# Voice Calculator MIT App Inventor

## Introduction

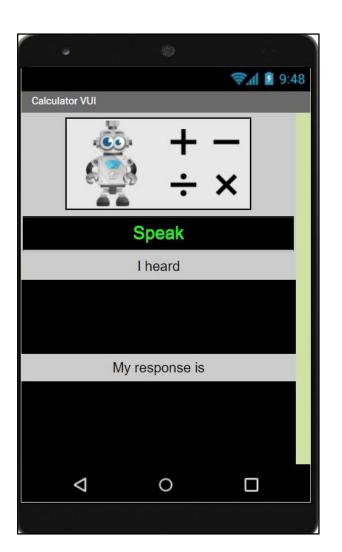
Automatic Speech Recognition is one of the most famous topics in Machine Learning. We've already seen famous conversational AI agents such as Alexa and Siri. They actually interpret what you are saying and grasp your intent. Then they give an appropriate and meaningfully respond to you.

In this project, we will build a simple voice-activated calculator app that takes speech as input and returns speech and text as output. Inputs include integers and basic mathematical operators, while outputs are the result of the operation uttered by the user.

### Aim of task:

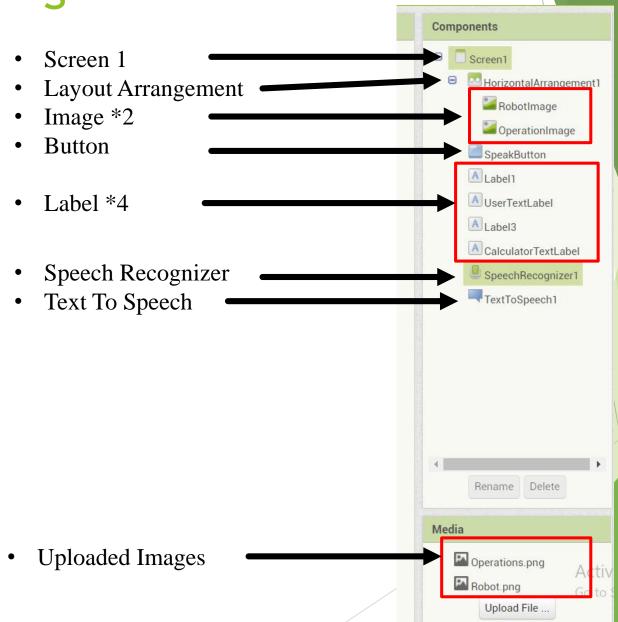
- ► How to design a simple AI system that can understand the intent of the user in a verbally stated calculation question and respond appropriately.
- ▶ Learn how to build a voice user interface (VUI) calculator.
- ► How to work with Speech Recognizer and Text to Speech function in MIT app inventor.
- ▶ Basic mathematical calculation like: addition, subtraction, multiplication and division.

The App overview (the final designed map image or Final app picture)



Project part in Designer section





## Objects and Steps

- 1. First in screen 1, set background color Light Gray, align horizontal center and title Calculator VUI
- 2. Open Horizontal Arrangement for layout section.
- 3. Then add two image block from User Interface. Rename them RobotImage and OperationImage respectively.
- 4. Then set height and width -100 pixels and picture robot.png and operations.png respectively.
- 5. Then add a button from user interface. Rename it as SpeakButton. Set background color black, height 10 percent. Width fill parent, font size –24, text Speak, text color green.

## Objects and Steps

- 6. Then add four labels from user interface one-by-one. Rename 2<sup>nd</sup> label and 4<sup>th</sup> label as UserTextLabel and CalculatorTextLabel respectively.
- 7. For label 01, set background color none, font size -18 and text I heard
- 8. For UserTextLabel, set background color black, font size 24, height 20 percent, width fill parent, text (blank) and text color green.
- 9. For label 03, set background color none, font size 18 and text My response is
- 10. For CalculatorTextLabel, set background color black, font size 24, height—30 percent, width fill parent, text (blank) and text color green.

## Objects and Steps

- 11. Now drag Speech Recognizer and Text to Speech to the screen 01 from Media section.
- 12. Speech Recognizer and Text to Speech function both are non-visible component of the screen.
- 13. Now template design is finished.
- 14. Then go to the block section and add following blocks.
- 15. After that, save the project and Connect AI companion to check the app's performance.

## Inside App inventor (Blocks Tab)

```
initialize global (numbersList) to Concrete empty list
                                                                           initialize global (additionIntents) to | make a list
                                                                                                                              add "
                                                                                                                             addition
initialize global (multiplicationIntents) to | make a list |
                                                                                                                             plus
                                                       X "
                                                                                                                              sum
                                                       X "
                                                                                                                              total
                                                       product
                                                       multiply
                                                       times "
                                                                           initialize global (subtractionIntents) to ( make a list )
                                                                                                                                subtract
 to extractNumbers sentence
                                                                                                                                subtraction
     set global numbersList v to C create empty list
                                                                                                                                minus
      initialize local wordList to split at spaces get sentence
                                                                                                                                difference
      in for each word in list get wordList
          do if is number? v get word v
                                                                              initialize global divisionIntents to make a list
                     add items to list list get global numbersList 🔻
                                                                                                                                divide
                                      item | get word -
                                                                                                                                division
                                                                                                                                divided
                                                                                                                                ratio '
  when SpeakButton . Click
                                                                                                                                quotient
   do call SpeechRecognizer1 .GetText
```

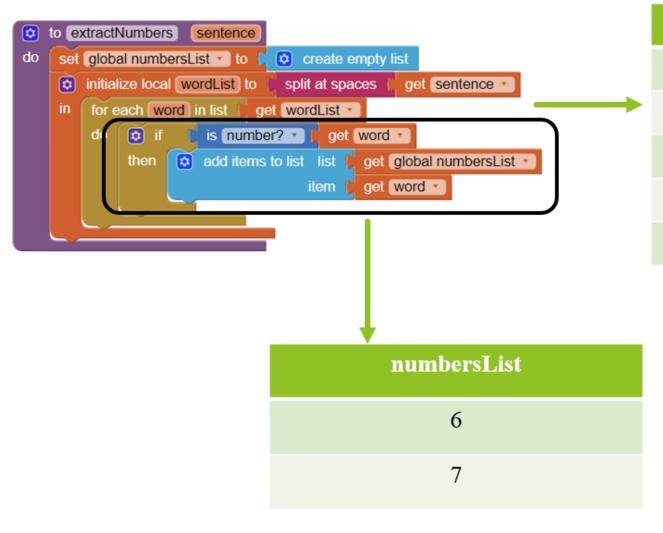
## Inside App inventor (Blocks Tab)

```
when SpeechRecognizer1 . AfterGettingText
     result
                              partial
do set UserTextLabel . Text to get result .
                set CalculatorTextLabel . Text to CalculatorTextLabel . Text to CalculatorTextLabel . Text via to CalculatorTextLabel via to Calc
                call extractNumbers •
                                                                                                get result 🕶
                                                           sentence
                                                            length of list list get global numbersList = 2
                                                                         contains any v text
                                                                                                                                                get result *
                                       🔯 if
                                                                                                                                                 get global multiplicationIntents .
                                                                                                             piece list
                                      then set CalculatorTextLabel •
                                                                                                                                                    . Text 🔻 to 🙀 join
                                                                                                                                                                                                                                             The product is
                                                                                                                                                                                                                                                                  select list item list 🌹 get (global numbersList
                                                                                                                                                                                                                                                                                                        index
                                                                                                                                                                                                                                                                  select list item list 🔰 get global numbersList 🔻
                                                                                                                                                                                                                                                                                                       index
                                                                         contains any ▼ text
                                                                                                                                                   get result *
                                                                                                                                                  get global additionIntents .
                                                                                                             piece list
                                                            set CalculatorTextLabel •
                                                                                                                                                     Text v to 🖟 🗯 join
                                                                                                                                                                                                                                           The sum is
                                                                                                                                                                                                                                                                  select list item list get global numbersList
                                                                                                                                                                                                                                                                                                        index
                                                                                                                                                                                                                                                                  select list item list 🏮 get global numbersList 🔻
                                                                                                                                                                                                                                                                                                        index
                                                                         contains any ▼ text
                                                                                                                                                  get result *
                                                                                                                                                get global subtractionIntents
                                                                                                             piece list
```

## Inside App inventor (Blocks Tab)

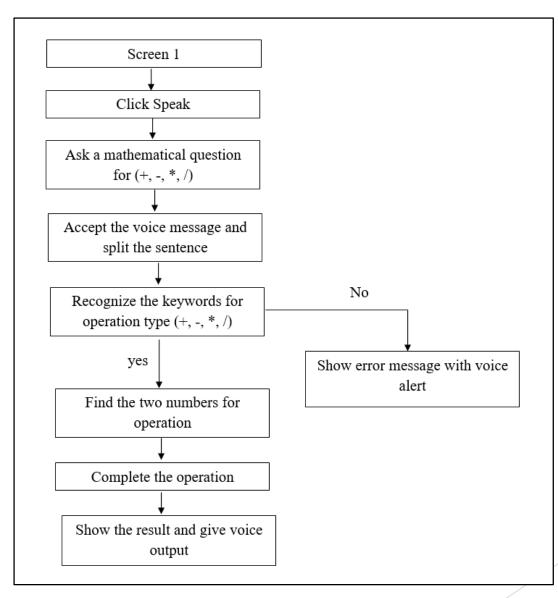
```
get global numbersList
                                                                                   index 2
                 contains any v text
                                       get result *
      else if
                                       get global subtractionIntents •
                                       . Text 🔻 to 🂢 join
      then set CalculatorTextLabel •
                                                                  The difference is
                                                                     select list item list get global numbersList
                                                                                index 1
                                                                     select list item list 📜 get global numbersList 🔻
                                                                                index 2
                 contains any v text
      else if
                                       get result 🔻
                                       get global divisionIntents
                           piece list
      then set CalculatorTextLabel •
                                       . Text 🔻 to 🙀 join
                                                                  The quotient is
                                                                     select list item list get global numbersList
                                                                                index 11
                                                                     select list item list | get global numbersList •
                                                                                index 2
call TextToSpeech1 .Speak
                               CalculatorTextLabel •
                    message
```

#### What is 6 times 7?



WordList
What
is
6
times
7

## **Program flow chart**



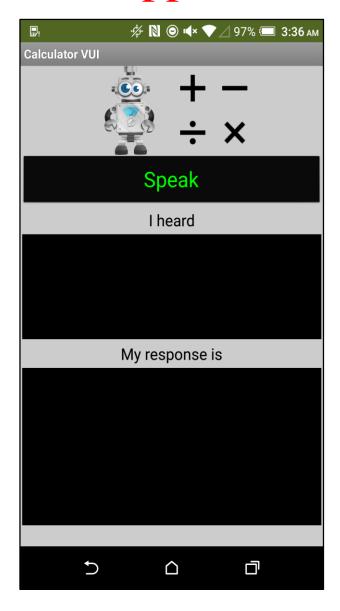
## Component List

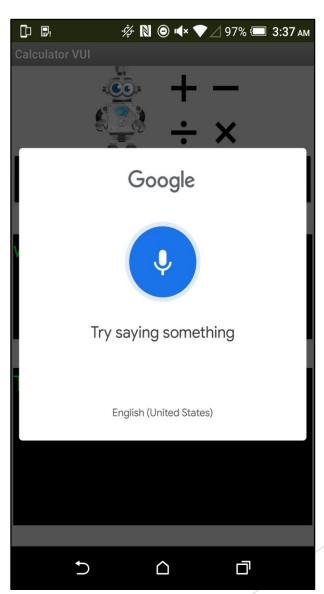
#### 1. List of the Design section components

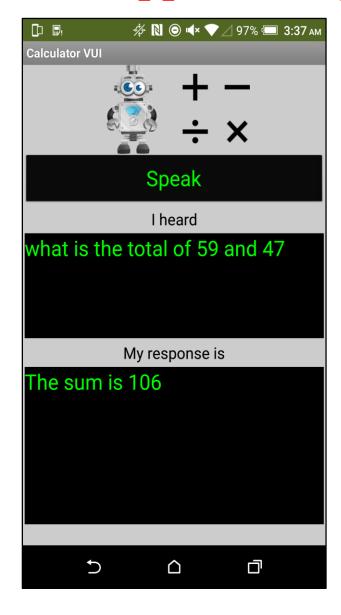
- 1. Horizontal Arrangement
- 2. Image
- 3. Button
- 4. Label
- 5. Speech Recognizer
- 6. Text to Speech

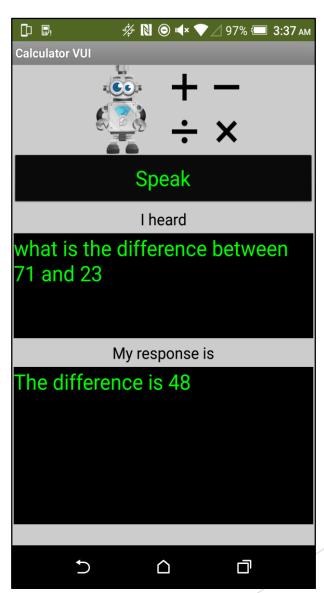
#### 1. List of the Block Section components

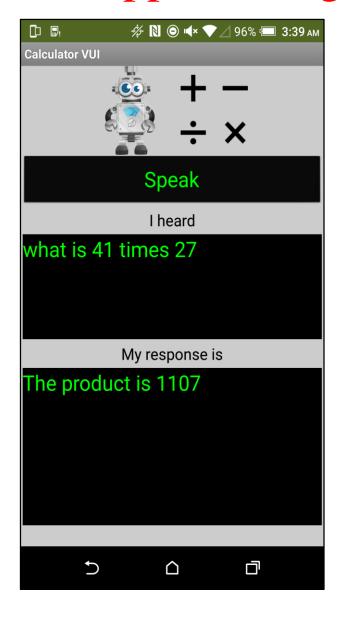
- 1. Speak Button
- 2. User Text Label
- 3. Calculator Text Label
- 4. Speech Recognizer
- 5. Text to Speech
- 6. Control
- 7. Math
- 8. Text
- 9. List
- 10. Variables
- 11. Procedures

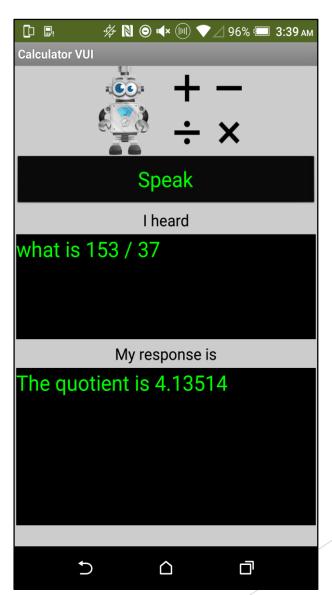


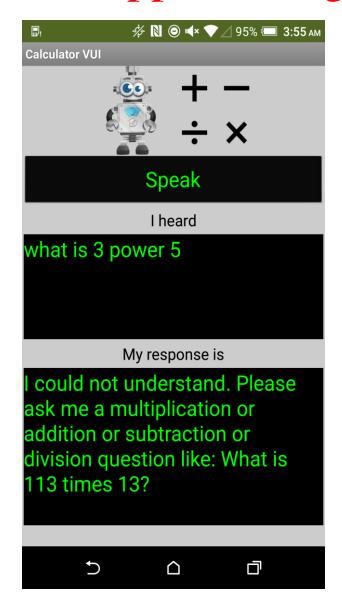


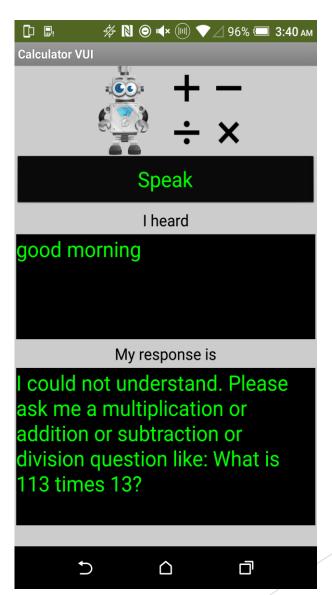






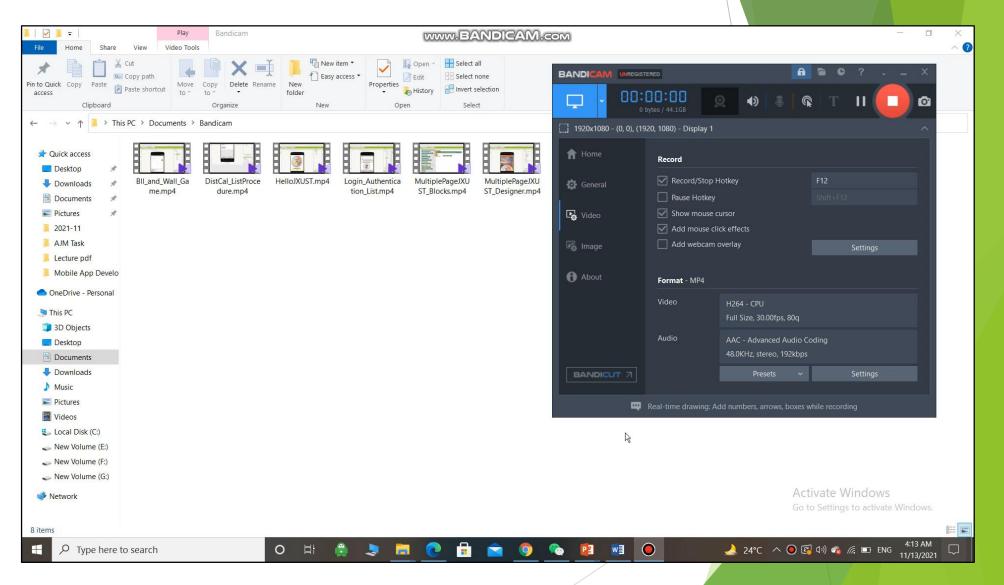




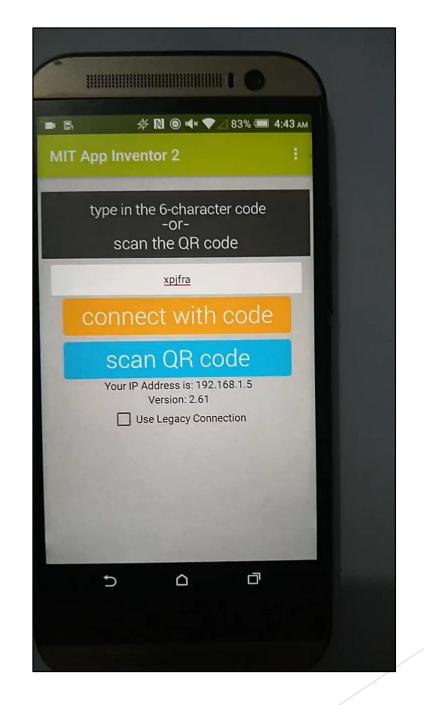


## Final point and result

## **Design Process Video clip:**



#### **Final app Video clip:**



# Thank You