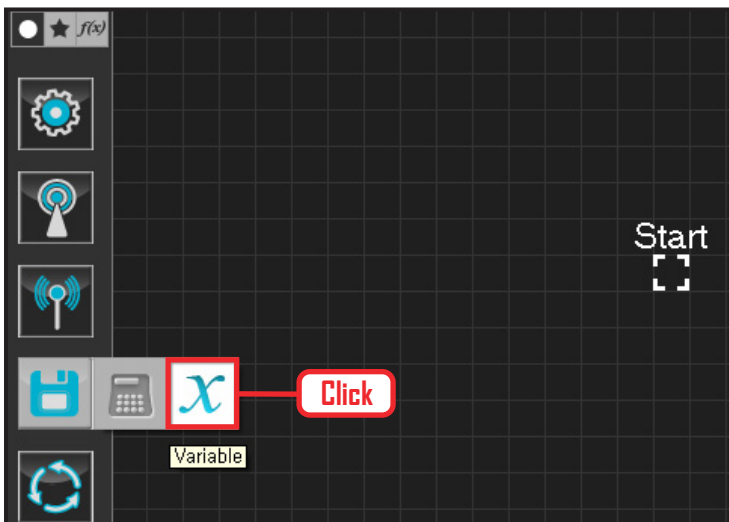


Sound Sensor Example Step by Step

Example Description

Sound Sensor is located inside the DRC controller on both sides.

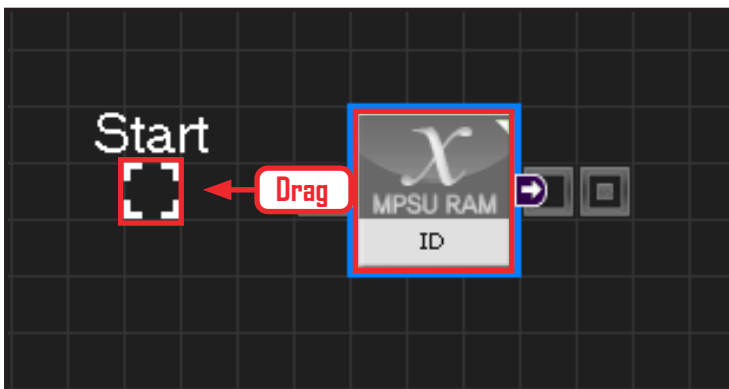
This example will make the robot lift the left arm with left side clap and right arm with the right side clap.



01 Assign Variable

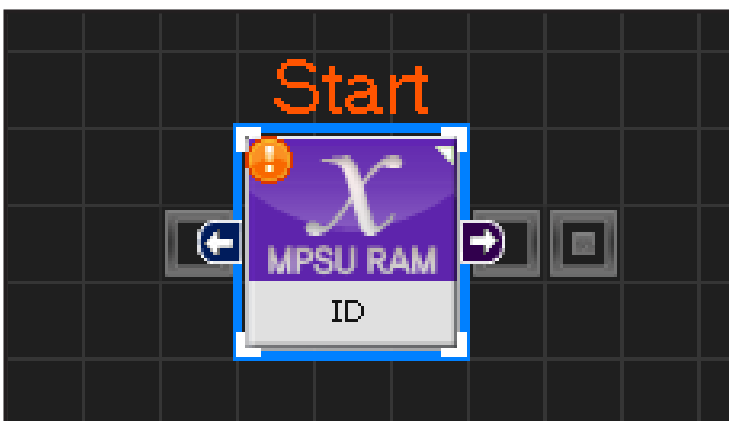
Operating the robot is same as operating the robot servo motor. Value has to be assigned so that servo will be able to operate.

Click Data › Variable module.



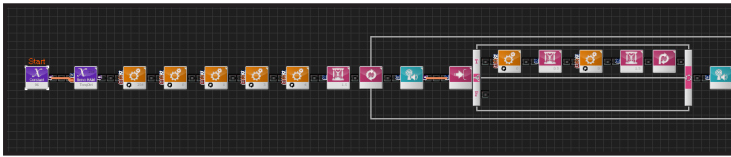
02 Start

Click and drag the connecting line located at left side of the module to the Start Point and dock



03 Start Programming

When the module and the Start Point is docked properly, module will become active and change color as seen in the photo to the left. This means programming has started..



04 Entire Program

Use the sound sensor to operate robot motors.

Navigation: ◀ ▶ **C-like** Graphic

```

sound_new.tsk | x
1 void main()
2 {
3     SERVO_TorgCtrl[254
4     jog( 512, 0, 254, 100 )
5     jog( 235, 0, 0, 100 )
6     jog( 235, 0, 1, 100 )
7     jog( 789, 0, 3, 100 )
8     jog( 789, 0, 4, 100 )
9     delay( 1500 )
10    while( true )
11    {
12        if( ( MPSU_SoundRecogFlag && MPSU_SoundDir > 1 ) )
13        {
14            jog( 512, 0, 0, 20 )
15            delay( 500 )
16            jog( 235, 0, 0, 40 )
17            delay( 1500 )
18            continue
19        }
20    }
    else
  
```

Click

05 Viewing C-Like

Click the 'C-like' tab near the top right and task programming window will open as shown in the photo to the left. This is the task window of the entire program. Codes are very similar to the C language structure so studying the codes will help the user become familiar with the C language structure. Cursor will jump following the clicked module, making it easy to see the module changing to text.

1 Click Start

2 Select

3 Input

Variable

Type: Constant

MPSU RAM ID: [Dropdown]

Servo RAM ID: [Dropdown]

Servo ID: [Slider]

Variable Name: [Text Field]

Constant Type: Bool Int

Constant Value: True False

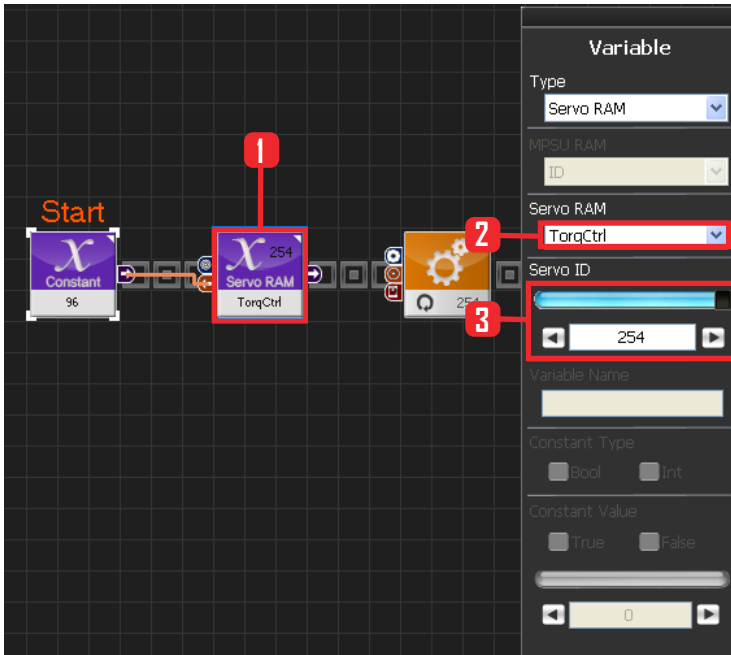
96

06 Setup Constant

This section allows the servo motor to operate on it's own.

Select Constant as the Variable Type. In properties, set constant value as 96.

When 96(0x60) is entered in the servo TorgControl register, servo becomes ready to operate. This value is sent to the torque value of the next module through the output connector.



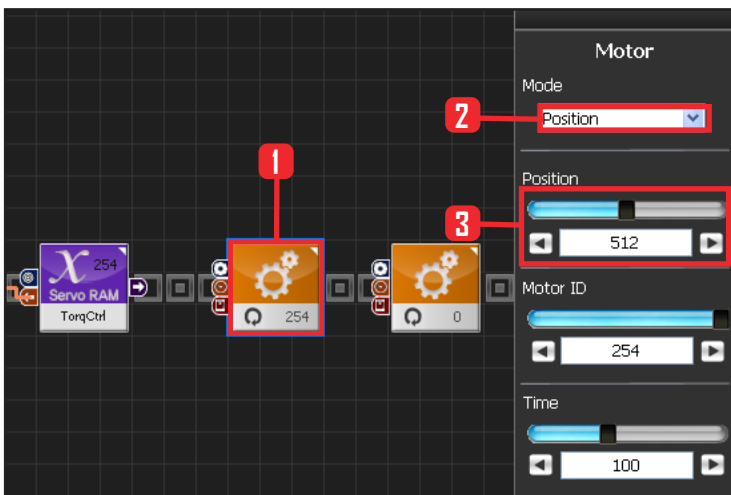
07 Apply to All Servos

This section applies contact value 96 to all servos.

Select Variable > Type : Servo RAM.

Select Servo RAM : TorqCtrl .

Set Servo ID : 254. 254 means it will be applied to all connected servos.



08 Set Angle to All Servos

This section sets all servo motor angles to the center.

Select Motion > Motor.

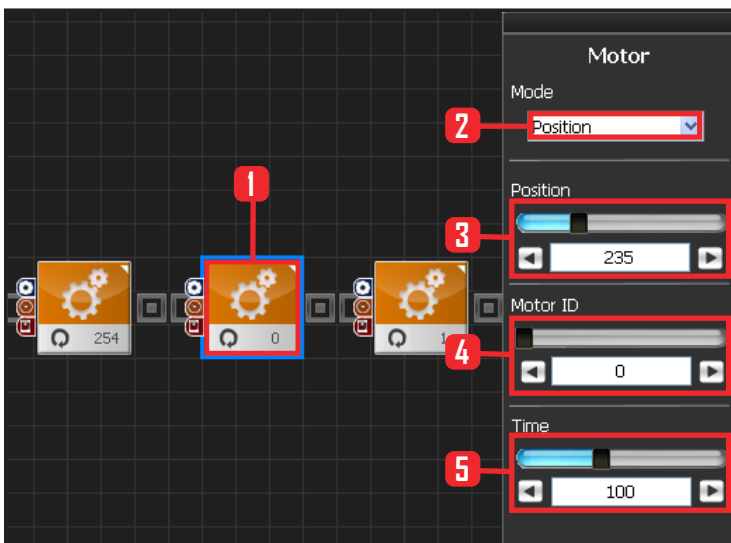
Select Mode : Position, adjust angle.

Set Position : 512 . 512 means motor will be sent to the center

Set Motor ID : 254 . 254 means it will be applied to all connected servos.

Set Time : 100 . 1 unit = 11,2ms, 100 units would be approximately 1,12s.

It means motors will be positioned at the desired angle in 1,12s.



09 Setup Motor ID 0 (Right Shoulder)

Creating attention posture (Basic Posture)

When all robot motors are aligned to the center, humanoid robot arms will be stretched out to the side. Setup below lowers one arm to the side of the body.

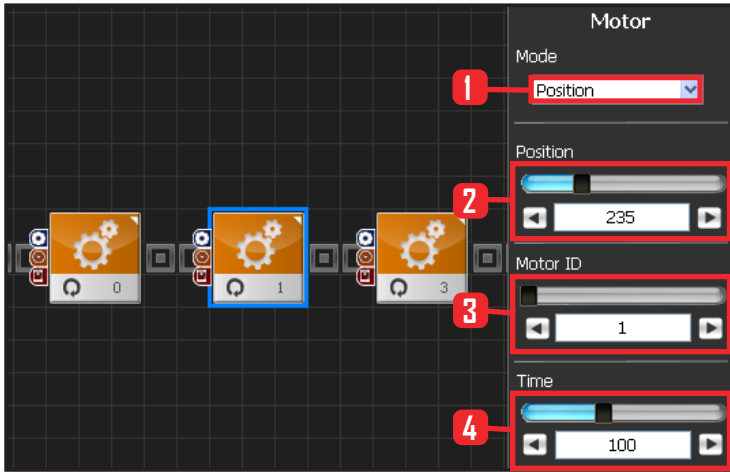
Select Motion > Motor .

Select Mode : Position.

Set Position : 235, 235 turns the motor so that that the arm stretched out horizontally will be lowered to vertical down position.

Set Motor ID : 0. Right shoulder motor has ID 0

Set Time : 100. Motor will turn to the desired angle in approximately 1,12s.



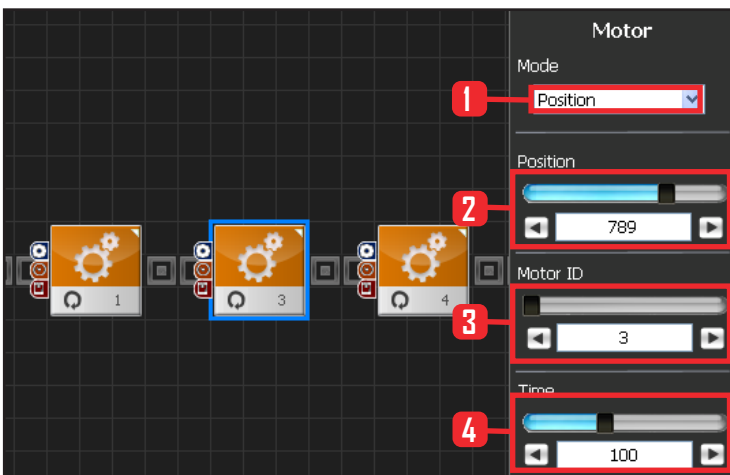
10 Setup Motor ID 1 (Right Arm)

Select Mode : Position.

Set Position : 235. 235 lowers the horizontally stretched arm to vertical down position.

Set Motor ID : 1. Right upper arm motor connected to the should has motor ID 1.

Set Time : 100 . Motor will turn to the desired angle in apporoximately 1.12s..



11 Setup Motor ID 3(Left Shoulder)

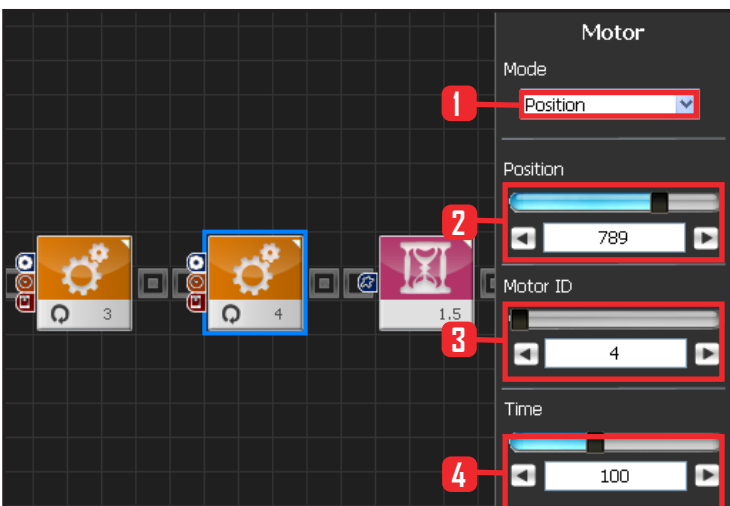
Select Motion > Motor .

Select Mode : Position.

Set Position : 789. 789 turns the motor so that that the arm stretched out horizontally will be lowered to vertical down position.

Set Motor ID : 0. Left shoulder motor has ID 3

Set Time : 100. Motor will turn to the desired angle in apporoximately 1.12s..



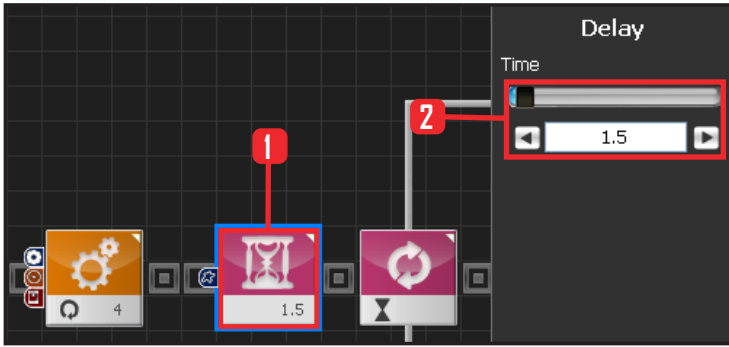
12 Setup Motor ID 4(Left Arm)

Select Mode : Position.

Set Position : 789. 789 lowers the horizontally stretched arm to vertical down position.

Set Motor ID : 4. Right upper arm motor connected to the should has motor ID 4.

Set Time : 100 . Motor will turn to the desired angle in apporoximately 1.12s.



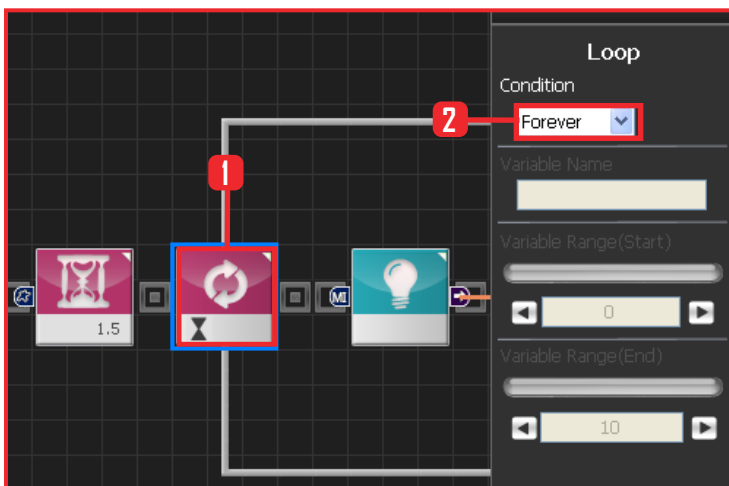
13 Delay

This section makes the robot wait until the robot is at attention posture and ready to run the next module.

Select Flow > Delay module.

Set Time : 1.5 . Unit is in seconds.

Delay 1.5s.

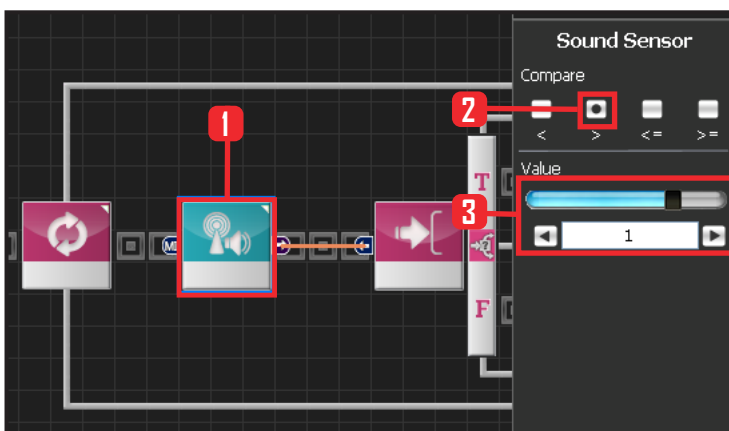


14 Loop

Select Flow > Loop module.

Select Condition: Forever.

Infinite loop.



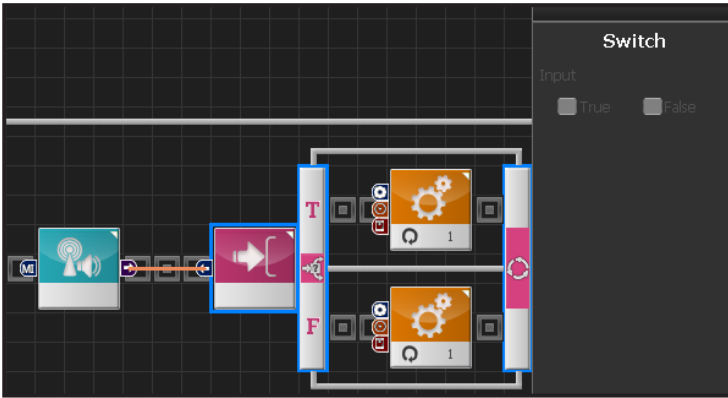
15 Sound Sensor

Select Sensor > Sound Sensor module.

Select Compare : >. Larger than certain value.

Set Value : 0 . Range of the sound location is from -2 to 2. Negative number denotes sound is from the left and the Positive number from the right.

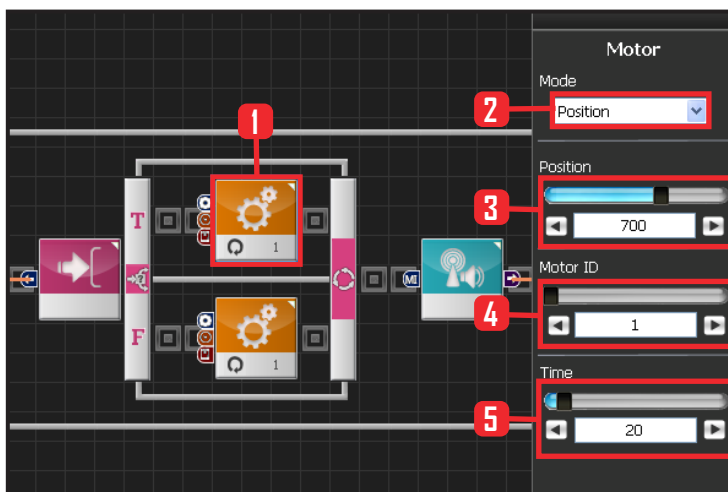
Value > 0 denotes that sound is from the right. If the detected sound is from the right side, Output is True or False otherwise.



16 Switch IF Conditional Statement

Run applicable section depending on True or False value.

True if the sound is from the right or False otherwise.



17 Setup Motor ID 1(Right Arm)

True if sound heard from the right side. Robot will lift right arm.

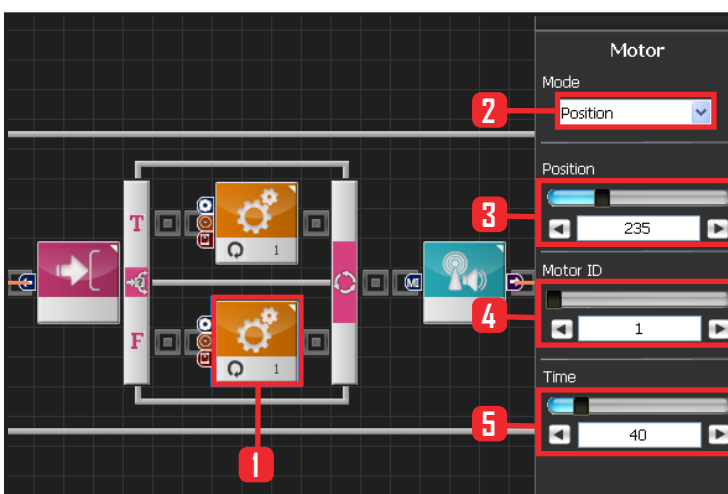
Select Motion > Motor .

Select Mode : Position .

Set Position : 700 . 700 lifts the right arm.

Set Motor ID : 1 . Upper right arm motor ID is 1.

Set Time : 20 .



18 Setup Motor ID 1(Right Arm)

False if no sound is detected or if the sound is from different location. Maintain attention posture with arms lowered to the side.

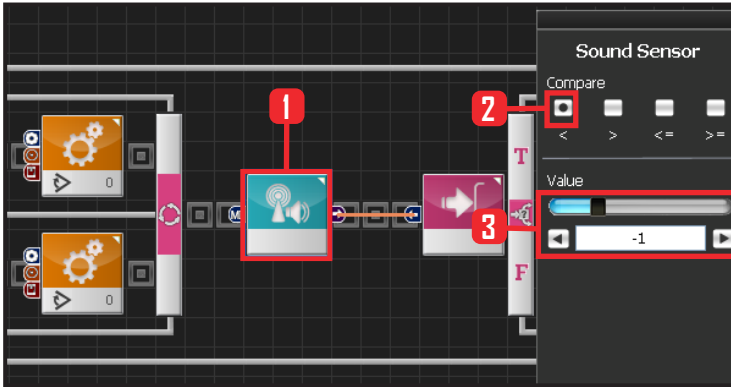
Select Motion > Motor.

Select Mode : Position.

Set Position : 235 . 235 maintains attention posture. Lowers the arm to the side if it was lifted up.

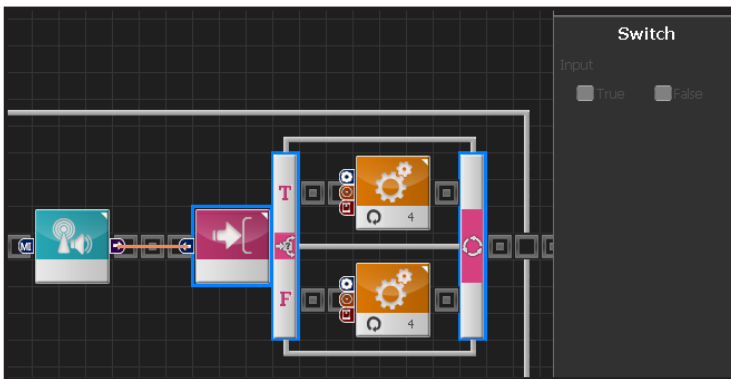
Set Motor ID : 1 . Upper right arm motor ID is 1.

Set Time : 40 . Arm comes down at slower pace than when it was going up.



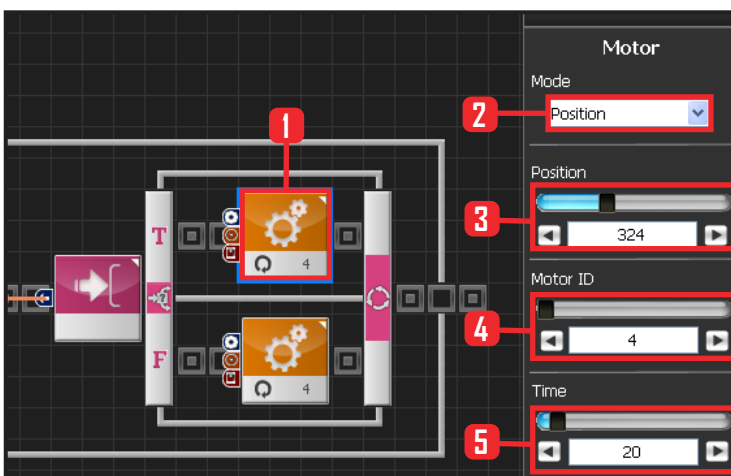
19 Sound Sensor

Select Sensor < Sound Sensor module.
 Select Compare : <, Larger than certain value.
 Set Value : 0 . Range of the sound location is from -2 to 2. Negative number denotes sound is from the left and the Positive number from the right.
 Value < 0 denotes that sound is from the left. If the detected sound is from the left side, Output is True or False otherwise.



20 Switch IF Conditional Statement

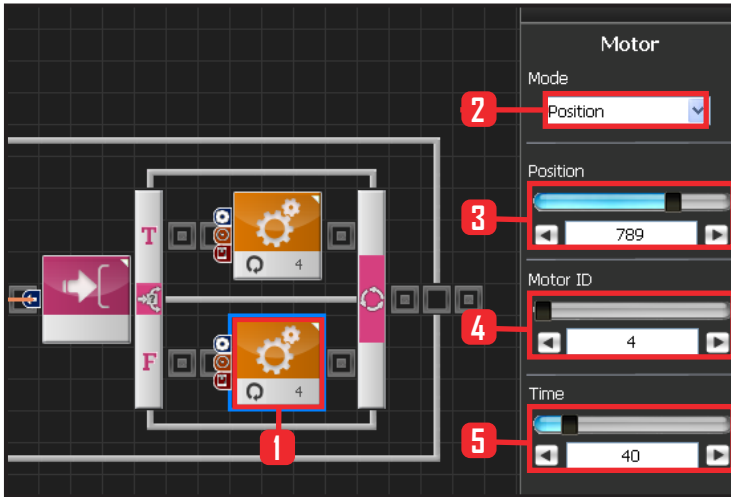
Run applicable section depending on True or False value.
 True if the sound is from the left or False otherwise.



21 Setup Motor ID 4 (Left Arm)

True if sound heard from the left side, Robot will lift left arm.

Select Motion > Motor .
 Select Mode : Position .
 Set Position : 324 . 324 lifts the left arm.
 Set Motor ID : 4 . Upper left arm motor ID is 4.
 Set Time : 20 .



22 Setup Motor ID 4 (Left Arm)

False if no sound is detected or if the sound is from different location. Maintain attention posture with arms lowered to the side..

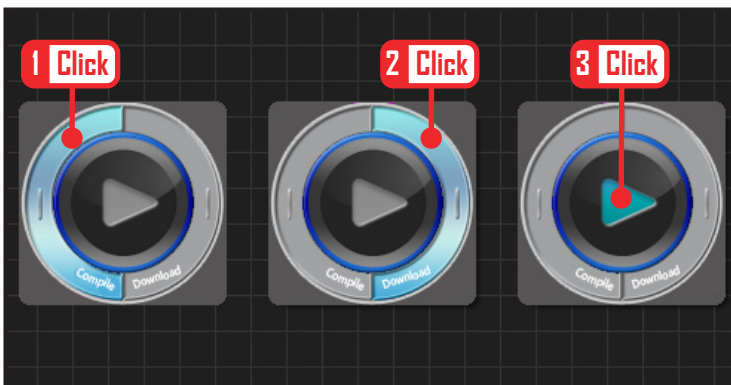
Select Motion > Motor.

Select Mode : Position.

Set Position : 789 . 789 maintains attention posture. Lowers the arm to the side if it was lifted up.

Set Motor ID : 4. Upper left arm motor ID is 4.

Set Time : 40 . Arm comes down at slower pace than when it was going up.



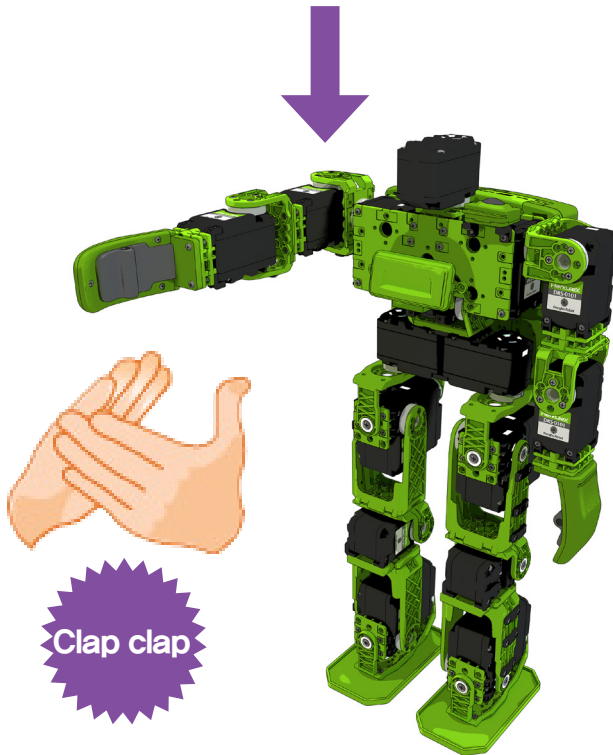
23 Compile, Download, Run

Click 'Compile'. Click 'download' on the right if there is no compilation error. Download to robot. Click 'Run' button (Arrow button) after the download.

1



2



24 Robot Motion

robot will lift the left arm with left side clap and right arm with the right side clap.