

Google AppInventor with LEGO NXT robot



機器人資訊
感應器面板
單點觸控
翻轉控制

Google



機器人資訊

主機名稱

電量

韌體版本

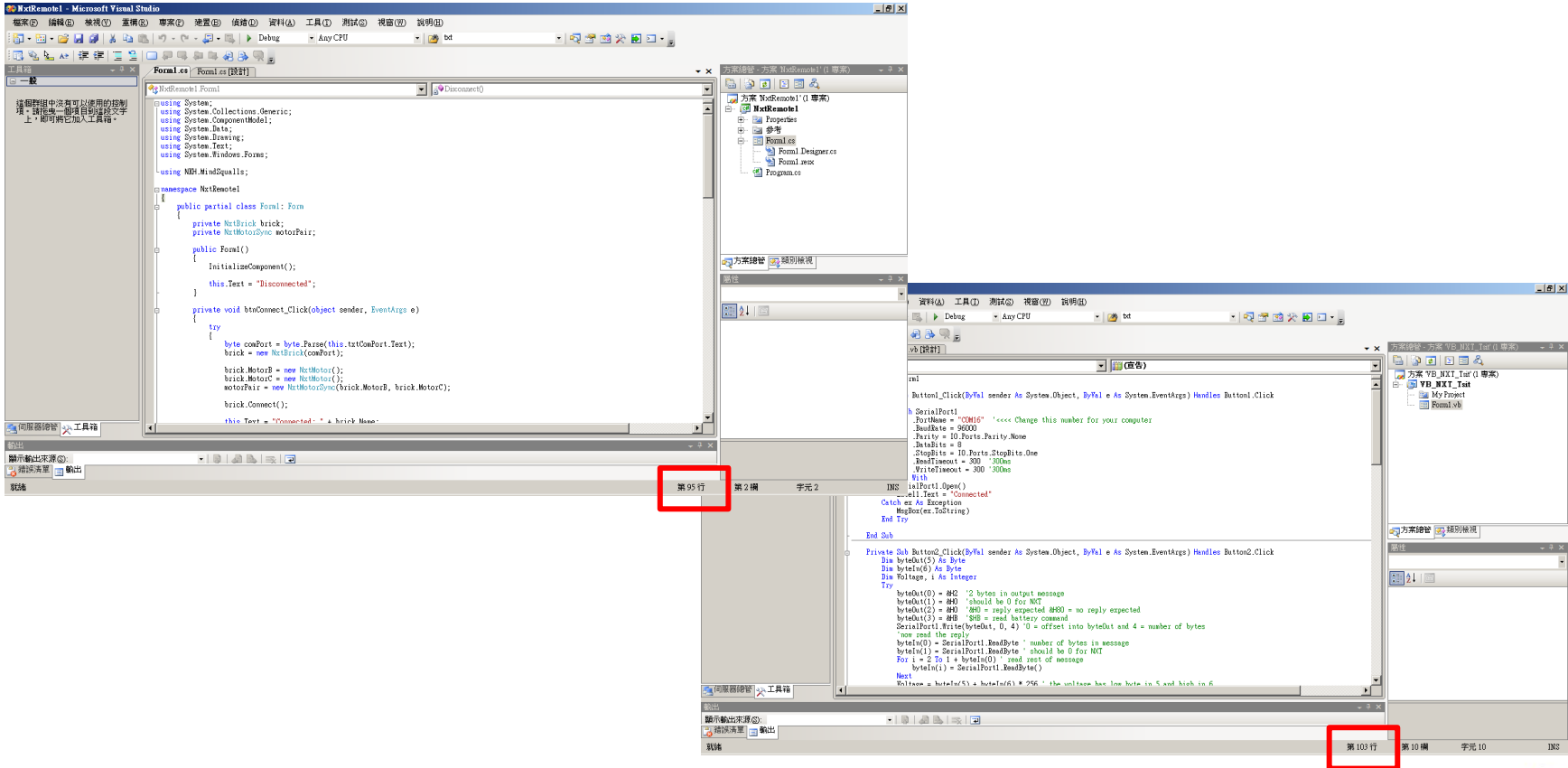
當前正在運行的程式

藍牙實體名稱



建立手機與NXT藍牙連接
擷取NXT資訊
由手機顯示





NXT_Information Save Save As Checkpoint Open the Blocks Editor Package for Phone

Palette	Viewer	Components	Properties
Basic Button Canvas CheckBox Clock Image Label ListPicker PasswordTextBox TextBox TinyDB Media Animation Social Sensors Screen Arrangement LEGO® MINDSTORMS® Other stuff Not ready for prime time Old stuff	<input type="checkbox"/> Display Invisible Components in Viewer 5:09 PM Screen1 藍芽裝置連線 Text for Label1 Text for Label2 Text for Label3 Text for Label4 Text for Label5 中斷藍芽連線 Non-visible components NxtDirectCommands1 BluetoothClient1 Clock1	Screen1 ListPickerConnect Label1 Label2 Label3 Label4 Label5 ButtonDisconnect NxtDirectCommands1 BluetoothClient1 Clock1 Rename... Delete... Media Add...	Properties BackgroundColor <input type="checkbox"/> White BackgroundImage None... Icon None... ScreenOrientation Unspecified Scrollable <input checked="" type="checkbox"/> Title Screen1



元件

ListPicker

Basic→ListPicker

Label

Basic→Label

Button

Basic→Button

NxtDirectCommands

LEGO_MINDSTORMS_→NxtDirectCommands

BluetoothClient

Other stuff→BluetoothClient

Clock

Basic→Clock

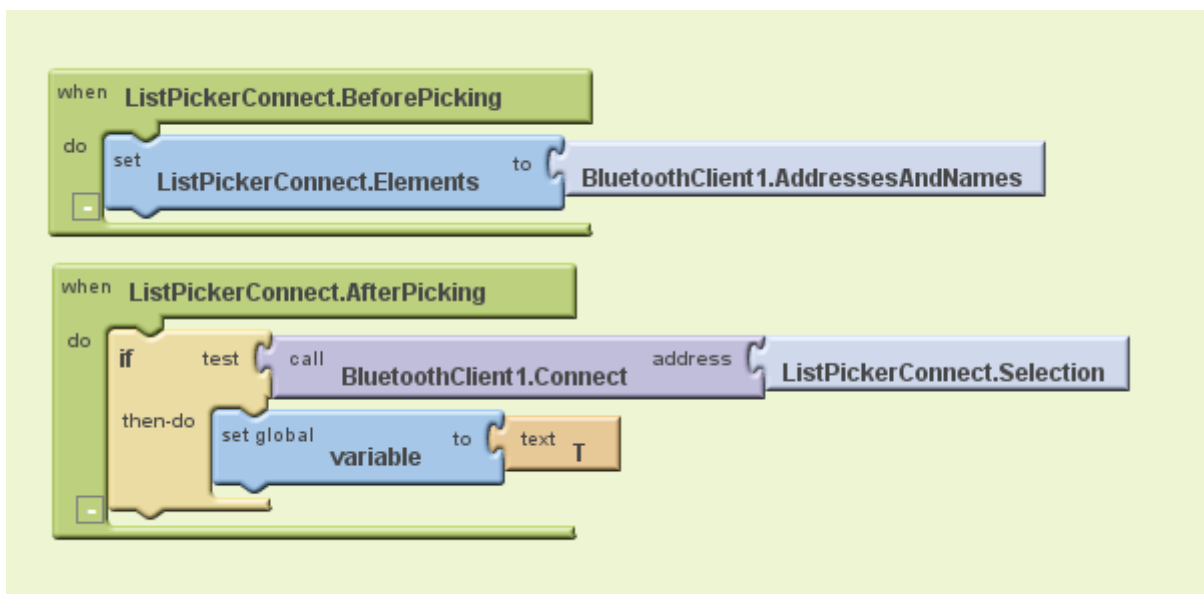


Components	Properties
Screen1 <ul style="list-style-type: none">ListPickerConnectLabel1Label2Label3Label4Label5ButtonDisconnectNxtDirectCommands1BluetoothClient1Clock1	TimerAlwaysFires <input checked="" type="checkbox"/> TimerEnabled <input checked="" type="checkbox"/> TimerInterval <input type="text" value="100"/>

Components	Properties
Screen1 <ul style="list-style-type: none">ListPickerConnectLabel1Label2Label3Label4Label5ButtonDisconnectNxtDirectCommands1BluetoothClient1Clock1	BluetoothClient <input type="text" value="BluetoothClient1..."/>



藍牙連線



My Blocks

Listpicker→

Listpicker.BeforePicking

Listpicker→

Listpicker.Elements

BluetoothClient →

BluetoothClient.AddressesAndNames



My Blocks

Listpicker→

Listpicker.AfterPicking

BluetoothClient→

BluetoothClient.Connect

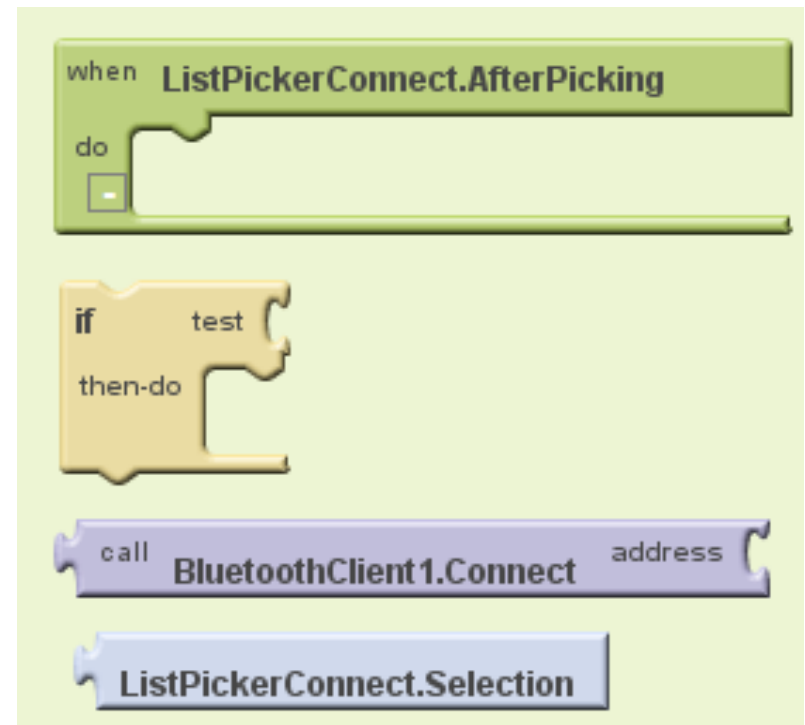
Listpicker→

Listpicker .Selection

Built-In

if

Control →if



中斷藍牙連線

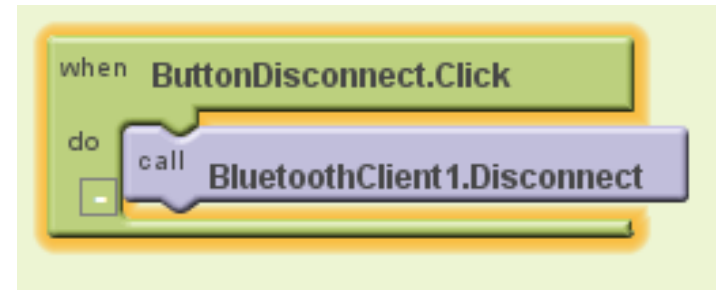
設置一個按鈕定義連線中斷

Button→

Button.Click

BluetoothClient→

BluetoothClient.Disconnect



顯示NXT資訊



GetBatteryLevel 取得NXT電池電量



GetBrickName取得NXT機器人名稱





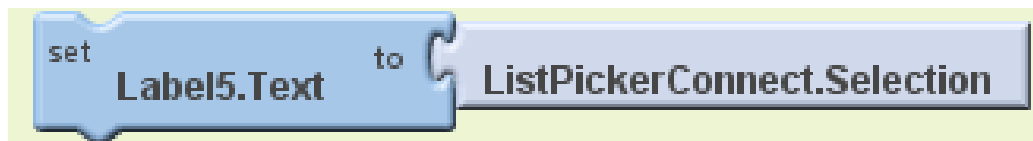
GetCurrentProgramName

取得當前NXT執行程式



GetFirmwareVersion

取得韌體版本



Selection

取得藍牙資訊



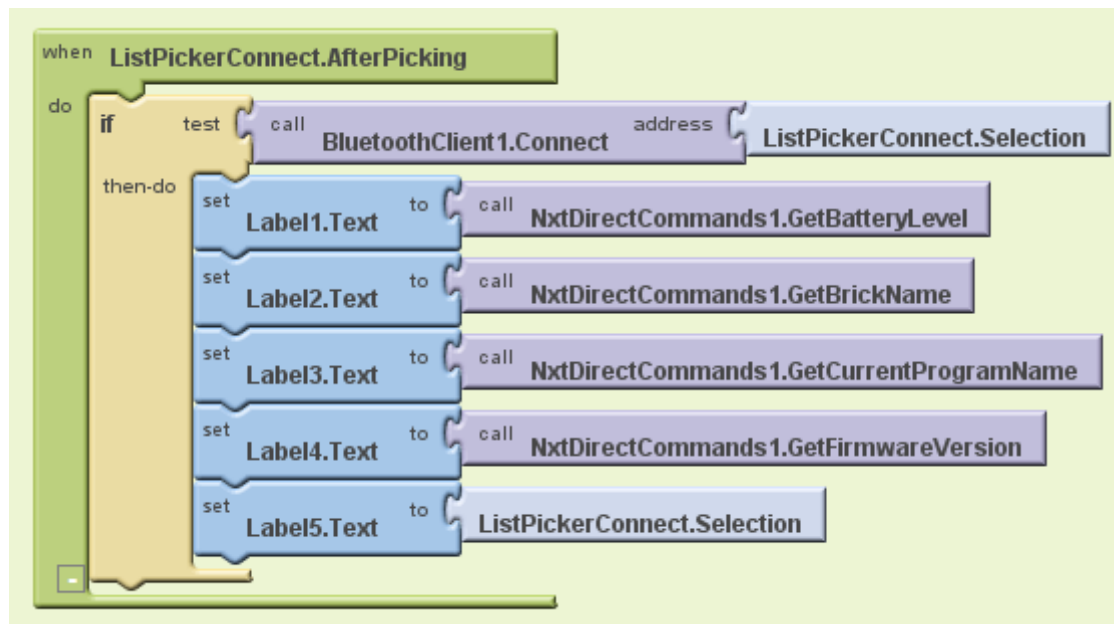
資訊顯示完成圖



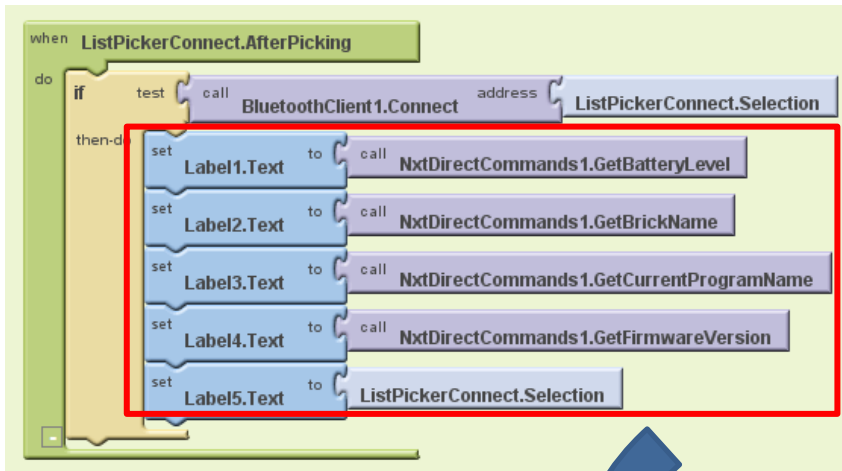
執行測試

執行測試(需要實機)

※無法以VM做模擬執行

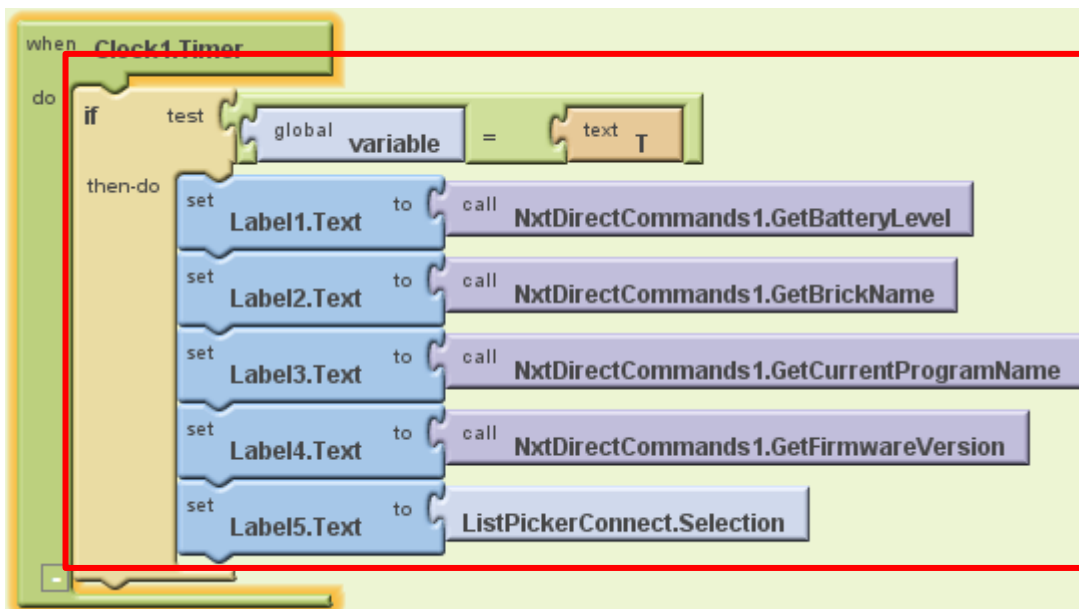
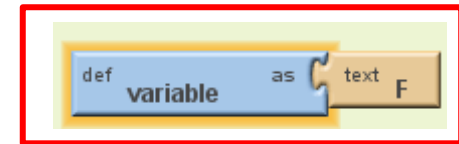
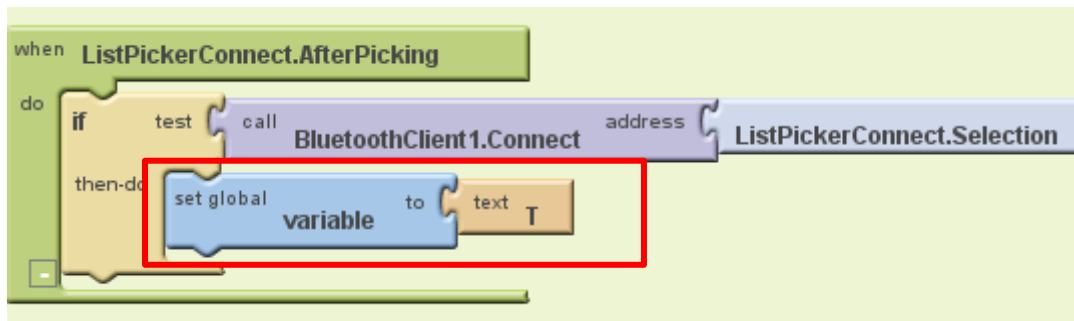


時間(Clock)



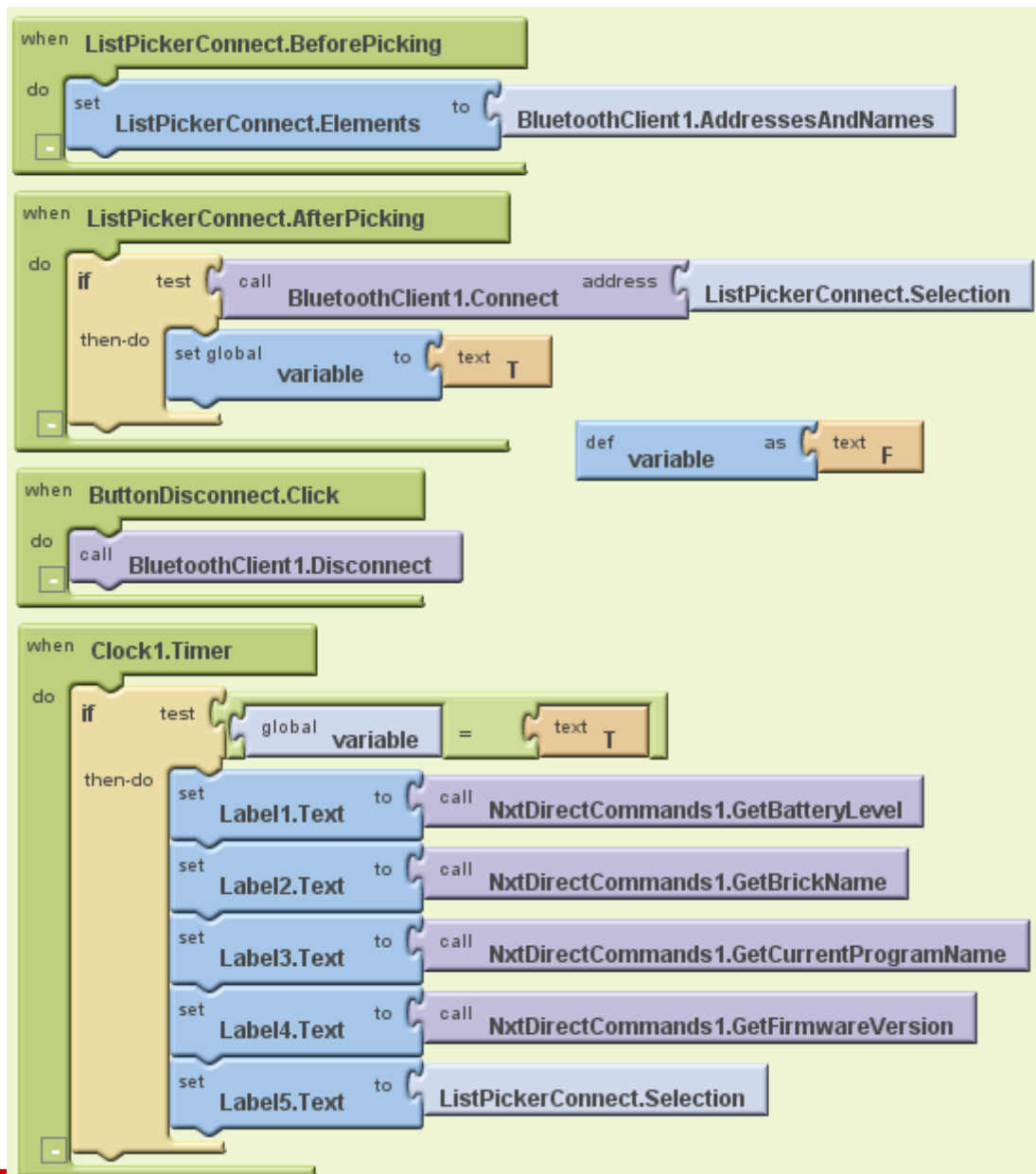
使用做連續讀取(100)
Clock→Clock.Timer





宣告一個變數
做為NXT資訊
擷取啟用判斷





感應器面板

The screenshot displays the LEGO Mindstorms NXT Blocks Editor interface. The main window is titled "LightSensorNXT" and includes a menu bar with "Save", "Save As", and "Checkpoint". The interface is divided into several panels:

- Palette:** A sidebar on the left containing various UI components categorized into "Basic", "Media", "Animation", "Social", "Sensors", "Screen Arrangement", "LEGO® MINDSTORMS®", "Other stuff", "Not ready for prime time", and "Old stuff".
- Viewer:** The central workspace showing a preview of the screen. It includes a status bar at the top with icons for signal strength, battery, and time (5:09 PM). The screen content includes:
 - A checkbox labeled "Display Invisible Components in Viewer".
 - A header "Screen1".
 - Text labels: "連芽裝置連線", "光感值:", "分貝值:", "按鈕:", "距離值:", and "藍芽連線中斷".
- Components:** A list of components on the right side, including "Screen1", "ListPicker1", "HorizontalArrangement1", "Label1", "Label3LS", "HorizontalArrangement3", "Label4", "Label2SS", "HorizontalArrangement4", "Label6", "Label1TS", "HorizontalArrangement5", "Label8", "Label4US", "Button2", "Label3", "NxtLightSensor1", "BluetoothClient1", "Clock1", and "NxtSoundSensor1".
- Properties:** A panel on the far right showing the properties for the selected "Screen1" component, such as "BackgroundColor" (White), "BackgroundImage" (None...), "Icon" (None...), "ScreenOrientation" (Unspecified), "Scrollable" (checked), and "Title" (Screen1).
- Non-visible components:** A list at the bottom of the viewer showing hidden components: "NxtLightSensor1", "BluetoothClient1", "Clock1", "NxtSoundSensor1", "NxtTouchSensor1", and "NxtUltrasonicSensor1".

At the bottom of the interface, there is a footer with copyright information: "©2010 Google - About - Privacy - Terms" and build information: "Build: Tue Apr 19 10:31:49 2011 (1303234309) -- 20748564".



NXT感應器元件

NxtLightSensor

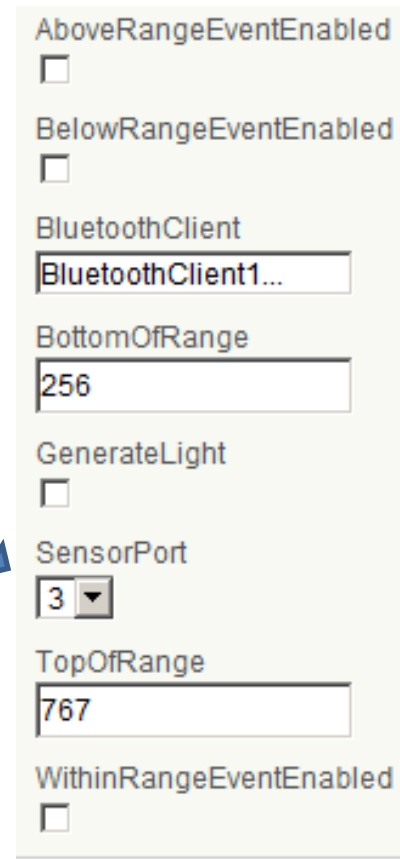
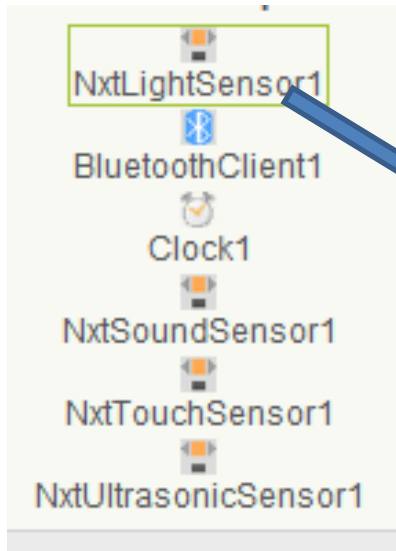
NxtSoundSensor

NxtTouchSensor

NxtUltrasonicSensor



NXT感應器Port設定



NxtLightSensor

 GetLightLevel ()

NxtSoundSensor

 GetSoundLevel ()

NxtTouchSensor

 IsPressed ()

NxtUltrasonicSensor

 GetDistance ()



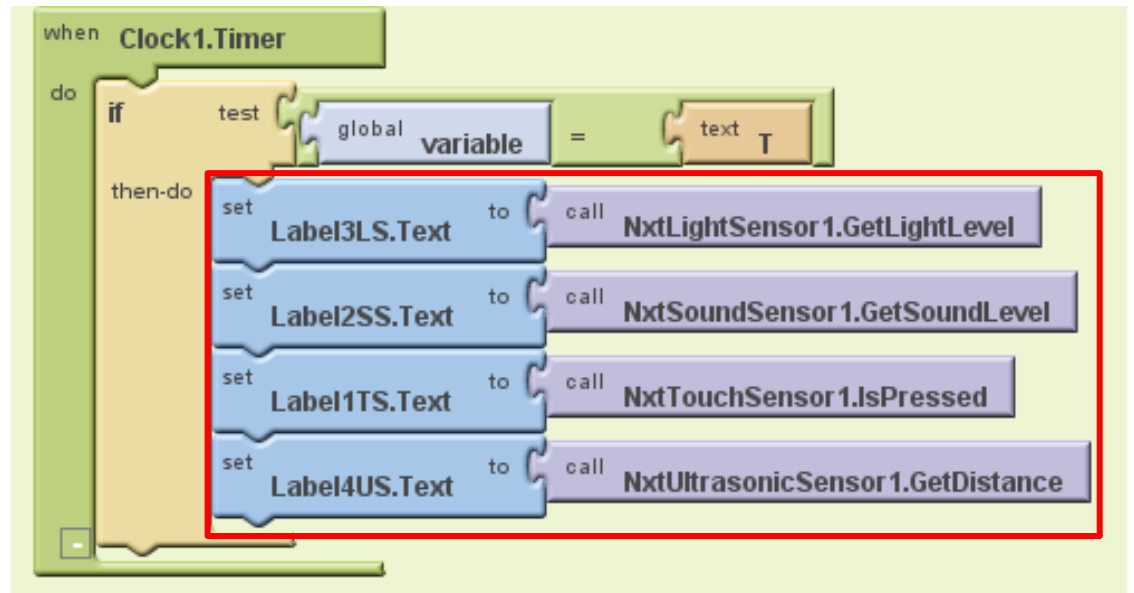
顯示NXT感應器數值

光感值

分貝值

按鈕判斷

距離值(cm)




```
when ListPicker1.BeforePicking
do
  set ListPicker1.Elements to BluetoothClient1.AddressesAndNames

when ListPicker1.AfterPicking
do
  if test call BluetoothClient1.Connect address ListPicker1.Selection
  then-do
    set global variable to text T

when Button2.Click
do
  call BluetoothClient1.Disconnect

when Clock1.Timer
do
  if test global variable = ∇ text T
  then-do
    set Label3LS.Text to call NxtLightSensor1.GetLightLevel
    set Label2SS.Text to call NxtSoundSensor1.GetSoundLevel
    set Label1TS.Text to call NxtTouchSensor1.IsPressed
    set Label4US.Text to call NxtUltrasonicSensor1.GetDistance
```



單點觸控

The screenshot displays the App Inventor web interface for a project named "NXT_TouchpadControl". The interface is divided into several sections:

- Header:** Includes the App Inventor logo, navigation links for "My Projects", "Design", and "Learn", and a "Welcome to App Inventor!" message.
- Toolbar:** Contains "Save", "Save As", and "Checkpoint" buttons, along with "Open the Blocks Editor" and "Package for Phone" options.
- Palette:** A sidebar on the left with categories like "Basic", "Media", "Animation", "Social", "Sensors", "Screen Arrangement", "LEGO® MINDSTORMS®", "Other stuff", "Not ready for prime time", and "Old stuff".
- Viewer:** The central workspace showing a mobile app design. It features a status bar at the top with the time "5:09 PM" and a "Display Invisible Components in Viewer" checkbox. The app layout includes three buttons: "Connect", "Stop", and "Disconnect".
- Components:** A tree view on the right showing the hierarchy of components: "Screen1" (containing "ListPicker1", "Canvas1", "HorizontalArrangement1" which contains "Label1" and "Label2", "Button2", "Button1", "BluetoothClient1", "NxtDriveB", and "NxtDriveC").
- Properties:** A panel on the right showing the properties for the selected "Screen1" component, such as "BackgroundColor" (set to "Black"), "Backgroundimage" (set to "None..."), "Icon" (set to "None..."), "Scrollable" (checked), and "Title" (set to "Screen1").
- Non-visible components:** A section below the viewer showing components that are not currently visible on the screen, including "BluetoothClient1", "NxtDriveB", and "NxtDriveC".



元件

List Picker

Canvas

*Ball

Horizontal Arrangement

Label

Button

Bluetooth Client

Nxt Drive



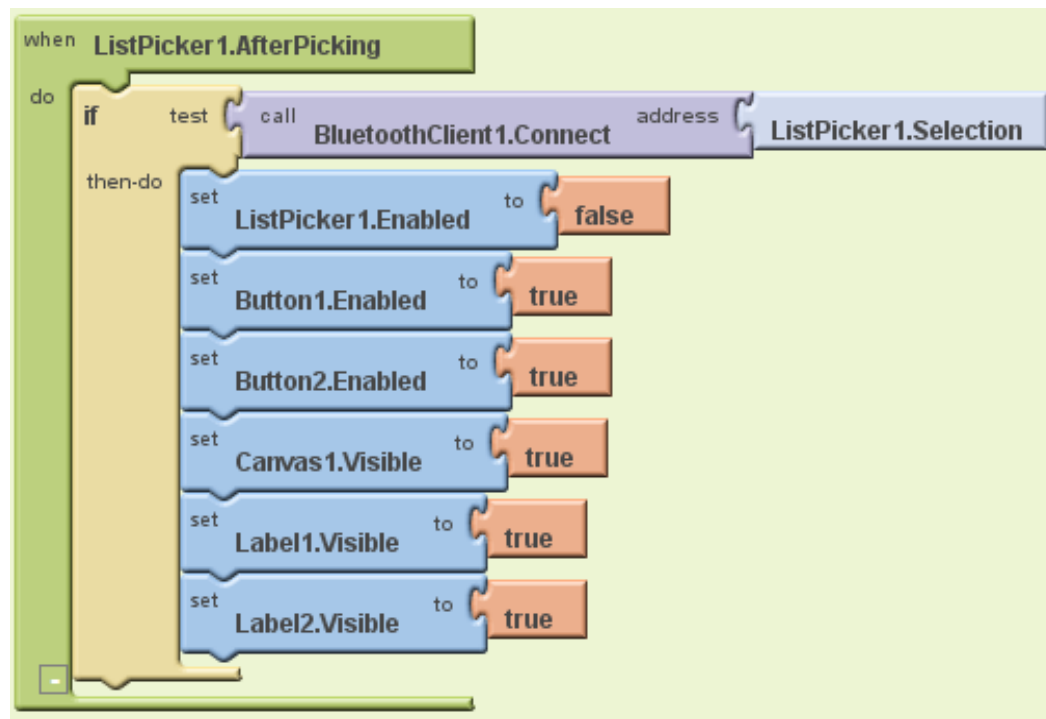
原件不顯示
Canvas
Label1
Label2

The image shows a software interface with two main panels: 'Components' and 'Properties'. The 'Components' panel on the left displays a hierarchical tree of components. Under 'Screen1', there is a 'ListPicker1' component, followed by a 'Canvas1' component which is highlighted with a green selection bar. Below 'Canvas1' are 'Ball1', 'HorizontalArrangement1', 'Label1', 'Label2', 'Button2', 'Button1', 'BluetoothClient1', 'NxtDriveB', and 'NxtDriveC'. The 'Properties' panel on the right shows settings for the selected 'Canvas1' component. The 'Visible' property is a checkbox that is currently unchecked and is highlighted with a red rectangular box. Other visible properties include 'BackgroundColor' (White), 'BackgroundImage' (None...), 'FontSize' (14.0), 'LineWidth' (2.0), 'PaintColor' (Black), 'TextAlignment' (center), 'Width' (320 pixels...), and 'Height' (320 pixels...). At the bottom of the 'Properties' panel are 'Rename...' and 'Delete...' buttons.



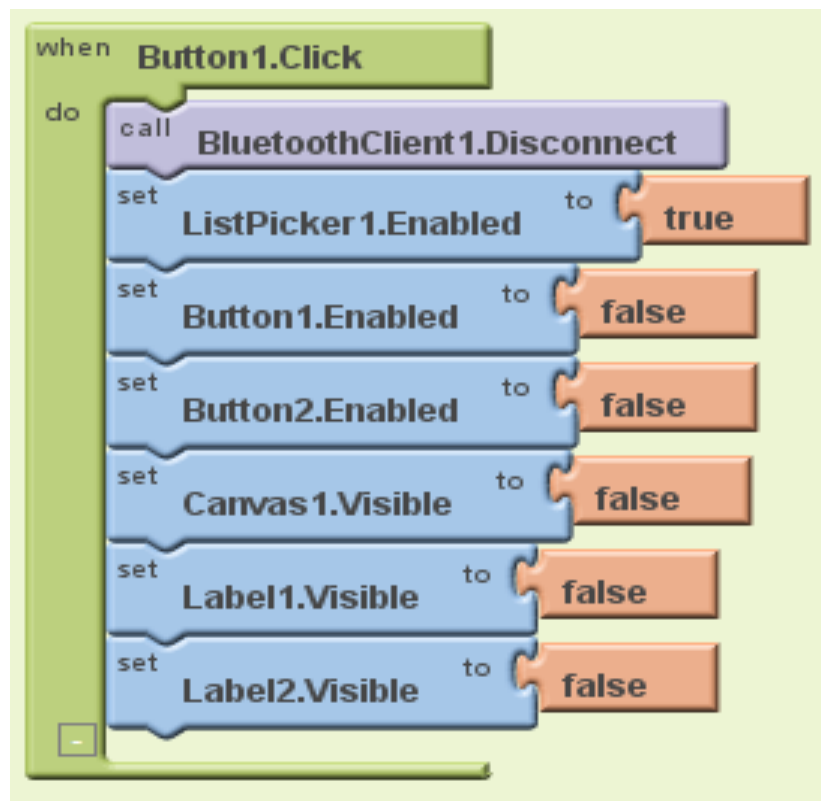
藍牙裝置連線

藍牙裝置確定連線後
設定元件預設值(是
否顯示)



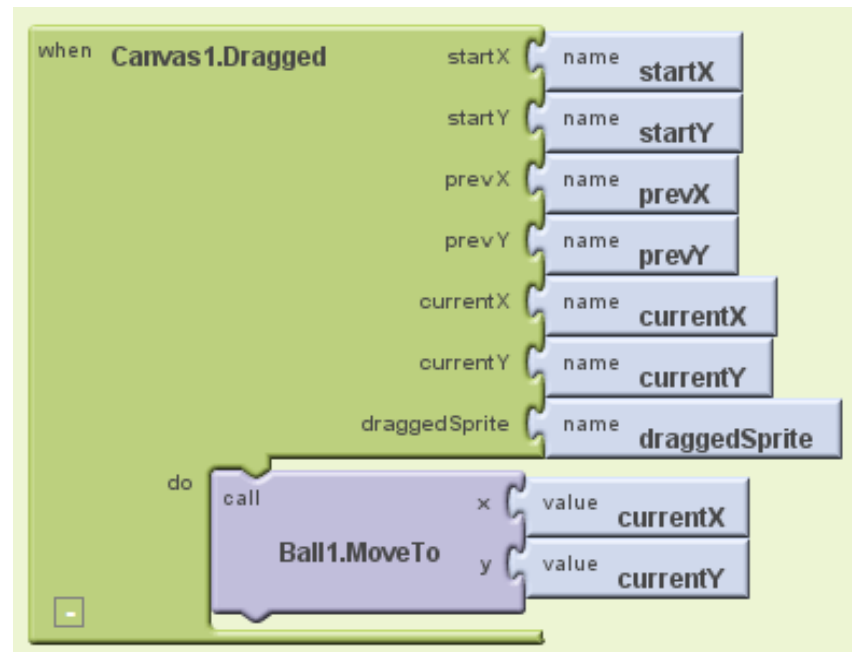
藍牙裝置中斷

設定按鈕為藍牙中斷按鈕，並給予離線預設值，按下按鈕後會中斷手機與NXT機器人之間的藍牙連線，給與手機內的程式回復預設狀態。



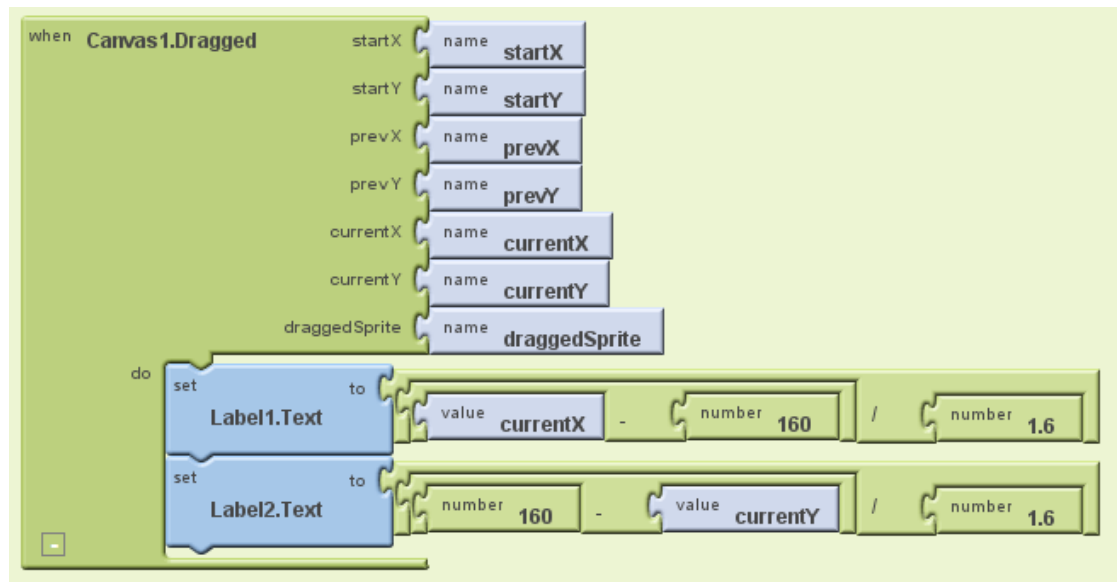
設定Canvas X、Y軸座標給Ball

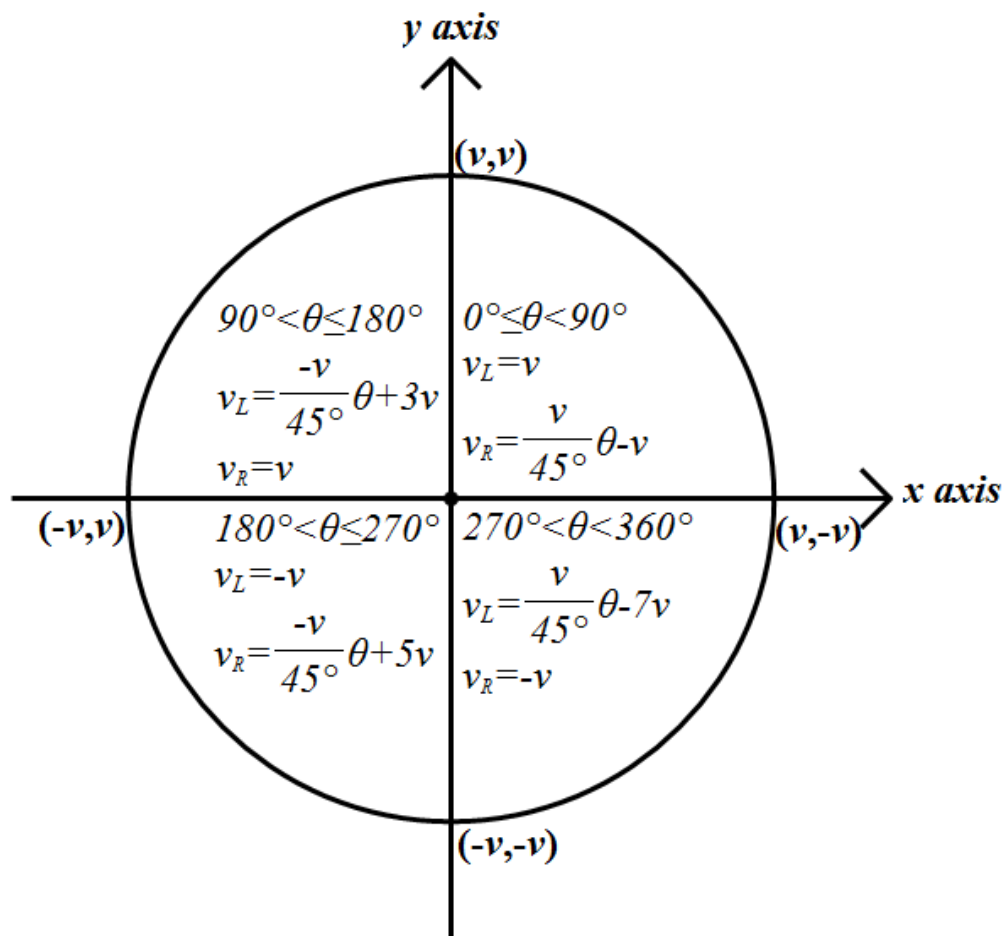
Dragged所給予的參數值可以直接使用。



顯示目前所在座標
位子以1-100位為劃
分並利用**Label1**及
Label2顯示在螢幕
上，在**Canvas1**中
長為320寬為320

$(X-160)/1.6$ 顯示在**Label1**
 $(160-Y)/1.6$ 顯示在**Label2**





NXT 機器人馬達設置

公式：

Nxt DriveB cos Y

$$= \sqrt{((160 - Y)/1.6 - 45) * (((X - 160) * (X - 160) + (160 - Y) * (160 - Y))/1.28)}$$

Nxt DriveB cos X

$$= \sqrt{((X - 160)/1.6 - 45) * (((X - 160) * (X - 160) + (160 - Y) * (160 - Y))/1.28)}$$

Nxt DriveC sin Y

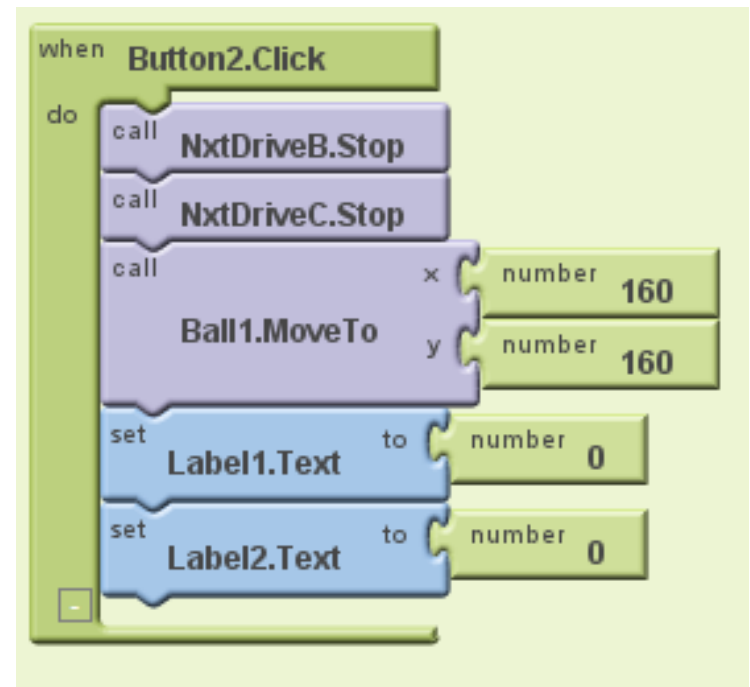
$$= \sqrt{((160 - Y)/1.6 - 45) * (((X - 160) * (X - 160) + (160 - Y) * (160 - Y))/1.28)}$$

Nxt DriveC sin X

$$= \sqrt{((X - 160)/1.6 - 45) * (((X - 160) * (X - 160) + (160 - Y) * (160 - Y))/1.28)}$$



設定按鈕為停止鈕並
給予座標預設值、顯
示預設值、停止B-C馬
達，按下按鈕後讓
NXT機器人呈現待命
狀態。



翻轉控制

利用手機內三向加速規(X-Y-Z)時做翻轉控制



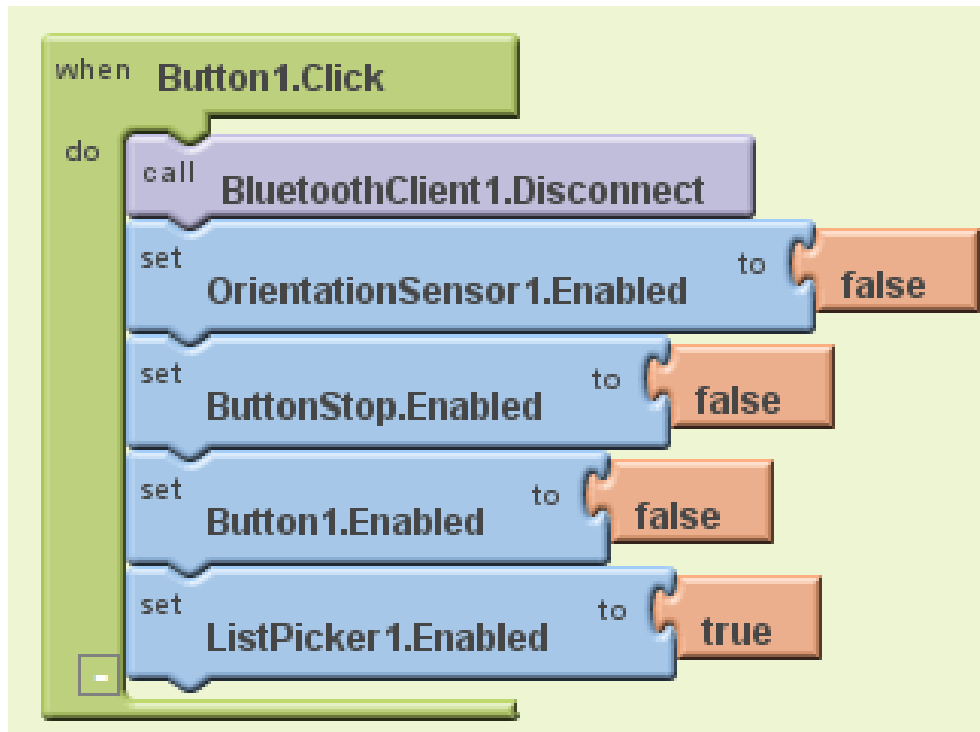
藍牙連線

```
when ListPicker1.BeforePicking
do
  set ListPicker1.Elements to BluetoothClient1.AddressesAndNames

when ListPicker1.AfterPicking
do
  if test call BluetoothClient1.Connect address ListPicker1.Selection
  then-do
    set OrientationSensor1.Enabled to true
    set ButtonStop.Enabled to true
    set Button1.Enabled to true
    set ListPicker1.Enabled to false
```

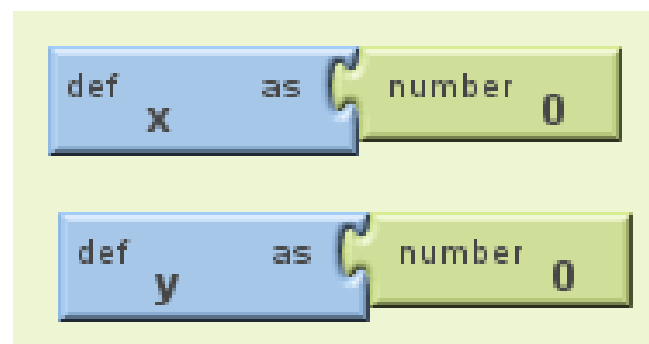


中斷藍牙連線



設定變數

設定變數接收手機
X-Y數值做運算



```

when OrientationSensor 1.OrientationChanged
  yaw name yaw
  pitch name pitch
  roll name roll

do
  set LabelPitch.Text to
    text Pitch: join
    value pitch * number 2

  set LabelRoll.Text to
    text Roll: join
    value roll * number -2

  set global x to
    call atan2
    value pitch
    value roll * number -1 - number 45

  set global y to
    call sqrt
    value roll * value roll +
    value pitch * value pitch * number 8

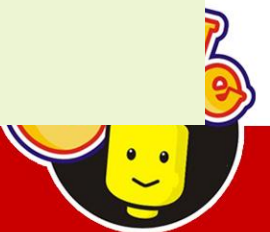
  call NxtDriveB.MoveForwardIndefinitely
    power call cos degrees
    global x * global y

  call NxtDriveC.MoveForwardIndefinitely
    power call sin degrees
    global x * global y

  set LabelLeftMotor.Text to
    text LeftMotorPower join
    call cos degrees
    global x * global y

  set LabelRightMotor.Text to
    text RightMotorPower join
    call sin degrees
    global x * global y

```



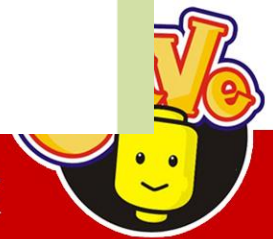
停止

停止B-C馬達。



計時器

按下開始開始計時，
秒數顯示在開始停止
中間，按下停止十秒
數停止。



Time_ Save Save As Checkpoint Blocks Editor is open Package for Phone ▾

Palette	Viewer	Components	Properties
Basic Button ? Canvas ? CheckBox ? Clock ? Image ? Label ? ListPicker ? PasswordTextBox ? TextBox ? TinyDB ? Media Animation Social Sensors Screen Arrangement LEGO® MINDSTORMS® Other stuff Not ready for prime time Old stuff	<input type="checkbox"/> Display Invisible Components in Viewer <div style="border: 1px solid gray; padding: 5px;"> <p>Screen 1</p> <p>開始</p> <p>停止</p> </div> <p style="text-align: right;">Screen1</p> <p>Non-visible components</p> <div style="border: 1px solid gray; padding: 2px; width: fit-content; margin-left: auto;"> Clock1 </div>	Screen1 Button1 Label1 Button2 Clock1 Rename... Delete... Media Add...	TimerAlwaysFires <input checked="" type="checkbox"/> TimerEnabled <input checked="" type="checkbox"/> TimerInterval <input type="text" value="10"/>



App Inventor for Android Blocks Editor: Time_

Time_ Save Undo Redo New emulator Connect to Device... Zoom

Built-In My Blocks

My Definitions

- Button1
- Button2
- Clock1
- Label1
- Screen1

when Button1.Click

do

- set global Time1 to call Clock1.SystemTime
- def Time1 as number 0
- set Label1.Visible to true
- set Clock1.TimerEnabled to true

when Clock1.Timer

do

- set Label1.Text to call Clock1.SystemTime - global Time1 / number 1000

when Button2.Click

do

- set Clock1.TimerEnabled to false
- set global Time1 to call Clock1.SystemTime - global Time1 / number 1000
- set Label1.Text to global Time1



END

