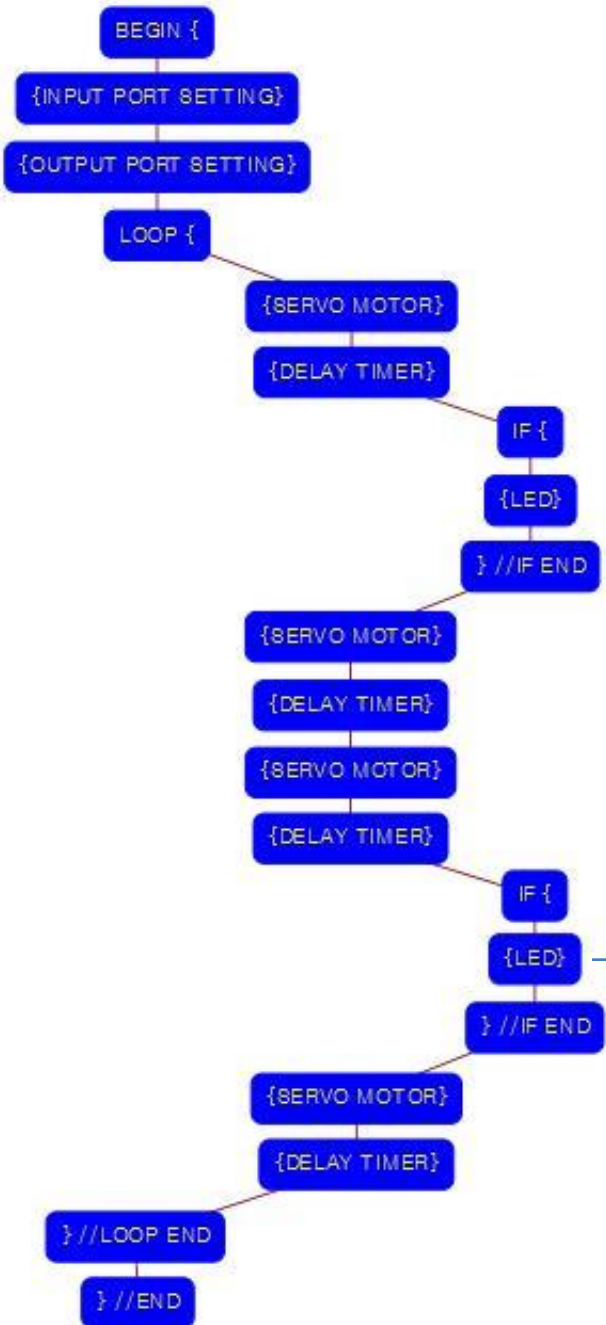
OK Cancel

2<sup>nd</sup> condition

True condition is  
 Ⓐ touch sensor of IN-1 : released  
 AND  
 Ⓑ touch sensor of IN-2 : pressed

If the condition is true, the next "{LED}" command is executed, else the next {SERVO MOTOR} command is executed.





**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

LED OUTPUT MODULE

OUTPUT PORT	On TIME	Off TIME	REPEAT
<input checked="" type="checkbox"/> OUT-1	5	5	2
<input type="checkbox"/> OUT-2			
<input type="checkbox"/> OUT-3			
<input type="checkbox"/> OUT-4			
<input type="checkbox"/> OUT-5			
<input type="checkbox"/> OUT-6			
<input type="checkbox"/> OUT-7			

[ On TIME ] : Select the LED ON time  
[ Off TIME ] : Select the LED OFF time  
5 : 0,5 seconds  
10 : 1,0 seconds  
15 : 1,5 seconds  
20 : 2,0 seconds

[ REPEAT ] : Select the REPEAT times ( 0 ~ 10 )

OK Cancel

This LED command is executed only if the above 2<sup>nd</sup> "IF {" condition is true.

The left LED module(OUT-2) turns on 0.5 seconds and turns off 0.5 seconds for 2 times.

On TIME : On time of LED  
Off TIME: Off time of LED  
REPEAT: Repetition number

**Define Function of Node**

SELECT FUNCTION OF NODE

- BEGIN { / } END
- INPUT PORT SETTING
- OUTPUT PORT SETTING
- IF {
- } // IF END
- ELSE IF {
- } // ELSE IF END
- ELSE {
- } // ELSE END
- LOOP {
- } // LOOP END
- DELAY TIMER
- REMOTE CONTROLLER
- DC MOTOR
- SERVO MOTOR
- LED OUTPUT MODULE
- BUZZER OUTPUT MODULE

~ IF END

IF END COMMAND

[ ID ] : Sequence Number (Manually assigned).

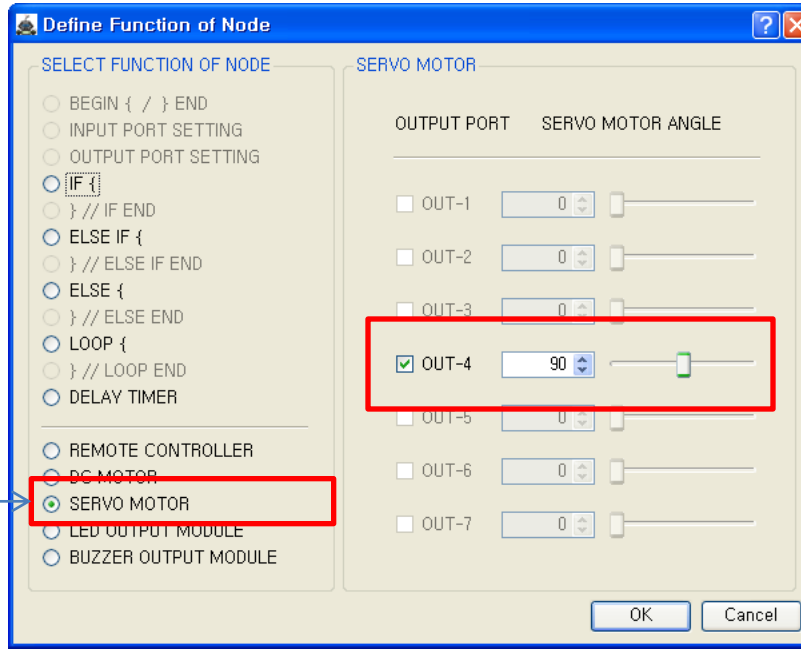
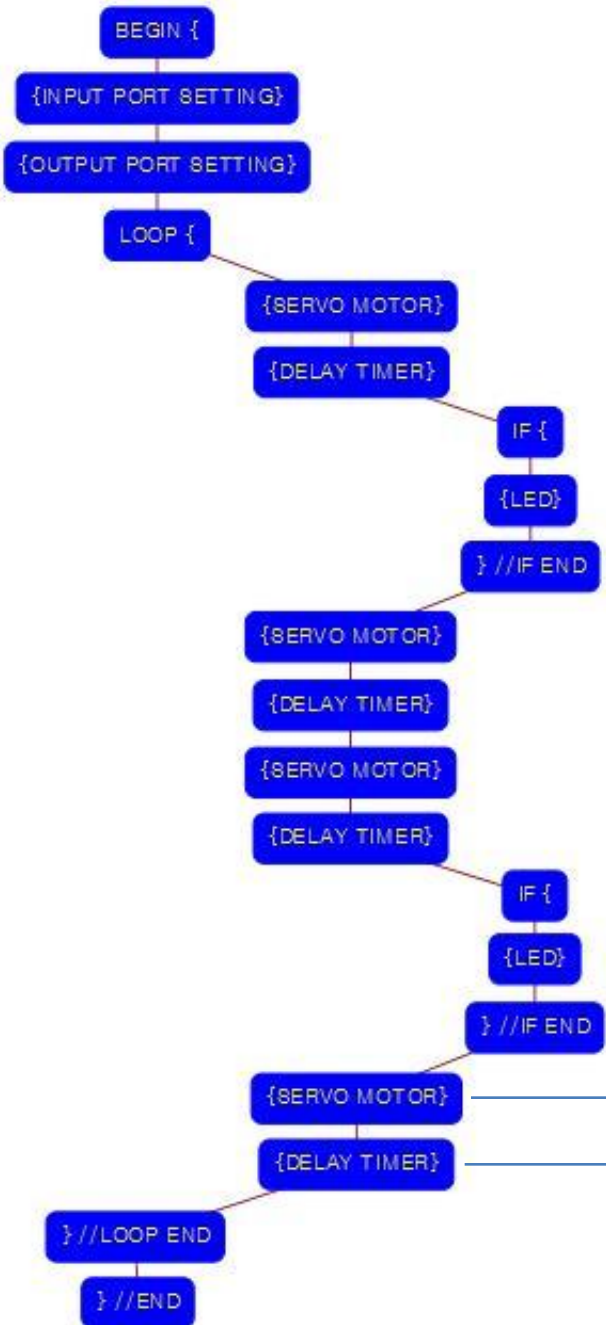
[ ID ] 14

OK Cancel

The end point of 2<sup>nd</sup> "IF {" condition.

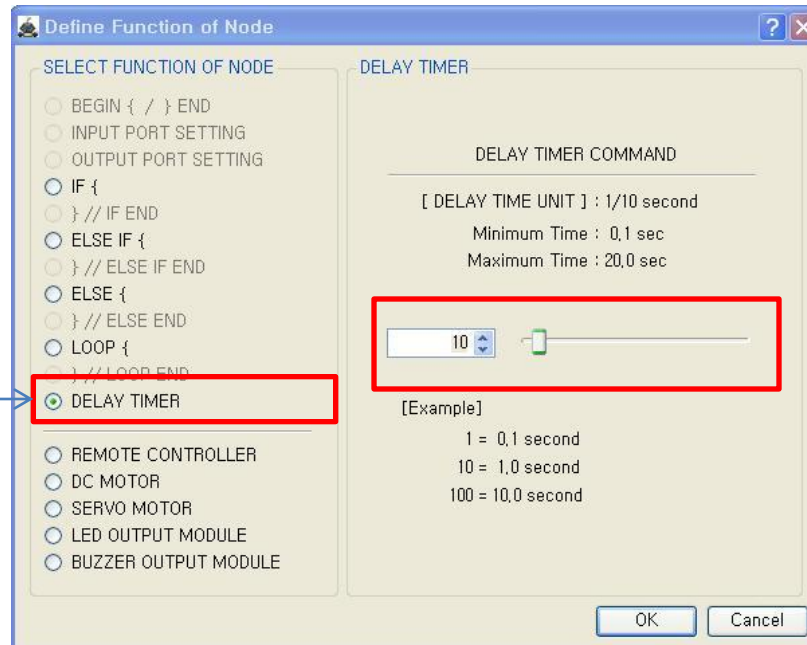
You have to assigned the ID of paired "IF {" condition.

(It is necessary to know that which "IF {" among the many "IF {" conditions in program.



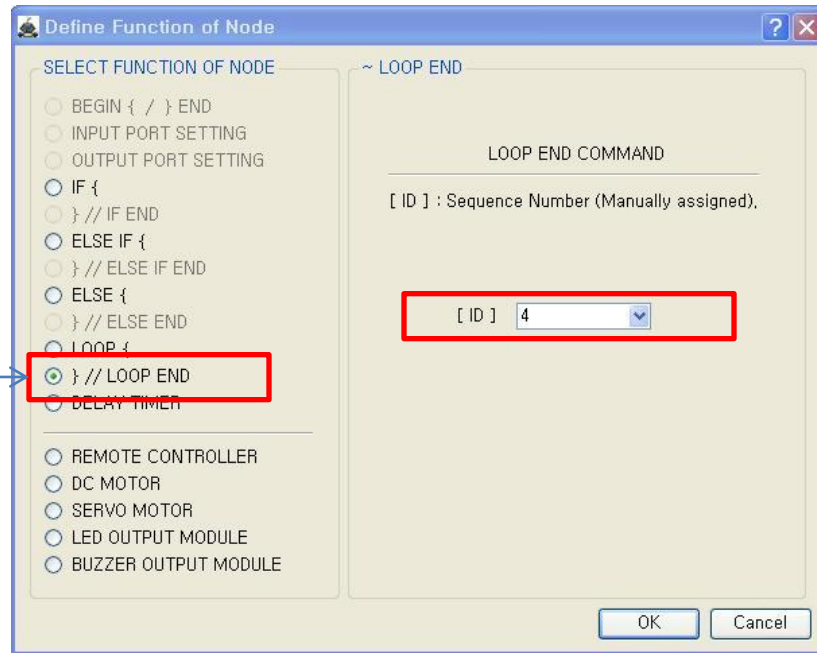
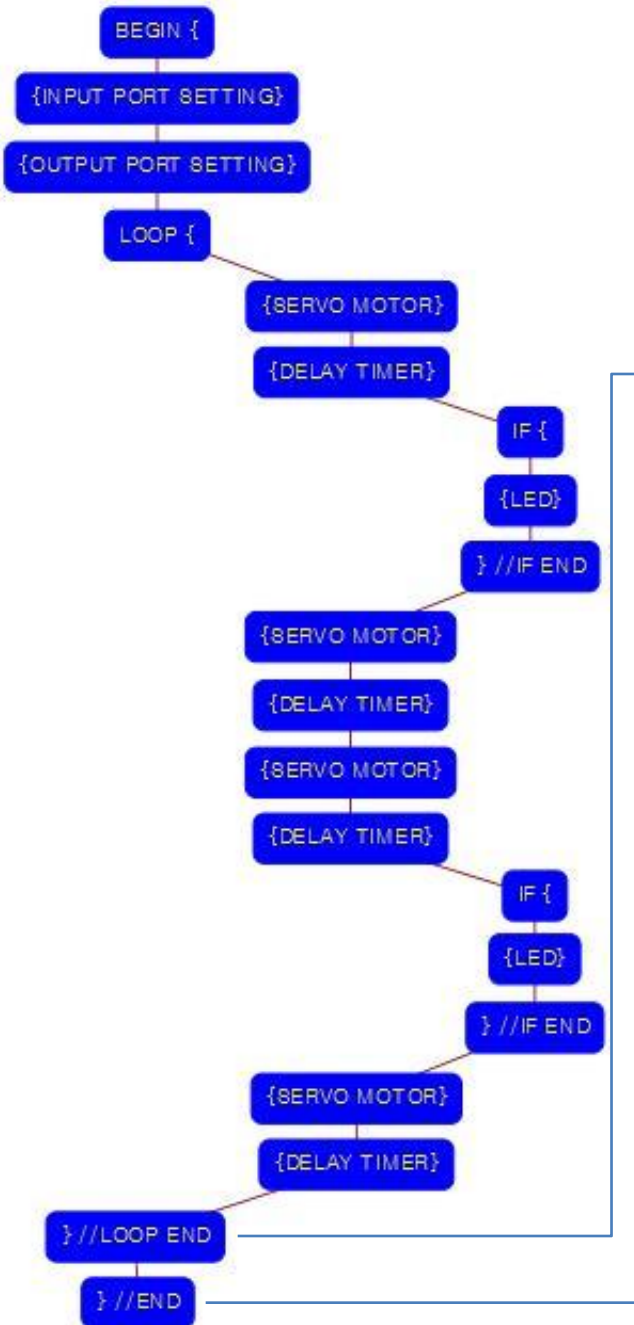
Move the Servo motor of OUT-4 port to the 90 degree.

This makes the frame which is connected to the servo motor will be toward to the center position.



To finish moving the servo motor needs some delay time.

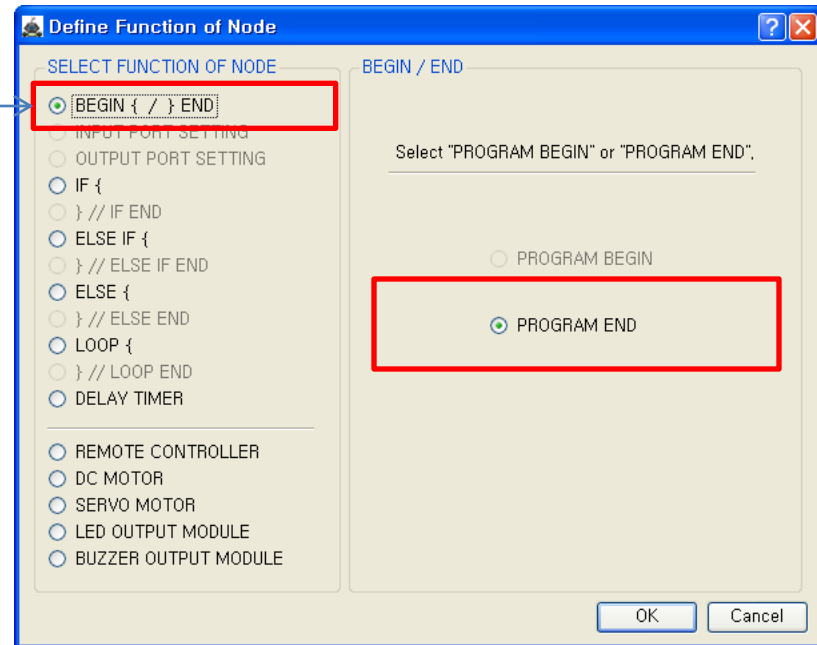
We give 1 second for this delay time.



The end point of “LOOP {” repetition command.

You have to assigned the ID of paired “LOOP {” repetition command.

(It is necessary to know that which “LOOP {” among the many “LOOP {” repetition commands in program.



This means that program ends hear.

You have to place this node at the end of program.

“PROGRAM BEGIN” is not active because you already define at the program.

To run the robot, it is necessary to download the program into the robot. (Refer to download manual)