



# App Inventor User's Guide

# 0. Preparation

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## Required devices

- 1 **Internet wireless router** (WiFi)



- 2 **PC** (both available at desktop and laptop)



- 3 **Smartphone**  
(Any type with Android system)



# 0. Preparation



## Must-dos before start

### 1 Install 'Chrome' Browser

To use App inventor, you are required to use Google's 'Chrome' browser which is the most optimized with App Inventor. If you haven't installed 'Chrome' yet, please download 'Chrome' first.



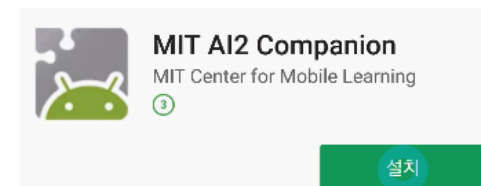
### 2 Create Google account

You must have Google account to use App Inventor. If you don't have it, please log in to Google first.



### 3 Install AI2 Companion app

Please download 'MIT AI2 Companion' from Play store. This application helps you to understand how your project is going by connecting your smartphone and App Inventor program in real-time.

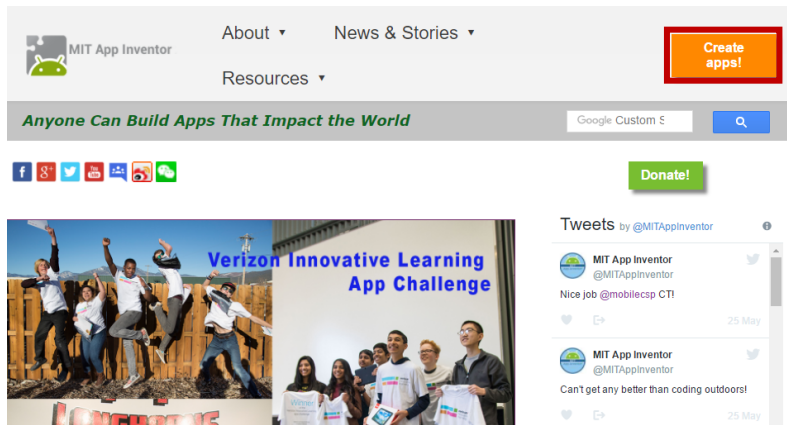


# 1. App Inventor

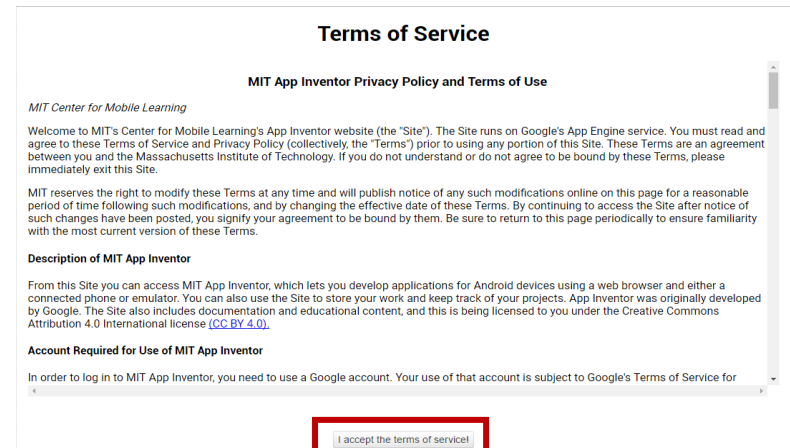


## Access to App Inventor

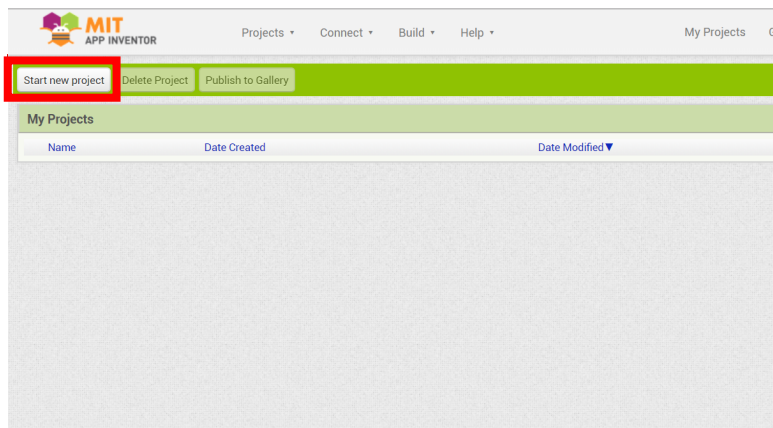
1) Access to <http://appinventor.mit.edu/>,  
click 'Create apps!'



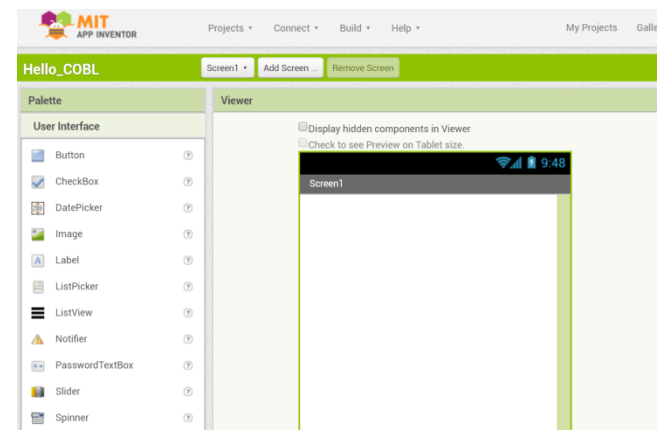
2) Accept the terms of service



3) Start a new project



4) Basic screen



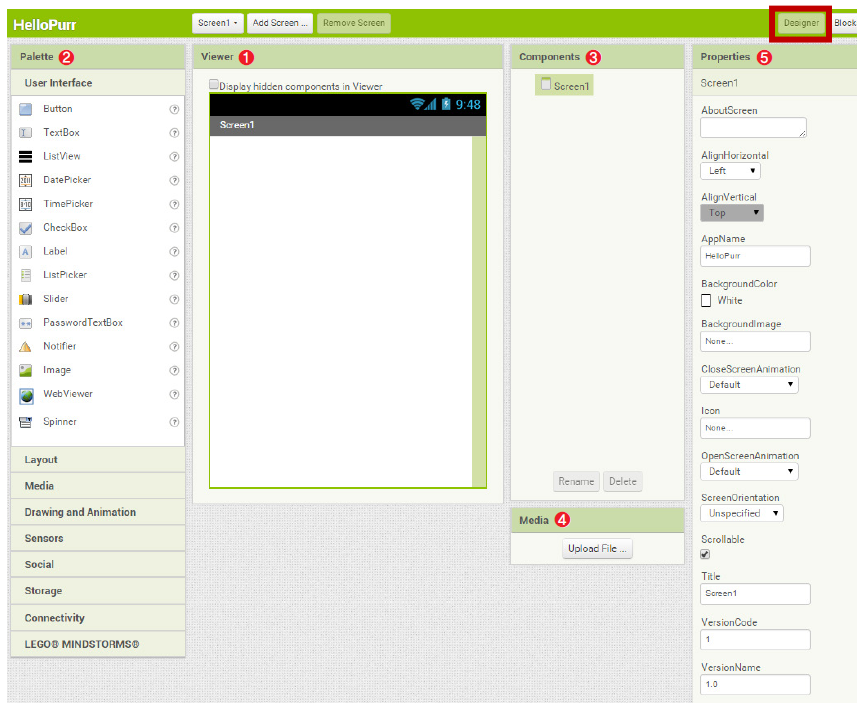


# 1. App Inventor



## App Inventor Structure

Generally, App Inventor consists of 2 kinds of pages.



### Designer screen

Screen shown on smartphone app



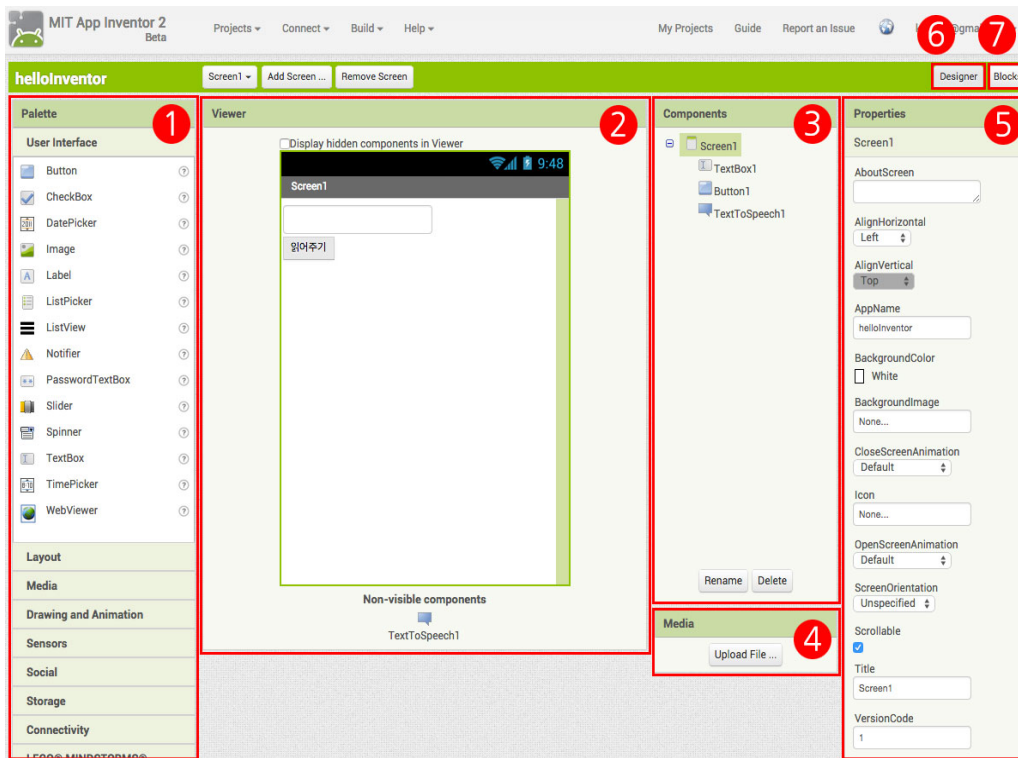
### Block Editor screen

Blocks to code each function for app

# 1. App inventor



## Designer Screen



### 1 Palette

Pallet displaying components to code your app

### 2 Viewer

Screen when your app works

### 3 Components

Components blocks you used

### 4 Media

To upload picture, music, and video For app

### 7 Blocks

Go to Block editor page

### 6 Designer

Go to Designer page

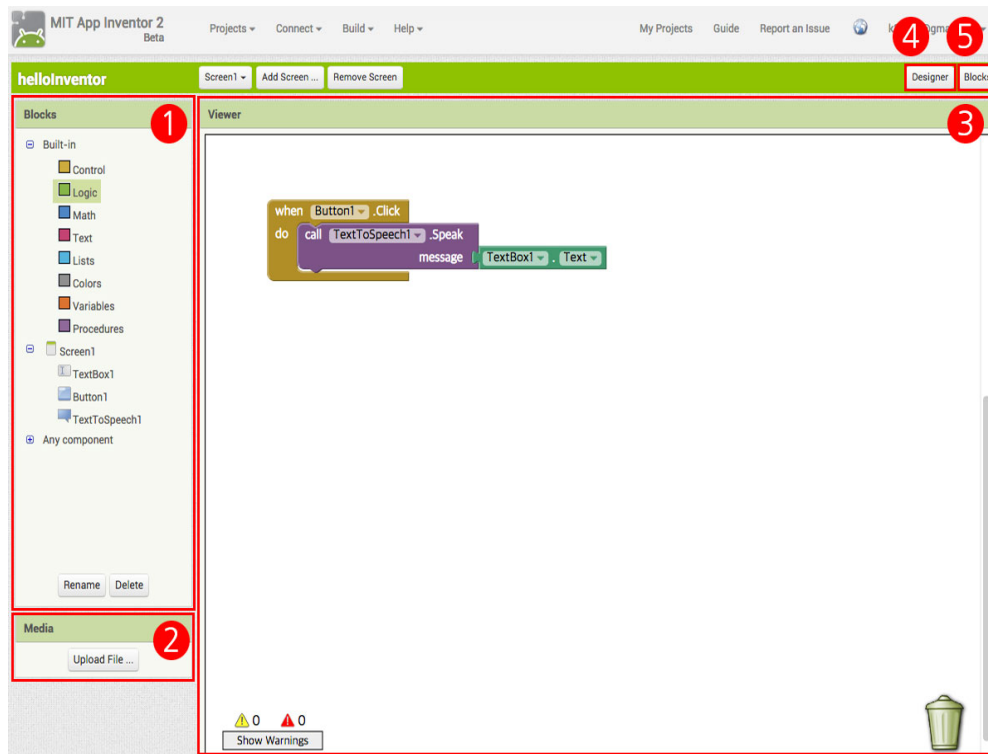
### 5 Properties

To change properties of each component

# 1. App Inventor



## Block Editor screen



### 1 Blocks

Blocks for coding.  
Consist of built-in blocks and components blocks.

### 2 Media

To upload image, music, or video for App

### 3 Viewer

To arrange blocks for coding

### 4 Designer

Go to Designer page

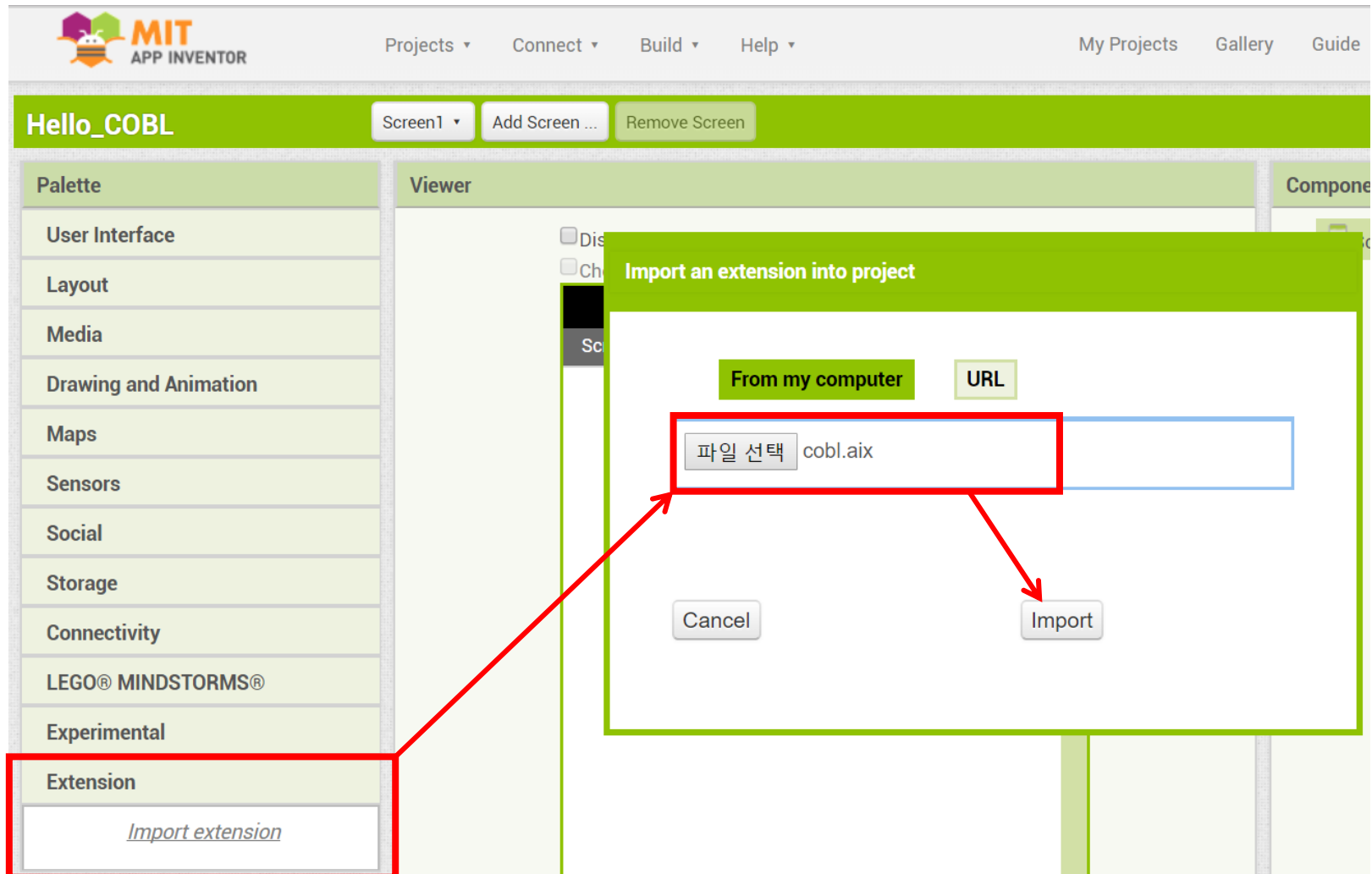
### 5 Blocks

Go to Block editor page

## 2. Load COBL at App Inventor



Basic App Inventor → Extension → Import extension → **cobl.aix** import



## 2. Load COBL at App Inventor



When drag & drop COBL on screen,  
You can check block COBL blocks on Block editor page.

The screenshot displays the MIT App Inventor interface. On the left, the 'Layout' pane shows the 'Extension' category with the 'Cobl' extension highlighted. A red arrow points from the 'Cobl' extension to the 'Non-visible components' section at the bottom of the 'Layout' pane, where a 'Cobl1' component is listed. Another red arrow points from the 'Cobl1' component to the 'Blocks' pane on the right. The 'Blocks' pane shows a list of built-in blocks, including 'Cobl1'. The 'Viewer' pane on the right shows a sequence of blocks for the 'Cobl1' component: 'call Cobl1 .ColorSensorRead', 'call Cobl1 .Connect address', 'call Cobl1 .DCMoveClockwise number speed', 'call Cobl1 .DCMoveCounterClockwise number speed', 'call Cobl1 .DCStop number', 'call Cobl1 .Disconnect', and 'call Cobl1 .LED RAINBOW'.

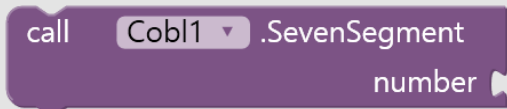
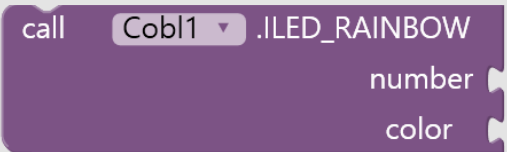
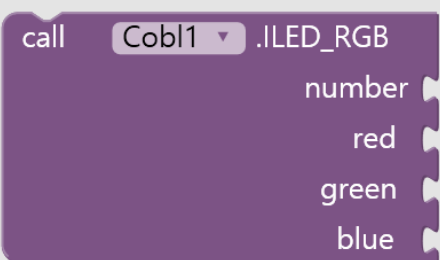
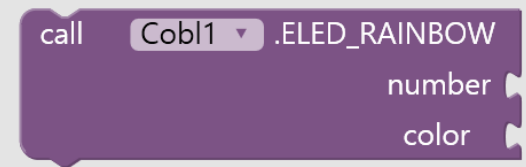
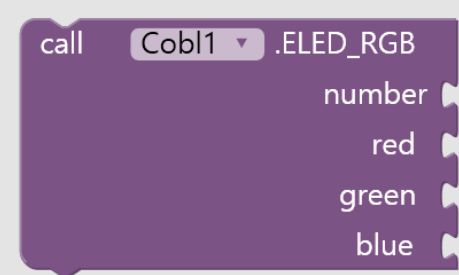
### 3. COBL blocks for App Inventor



COBL blocks	Function
	Connect COBL Board to designated address
	Disconnect with COBL Board
	Set angle of Servomotor (15~165 degree)
	Set speed(0~255) of DC motor 1~2 clockwise
	Set speed(0~255) of DC motor 1~2 counterclockwise
	Stop DC motor 1, 2
	Play melody with tone(Hz) for certain seconds(milliseconds)

### 3. COBL blocks for App Inventor



COBL blocks	Function
	Show 4-digit on 7 segment display (0~9999)
	Light Board LED #1~3 with designated color (0 turn off, 1 red, 2 orange, 3 yellow, 4 green, 5 blue, 6 navy, 7 purple, 8 white)
	Light Board LED #1~3 according to RGB color
	Light exterior LED #1~3 with designated color (0 turn off, 1 red, 2 orange, 3 yellow, 4 green, 5 blue, 6 navy, 7 purple, 8 white)
	Light exterior LED #1~3 according to RGB color

### 3. COBL blocks for App Inventor



COBL blocks	Function
	Read value of IR sensor #1, 2(0~1023)
	Read value of joystick X, Y axis (1, 0, -1)
	Read value of light sensor (port 1,2 means where connects to COBL board)
	Read value of potentiometer (0~1023)
	Read whether button switch is pushed (port 1,2 means where connects to COBL board)
	Read value of temperature sensor(port 1,2 means where connects to COBL board)
	Read value of ultrasonic sensor (cm)

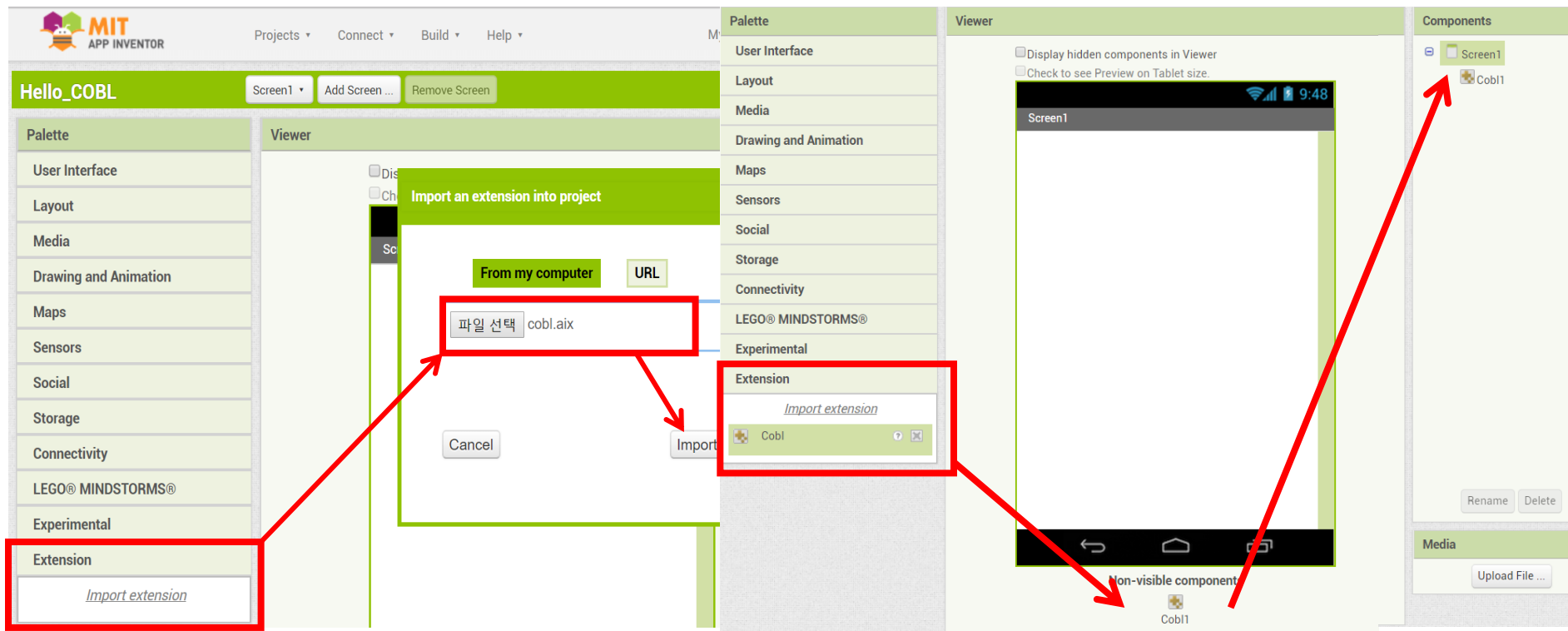


# 4. How to Make COBL App (Basic connection)



## Designer ① import COBL.aix

After importing **cobl.aix** to App Inventor, COBL blocks are added

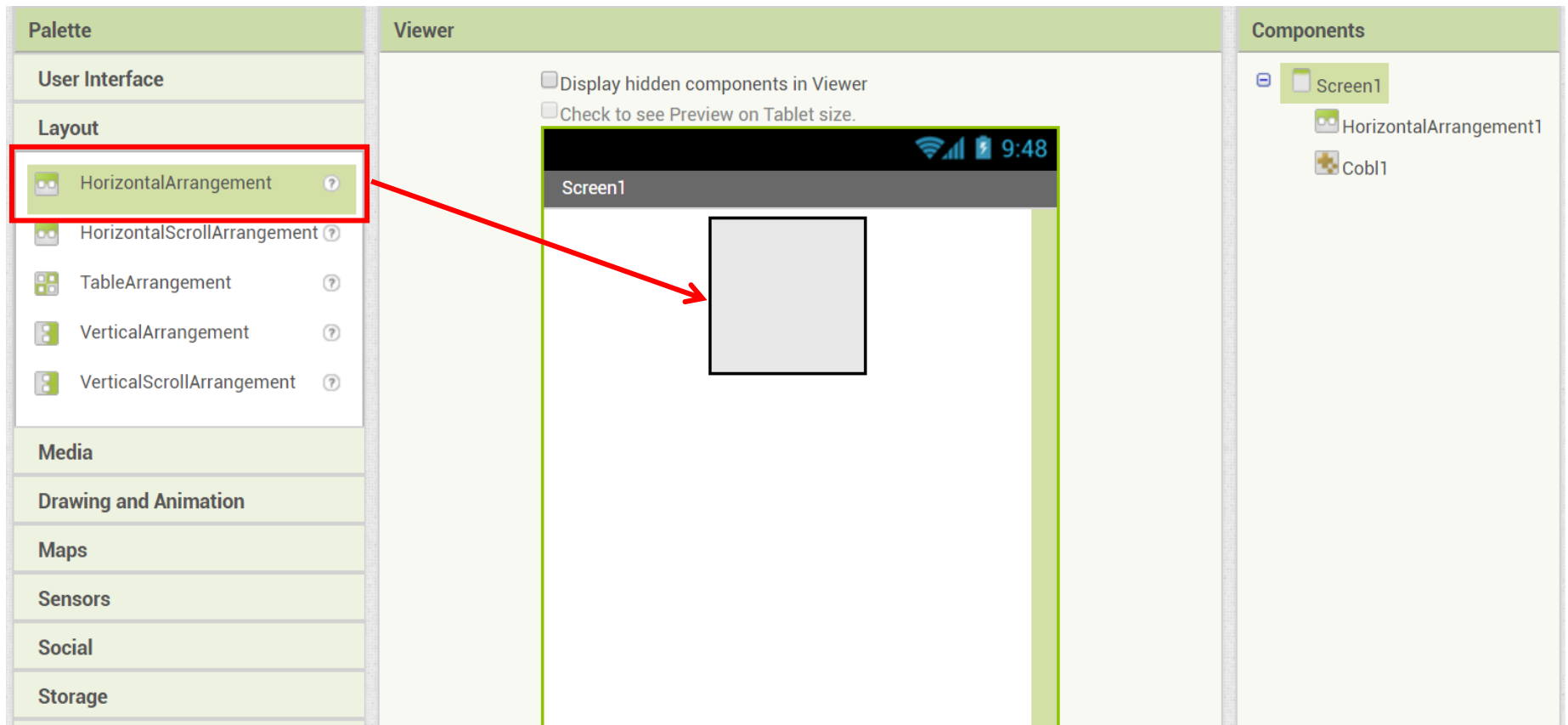


# 4. How to Make COBL App (Basic connection)



## Designer ② Add horizontal arrangement

Add **horizontal arrangement** to viewer



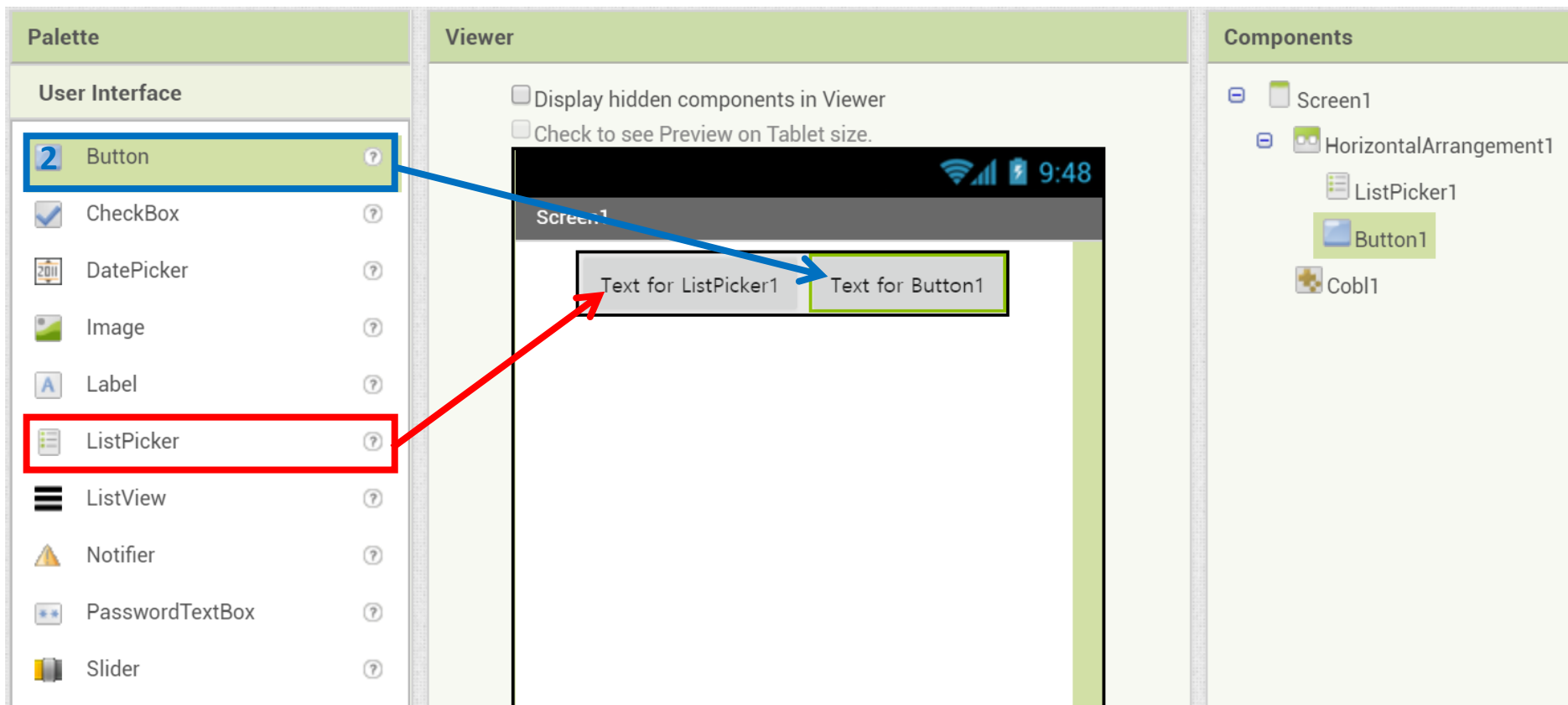
\* Reason add 'horizontal arrangement' is arrange more than two blocks horizontally.

# 4. How to Make COBL App (Basic connection)



## Designer ③ Add List picker and button

Add **List picker** and **Button** to viewer.



\* Please use List picker not Button so that you can choose correct BT when clicked.

## 4. How to Make COBL App (Basic connection)



### Designer ④ Set width to 'fill parent'

Fill width of Horizontal arrangement, List picker, and Button to '**Parent**'.

The screenshot displays the COBL Designer interface with three main panels:

- Viewer:** Shows a preview of the app screen. At the top, there's a status bar with icons for Wi-Fi, signal strength, battery, and the time 9:48. Below it, a header bar labeled "Screen1" contains two text boxes: "Text for ListPicker1" and "Text for Button1". The "Text for Button1" box is highlighted with a green border.
- Components:** A tree view showing the hierarchy of components: "Screen1" (root), "HorizontalArrangement1" (child of Screen1), "ListPicker1" (child of HorizontalArrangement1), "Button1" (child of HorizontalArrangement1), and "Cobl1" (child of Screen1). "Button1" is highlighted with a green box.
- Properties:** A list of properties for the selected "Button1" component. The "Width" property is highlighted with a red circle and set to "Fill parent...". Other visible properties include "BackgroundColor" (Default), "Enabled" (checked), "FontBold" (unchecked), "FontItalic" (unchecked), "FontSize" (14.0), and "FontTypeface" (default).

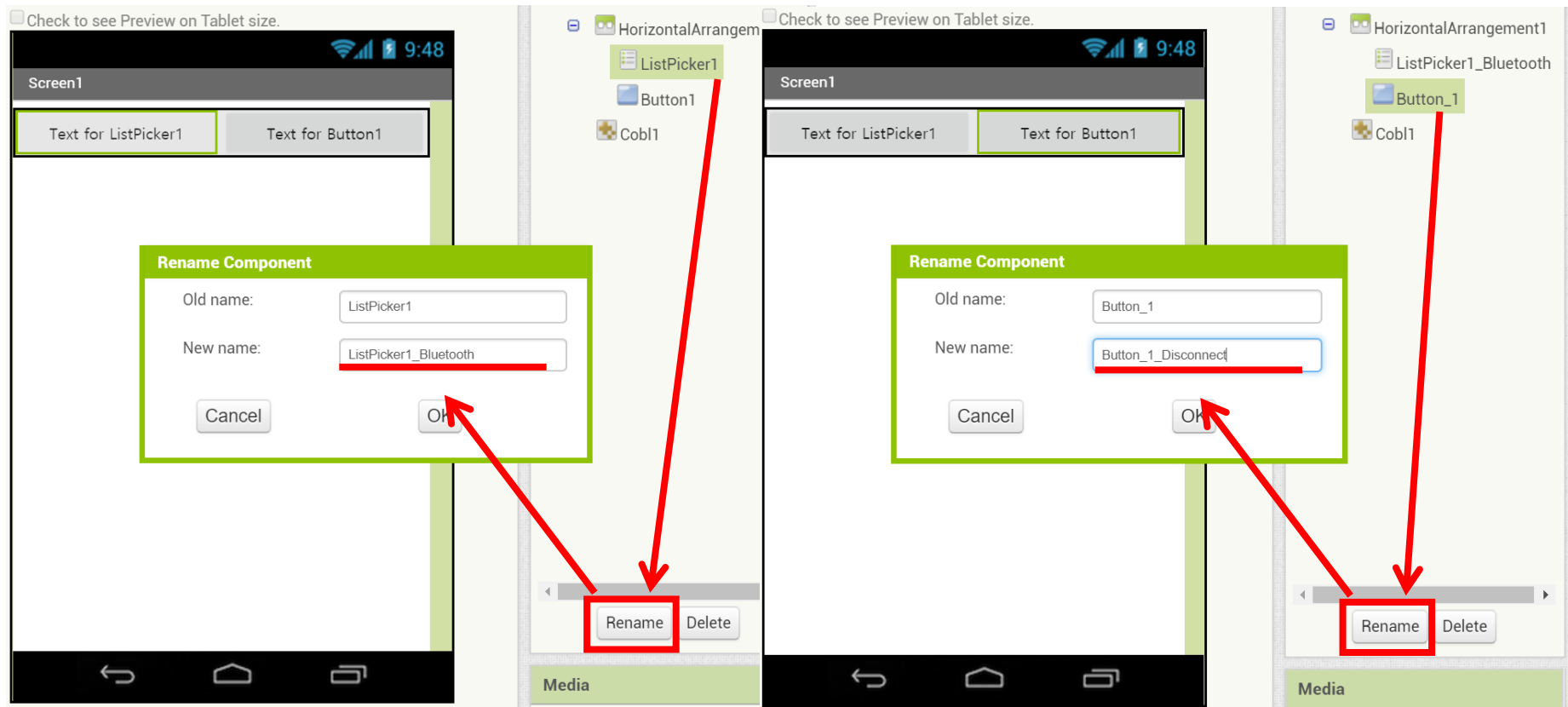
\* Please use List picker not Button so that you can choose correct BT when clicked.

## 4. How to Make COBL App (Basic connection)



### Designer ⑤ Change component name

Change component name by their purpose to prevent confusion.

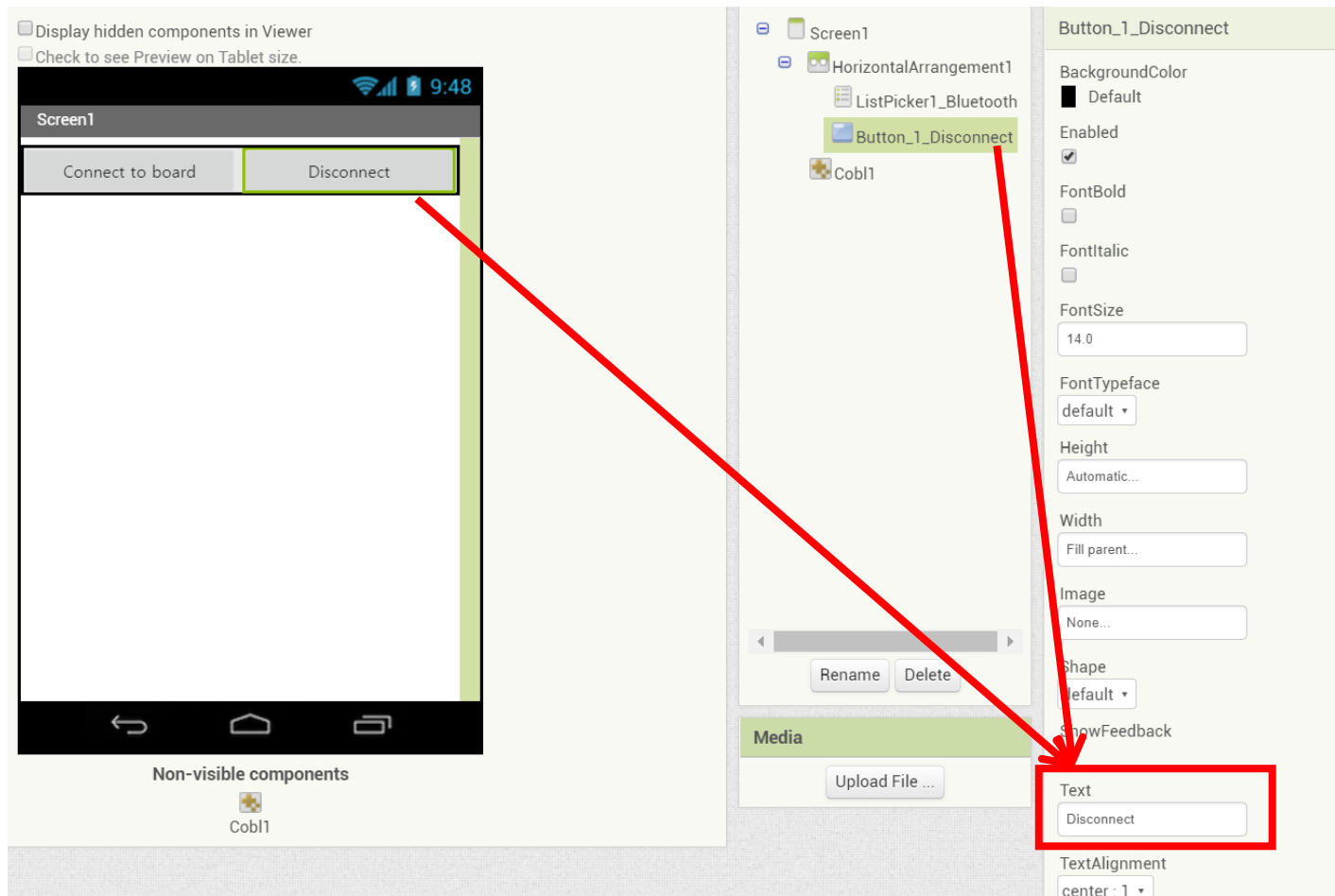


## 4. How to Make COBL App (Basic connection)



### Designer ⑥ Change text

Change text on Listpicker and Button as '**Connect to board**' and '**Disconnect**'.



# 4. How to Make COBL App (Basic connection)



## Coding ① List picker – load blocks

Drag below blocks from Bluetooth List picker.

The screenshot displays the COBL app development environment. On the left, the 'Blocks' panel shows a tree view of components. Under 'Built-in', the 'ListPicker1\_Bluetooth' component is highlighted with a red box. A red arrow points from this box to the 'Viewer' panel. The 'Viewer' panel shows a list of blocks for the 'ListPicker1\_Bluetooth' component, including 'when .AfterPicking', 'when .BeforePicking', 'when .GotFocus', 'when .LostFocus', 'when .TouchDown', 'when .TouchUp', and 'call .Open'. Another red arrow points from the 'when .BeforePicking' block to the 'Viewer' panel, where it is being dragged. The 'Viewer' panel also shows a 'set ListPicker1\_Bluetooth . Elements to' block and a 'ListPicker1\_Bluetooth . Selection' block.

# 4. How to Make COBL App (Basic connection)



## Coding ② Load COBL – block

Drag below blocks from Cobl1.

The screenshot shows the COBL app interface. On the left, the 'Blocks' panel is open, showing a list of components. The 'Cobl1' component is highlighted in the 'Any component' section. A red arrow points from the 'Cobl1' block in the 'Any component' section to the 'Viewer' panel. The 'Viewer' panel displays a list of blocks for 'Cobl1', including 'Cobl1 .Melody', 'Cobl1 .PotentioRead', 'Cobl1 .ServoAngle', 'Cobl1 .SevenSegment', 'Cobl1 .TactRead', 'Cobl1 .ThermistorRead', 'Cobl1 .TiltRead', 'Cobl1 .UltrasonicRead', 'Cobl1 .AddressesAndNames', and 'Cobl1'. A second red arrow points from the 'Cobl1' block in the 'Viewer' panel to the 'Cobl1' block in the 'Any component' section.

Blocks

- Built-in
  - Control
  - Logic
  - Math
  - Text
  - Lists
  - Colors
  - Variables
  - Procedures
- Screen1
  - HorizontalArrangement1
    - ListPicker1\_Bluetooth
    - Button1\_Disconnect
    - Cobl1
- Any component

Viewer

- call Cobl1 .Melody
  - tone
  - duration
- call Cobl1 .PotentioRead
- call Cobl1 .ServoAngle
  - angle
- call Cobl1 .SevenSegment
  - number
- call Cobl1 .TactRead
  - port
- call Cobl1 .ThermistorRead
  - port
- call Cobl1 .TiltRead
- call Cobl1 .UltrasonicRead
- Cobl1 .AddressesAndNames
- Cobl1

Viewer

- when ListPicker1\_Bluetooth .BeforePicking
  - do
- when ListPicker1\_Bluetooth .AfterPicking
  - do
- set ListPicker1\_Bluetooth .Elements to
- ListPicker1\_Bluetooth .Selection

4 0

Show Warnings



## 4. How to Make COBL App (Basic connection)



### Coding ③ Block assemble

Assemble each block like right picture.

Viewer

when ListPicker1\_Bluetooth .BeforePicking  
do

when ListPicker1\_Bluetooth .AfterPicking  
do

set ListPicker1\_Bluetooth .Elements to

ListPicker1\_Bluetooth . Selection

Cobl1 . AddressesAndNames

call Cobl1 .Connect  
address

Viewer

when ListPicker1\_Bluetooth .BeforePicking  
do  
set ListPicker1\_Bluetooth .Elements to Cobl1 . AddressesAndNames

**\* Set Bluetooth list to address of COBL.**

when ListPicker1\_Bluetooth .AfterPicking  
do  
call Cobl1 .Connect  
address ListPicker1\_Bluetooth . Selection

**\* When Bluetooth selected,  
Connect COBL to selected Bluetooth.**

0 0

## 4. How to Make COBL App (Basic connection)



### Coding ④ When 'Disconnect' button clicked

Drag 'When button clicked and do' block.

The screenshot displays the COBL app development environment. On the left, the 'Blocks' panel shows a hierarchy of components: Built-in (Control, Logic, Math, Text, Lists, Colors, Variables, Procedures), Screen1 (HorizontalArrangement1, ListPicker1\_Bluetooth, Button\_1\_Disconnect, Cobl1), and Any component. On the right, the 'Viewer' panel shows a sequence of code blocks for Button\_1\_Disconnect. A red arrow points from a 'when Button\_1\_Disconnect .Click' block in the 'Viewer' panel to a similar block in the 'Blocks' panel, indicating where to drag the block from.

The code blocks in the Viewer panel include:

- when Button\_1\_Disconnect .Click
- do when ListPicker1\_Bluetooth .BeforePicking
- do set ListPicker1\_Bluetooth .Element to Cobl1 .AddressesAndNames
- when Button\_1\_Disconnect .GotFocus
- do when ListPicker1\_Bluetooth .AfterPicking
- do call Cobl1 .Connect
- when Button\_1\_Disconnect .LongClick
- do Selection
- when Button\_1\_Disconnect .LostFocus
- do
- when Button\_1\_Disconnect .TouchDown
- do
- when Button\_1\_Disconnect .TouchUp

## 4. How to Make COBL App (Basic connection)



### Coding ⑤ When 'Disconnect' button clicked

Assemble 'call Cobl1. Disconnect' with ④ block.

The screenshot displays the COBL app development interface, divided into a 'Blocks' panel on the left and a 'Viewer' panel on the right.

**Blocks Panel:**

- Built-in:**
  - Control
  - Logic
  - Math
  - Text
  - Lists
  - Colors
  - Variables
  - Procedures
- Screen1**
  - HorizontalArrangement1
    - ListPicker1\_Bluetooth
    - Button\_1\_Disconnect
  - Cobl1** (highlighted with a red arrow pointing to the 'call Cobl1 .Disconnect' block in the Viewer)
- Any component

**Viewer Panel:**

The Viewer shows a sequence of blocks for the Cobl1 component:

- call Cobl1 .ColorSensorRead**
- when ListPicker1\_Bluetooth .BeforePicking** (event trigger)
  - call Cobl1 .Connect** (block with 'address' input)
  - Bluetooth .Elements** (block with 'to' input connected to 'AddressesAndNames')
- call Cobl1 .DCMoveClockwise** (block with 'number' and 'speed' inputs, 'speed' connected to 'ListPicker1\_Bluetooth .Selection')
- call Cobl1 .DCMoveCounterClockwise** (block with 'number' and 'speed' inputs)
- call Cobl1 .DCStop** (block with 'number' input)
- call Cobl1 .Disconnect** (block with a red arrow pointing to it from the 'Cobl1' block in the Blocks panel)

**Event Listener:**

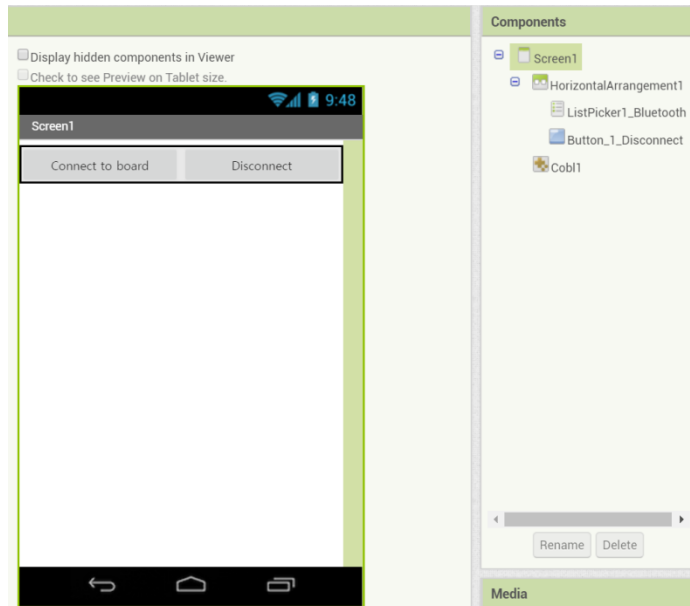
- when Button\_1\_Disconnect .Click** (event trigger)
  - do** (do block)
    - call Cobl1 .Disconnect** (block with a red arrow pointing to it from the 'call Cobl1 .Disconnect' block in the Viewer)

# 4. How to Make COBL App (Basic connection)

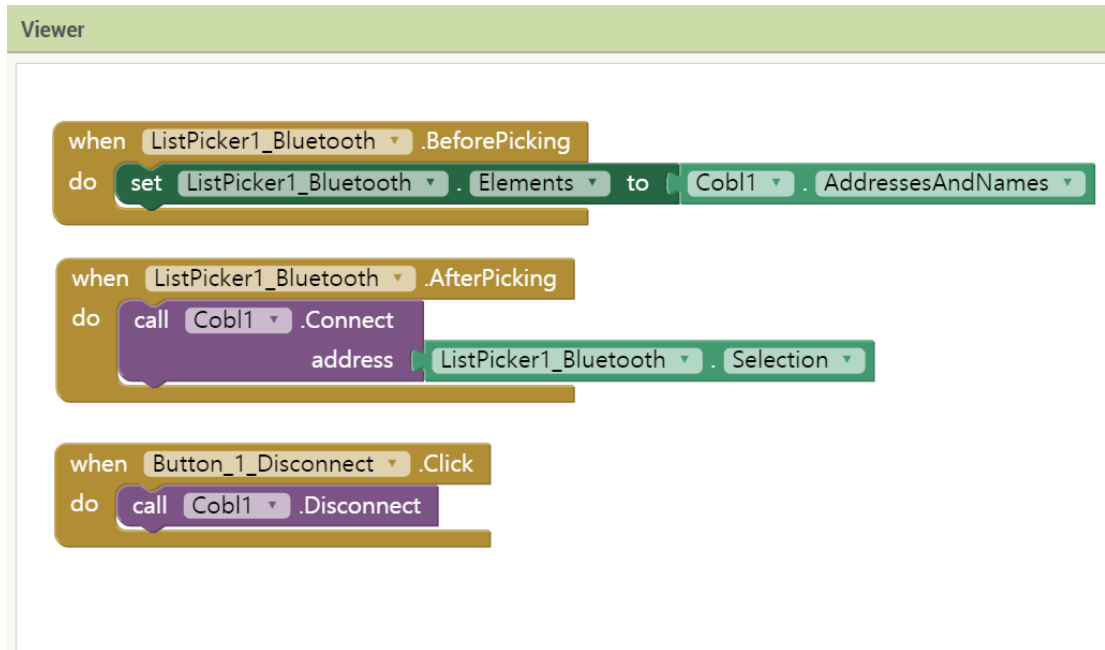


**Conclusion:** Connection COBL with Bluetooth

<Designer>



<Block Editor>

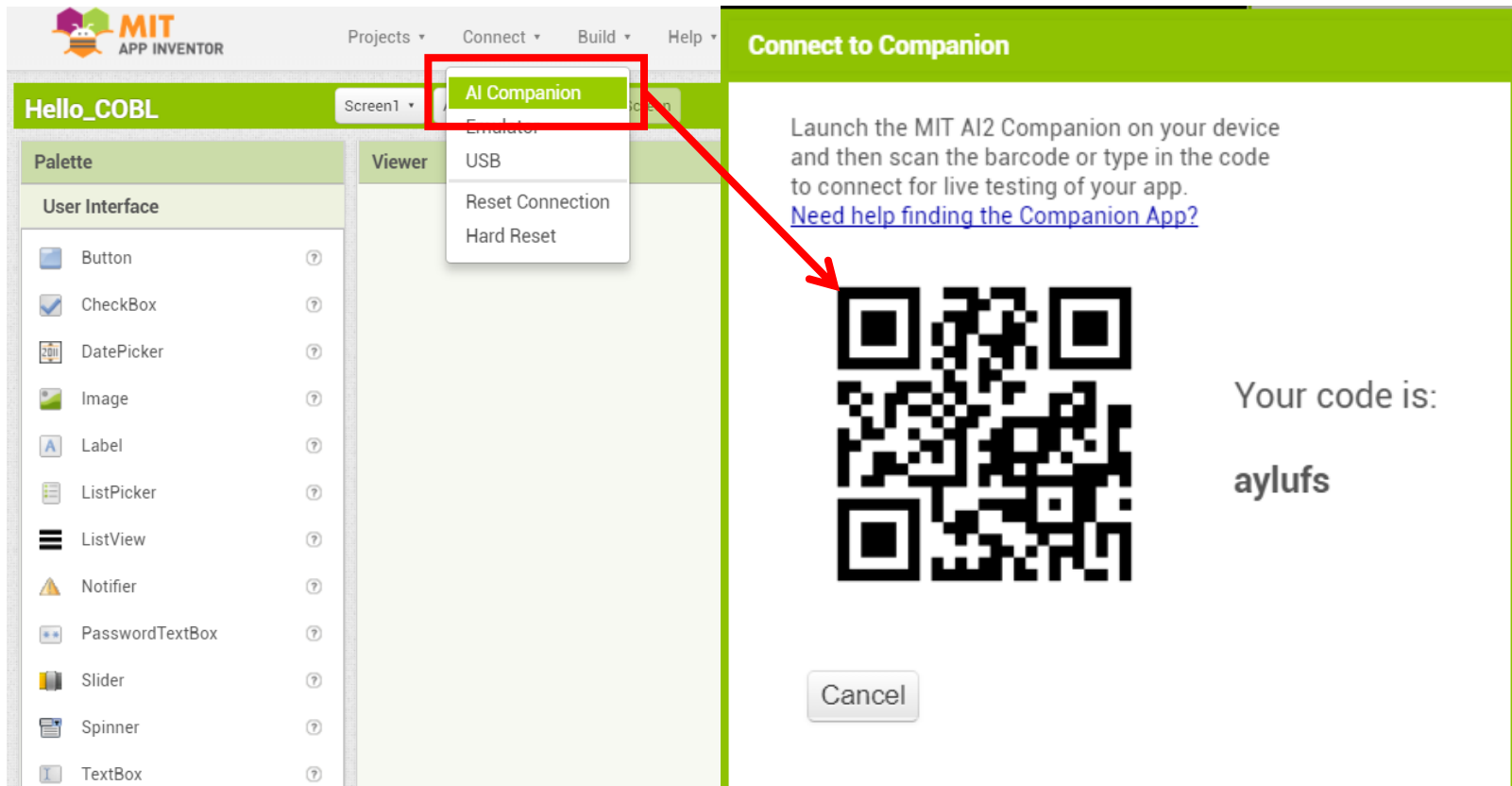


## 4. How to Make COBL App (Basic connection)



### Connect to AI2 Companion

When click **AI Companion** on 'Connect' tap,  
QR code for application connection is uploaded.

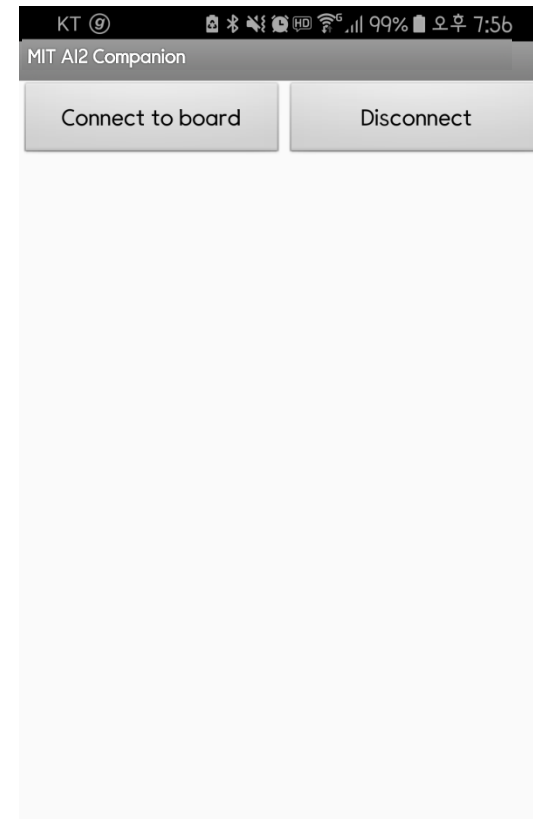
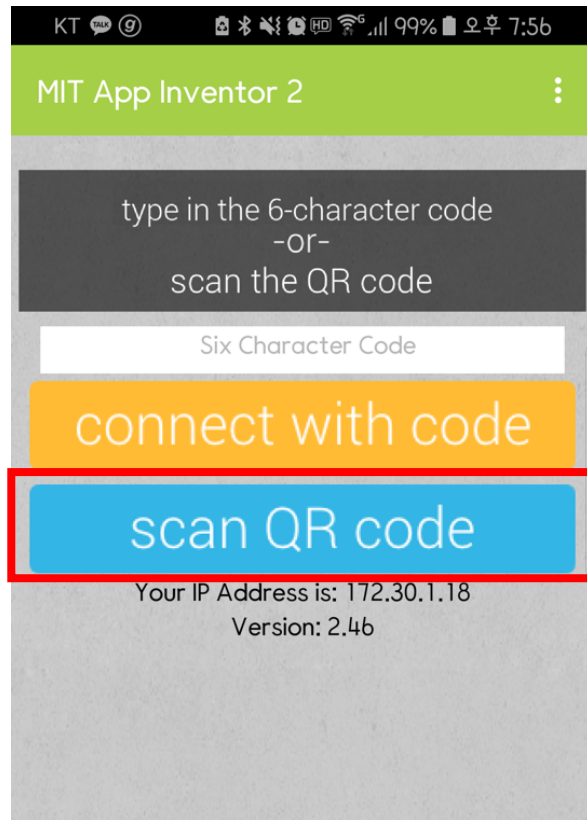


## 4. How to Make COBL App (Basic connection)



### Connect to AI2 Companion

When scanning QR code with **MIT AI2 Companion**,  
You can check the App at the same time.



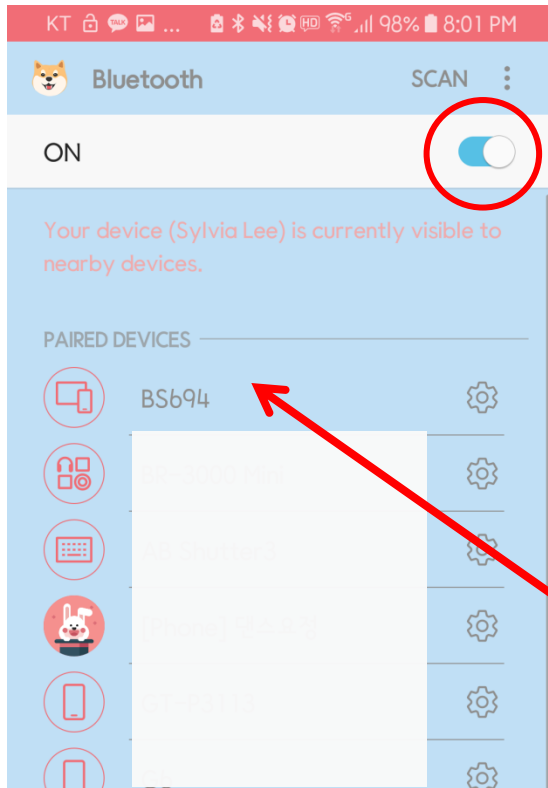
\* Both PC and Smartphone has to be connected with same wifi.

# 4. How to Make COBL App (Basic connection)

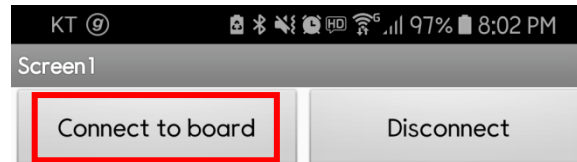


## Connect to COBL Board with COBL App

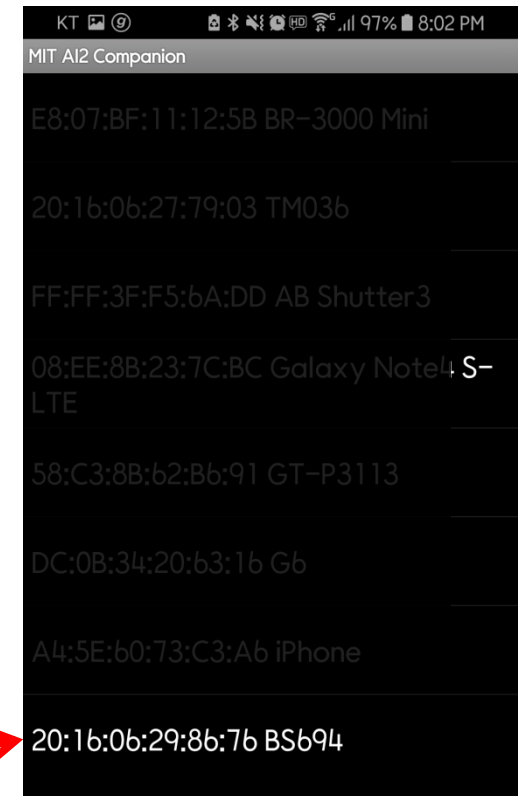
1) Bluetooth On



2) App – ‘Connect to Board’



3) Find serial number on board and connect.



# 4. How to Make COBL App (Basic connection)



## Download apk file

If App is done,  
Click App (provide QR code for apk).  
QR code connecting link is provided.

The image shows the MIT App Inventor web interface. On the left is the 'Palette' with various UI components like Button, CheckBox, DatePicker, Image, Label, ListPicker, ListView, Notifier, PasswordTextBox, Slider, Spinner, TextBox, TimePicker, and WebViewer. In the center is the 'Viewer' showing a preview of the app. A red box highlights the 'App (provide QR code for .apk)' button in the top toolbar, with a red arrow pointing to a dialog box on the right. The dialog box is titled 'Barcode link for Hello\_COBL' and contains a large QR code. Below the QR code is an 'OK' button. At the bottom of the dialog, there is a note: 'Note: this barcode is only valid for 2 hours. See [the FAQ](#) for info on how to share your app with others.'

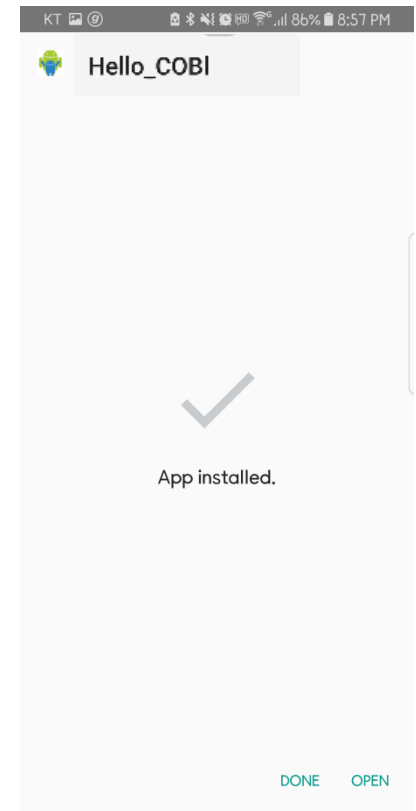
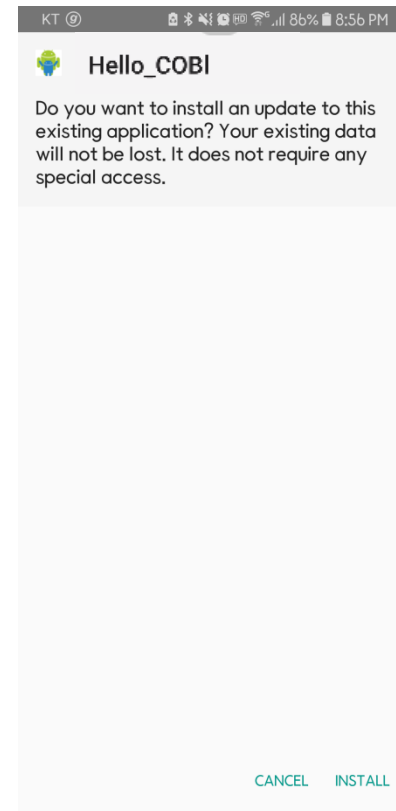
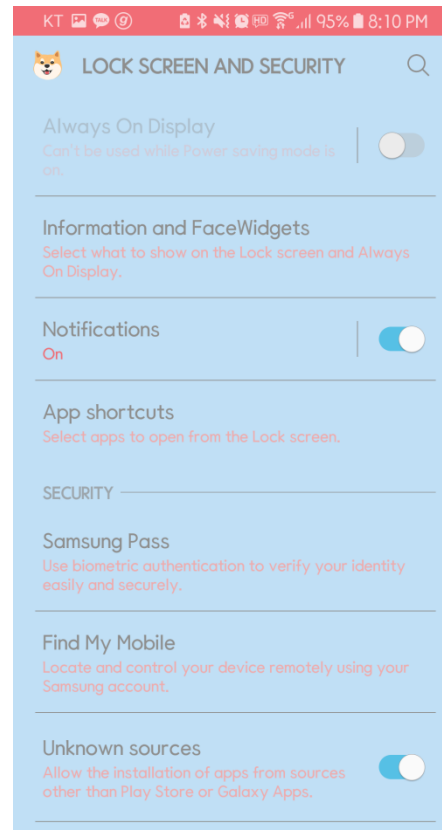
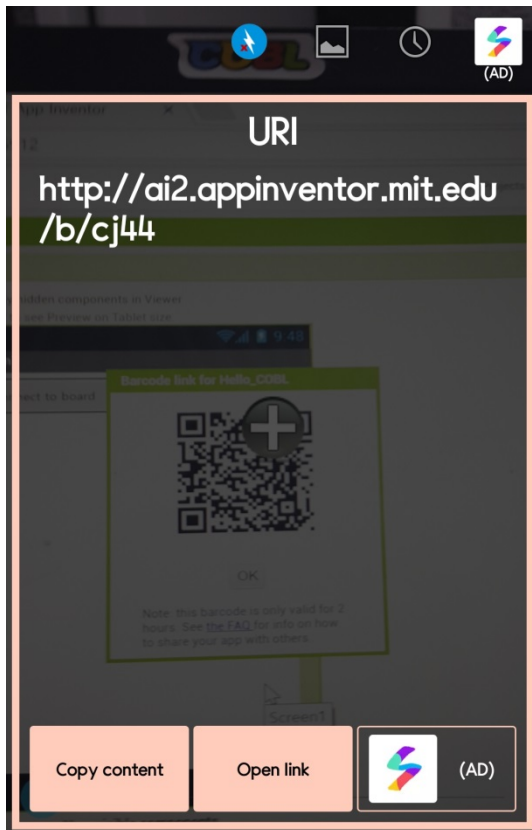


# 4. How to Make COBL App (Basic connection)



## Download apk file

After downloading 'QR code Scanner',  
Apk file is downloaded when camera takes pictures to QR code.

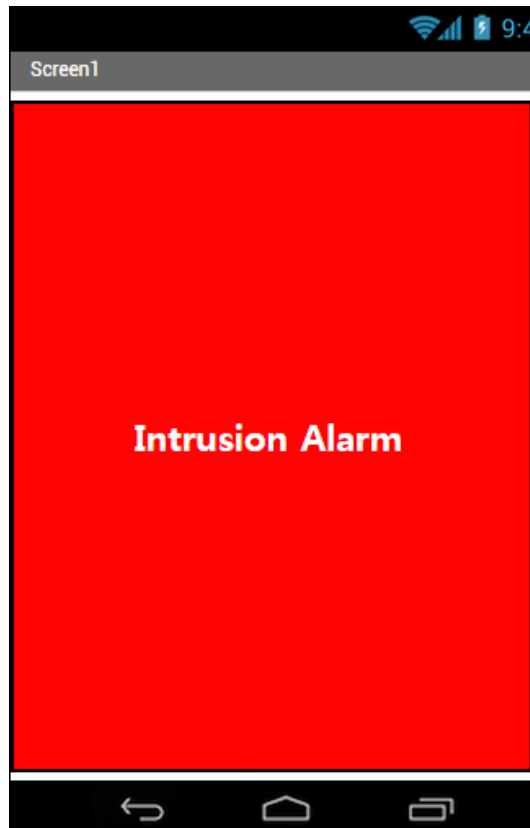


\* Please allow installation of unknown sources of app.

## 5. Examples with COBL App



### Intrusion Alarm



When ultrasonic sensor located nearby window detects intrusion, 'Intrusion Alarm' app rings alarm and send text to family member.

## 5. Examples with COBL App



### Voice remote controller

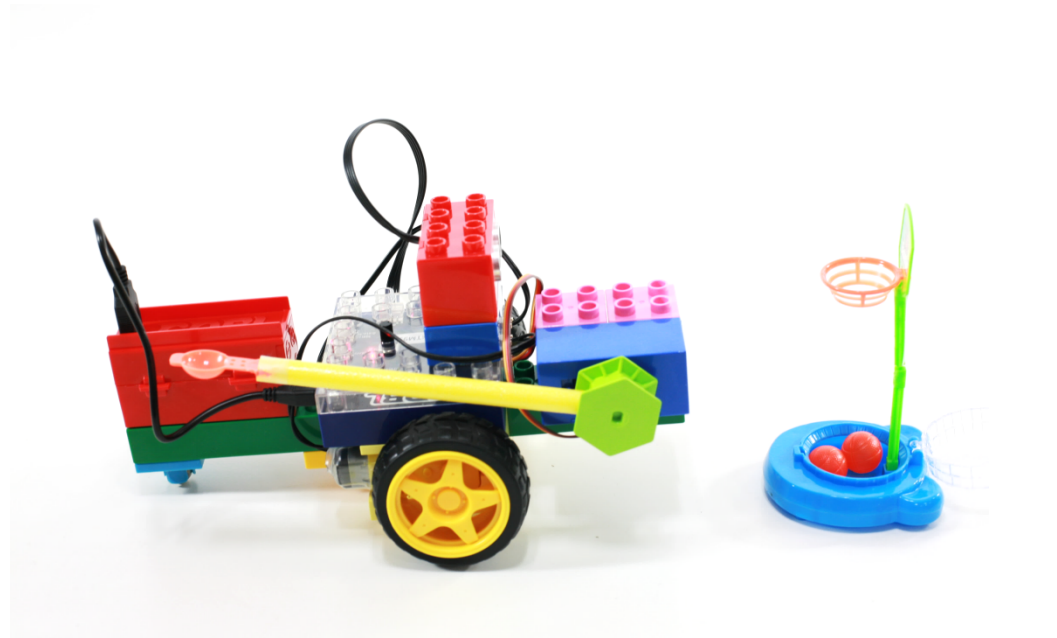


After pressing mic and telling 'turn the light on', 'how is temperature', and 'turn the fan on', the voice recognition remote controller recognizes the order and process the request.

## 5. Examples with COBL App



### COBL Bot controller



COBL bot can be controlled with built-in gyro-sensor in smartphone by just controlling tilting your phone. When pressing 'KICK' button on screen, the bot can kick a ball.



**Thank you**