

人工智慧

文字轉語音 + 語音辨識教學

App Inventor串接TTS與Google語音辨識

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登入App Inventor2網站

<https://appinventor.mit.edu/>



Create Apps!

About

Educators

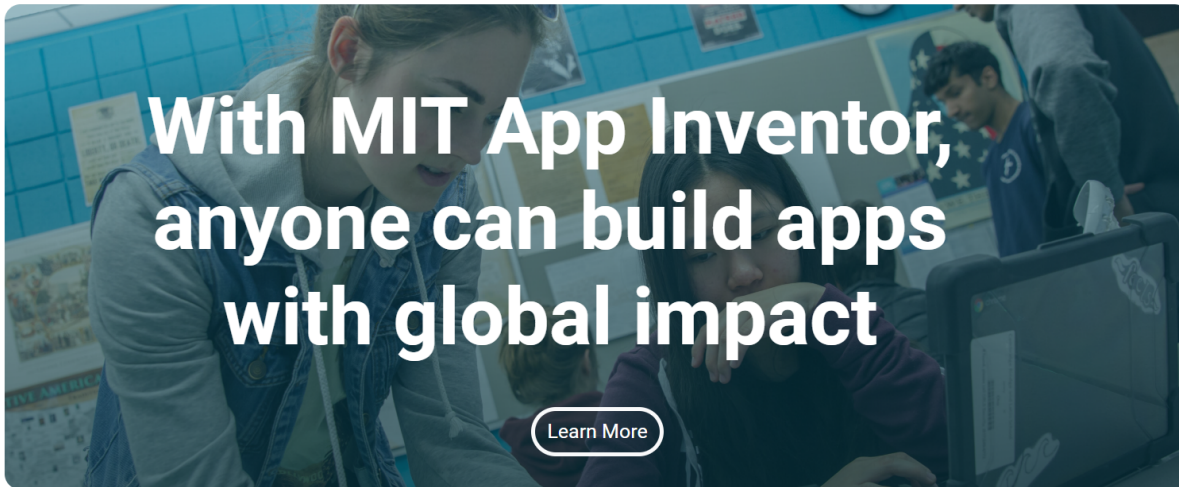
News

Resources

Blogs

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Google Custom :



Active Users today: 109.7K	Active Users this week: 386.2K	Active Users this month: 1135.7K	Registered Users: 10.0M	Countries: 195	Apps Built: 43.3M
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下載Aistarter

<https://appinventor.mit.edu/explore/ai2/windows>

Installing App Inventor 2 Setup on Windows

Installing the Windows software for App Inventor Setup has two parts:

1. Installing the App Inventor Setup software package. This step is the same for all Android devices, and the same for Windows XP, Vista, Windows 7, 8.1, and 10.
2. If you choose to use the USB cable to connect to a device, then you'll need to [install Windows drivers](#) for your Android phone.

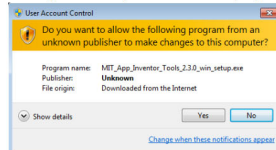
NOTE: App Inventor 2 does not work with Internet Explorer. For Windows users, we recommend using either [Chrome](#) or [Firefox](#) as your browser for use with App Inventor.

Installing the App Inventor Setup software package

You must perform the installation from an account that has administrator privileges. Installing via a non-administrator account is currently not supported.

If you have installed a previous version of the App Inventor 2 setup tools, you will need to uninstall them before installing the latest version. Follow the instructions at [How to Update the App Inventor Setup Software](#).

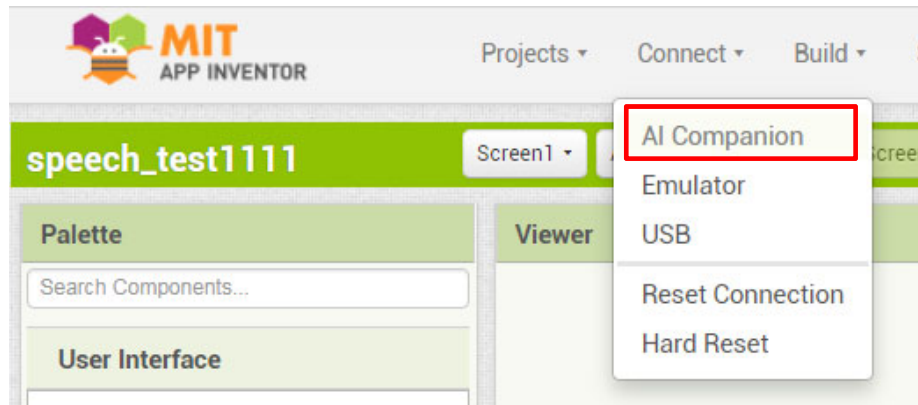
1. Download the installer.
2. Locate the file **MIT_Appinventor_Tools_2.3.0 (~80 MB)** in your Downloads file or your Desktop. The location of the download on your computer depends on how your browser is configured.
3. Open the file.
4. Click through the steps of the installer. Do not change the installation location but record the installation directory, because you might need it to check drivers later. The directory will differ depending on your version of Windows and whether or not you are logged in as an administrator.
5. You may be asked if you want to allow a program from an **unknown publisher** to make changes to this computer. **Click yes.**



在手機上測試的方法#1

測試階段

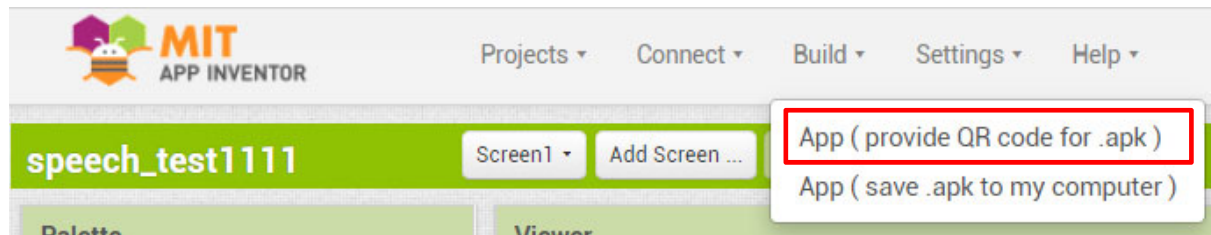
- AI Companion (透過MIT AI2 Companion APP，直接把程式傳到手機測試) 推薦!!!
- Emulator (啟動PC上的Android手機模擬器測試)
- USB (把手機透過USB連線直接測試，需先安裝驅動)



在手機上測試的方法#2

完成階段

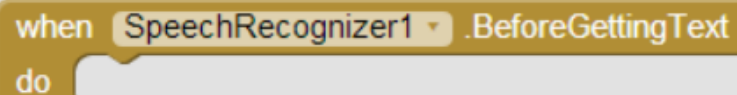
- App (provide QR code for .apk) 直接掃描QR Code把程式安裝到手機。透過AI2 Companion。建議！！
- App (save .apk to my computer) 比較麻煩，不建議這個方式。



App Inventor2的語音辨識指令

BeforeGettingText()

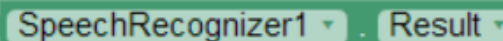
SpeechRecognizer.BeforeGettingText：在辨識器呼叫之前發出訊號。



when SpeechRecognizer1 .BeforeGettingText
do

Result

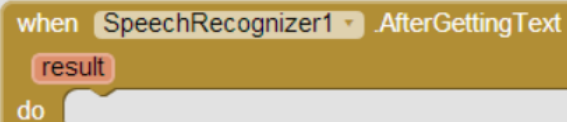
SpeechRecognizer.Result：辨識器產生的最後一段文字資料。



SpeechRecognizer1 . Result

AfterGetting(Text result)

SpeechRecognizer.AfterGetting：在辨識器產生文字資料之後發出訊號，這個參數代表產生的文字資料。

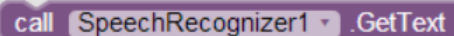


when SpeechRecognizer1 .AfterGettingText
result
do

GetText()

SpeechRecognizer.GetText：請使用者發言，並將語音資料轉換為文字資料。

當有結果可用時，會發出 AfterGettingText事件訊號。



call SpeechRecognizer1 .GetText

試著加入文字轉語音功能

Text to Speech (TTS)

把辨識出來的文字念出來

課堂練習

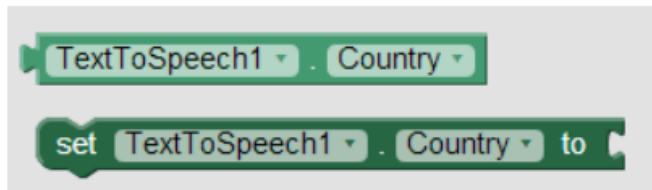
上網搜尋資源，中文語音辨識有哪些資源可用？

思考語音辨識與TTS能用在什麼情境？

APP Inventor2 提供的TTS指令

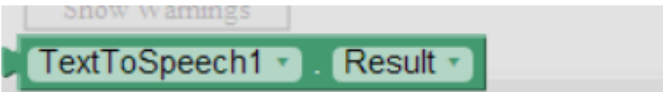
Country

TextToSpeech.Country : 語音輸出的國家代碼。



Result

TextToSpeech.Result : 詳細資訊。



Pitch

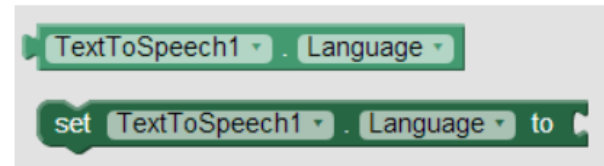
TextToSpeech.Pitch : 音調。

設定TTS的音調高低，數字介於0~2，值越低音調越低，反之則越高



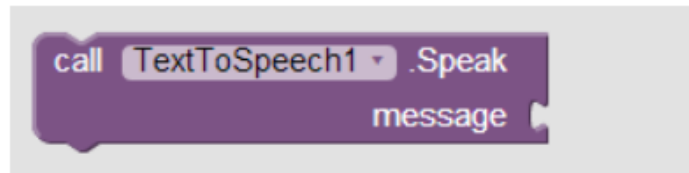
Language

TextToSpeech.Language : 語音輸出的語言代碼。



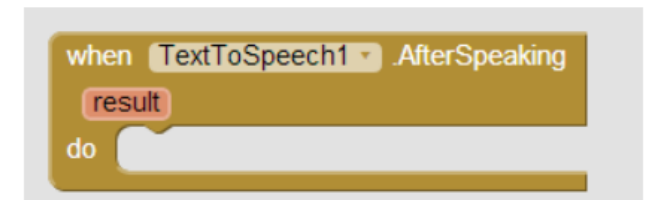
Speak(Text message)

TextToSpeech.Speak : 發送指定文字資料。



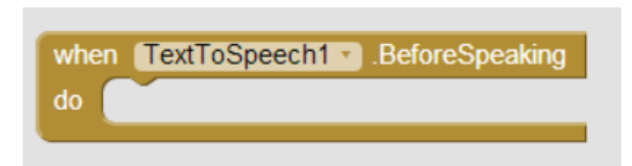
AfterSpeaking(Text result)

TextToSpeech.AfterSpeaking : 文字資料發送後的信號，該參數是依文字資料的結果產生的。



BeforeSpeaking()

TextToSpeech.BeforeSpeaking : 在文字資料發出前發出的信號。



Practice

製作一個情境式英文學習APP

要求

1. 能有語音辨識
2. 能夠文字轉語音
3. 能夠判斷是否使用者正確唸出正確句子
4. 計算正確率
5. 有兩個螢幕切換
6. 有六組conversation對話

素材準備 餐廳訂位情境對話

原始對話 素材：conversation1.txt

A: Wu's Restaurant. How may I help you?
B: Hi, I would like to make a dinner reservation.

A: Of course, what evening will you be joining us on?
B: We will be there on Tuesday evening.

A: What time would you like the reservation for?
B: We would prefer 7:00 pm or 7:30.

A: How many people will you need the reservation for?
B: 4 please.

A: Great, I can seat you at 7:00 pm on Tuesday, if you would kindly give me your name.
B: Sure. The last name is Hsu.

A: See you at 7 this Tuesday evening, Mr. Hsu.
B: Thank you so much. I appreciate your help.

修正後 素材：converstation2.txt

A: Wu's Restaurant. How may I help you?
B: I would like to make a dinner reservation

A: Of course, what evening will you be joining us on?
B: We will be there on Tuesday evening

A: What time would you like the reservation for?
B: We prefer 7pm

A: How many people will you need the reservation for?
B: Four

A: Great, I can seat you at 7:00 pm on Tuesday, if you would kindly give me your name.
B: Okay My name is John

A: See you at 7 this Tuesday evening
B: Thank you so much I appreciate your help

修正地方

修正一些語音辨識不好辨識的地方

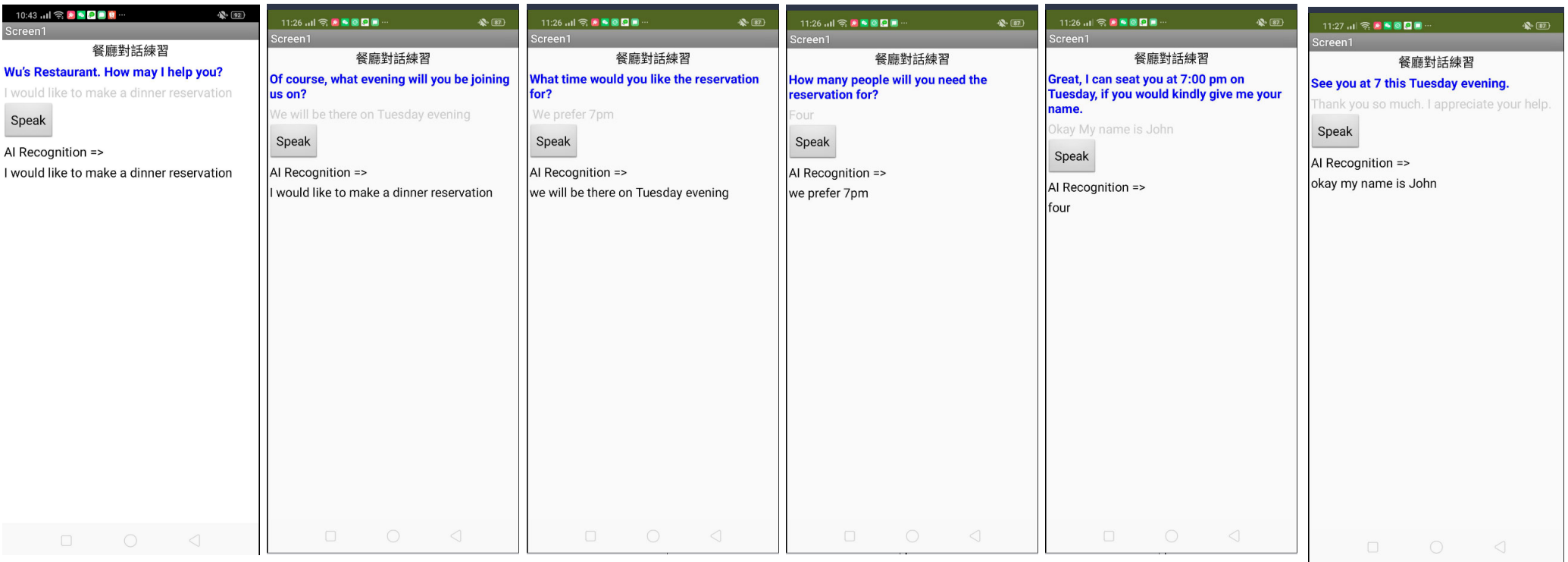
- 句點
- 縮寫
 - 7:00 pm -> 7pm
 - 不能有空格，語音辨識無法自動加上空格

製作語音辨識 + 文字轉語音 情境式學習APP

初步版本



完成畫面



通過畫面

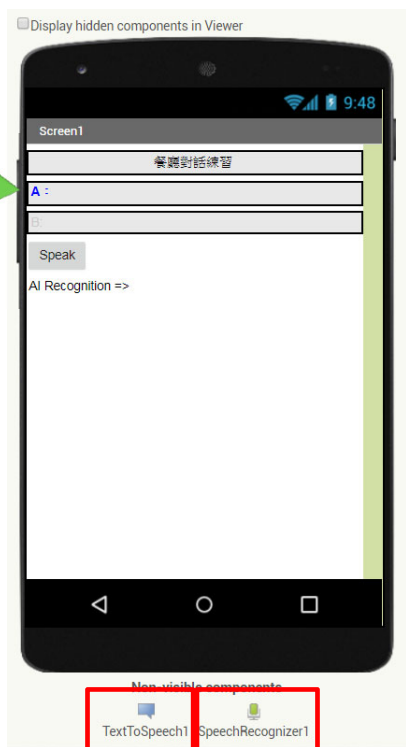
計算得分 正確率 = 6 / 嘗試次數



初步版本

先建立一組對話，能夠正確執行

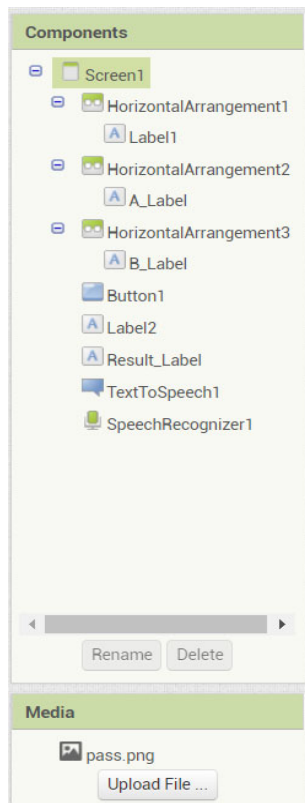
畫面設計



設定不同字體顏色

文字轉語音

語音辨識



文字轉語音設定，可以讓發音採美式發音

這邊可控制說話語調高低 (pitch)與快慢



先完成一組對話測試

定義變數

initialize global `speak_no` to `1`

initialize global `try_times` to `0`

把對話建立在LIST結構中

WHY? 為了方便用迴圈依次顯示對話

會把A的對話與B的對話分別存入List結構中

initialize global A to

- “ Wu's Restaurant. How may I help you? ”
- “ Of course, what evening will you be joining us on? ”
- “ What time would you like the reservation for? ”
- “ How many people will you need the reservation for? ”
- “ Great, I can seat you at 7:00 pm on Tuesday, if ... ”
- “ See you at 7 this Tuesday evening. ”

B的對話

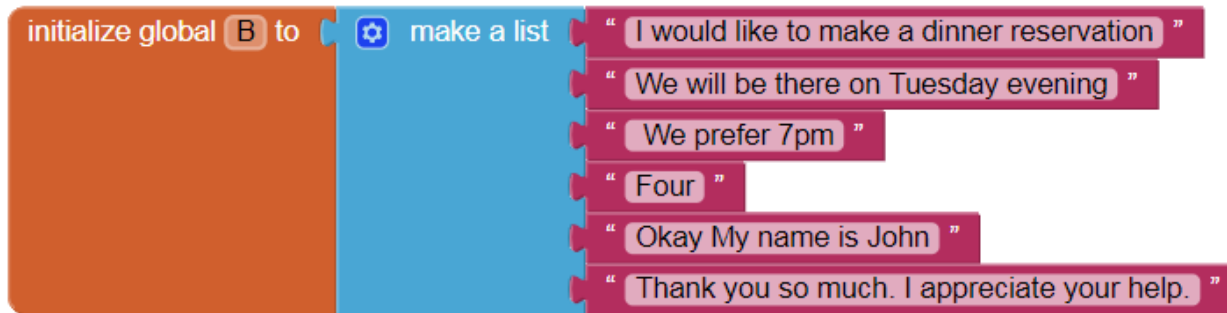
initialize global B to

- “ I would like to make a dinner reservation ”
- “ We will be there on Tuesday evening ”
- “ We prefer 7pm ”
- “ Four ”
- “ Okay My name is John ”
- “ Thank you so much. I appreciate your help. ”

Note: 創建一個C的對話

Why? 方便給語音辨識判斷

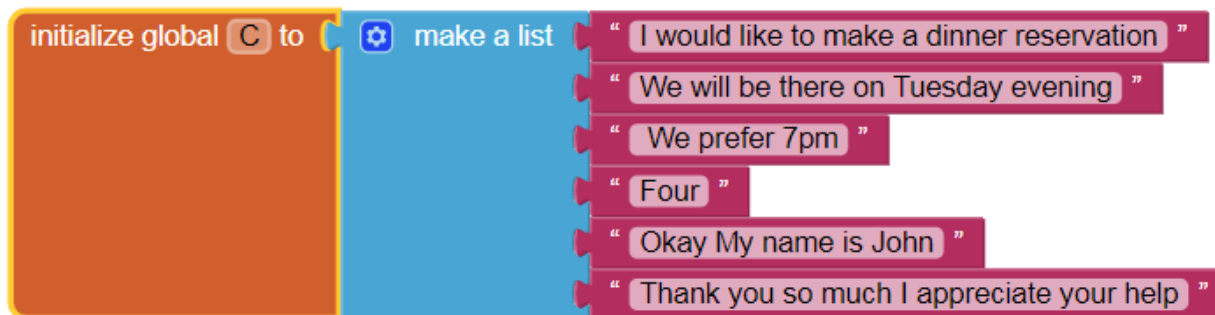
原先B的對話



A Scratch script for a variable named 'B'. The script starts with 'initialize global B to' followed by a 'make a list' block. The list contains six items: 'I would like to make a dinner reservation', 'We will be there on Tuesday evening', 'We prefer 7pm', 'Four', 'Okay My name is John', and 'Thank you so much. I appreciate your help.'.

比較一下有什麼地方不一樣？

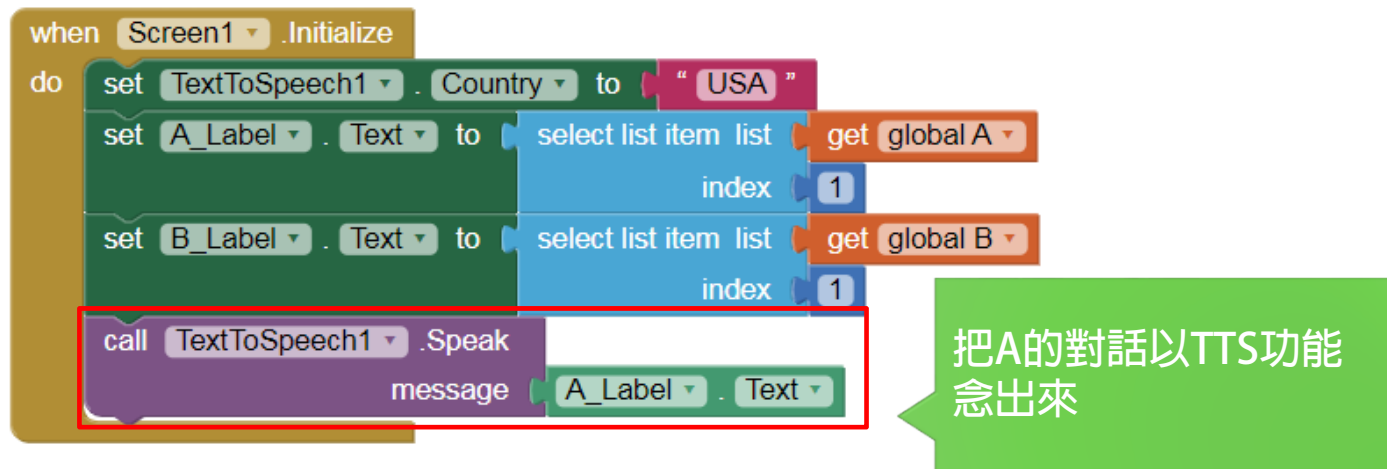
給語音辨識比對用的對話 (C)



A Scratch script for a variable named 'C'. The script starts with 'initialize global C to' followed by a 'make a list' block. The list contains six items: 'I would like to make a dinner reservation', 'We will be there on Tuesday evening', 'We prefer 7pm', 'Four', 'Okay My name is John', and 'Thank you so much I appreciate your help.'.

流程控制

開始進入時的需要執行的程式（將A、B對話畫面顯示在螢幕上）



The image shows a Scratch script for the 'when Screen1 Initialize' event. The script consists of the following blocks:

- when Screen1 Initialize** (yellow block)
- do** (green block)
- set TextToSpeech1 Country to "USA"** (purple block)
- set A_Label Text to select list item list get global A index 1** (blue block)
- set B_Label Text to select list item list get global B index 1** (blue block)
- call TextToSpeech1 Speak message A_Label Text** (purple block, highlighted with a red box)

A green callout bubble points to the 'call TextToSpeech1 Speak message A_Label Text' block with the text: 把A的對話以TTS功能念出來

檢查流程的程式

當按下按鈕時呼叫語音辨識

```
when Button1 .Click  
do call SpeechRecognizer1 .GetText
```

```
when SpeechRecognizer1 .AfterGettingText  
  result partial  
do set Result_Label .Text to get result  
  call check_sentence
```



取得語音辨識的結果
get (result)

利用contains text檢查是否C對話與使用者說的是否相同？
並透過downcase全部轉成小寫

檢查是否正確的程式

```
to check_sentence  
do if contains text (downcase (select list item list (get global C) index (get global speak_no) piece (downcase (Result_Label .Text)))  
  then set global speak_no to (get global speak_no) + 1  
  call show_sentence
```

利用select list item list
取出對應的LIST中的指定Index
對話組

把speak_no加一
以便顯示下一組對話

檢查句子與顯示句子的副程式

```
to check_sentence
do
  if contains text [
    lowercase [select list item list [get global C] index [get global speak_no]
    piece [lowercase [Result_Label . Text]
  then
    set global speak_no to [get global speak_no] + [1]
    call show_sentence
```

檢查句子

```
to show_sentence
do
  set A_Label . Text to [select list item list [get global A] index [get global speak_no]
  set B_Label . Text to [select list item list [get global B] index [get global speak_no]
  call TextToSpeech1 .Speak message [A_Label . Text]
```

顯示句子

初步版本所有程式碼 speech1

initialize global speak_no to 1

```
initialize global A to make a list  
  " Wu's Restaurant. How may I help you? "  
  " Of course, what evening will you be joining us on? "  
  " What time would you like the reservation for? "  
  " How many people will you need the reservation for? "  
  " Great, I can seat you at 7:00 pm on Tuesday, if ... "  
  " See you at 7 this Tuesday evening. "
```

```
when Screen1 .Initialize  
do  
  set TextToSpeech1 . Country to " USA "  
  set A_Label . Text to select list item list get global A  
  index 1  
  set B_Label . Text to select list item list get global B  
  index 1  
  call TextToSpeech1 . Speak  
  message A_Label . Text
```

```
when Button1 .Click  
do  
  call SpeechRecognizer1 .GetText
```

```
when SpeechRecognizer1 .AfterGettingText  
  result partial  
do  
  set Result_Label . Text to get result  
  call check_sentence
```

```
initialize global B to make a list  
  " I would like to make a dinner reservation "  
  " We will be there on Tuesday evening "  
  " We prefer 7pm "  
  " Four "  
  " Okay My name is John "  
  " Thank you so much. I appreciate your help. "
```

```
initialize global C to make a list  
  " I would like to make a dinner reservation "  
  " We will be there on Tuesday evening "  
  " We prefer 7pm "  
  " Four "  
  " Okay My name is John "  
  " Thank you so much I appreciate your help. "
```

```
to check_sentence  
do  
  if contains text lowercase select list item list get global C  
  index get global speak_no  
  piece lowercase Result_Label . Text  
then  
  set global speak_no to get global speak_no + 1  
  call show_sentence
```

```
to show_sentence  
do  
  set A_Label . Text to select list item list get global A  
  index get global speak_no  
  set B_Label . Text to select list item list get global B  
  index get global speak_no  
  call TextToSpeech1 . Speak  
  message A_Label . Text
```


最後版本

增加功能

可以呼叫第二個螢幕

可以記錄使用者作答幾次

可以計算正確率

程式碼

Screen1

```
initialize global speak_no to 1
initialize global try_times to 0

initialize global A to make a list
  "Wu's Restaurant. How may I help you?"
  "Of course, what evening will you be joining us on?"
  "What time would you like the reservation for?"
  "How many people will you need the reservation for?"
  "Great, I can seat you at 7:00 pm on Tuesday, if ..."
  "See you at 7 this Tuesday evening."

when Screen1.Initialize
do
  set TextToSpeech1.Country to "USA"
  set A_Label.Text to select list item list get global A index 1
  set B_Label.Text to select list item list get global B index 1
  call TextToSpeech1.Speak message A_Label.Text

when Button1.Click
do
  call SpeechRecognizer1.GetText

when SpeechRecognizer1.AfterGettingText
  result partial
do
  set Result_Label.Text to get result
  call check_sentence

to show_sentence
do
  set A_Label.Text to select list item list get global A index get global speak_no
  set B_Label.Text to select list item list get global B index get global speak_no
  call TextToSpeech1.Speak message A_Label.Text
```

Screen2

```
initialize global B to make a list
  "I would like to make a dinner reservation"
  "We will be there on Tuesday evening"
  "We prefer 7pm"
  "Four"
  "Okay My name is John"
  "Thank you so much. I appreciate your help."

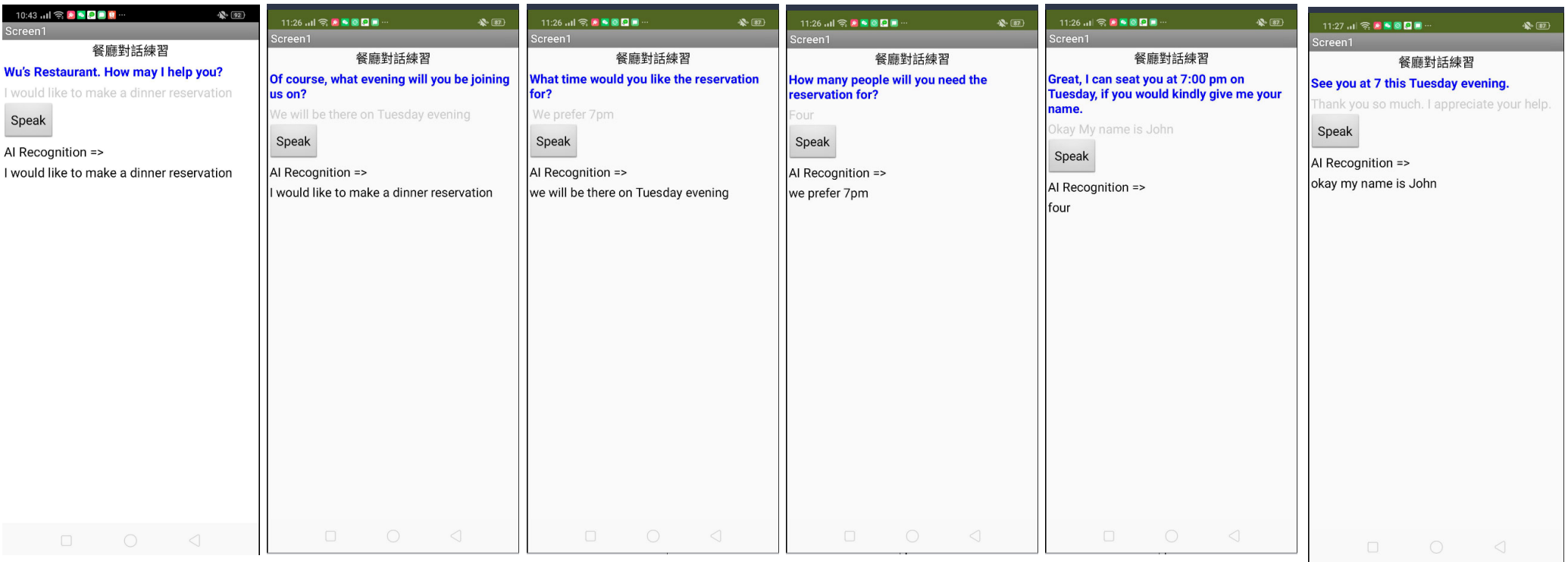
initialize global C to make a list
  "I would like to make a dinner reservation"
  "We will be there on Tuesday evening"
  "We prefer 7pm"
  "Four"
  "Okay My name is John"
  "Thank you so much I appreciate your help."

to check_sentence
do
  set global try_times to get global try_times + 1
  if contains text lowercase select list item list get global C index get global speak_no
    piece lowercase Result_Label.Text
  then
    set global speak_no to get global speak_no + 1
    if get global speak_no > 6
    then
      open another screen with start value screenName "Screen2"
      startValue 6 / get global try_times
    else
      call show_sentence

when Screen2.Initialize
do
  set Accuracy_Label.Text to join Accuracy_Label.Text
  get start value
```

呼叫第二個螢幕，
並傳送
正確率計算

完成畫面



通過畫面

計算得分 正確率 = 6 / 嘗試次數

