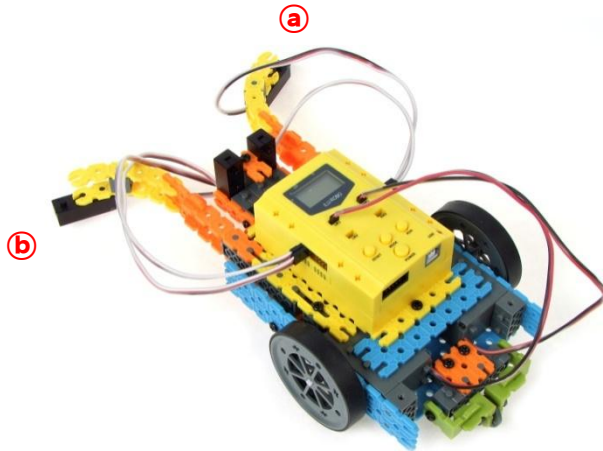


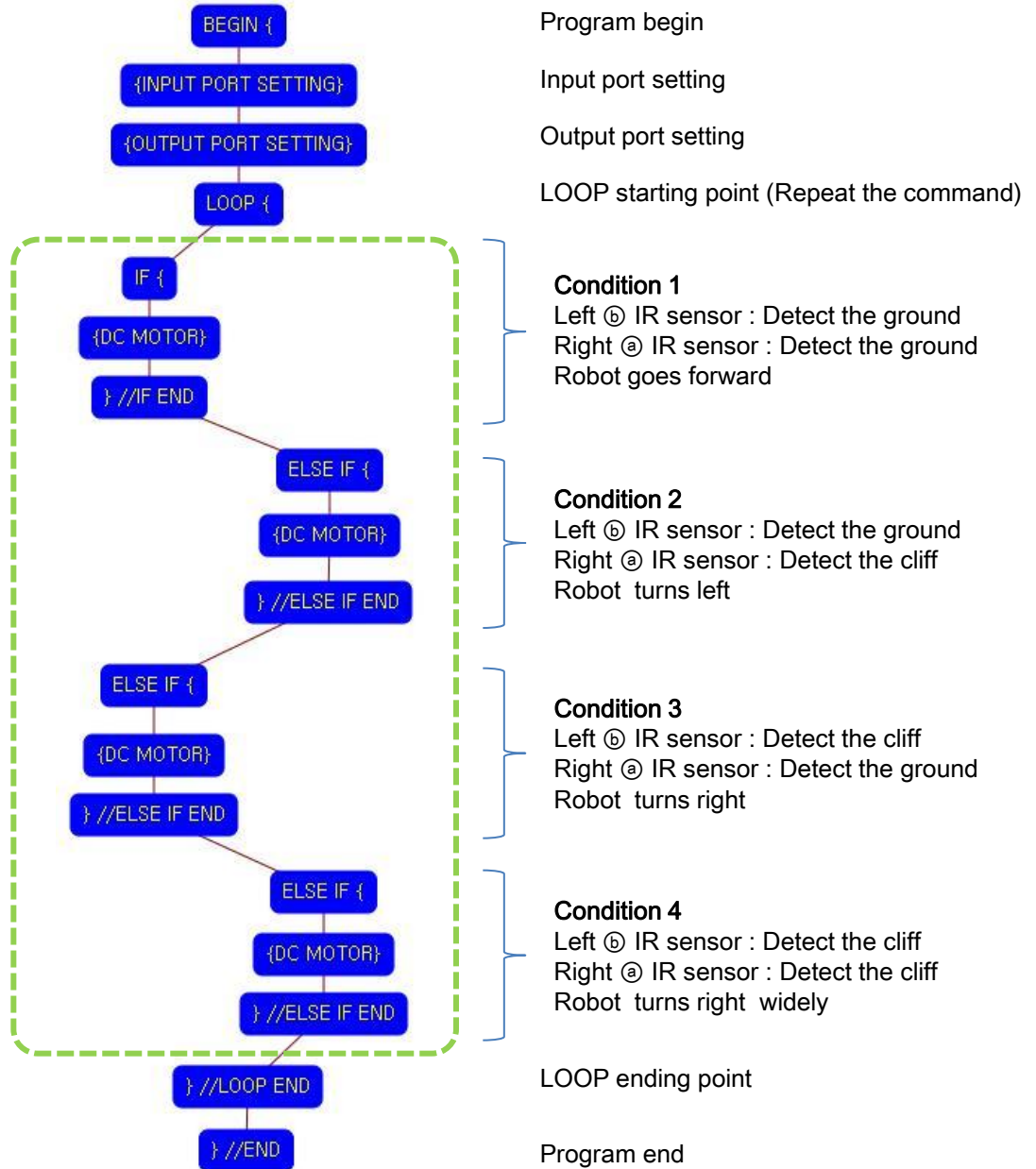
# EQ-ROBO Programming : Cliff Check Robot

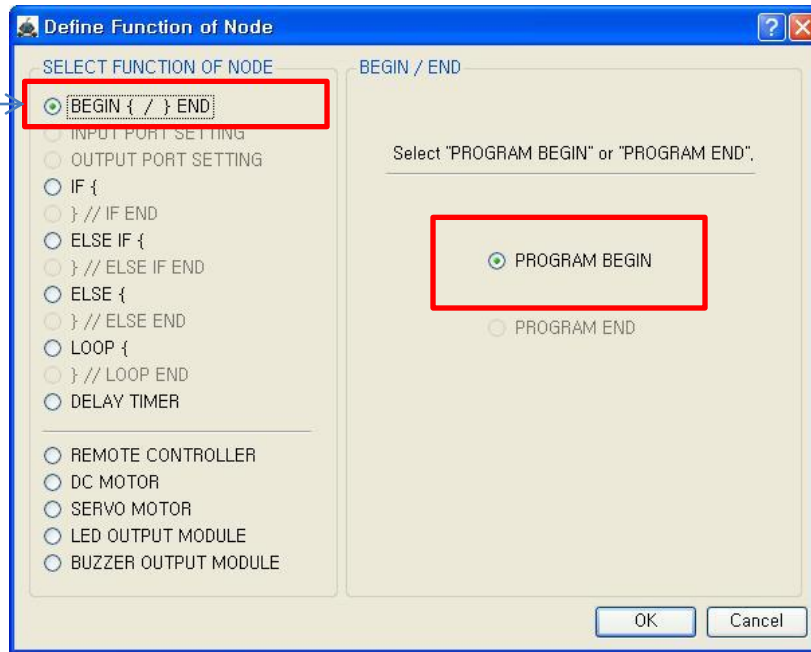
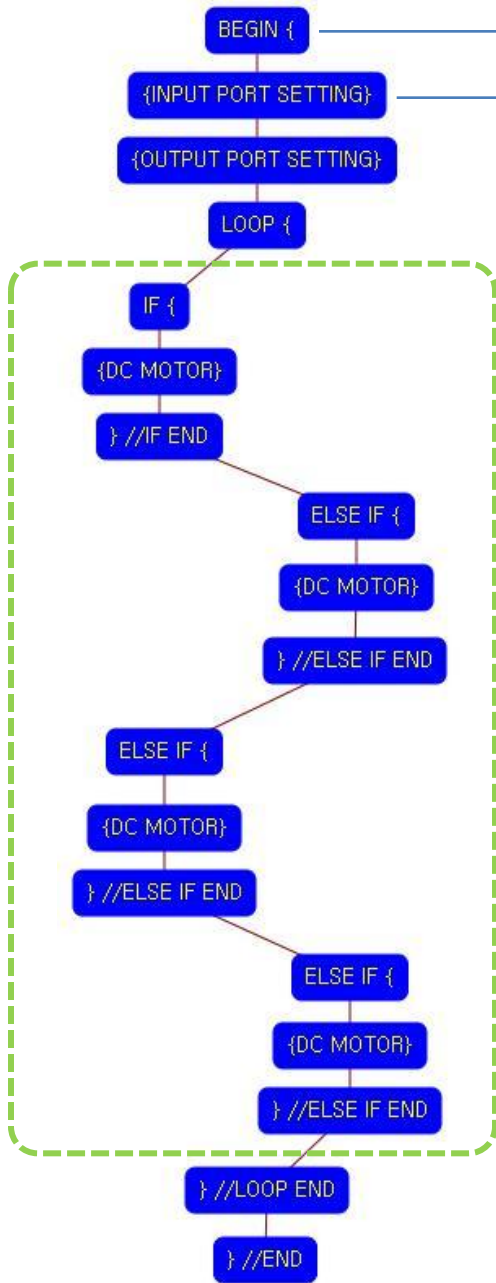


This Cliff check robot use 2 IR sensors to detect the cliff in front of robot.

The key point of programming is that the IR sensors detecting conditions.

Program name :  
eq2-3-p27\_CliffCheck.ufc

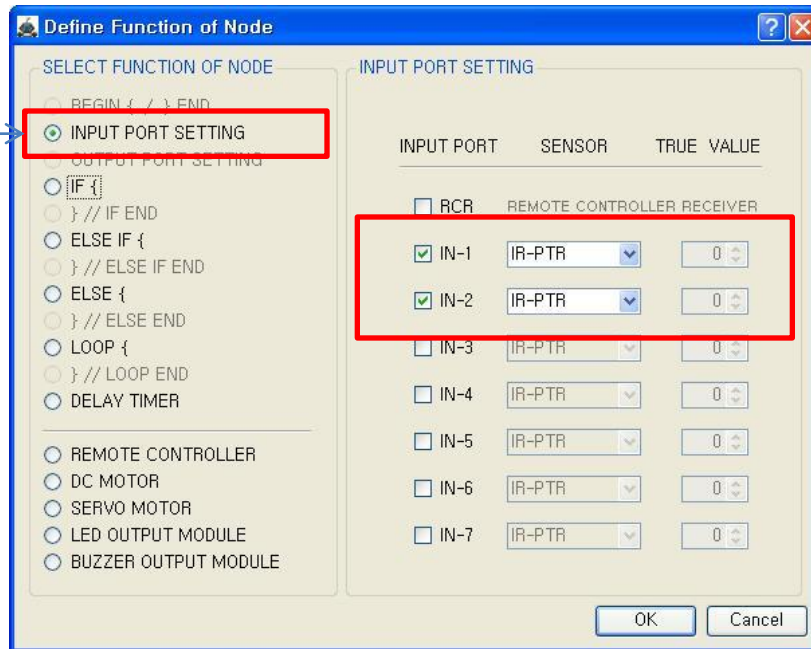




This means that program begins from here.

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

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

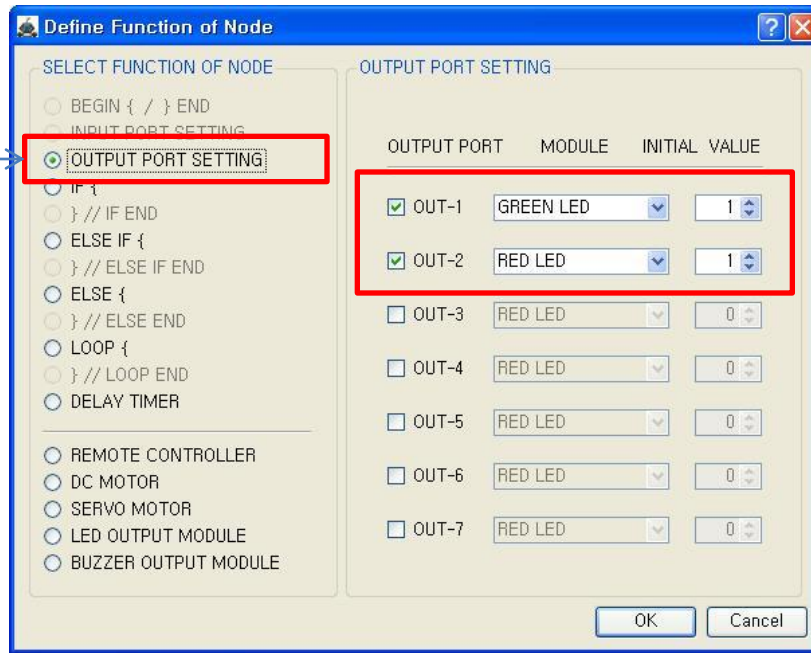
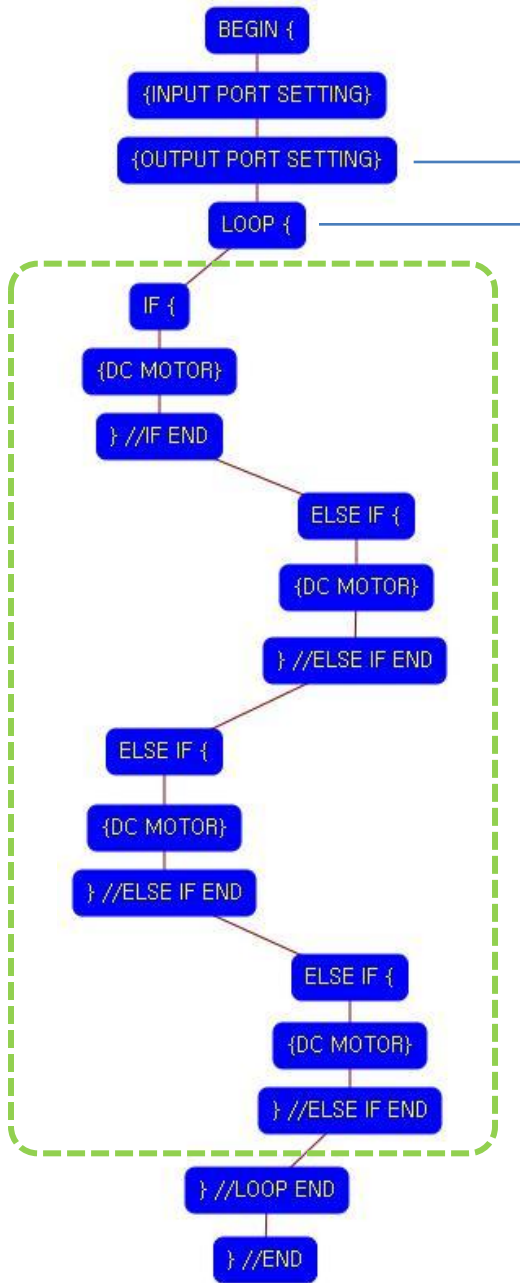


This model use 2 IR sensors as input device.

You have to connect the right IR sensor to the IN-1 input port and the left IR sensor to the IN-2 input port of main board.

And check the IN-1, IN-2 with “IR-PTR” in software.

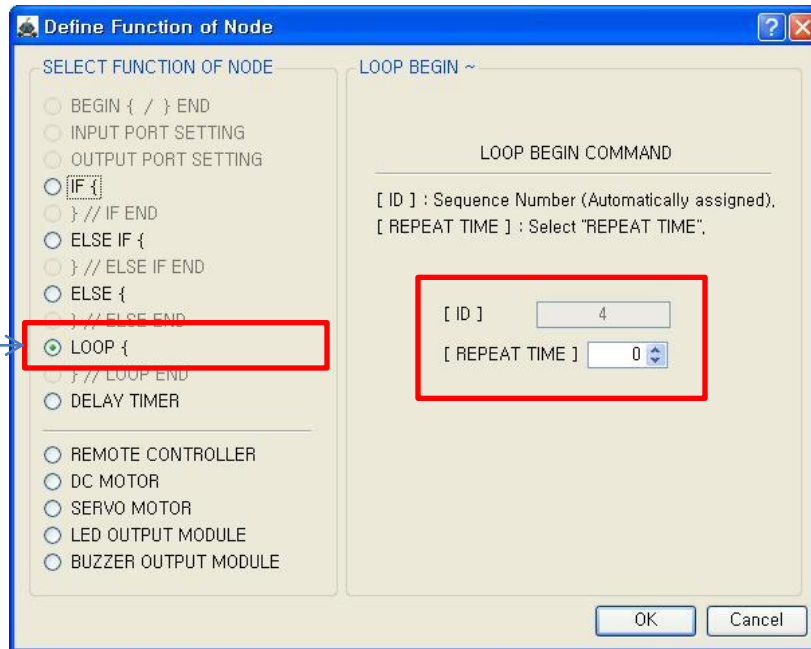
If the real connection of sensors are different to the setting on software, it will make robot to wrong operation.



This model use 2 LED modules 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 of main board.

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

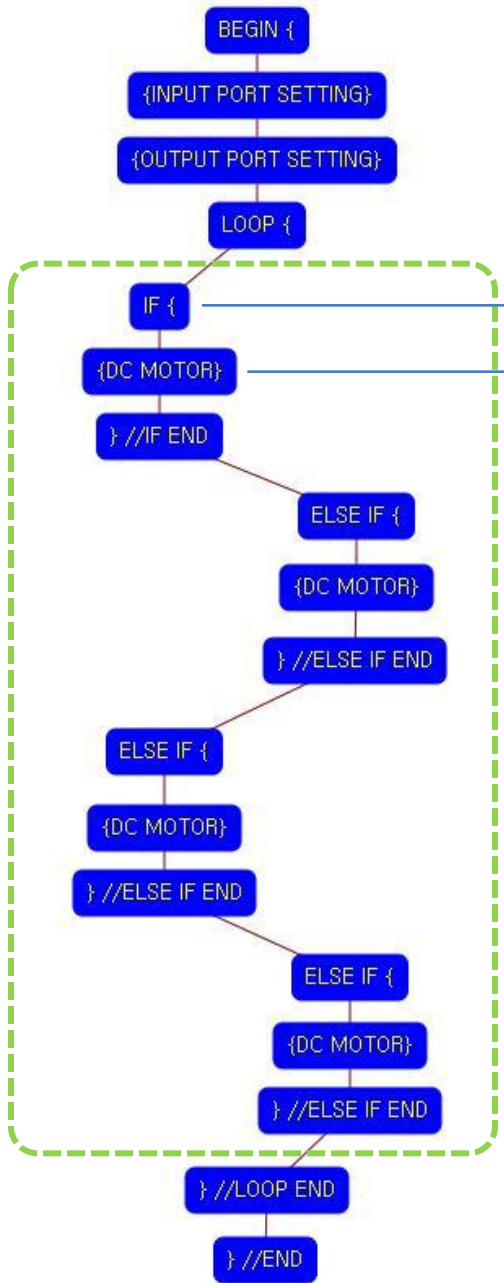


LOOP command is used to repeat the commands.

"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.



**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 ] 5 [ 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	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	0

OK Cancel

1<sup>st</sup> condition

True condition is

- Ⓐ IR sensor of IN-1 : detects the ground
- Ⓑ IR sensor of IN-2 : detects the ground

If the condition is true, the next "{DC MOTOR}" command is executed, else the next "ELSE IF {" 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

DC MOTOR

DC MOTOR CONTROL COMMAND

[ DIRECTION ] : Select "FORWARD" or "BACKWARD".  
 [ SPEED ] : Select Rotational Speed ( 0 ~ 100 ).  
 [ RUNNING TIME ] : Select Time ( 0.1 ~ 8.0 sec. )

[ LEFT DC MOTOR ]	[ RIGHT DC MOTOR ]
[ DIRECTION ]	[ DIRECTION ]
FORWARD	FORWARD
[ SPEED ]	[ SPEED ]
100	100
[ RUNNING TIME ]	
1	

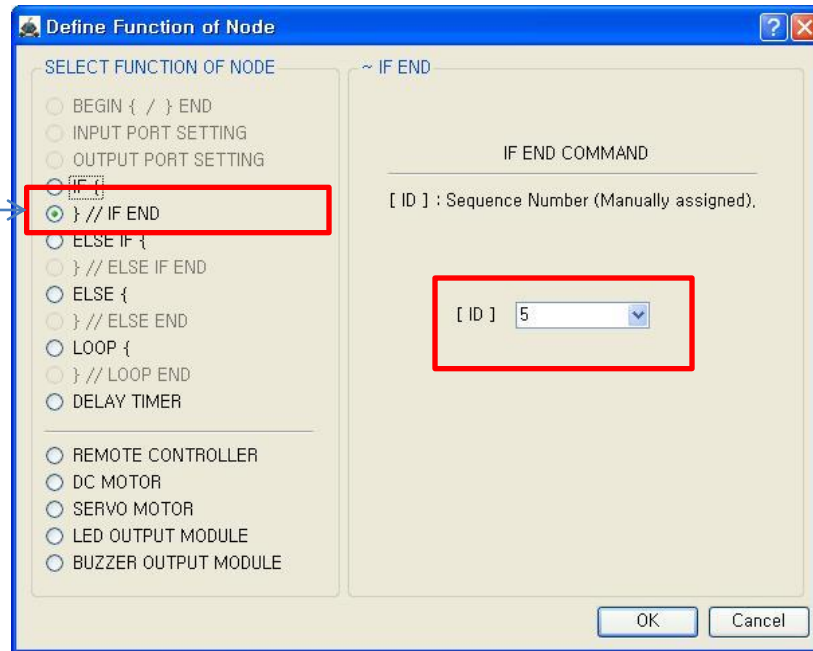
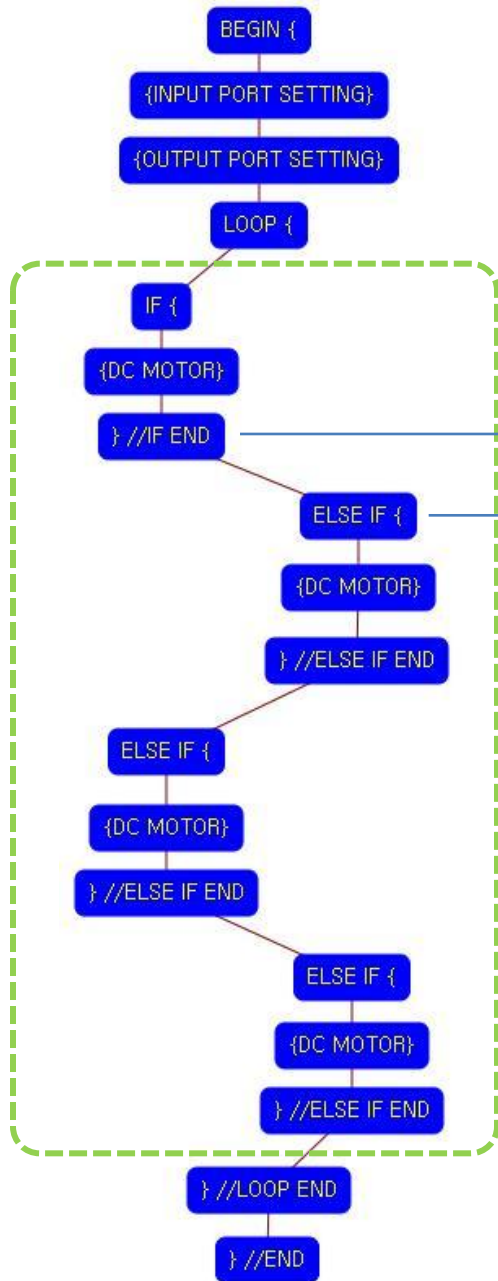
OK Cancel

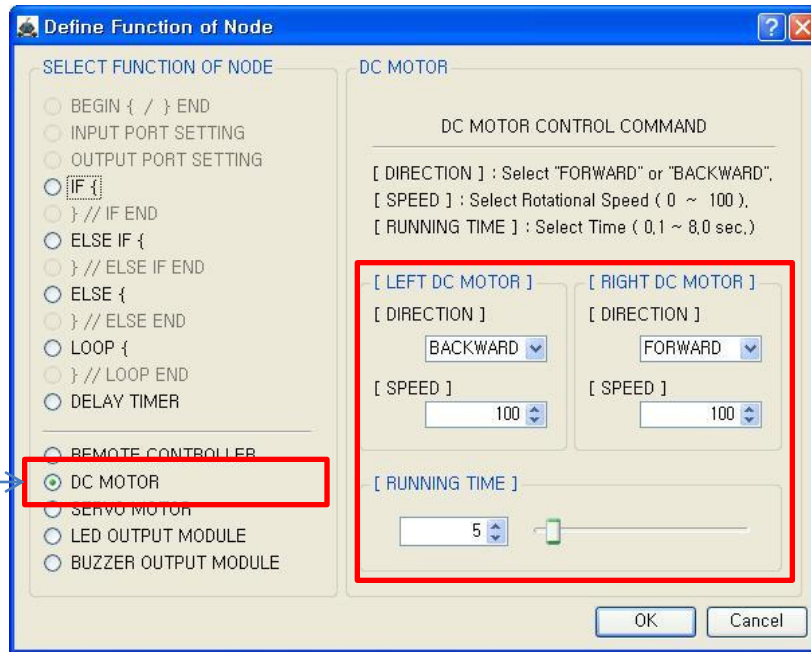
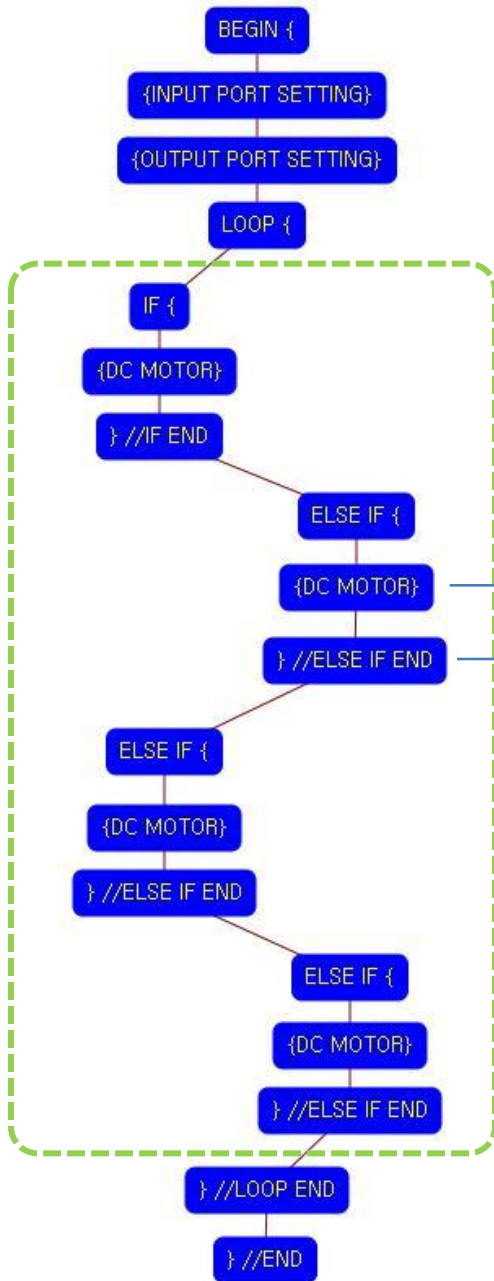
If the 1<sup>st</sup> "IF {" condition is true, both of DC motor run like as followings.

- Both DC Motor
- Direction : Forward
  - Speed : 100
  - Running Time : 1
  - ➔ Robot goes forward during 0.1 second

Motor speed is from 0 to 100 and running time is based on 0.1 second. (1 is 0.1 second)

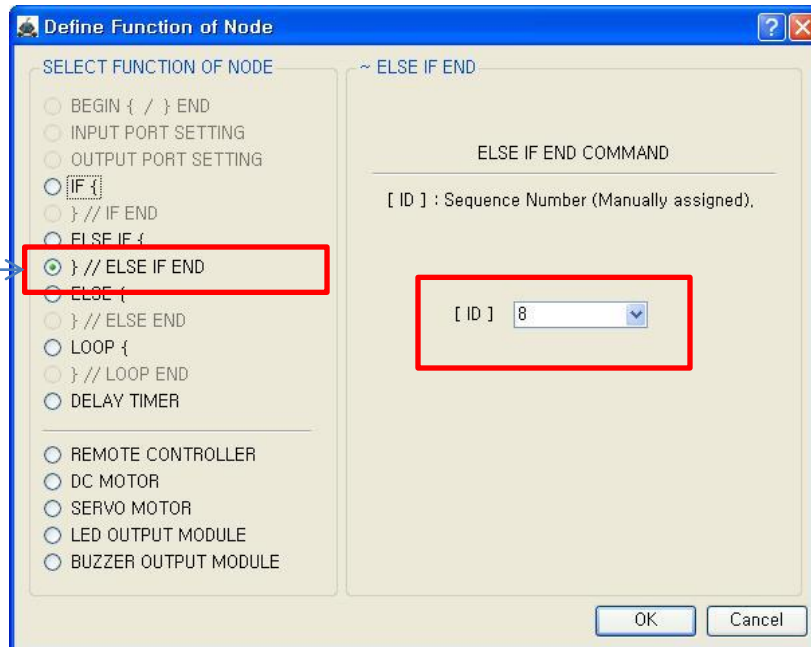






If the 2<sup>nd</sup> condition is true, both of DC motor run like as followings.

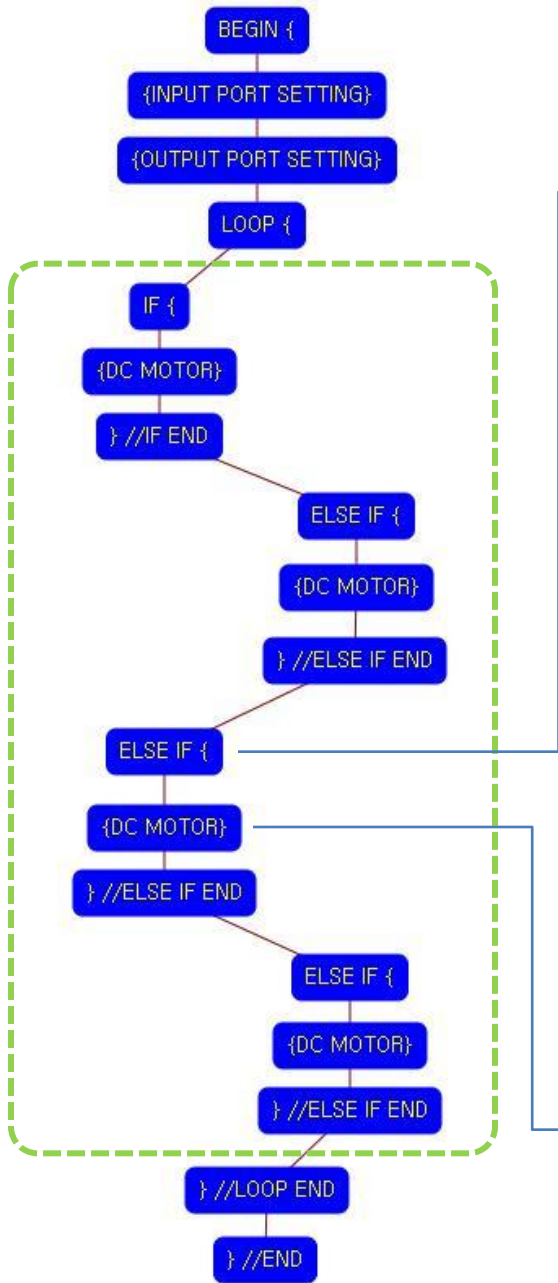
- Left DC Motor
- Direction : Backward
  - Speed : 100
  - Running Time : 5
- Right DC Motor
- Direction : Forward
  - Speed : 100
  - Running Time : 5
- Robot turns left during 0.5 second



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

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

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



**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

ELSE IF BEGIN ~

ELSE IF BEGIN COMMAND

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

[ ID ] 12 [ 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

3<sup>rd</sup> condition

True condition is

- Ⓐ IR sensor of IN-1 : detects the ground
- Ⓑ IR sensor of IN-2 : detects the cliff

If the condition is true, the next "{DC MOTOR}" command is executed, else the next "ELSE IF {" 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

DC MOTOR

DC MOTOR CONTROL COMMAND

[ DIRECTION ] : Select "FORWARD" or "BACKWARD".  
 [ SPEED ] : Select Rotational Speed ( 0 ~ 100 ).  
 [ RUNNING TIME ] : Select Time ( 0.1 ~ 8.0 sec. )

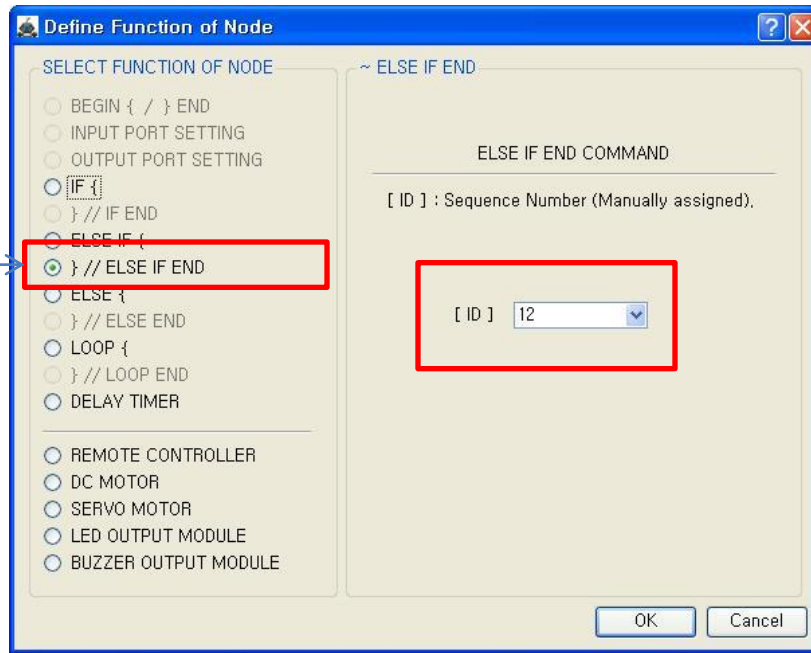
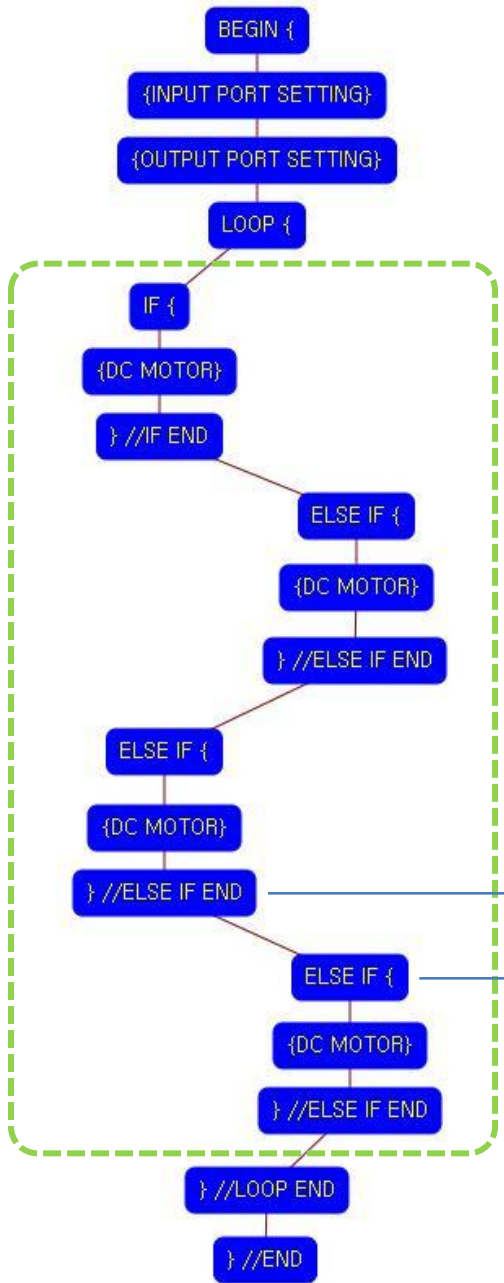
[ LEFT DC MOTOR ]	[ RIGHT DC MOTOR ]
[ DIRECTION ]	[ DIRECTION ]
FORWARD	BACKWARD
[ SPEED ]	[ SPEED ]
100	100
[ RUNNING TIME ]	
5	

OK Cancel

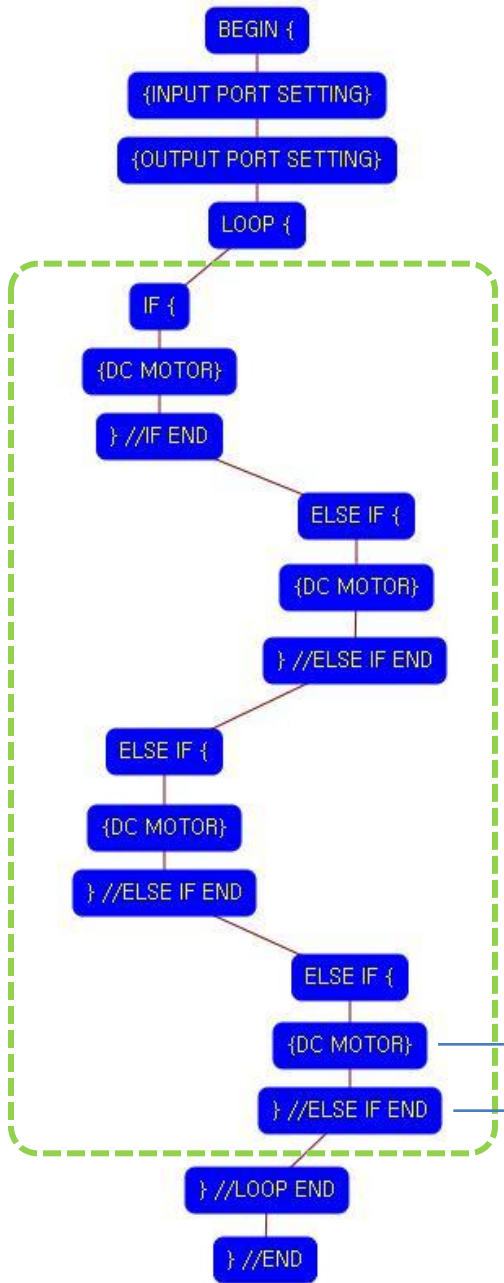
If the 3<sup>rd</sup> condition is true, both of DC motor run like as followings.

- Left DC Motor
- Direction : Forward
  - Speed : 100
  - Running Time : 5
- Right DC Motor
- Direction : Backward
  - Speed : 100
  - Running Time : 5
- Robot turns right during 0.5 second









**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

DC MOTOR CONTROL COMMAND

[ DIRECTION ] : Select "FORWARD" or "BACKWARD".  
 [ SPEED ] : Select Rotational Speed ( 0 ~ 100 ).  
 [ RUNNING TIME ] : Select Time ( 0.1 ~ 8.0 sec.)

[ LEFT DC MOTOR ] [ RIGHT DC MOTOR ]

[ DIRECTION ] [ DIRECTION ]

FORWARD BACKWARD

[ SPEED ] [ SPEED ]

100 100

[ RUNNING TIME ]

10

OK Cancel

If the 4<sup>th</sup> condition is true, both of DC motor run like as followings.

- Left DC Motor
- Direction : Forward
  - Speed : 100
  - Running Time : 10
- Right DC Motor
- Direction : Backward
  - Speed : 100
  - Running Time : 10
- Robot turns right during 0.5 second

**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

ELSE IF END COMMAND

[ ID ] : Sequence Number (Manually assigned).

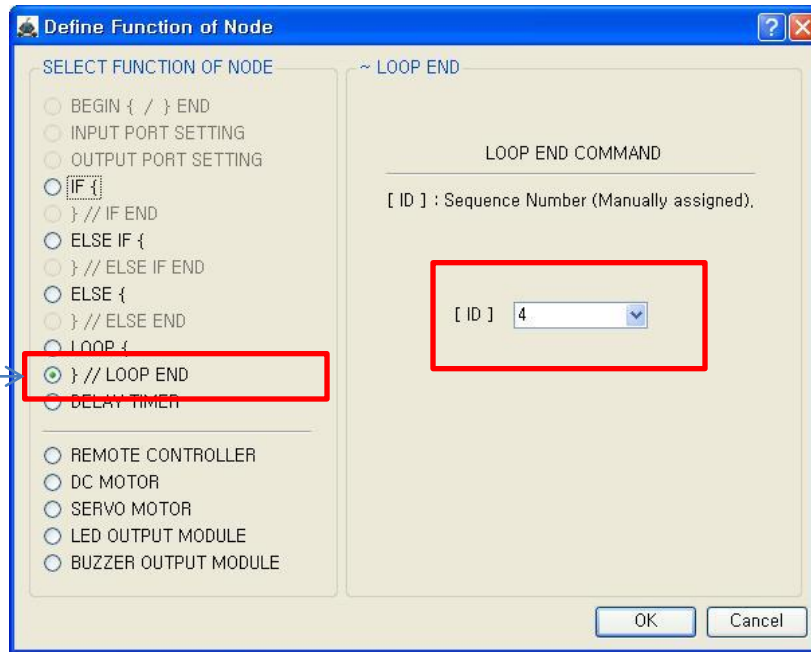
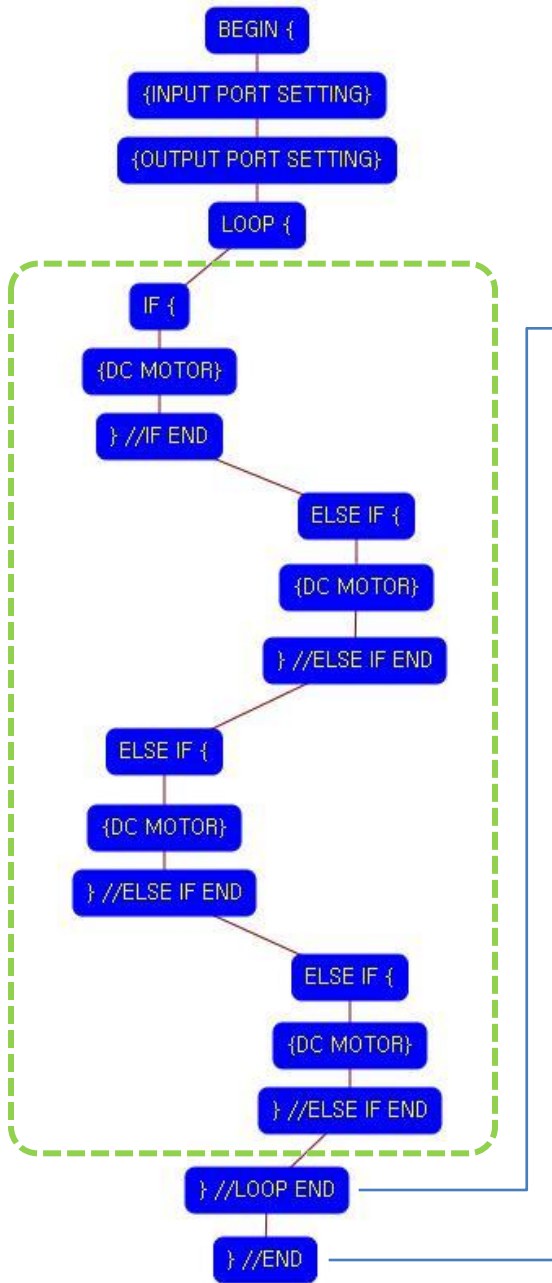
[ ID ] 16

OK Cancel

The end point of 4<sup>th</sup> condition.

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

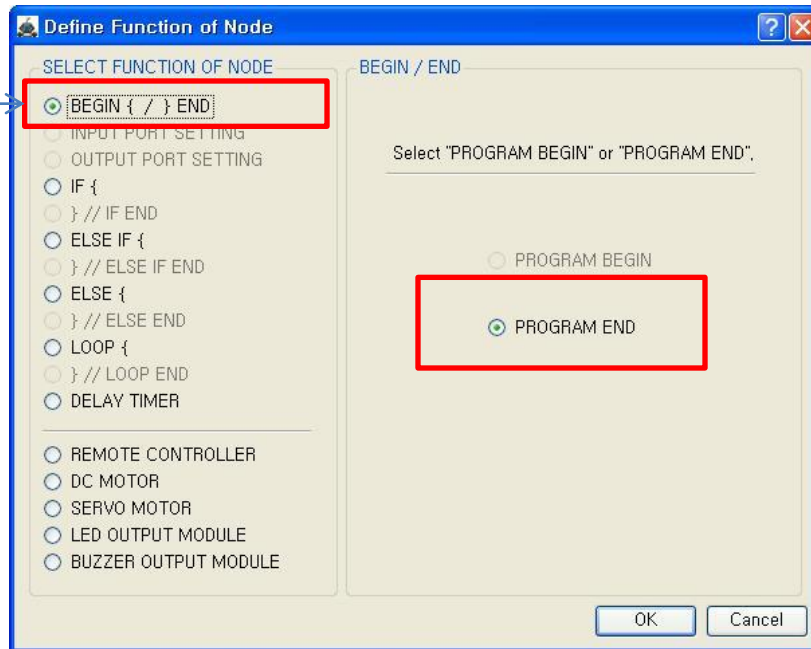
(It is necessary to know that which "ELSE IF {" among the many "ELSE IF {" conditions in program.



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)