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Mobile Application Development using App Inventor for Android Devices

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INDIA

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Kiran Trivedi, India

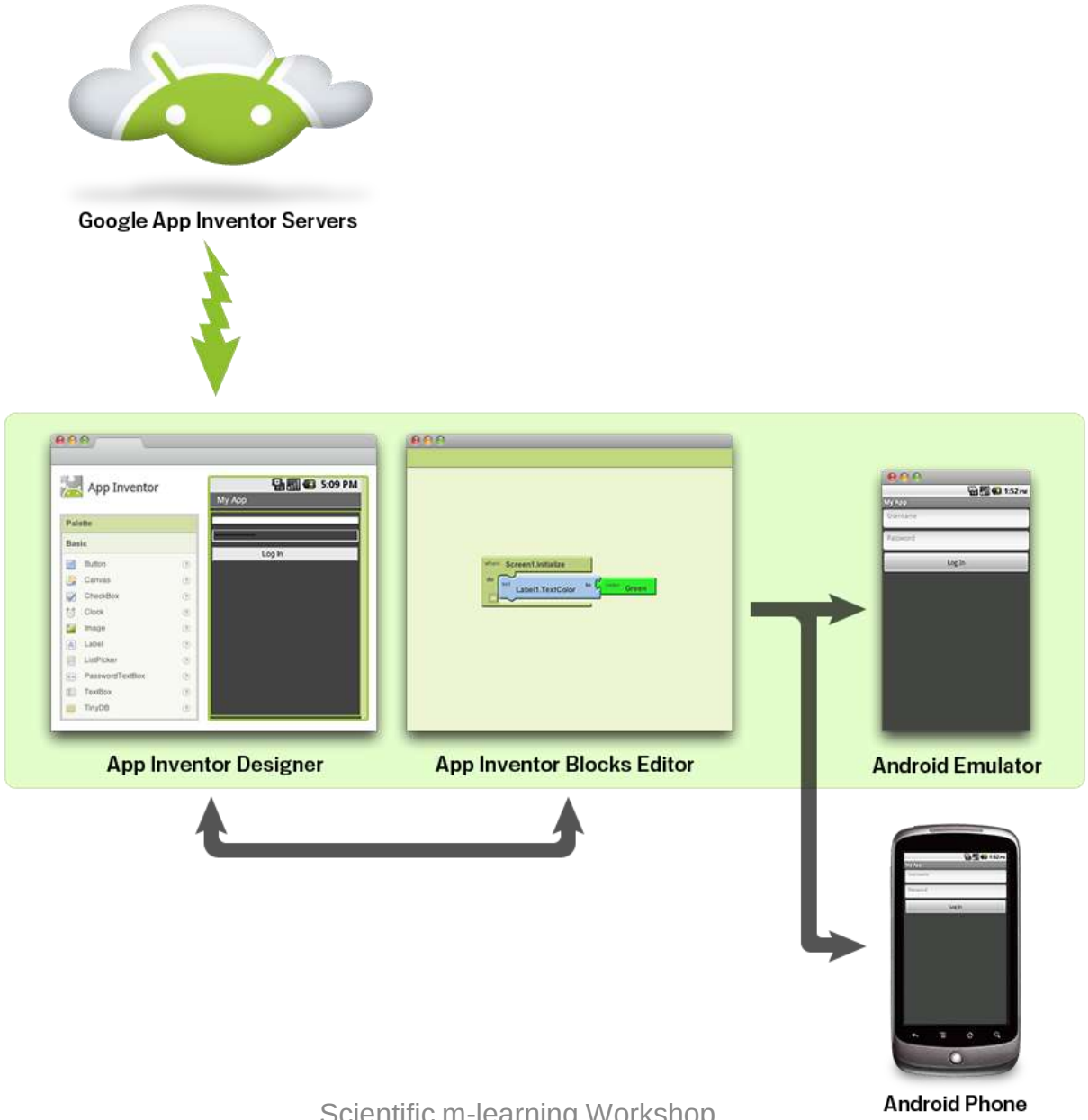
“Scientific m-learning Workshop”

Why App Inventor?

- **No syntax**
  - The blocks language eliminates the need to remember and type code
- **Everything is right in front of you**
  - The components and functions are organized into drawers. Just find, drag, and drop.
- **Events at top level**
  - "When this happens, the app does this" is the correct conceptual model. Down with Listeners!
- **High-level components**
  - The app inventor team has built a great library with simplicity the main goal.
- **Only some blocks plug-in**
  - You can't do things that don't make sense.
- **Concreteness**
  - You program components, not abstractions

What is the App Inventor?

- App Inventor lets you develop applications for Android phones using a web browser and either a connected phone or emulator.
- The App Inventor servers store your work and help you keep track of your projects


Google App Inventor Servers
App Inventor
5:09 PM
My App
Palette
Basic
Log In
App Inventor Designer
Screen1.Initialize
Label1.TextColor
Green
App Inventor Blocks Editor
Android Emulator
Android Phone

What you need?

- The *App Inventor Designer*, where you select the components for your app.
- The *App Inventor Blocks Editor*, where you assemble program blocks that specify how the components should behave.
- You assemble programs visually, fitting pieces together like pieces of a puzzle.

Procedure

- Your app appears on the phone step-by-step as you add pieces to it, so you can test your work as you build.
- When you're done, you can package your app and produce a stand-alone application to install.
- If you don't have an Android phone, you can build your apps using the *Android emulator* , software that runs on your computer and behaves just like the phone.

On the website

- The App Inventor development environment is supported for Mac OS X, GNU/Linux, and Windows operating systems, and several popular Android phone models. Applications created with App Inventor can be installed on any Android phone. (See system requirements .)
- Before you can use App Inventor, you need to set up your computer and install the *App Inventor Setup* package on your computer.

System requirements

- To use App Inventor, your computer must meet the following system requirements:
- Computer and operating system
- Macintosh (with Intel processor): Mac OS X 10.5, 10.6
- Windows: Windows XP, Windows Vista, Windows 7
- GNU/Linux: Ubuntu 8+, Debian 5+

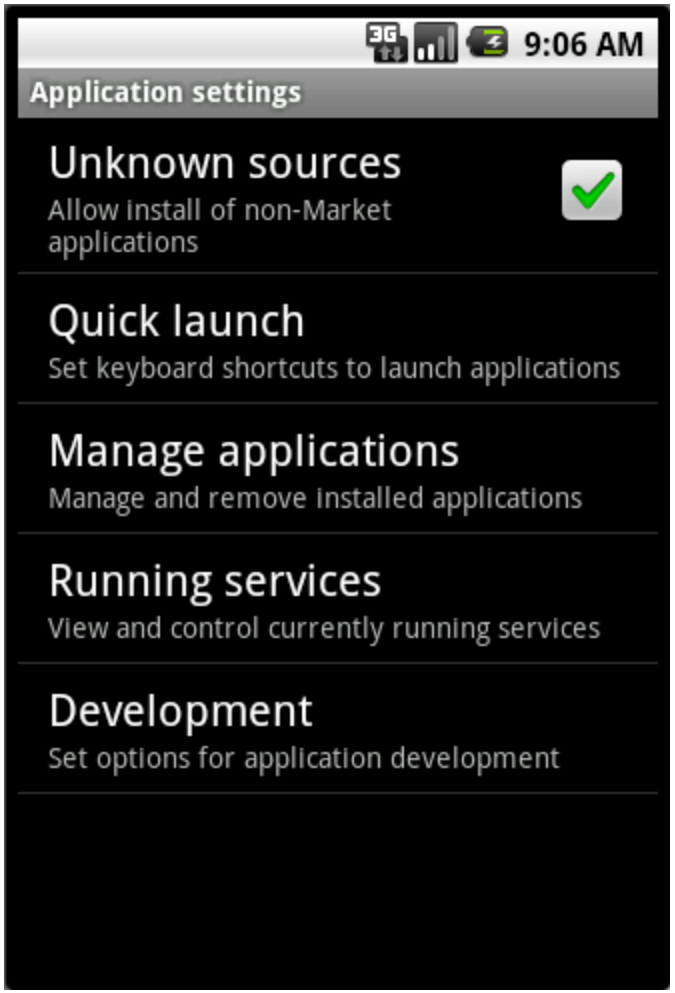
- Browser
- Mozilla Firefox 3.6 or higher
- Apple Safari 5.0 or higher
- Google Chrome 4.0 or higher
- Microsoft Internet Explorer 7 or higher

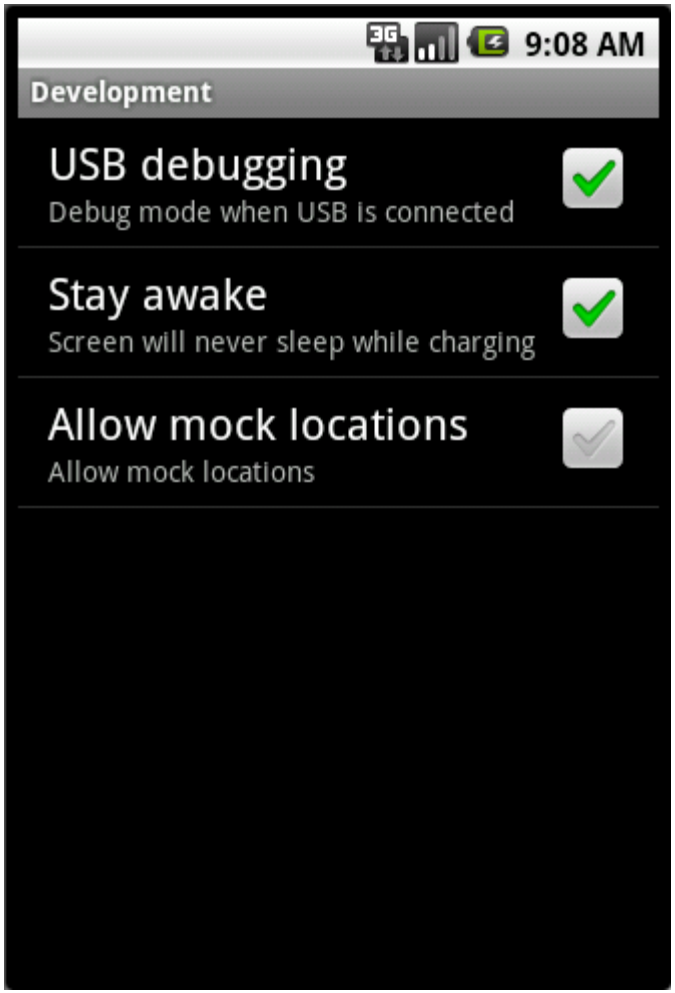
Phone

- Applications created with App Inventor can run on any Android Phone. The development environment and Setup software itself directly supports the following phones:
- Your phone must have an SD card installed, or else it won't work with App Inventor.
- App Inventor also works with many other Android phones, including models from HTC, Samsung, and Dell, but in many cases you will need to download and install additional software from the manufacturer if needed

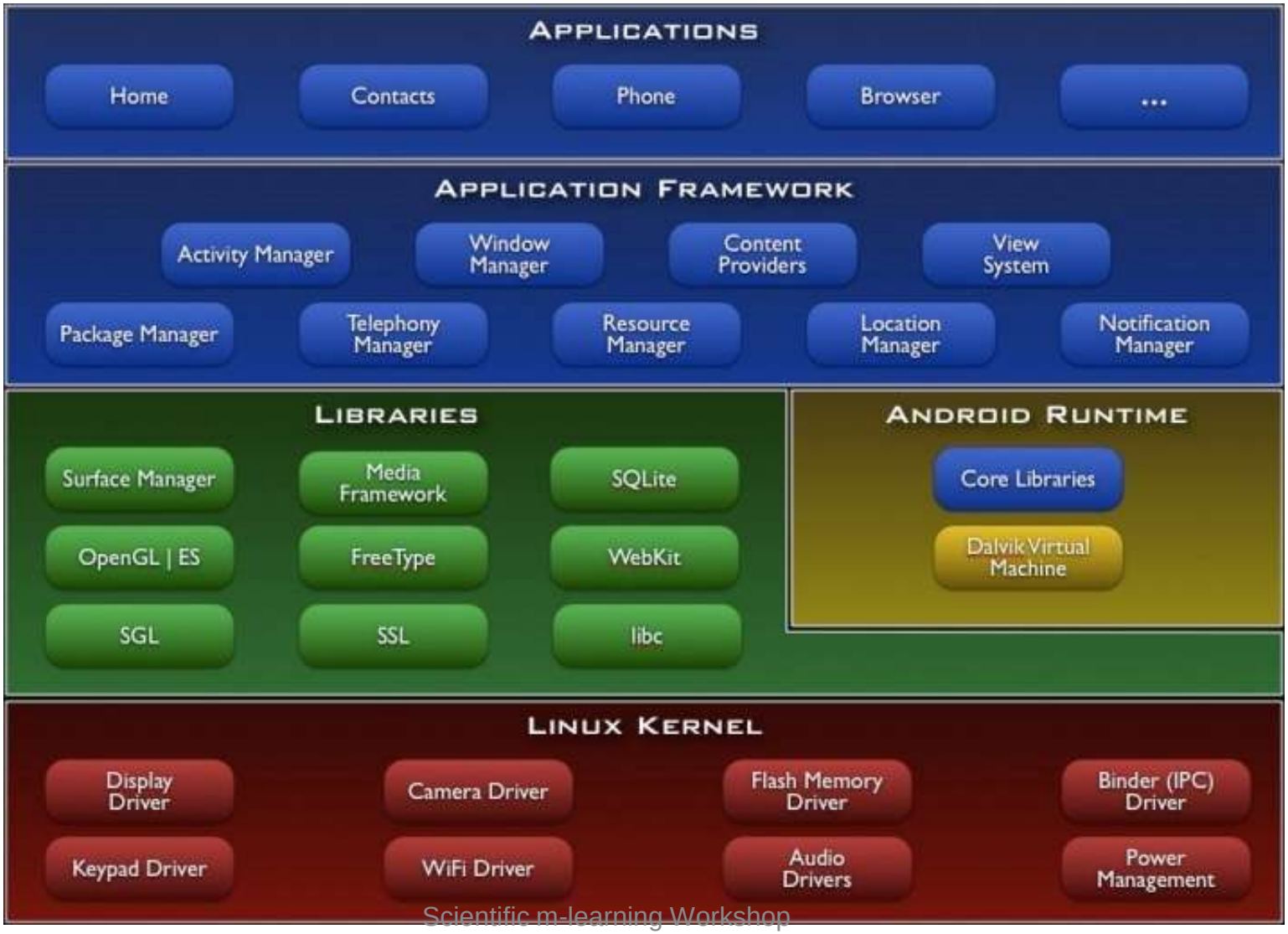
Set up your Android phone

- To get your phone ready to work with App Inventor, follow these steps:
- Tap the Home button to go to your phone's Home screen.
- Tap the Menu button, then Settings, then Applications.
- If your phone has an Unknown sources setting, make sure it is checked.

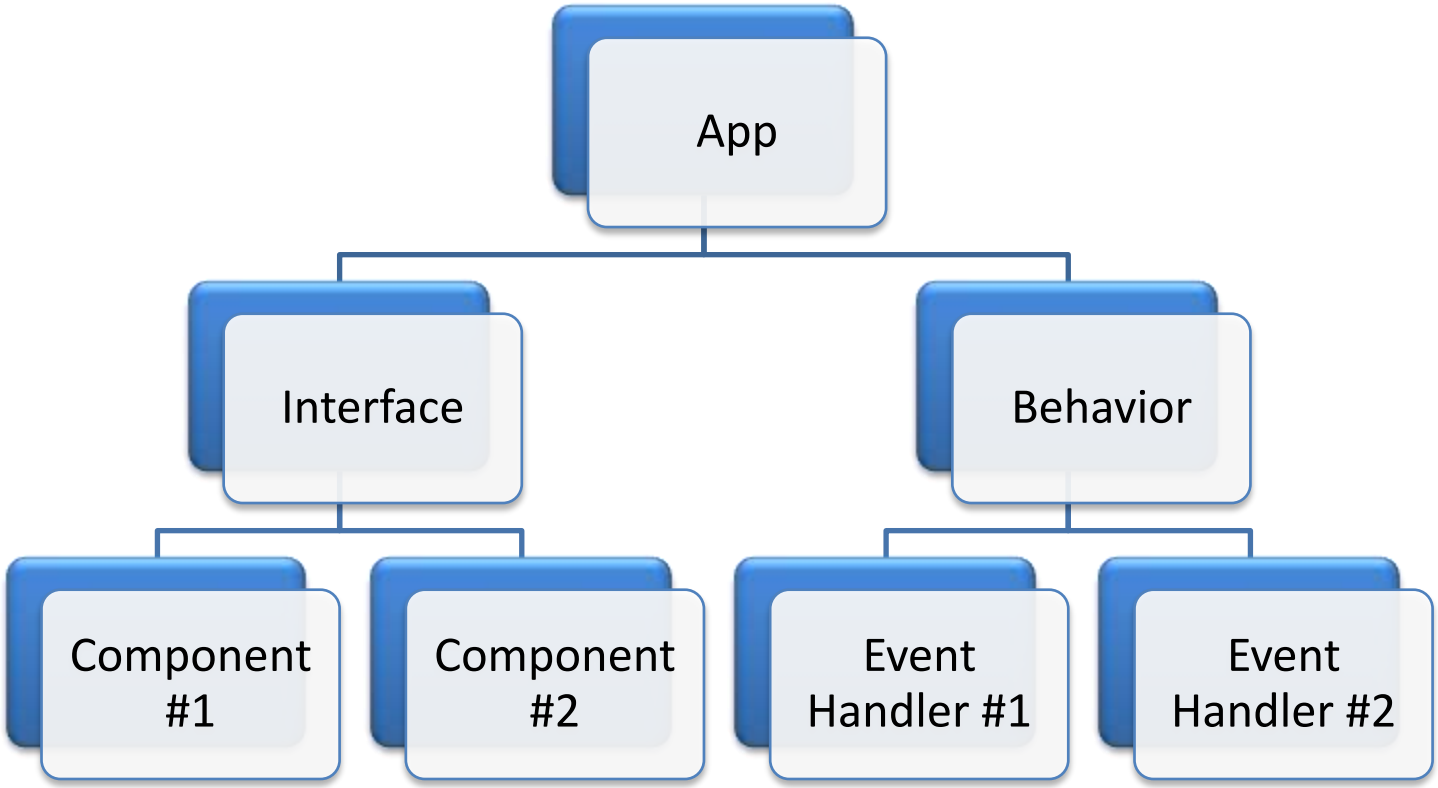

9:06 AM
Application settings
Unknown sources
Allow install of non-Market applications
Quick launch
Set keyboard shortcuts to launch applications
Manage applications
Manage and remove installed applications
Running services
View and control currently running services
Development
Set options for application development


9:08 AM
Development
USB debugging
Debug mode when USB is connected
Stay awake
Screen will never sleep while charging
Allow mock locations
Allow mock locations

Android architecture



App Inventor Architecture

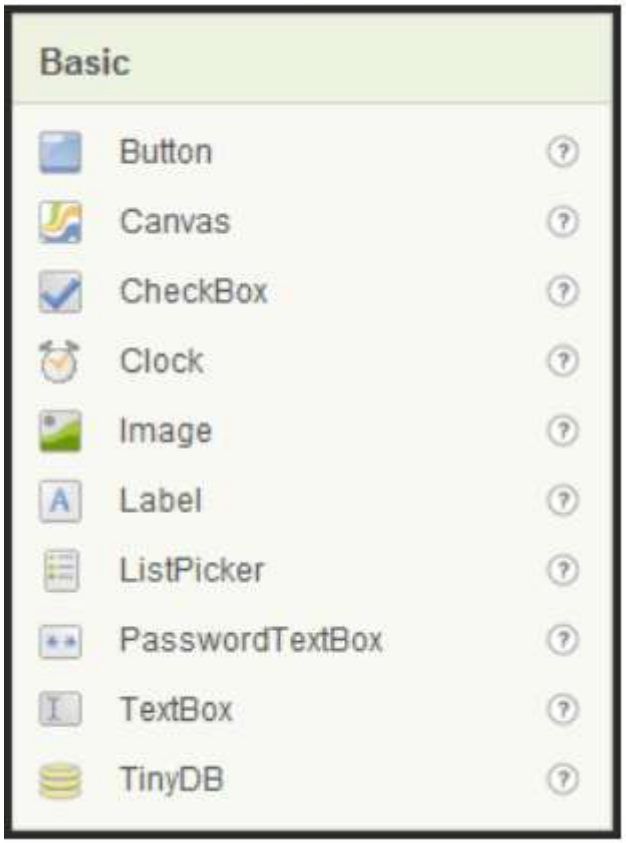


USER INTERFACE

- Consists of Components
  - Components are same as Tools in windows forms or Web forms.
- Two Types of Components
  - Visible Components
  - Non-Visible Components

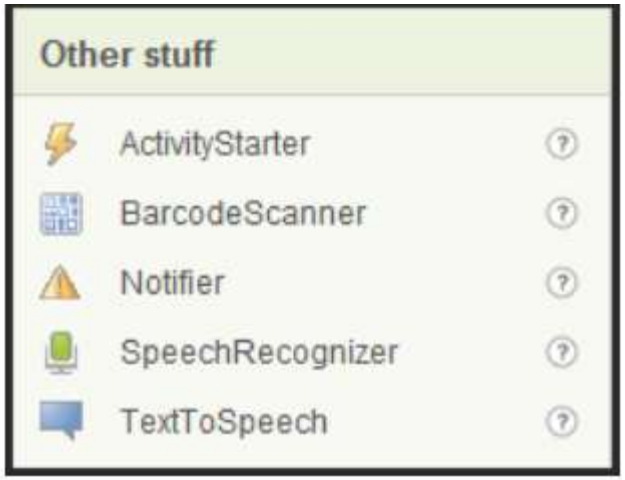
Visible component

- Widely used components
- These are common components
  - Button
  - TextBox
  - Label
  - CheckBox
  - Etc.



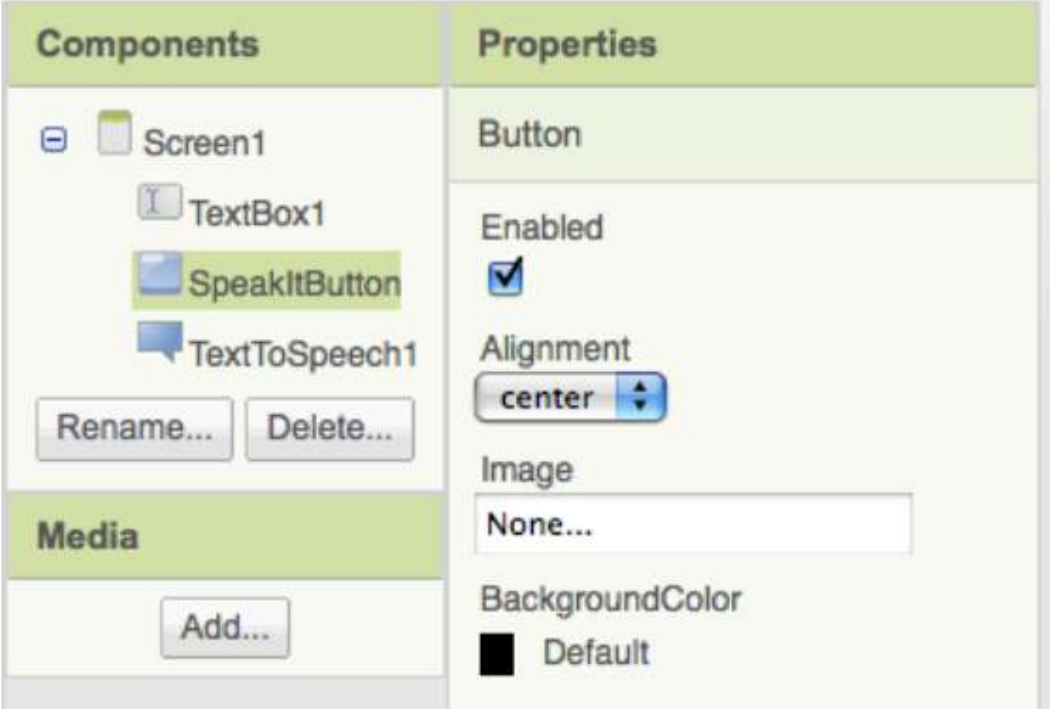
Non visible Components

- We won’t be dealing much with these controls today.
- These are controls such as timer and DataSource.
- These are not Visible on the screen but have their own functionality.
- Demo



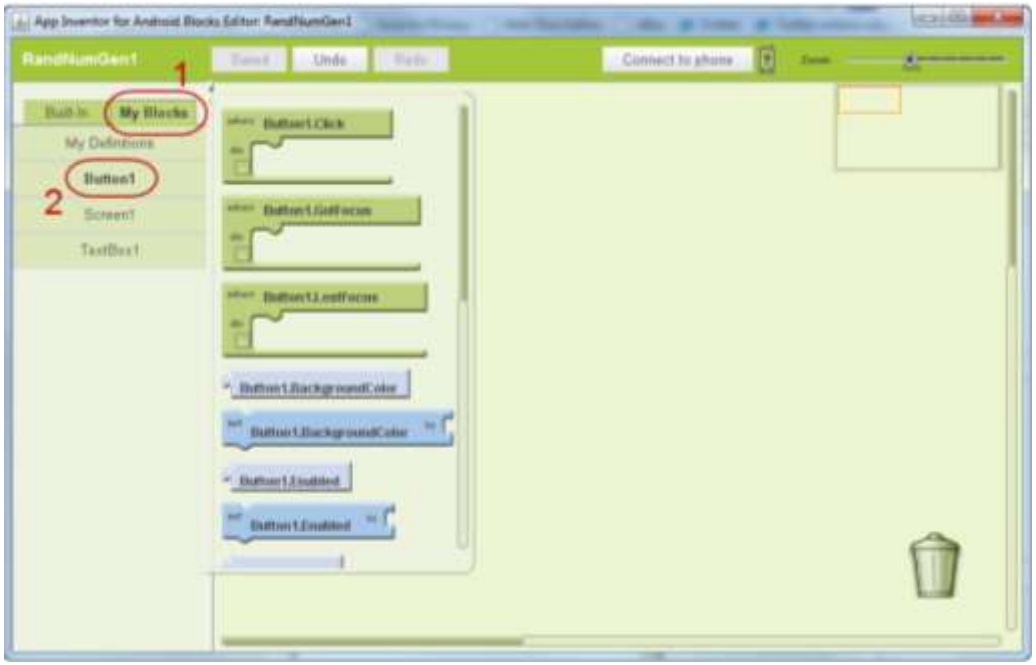
Properties of the Components

- Select any Visible or non Visible Component.
- In the right corner we can see the properties of
  the item.



Behaviour

- Behavior is same as the code part in windows forms.
- Behavior is defined using Block Editor.



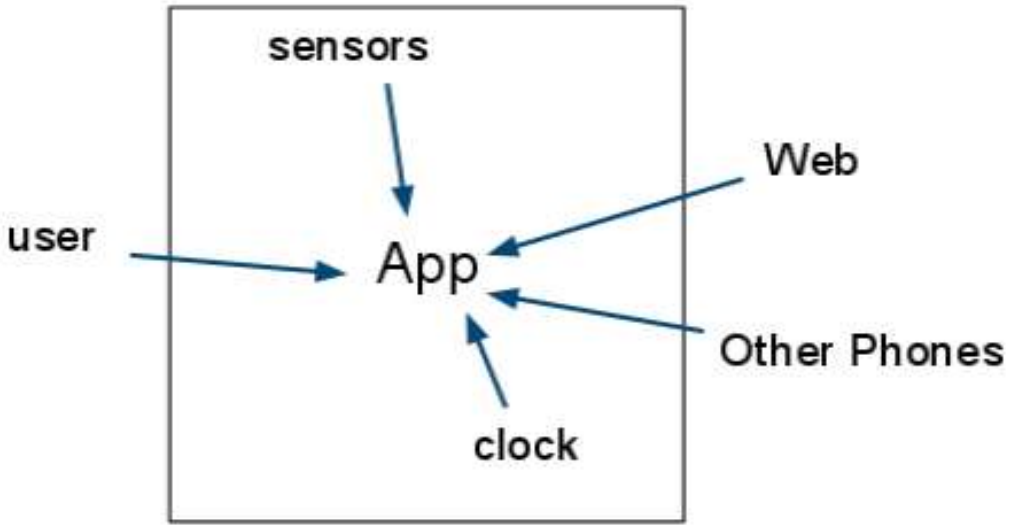
Define a variable

- Defining:
  - Go to Built in Tab Drag Drop the Define Variable
  - Set its name by clicking on ‘variable’.
  - Set its Datatype by clicking the ‘Down arrow’ next to ‘?’.

  - Assign it the value by clicking the newly appeared value and then typing in the new value.
  - Demo.

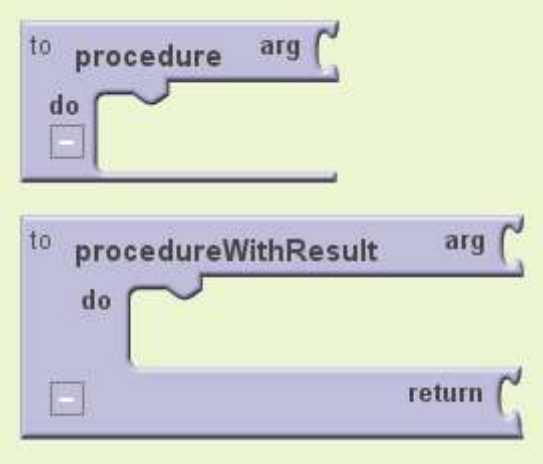
Possible Events

Event Types	Example
User-initiated Events	Button click
Initialization Events	At App launch
Timer Events	After 1 sec do something
External Events	Receive a text



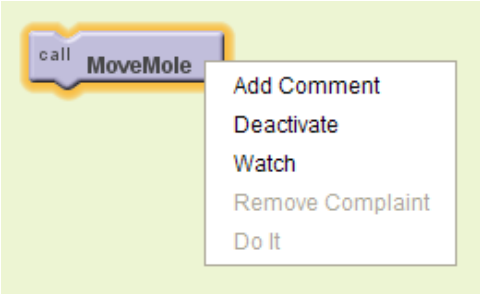
Define a function

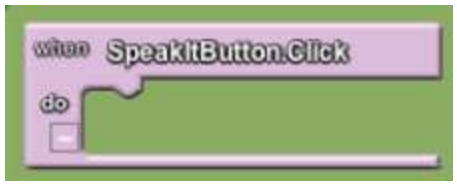
- Set of activities grouped together.
- Can send in Multiple Arguments
- Two Types of functions
  - With return values.
  - With out return values.



Test and Debug

- **Deactivate**
  - Right Click on a block and choose Deactivate.
  - Choosing *Deactivate* from the block menu will keep the block from becoming part of the app when you package it.
  - Selecting *Activate* restores the deactivated block.
- **Collapsing blocks**
  - If your app has many blocks, they won't all fit on the screen at once.
  - Use *block collapsing*.
  - Click on the minus sign at the lower left of any block.
  - Only the title will be visible.
  - Click on the plus sign to restore the block to full visibility.





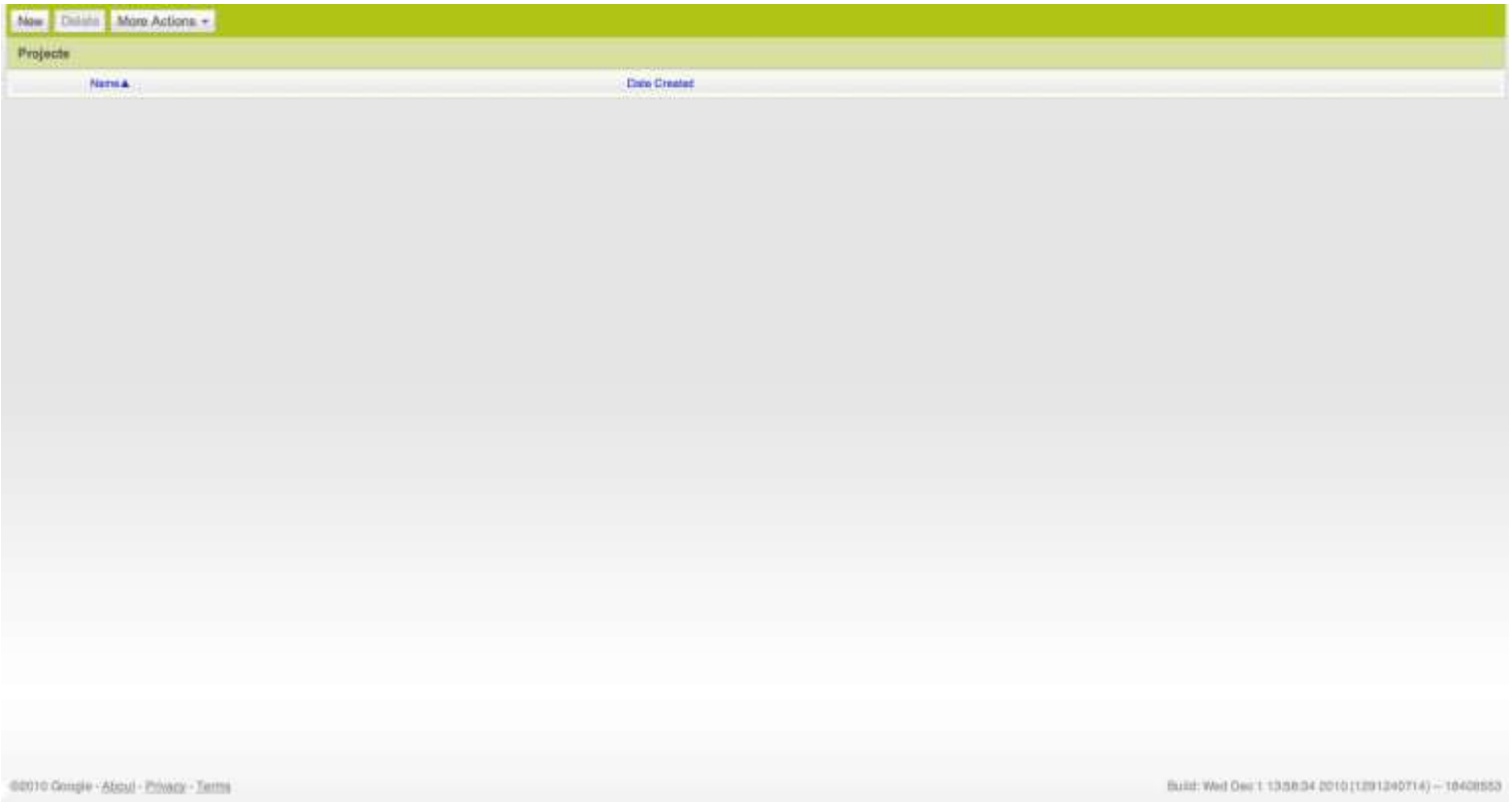
Emulator

- **Starting the Emulator**
  - You don't need to download any additional software to use the emulator.
  - It was included with the software you already downloaded as part of the App Inventor Extras Package.
  - Navigate to the directory where the App Inventor Extras software was installed, locate the folder called commands-for-appinventor
  - Run the command ‘run-emulator’.

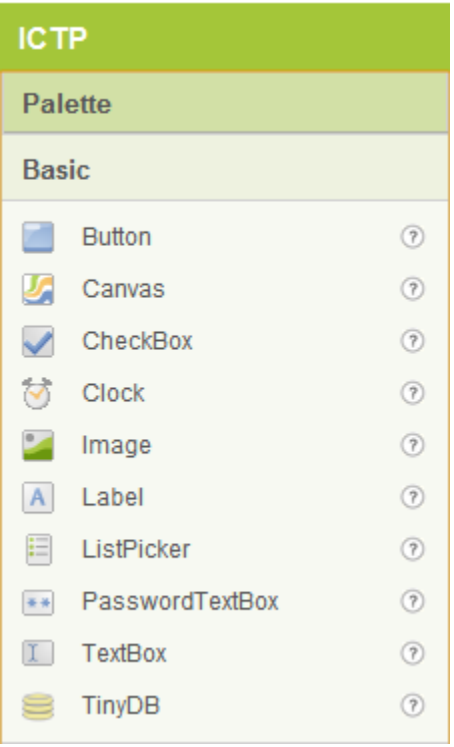
Project upload/download

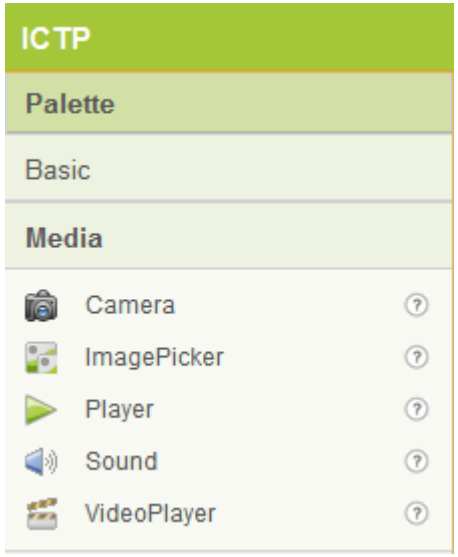
- **Download Source**
  - Go to the *My Projects* page,
  - Select a project,
  - Then choose *More Actions | Download Source*.
  - This will create a zip file which you can share with others.
- **Upload Source**
  - To upload a project, go to *My Projects*,
  - Choose *More Actions | Upload Source*,
  - Choose the zip file previously downloaded from App Inventor.

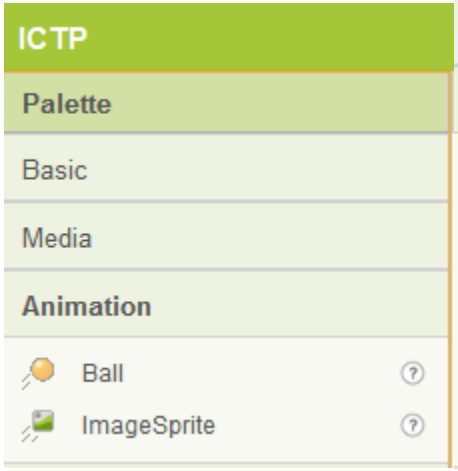
First Time Login

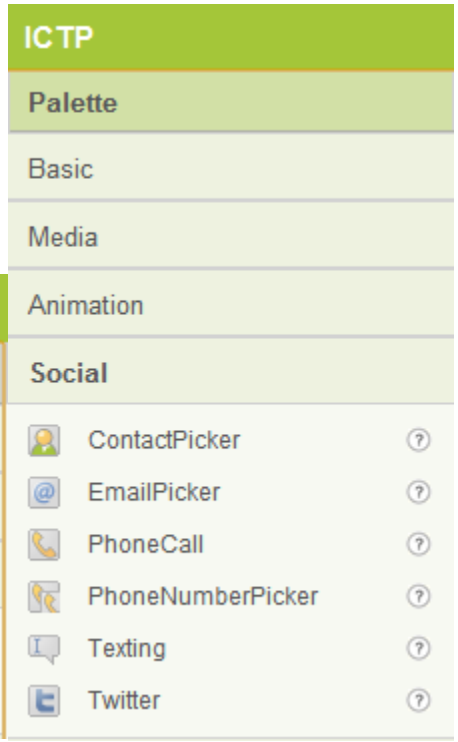


Pallette

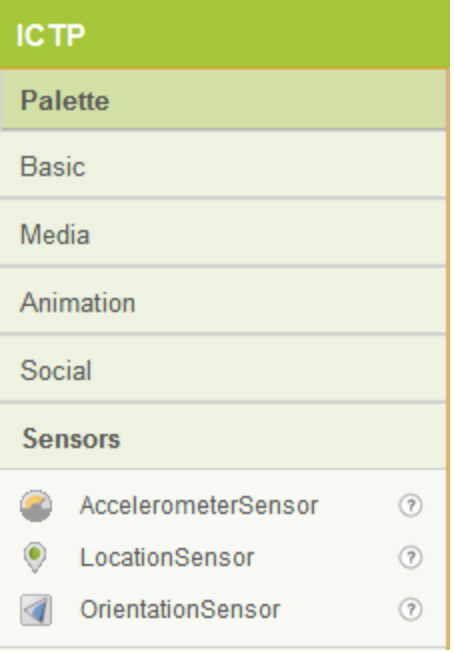

ICTP
Palette
Basic
Button
Canvas
CheckBox
Clock
Image
Label
ListPicker
PasswordTextBox
TextBox
TinyDB

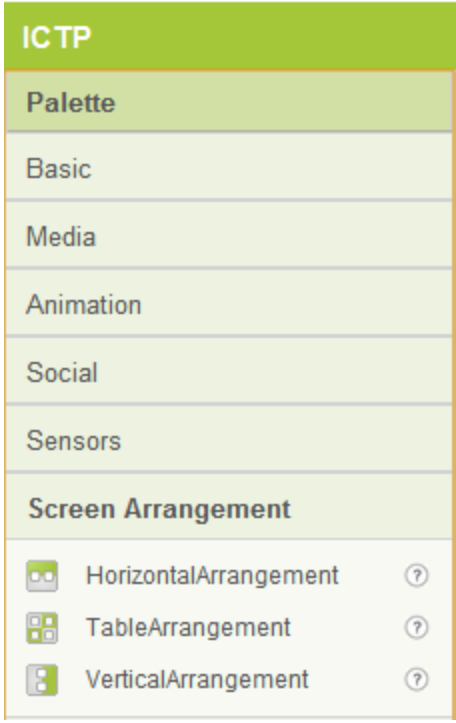

ICTP
Palette
Basic
Media
Camera
ImagePicker
Player
Sound
VideoPlayer


ICTP
Palette
Basic
Media
Animation
Ball
ImageSprite

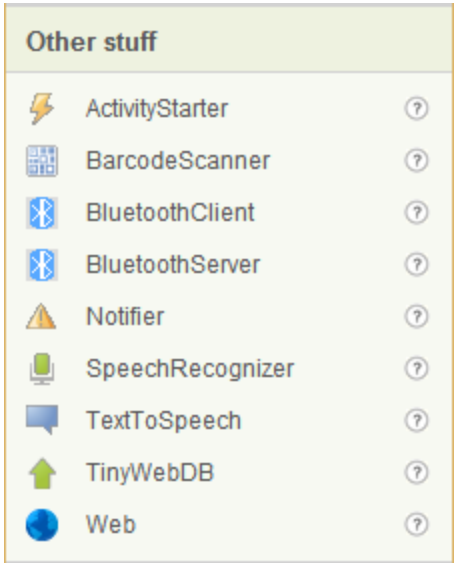

ICTP
Palette
Basic
Media
Animation
Social
ContactPicker
EmailPicker
PhoneCall
PhoneNumberPicker
Texting
Twitter

Pallatte

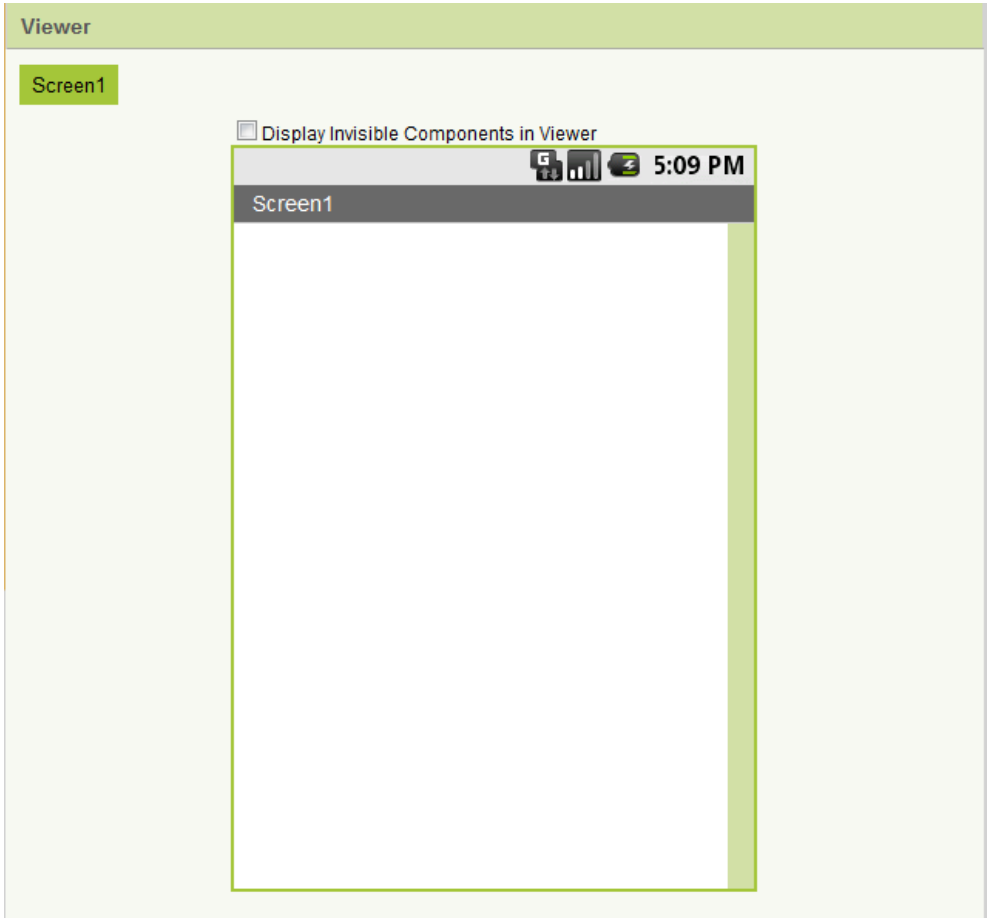

ICTP
Palette
Basic
Media
Animation
Social
Sensors
AccelerometerSensor
LocationSensor
OrientationSensor


ICTP
Palette
Basic
Media
Animation
Social
Sensors
Screen Arrangement
HorizontalArrangement
TableArrangement
VerticalArrangement

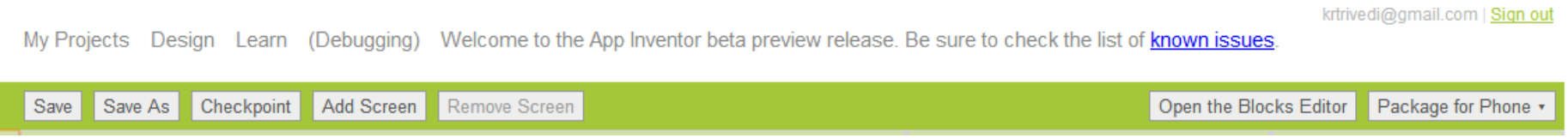

Not ready for prime time
FusiontablesControl
GameClient
SoundRecorder
Voting
WebViewer

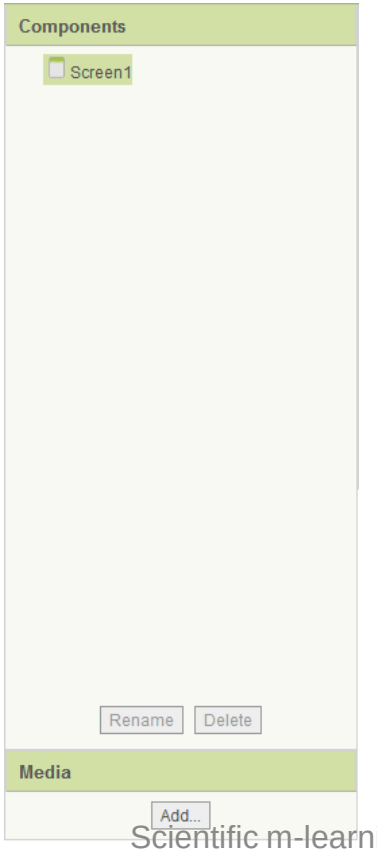

Other stuff
ActivityStarter
BarcodeScanner
BluetoothClient
BluetoothServer
Notifier
SpeechRecognizer
TextToSpeech
TinyWebDB
Web

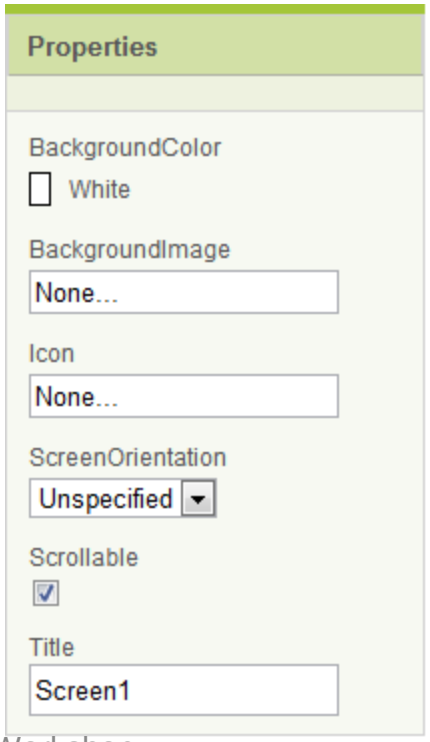
Viewer / Workspace



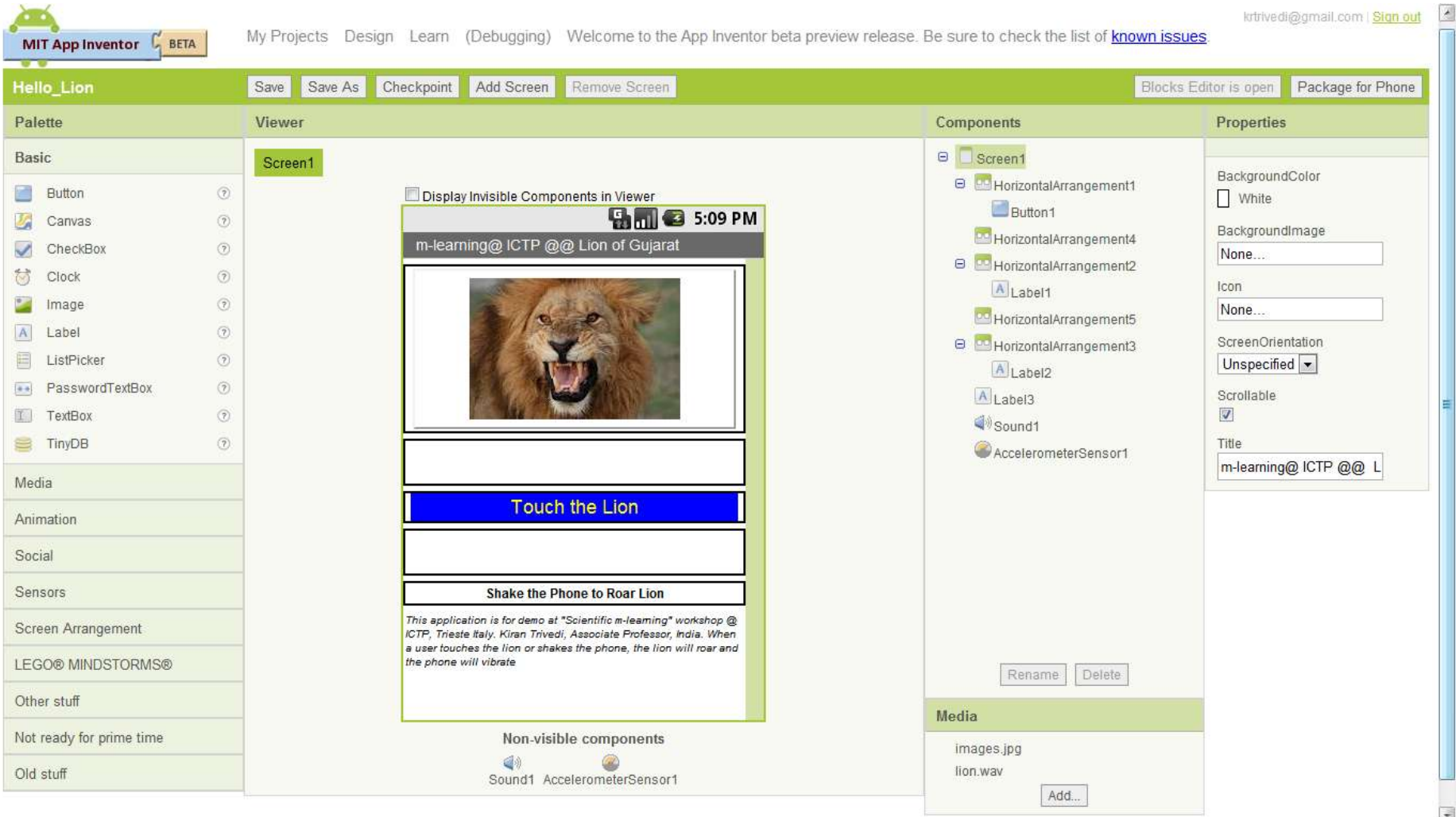
Component Properties



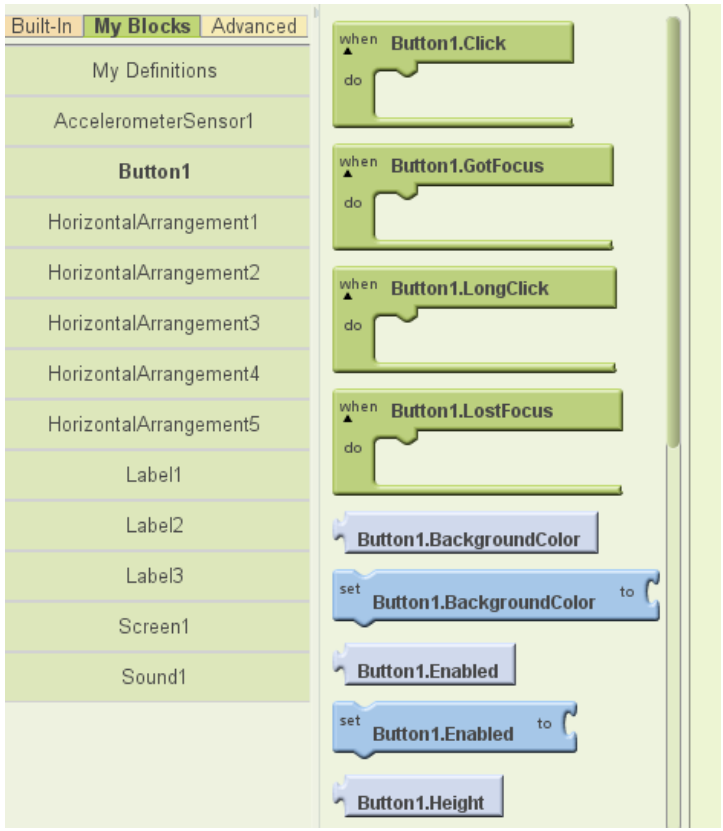


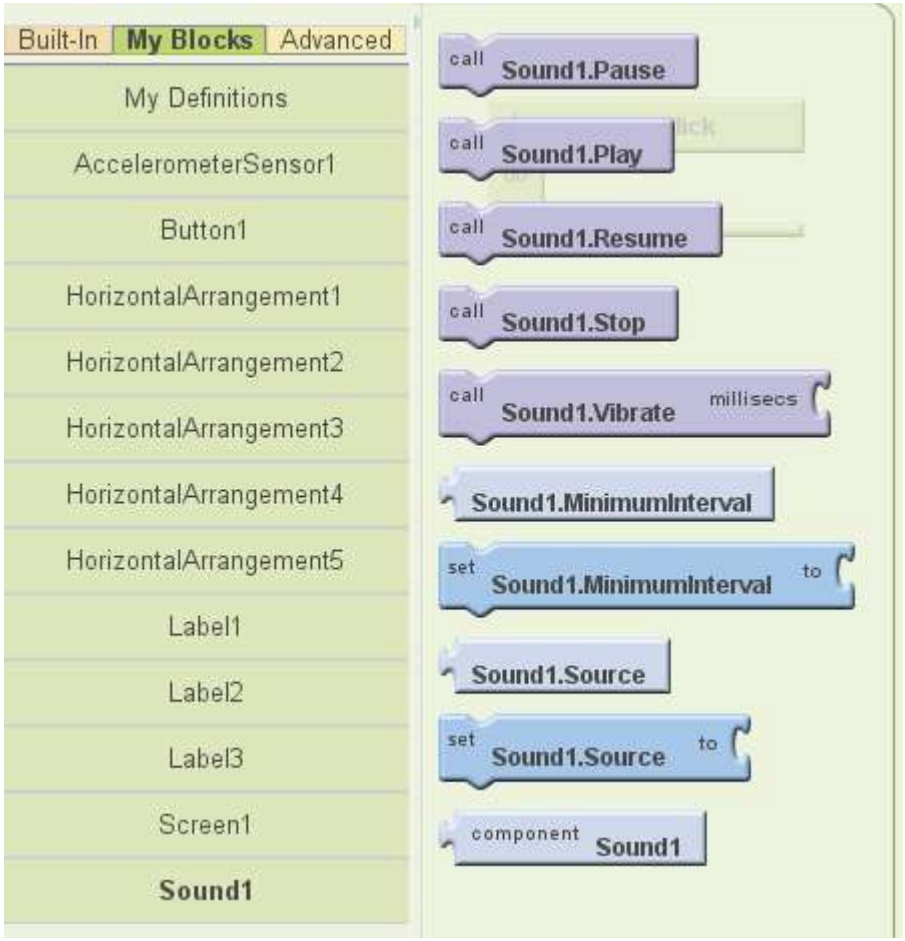


First Example !



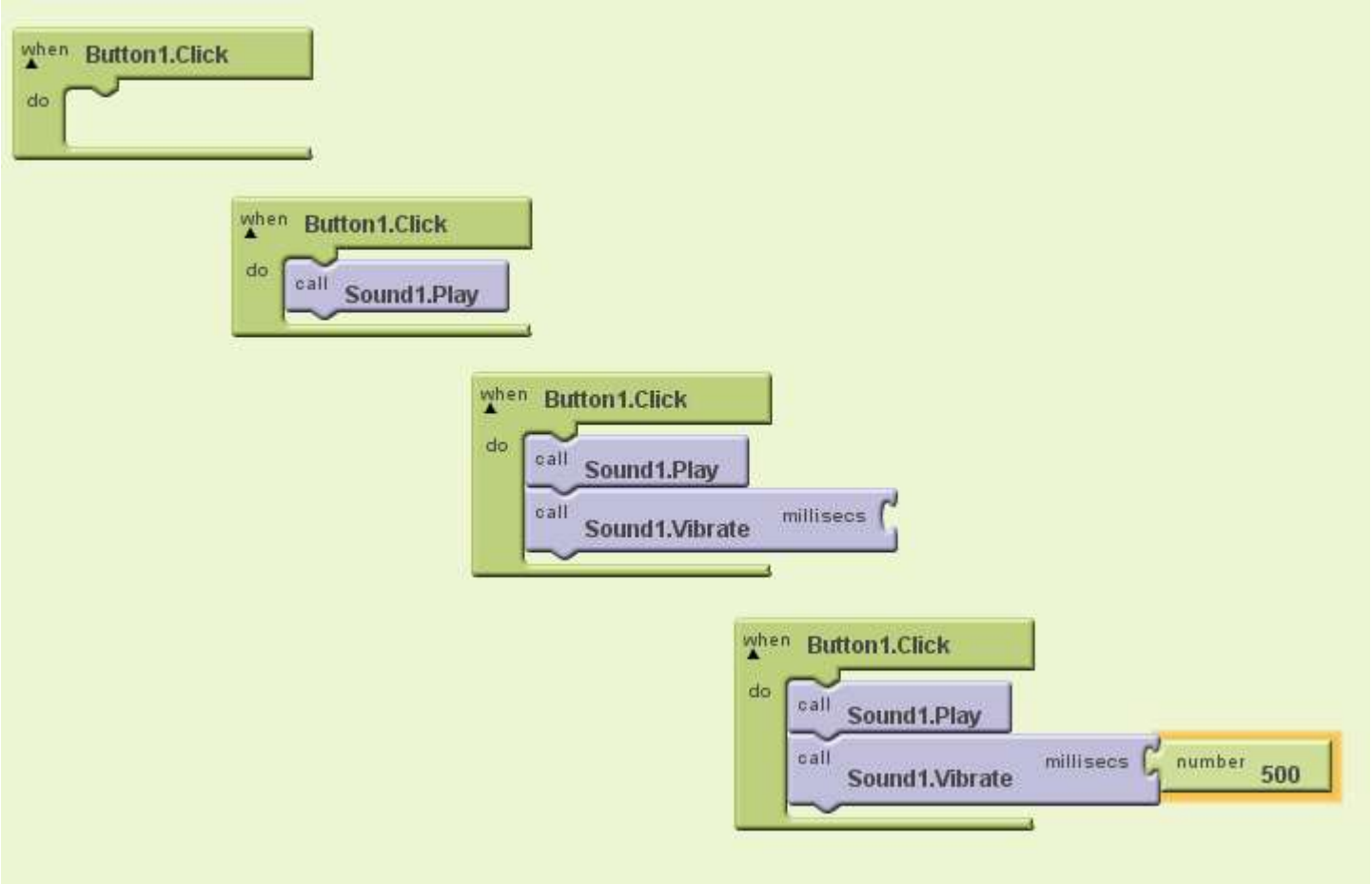
My Blocks


Built-In
My Blocks
Advanced
My Definitions
AccelerometerSensor1
Button1
HorizontalArrangement1
HorizontalArrangement2
HorizontalArrangement3
HorizontalArrangement4
HorizontalArrangement5
Label1
Label2
Label3
Screen1
Sound1
when Button1.Click do
when Button1.GotFocus do
when Button1.LongClick do
when Button1.LostFocus do
Button1.BackgroundColor
set Button1.BackgroundColor to
Button1.Enabled
set Button1.Enabled to
Button1.Height

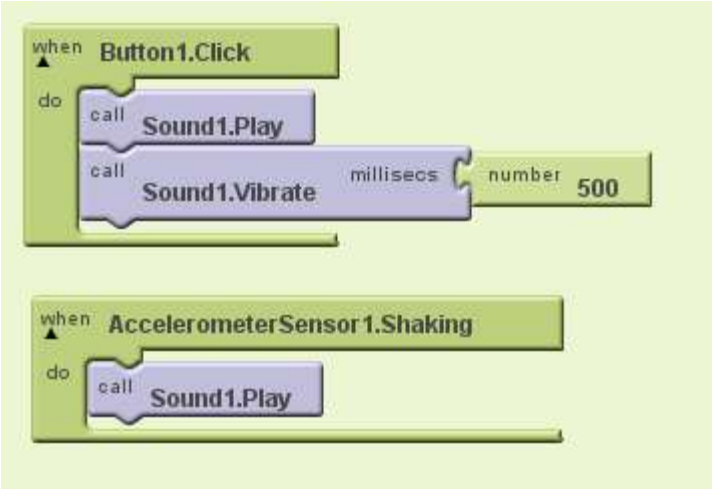

Built-In
My Blocks
Advanced
My Definitions
AccelerometerSensor1
Button1
HorizontalArrangement1
HorizontalArrangement2
HorizontalArrangement3
HorizontalArrangement4
HorizontalArrangement5
Label1
Label2
Label3
Screen1
Sound1
call Sound1.Pause
call Sound1.Play
call Sound1.Resume
call Sound1.Stop
call Sound1.Vibrate millisecs
Sound1.MinimumInterval
set Sound1.MinimumInterval to
Sound1.Source
set Sound1.Source to
component Sound1


Built-In
My Blocks
Advanced
My Definitions
AccelerometerSensor1
Button1
HorizontalArrangement1
HorizontalArrangement2
HorizontalArrangement3
HorizontalArrangement4
HorizontalArrangement5
Label1
Label2
Label3
Screen1
Sound1
when AccelerometerSensor1.AccelerationChanged
xAccel
yAccel
zAccel
do
when AccelerometerSensor1.Shaking
do
AccelerometerSensor1.Available
AccelerometerSensor1.Enabled
set AccelerometerSensor1.Enabled to
AccelerometerSensor1.XAccel
AccelerometerSensor1.YAccel
AccelerometerSensor1.ZAccel
component AccelerometerSensor1

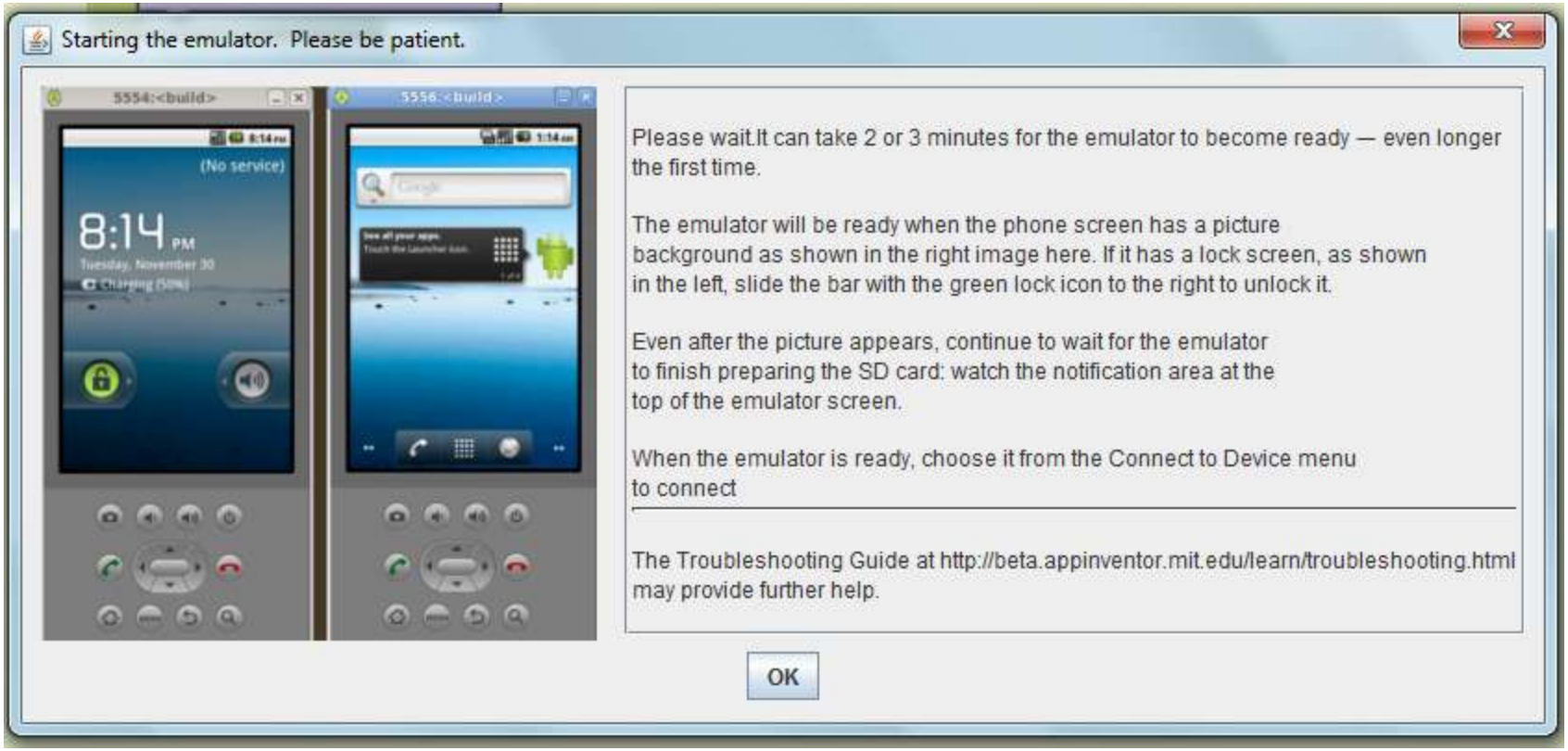
Step by Step Block Creation



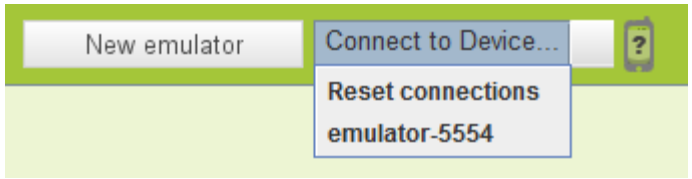
Setting up Blocks for Hello_Lion



Running an Emulator

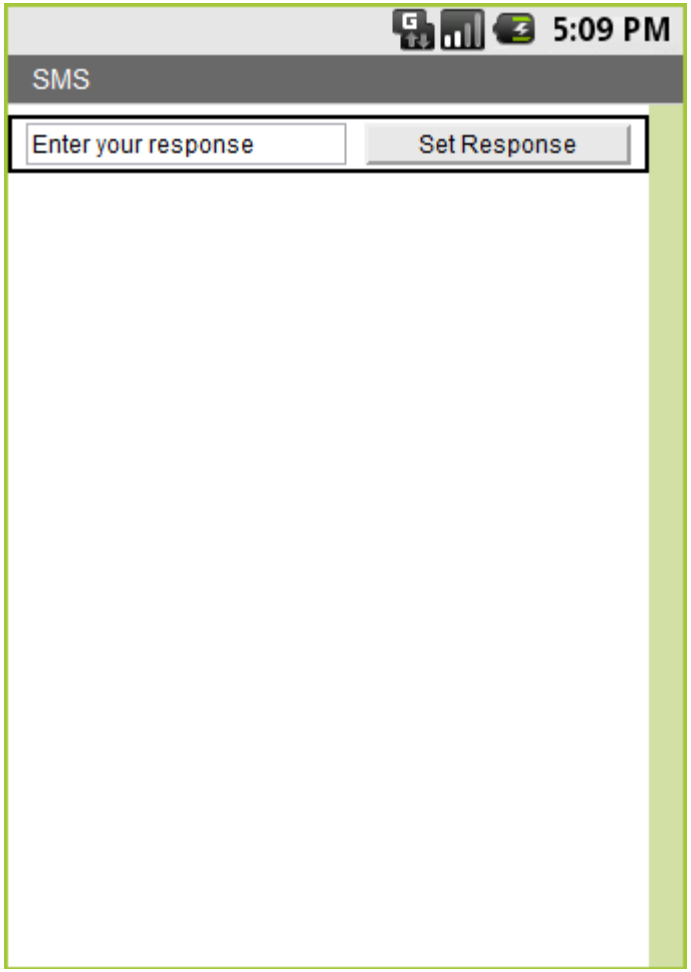


Connect to Emulator

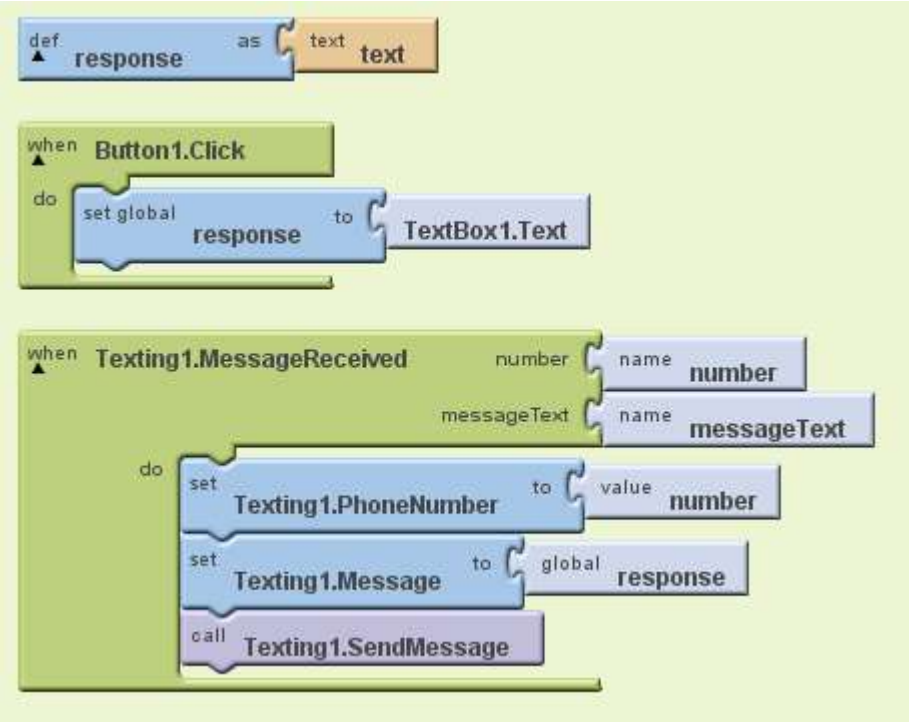


Example: SMS Auto Responder

UI

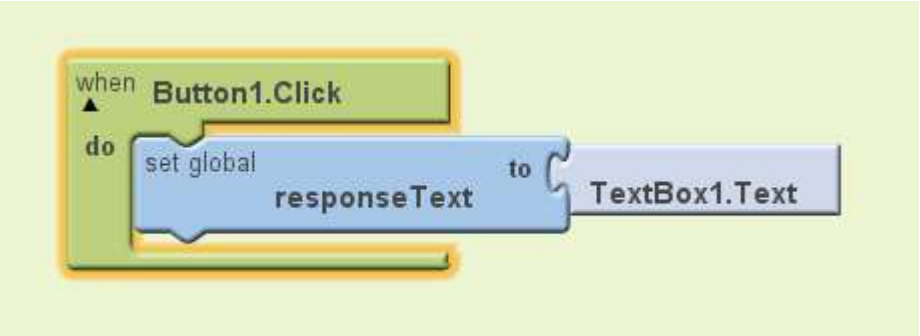


Basic Auto Responder



Define the Varible

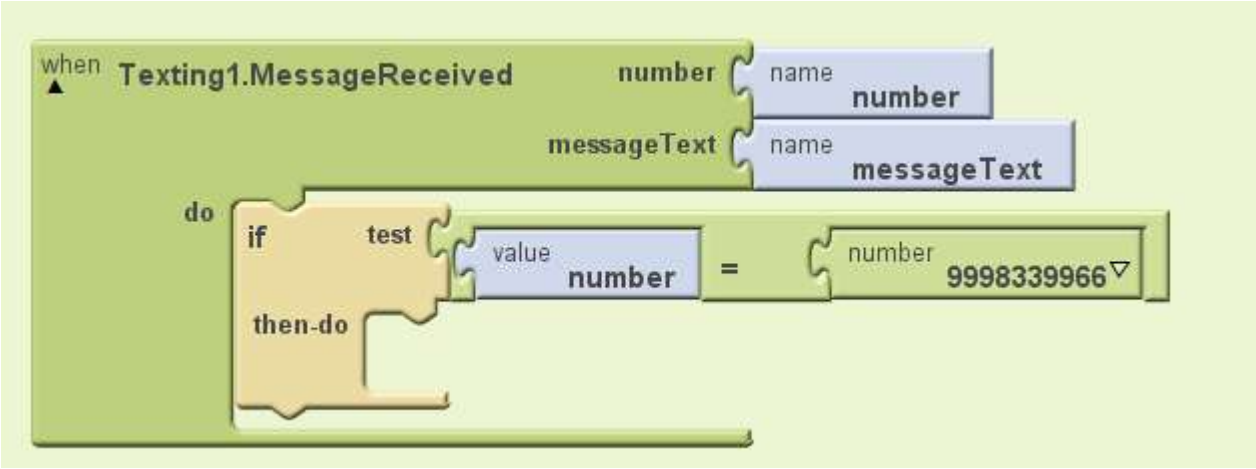
Add Click Event to Button for changing the response text



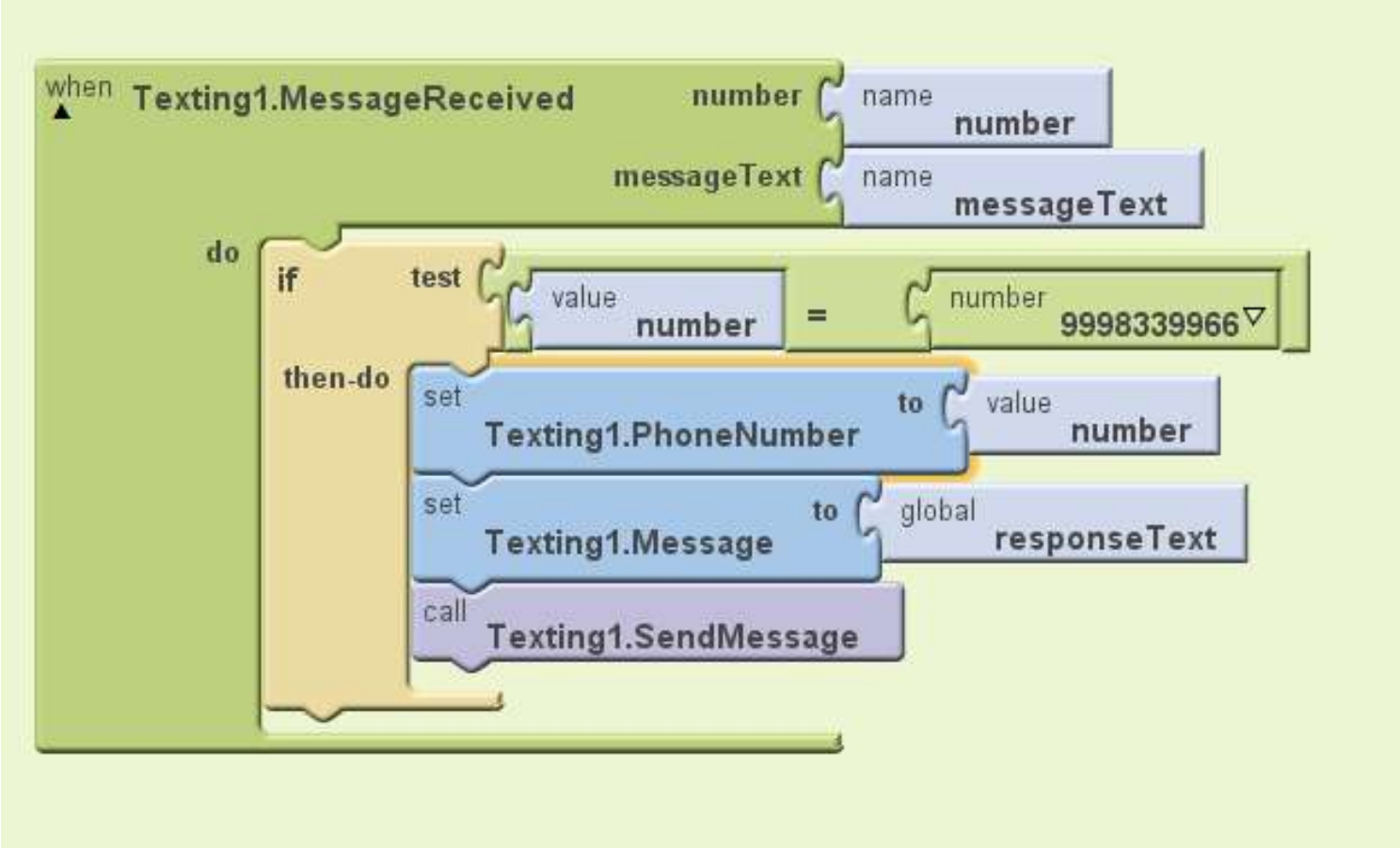
Add Message Received Event

Add If Else from built in control block

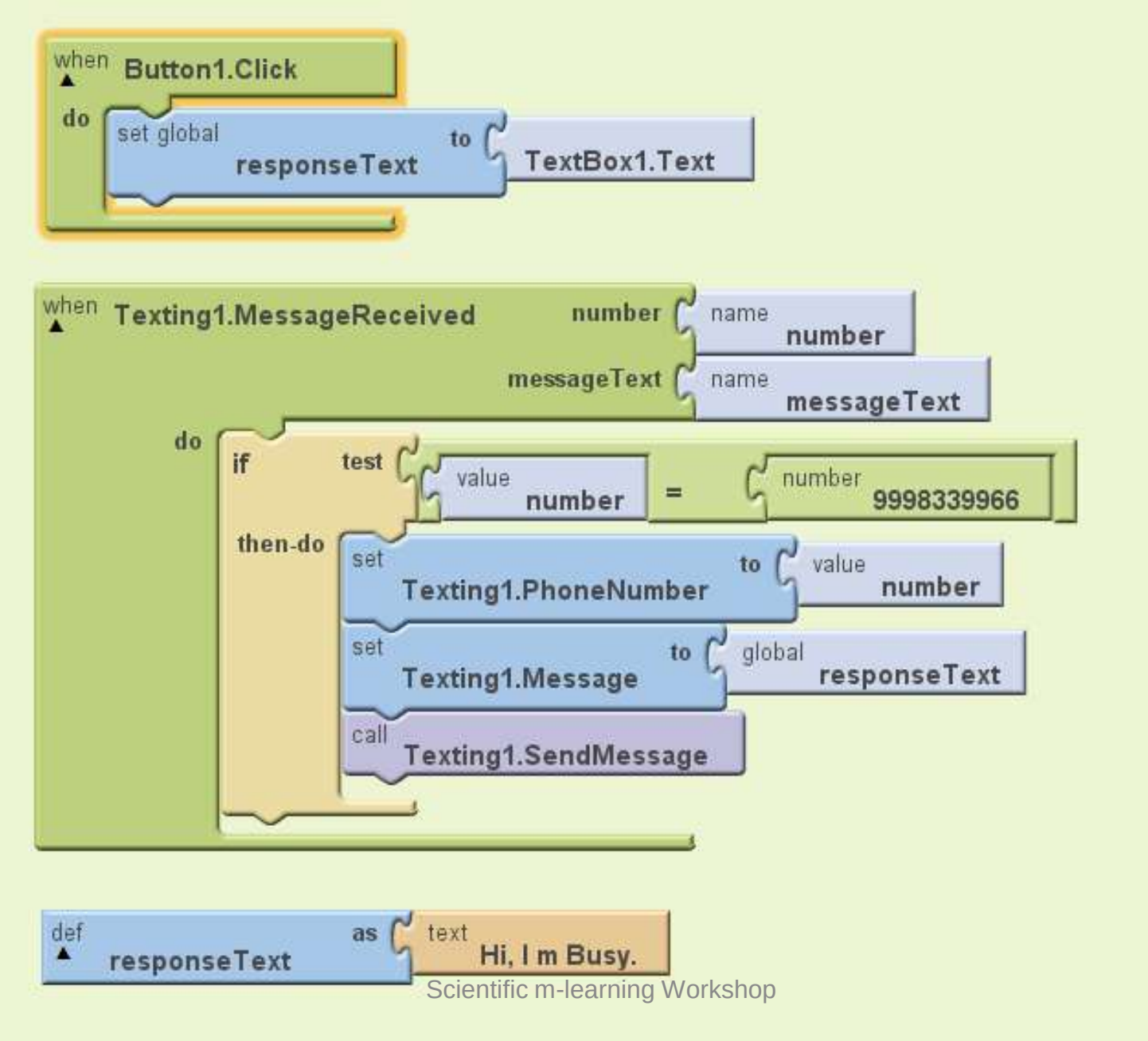
- This app will response to a specific number



Set the SMS text and phone number for sending the SMS

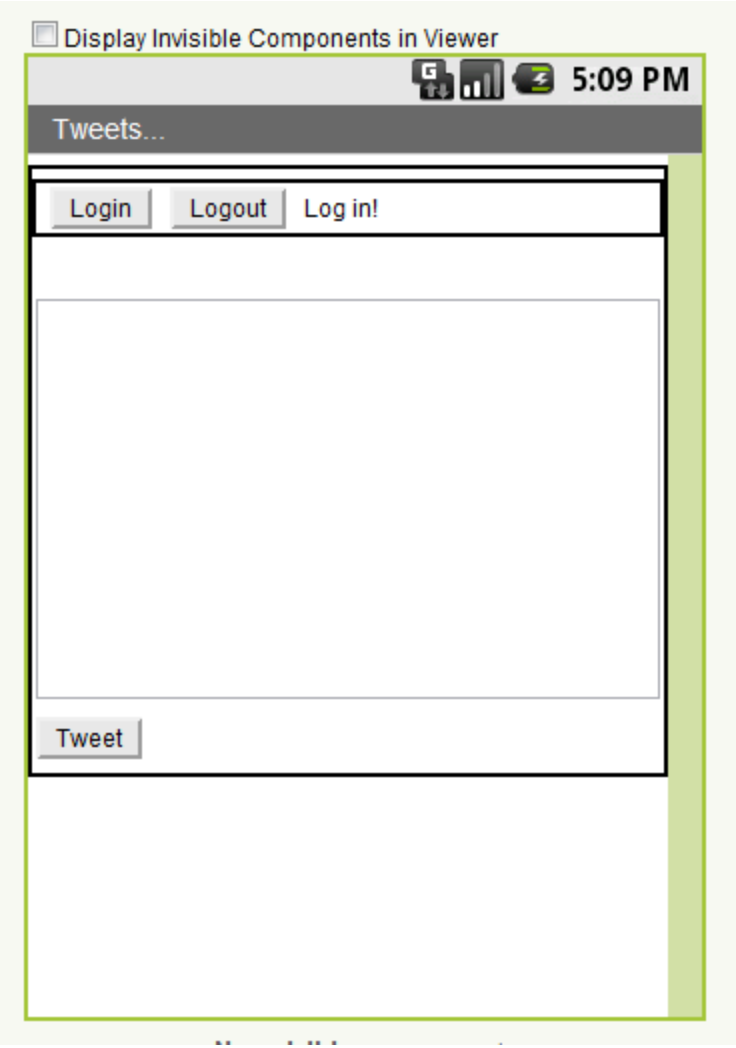


Complete Application

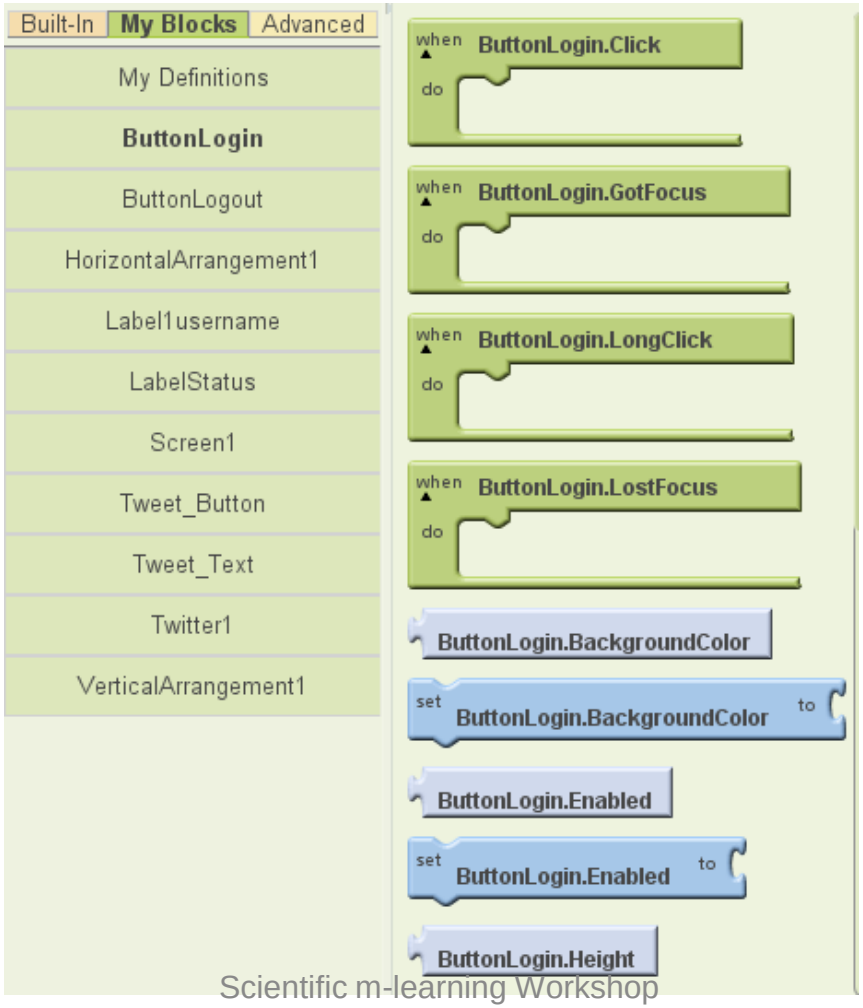


Now Let us make a Workshop Twitter

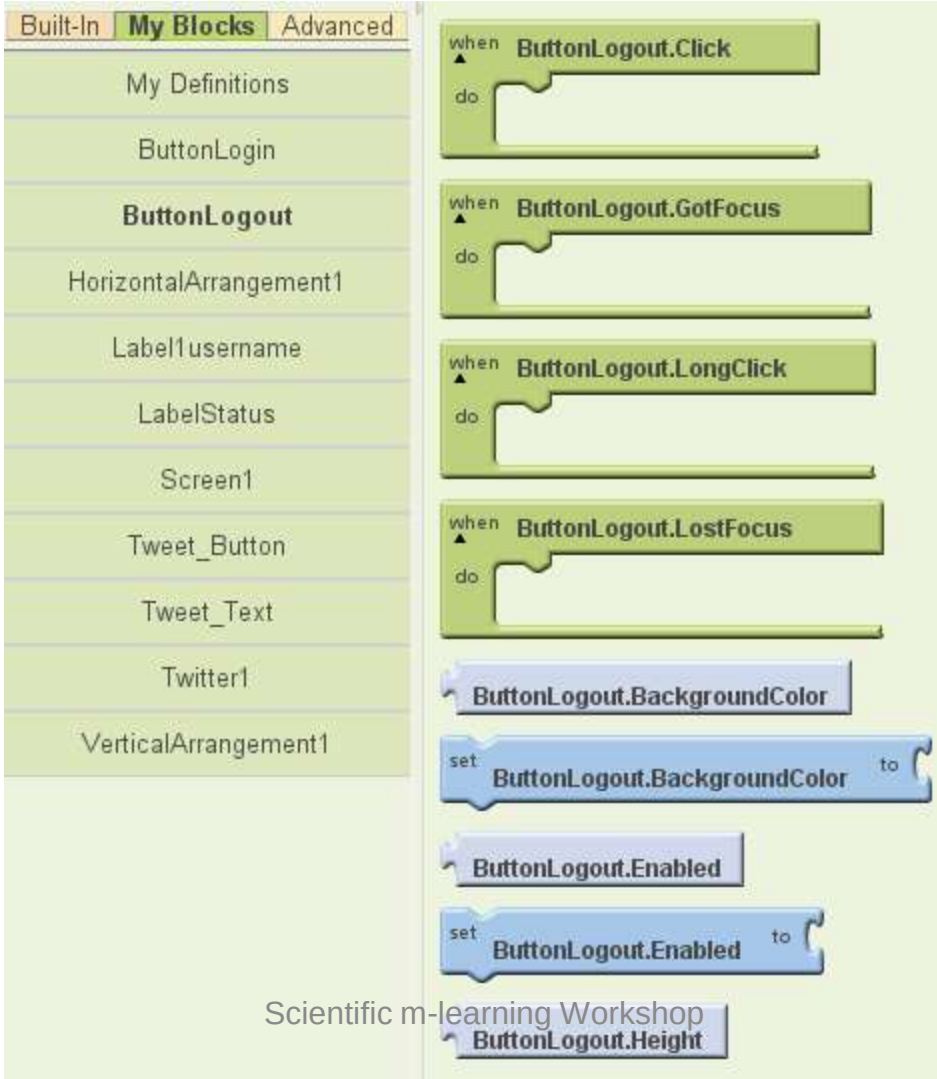
The UI for the Twitter App



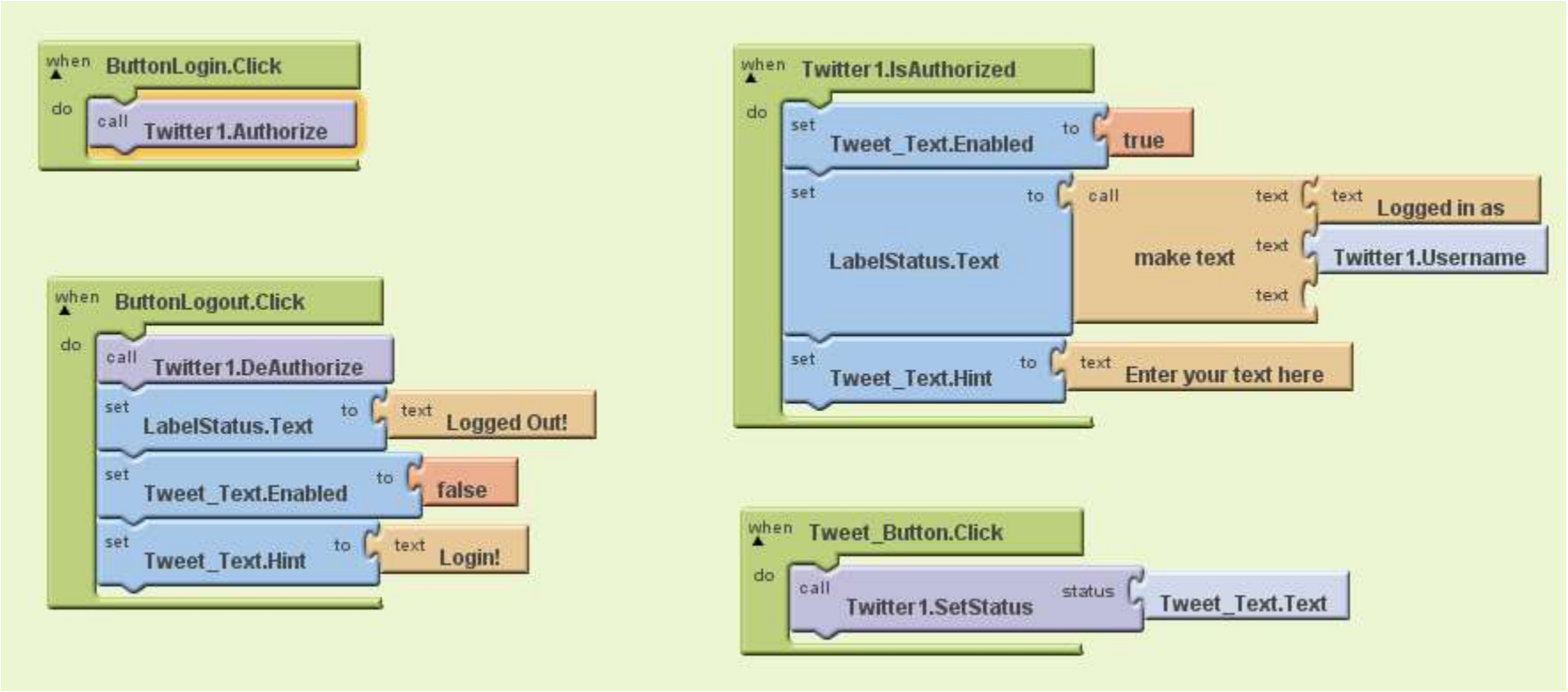
Login Button Definition



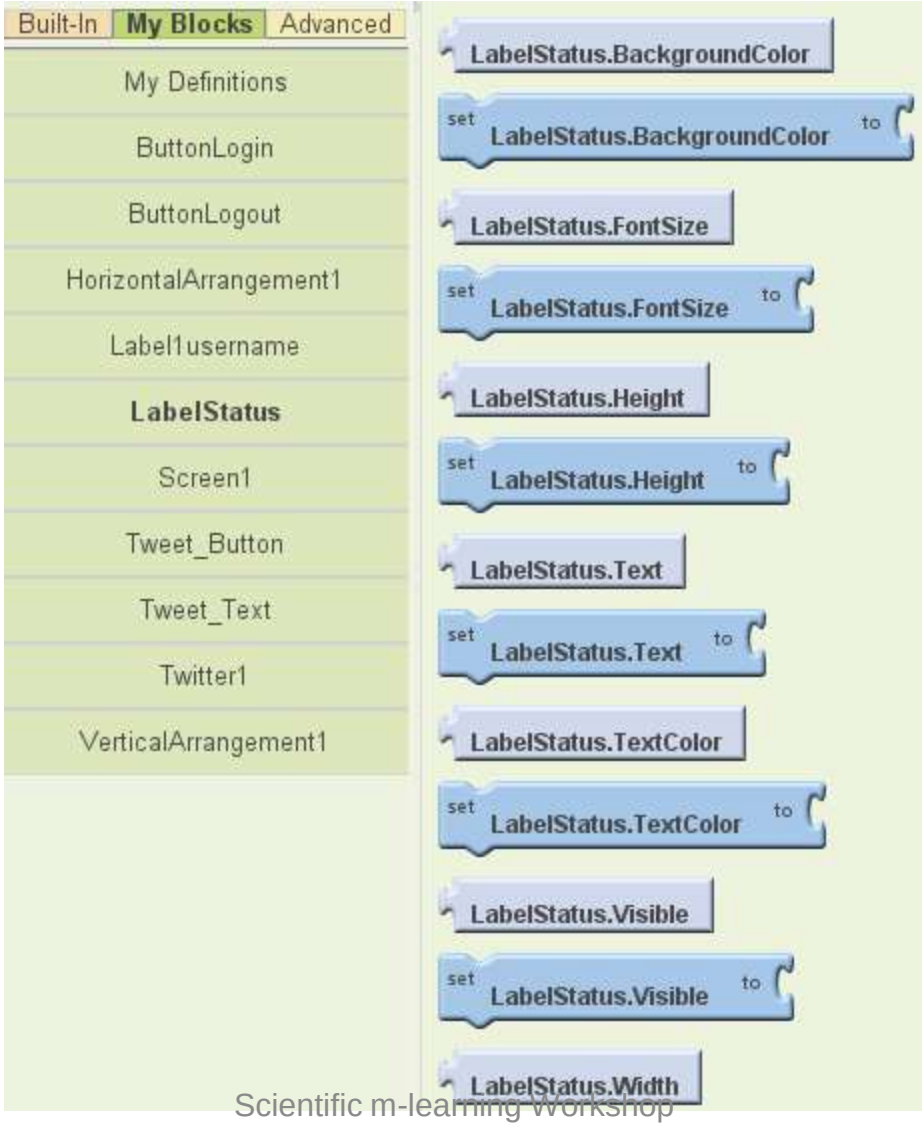
Logout Button Defination



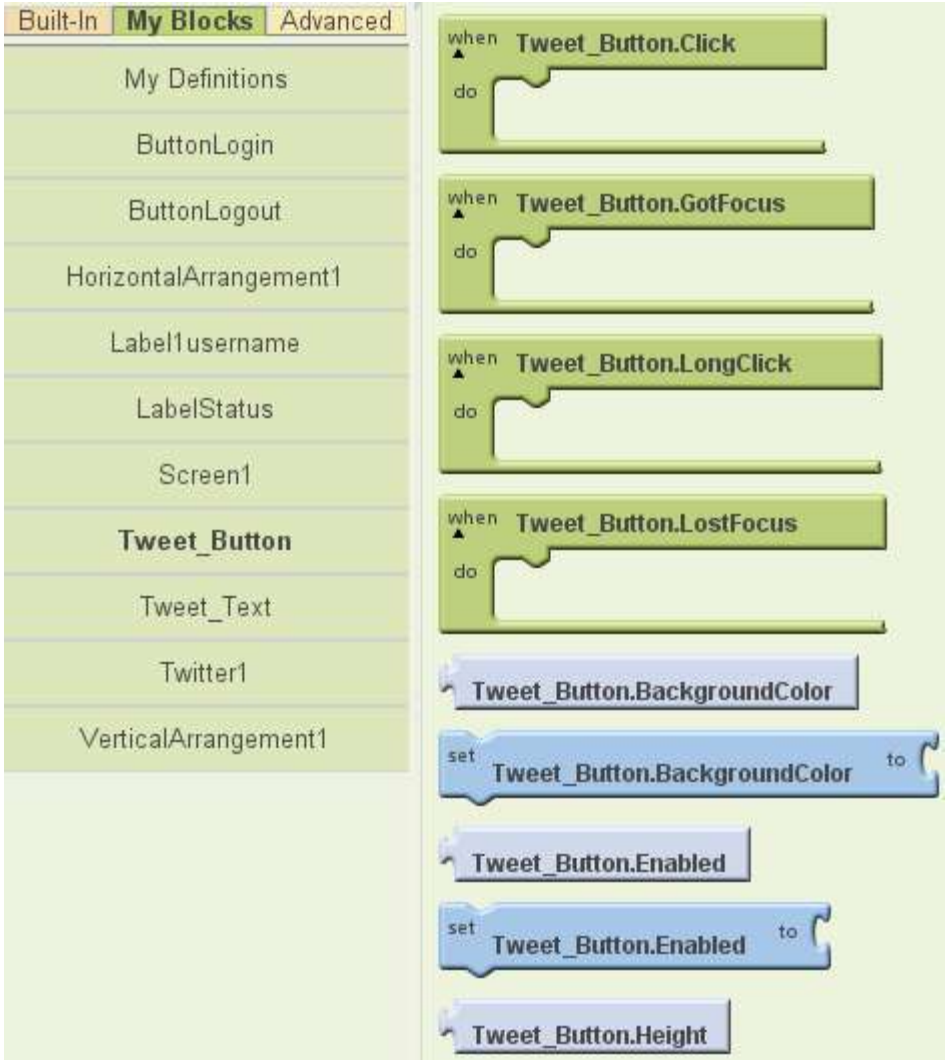
Ingredients



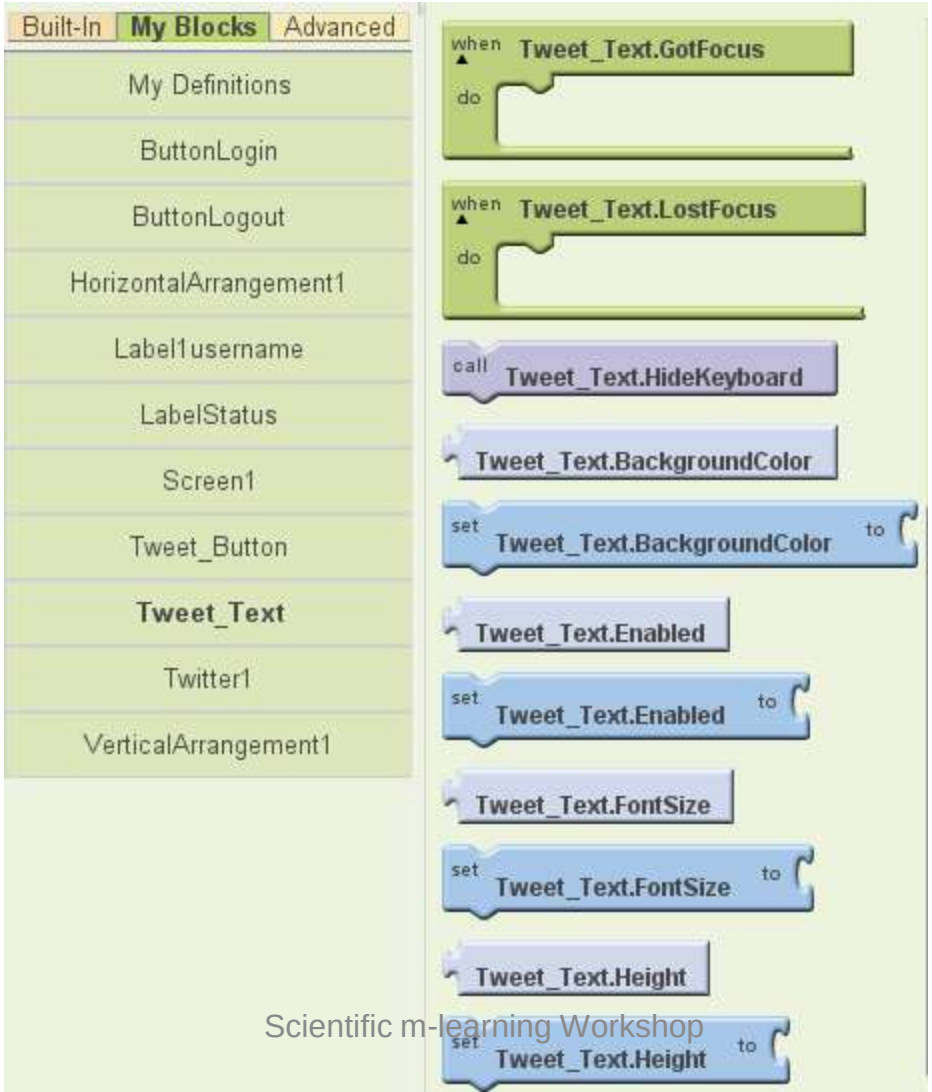
LabelStatus Defination



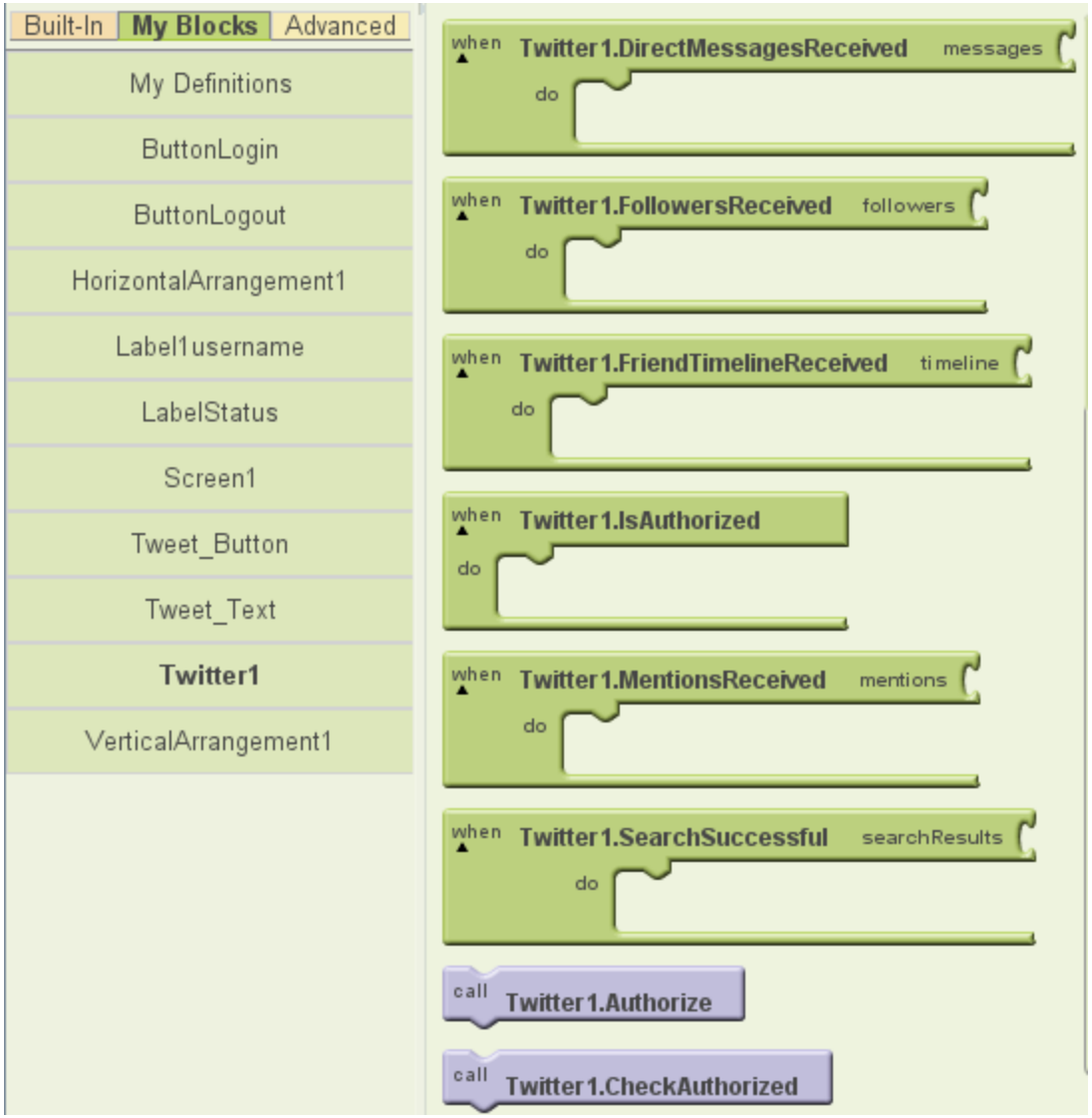
Twitt Button Definition



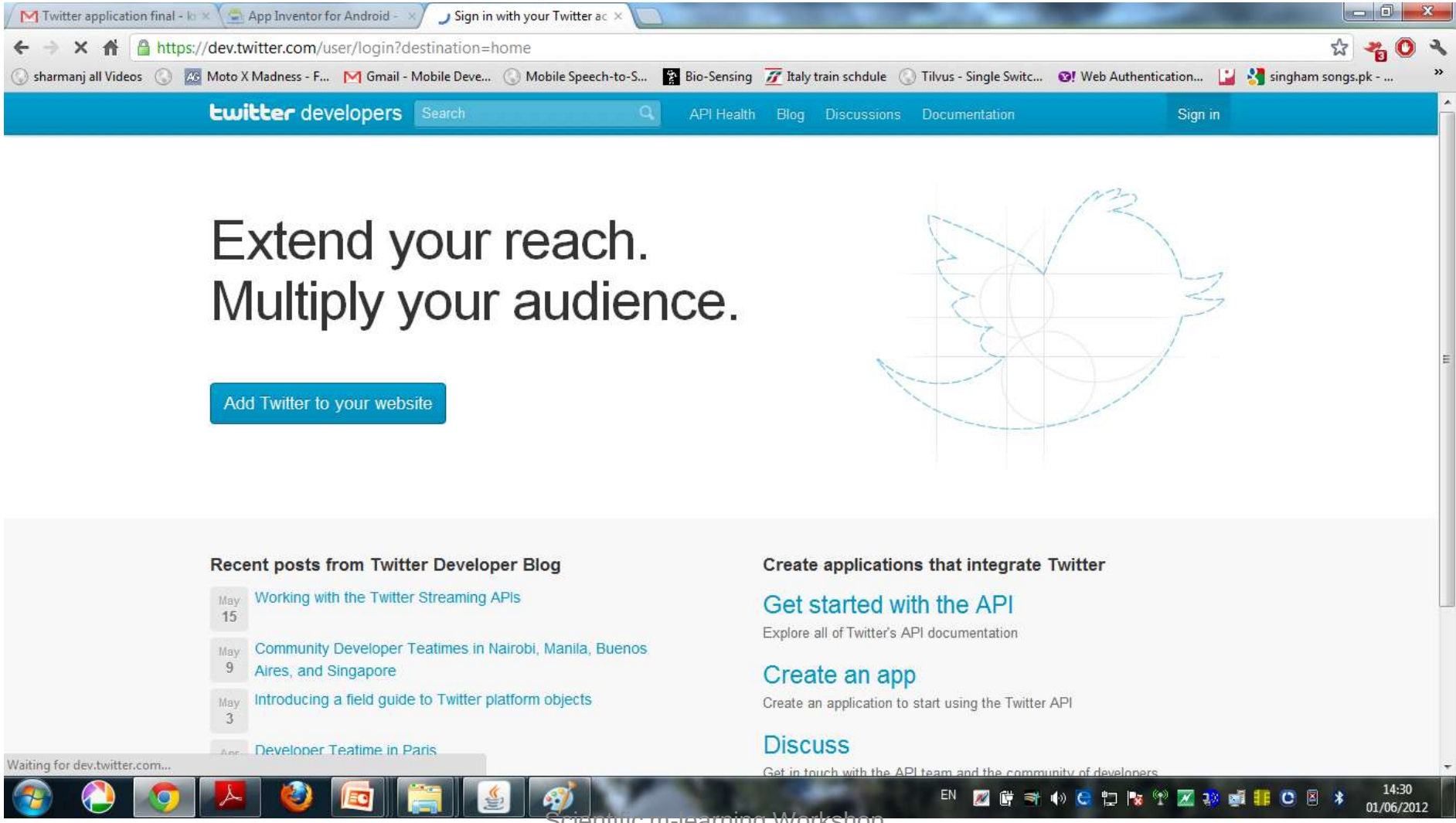
Twitt Text Definition



Twitter1 Definition



Add Twitter to your Application



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Home → My applications

ICTP m-learning Workshop

Details | **Settings** | OAuth tool | @Anywhere domains | Reset keys | Delete

Application Details

Name: *

ICTP m-learning Workshop

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description: *

ICTP Workshop

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

WebSite: *

http://mobapps.org

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.
(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

Application Icon

Change icon:

Choose File | No file chosen

Maximum size of 700k. JPG, GIF, PNG.

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Application Icon

Change icon:

Choose File No file chosen

Maximum size of 700k. JPG, GIF, PNG.

Application Type

Access:

- Read only
- Read and Write
- Read, Write and Access direct messages

What type of access does your application need? Note: @Anywhere applications require read & write access.
Find out more about our Application Permission Model.

Callback URL:

http://twitter.com

Where should we return after successfully authenticating? For @Anywhere applications, only the domain specified in the callback will be used. OAuth 1.0a applications should explicitly specify their `oauth_callback` URL on the request token step, regardless of the value given here. To restrict your application from using callbacks, leave this field blank.

Organization

Organization name:

Kiran Trivedi

The organization or company behind this application, if any.

Organization website:

http://myssec.com

The organization or company behind this application's web page, if any.

Twitter application final - | App Inventor for Android - | ICTP m-learning Workshop | School of Engineering | www.rku.ac.in/phddocs/T | www.rku.ac.in/phddocs/D

https://dev.twitter.com/apps/2419263/show

sharmanj all Videos | Moto X Madness - F... | Gmail - Mobile Deve... | Mobile Speech-to-S... | Bio-Sensing | Italy train schdule | Tilvus - Single Switc... | Web Authentication... | singham songs.pk - ...

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Organization	None
Organization website	None

OAuth settings

Your application's OAuth settings. Keep the "Consumer secret" a secret. This key should never be human-readable in your application.

Access level	Read-only About the application permission model
Consumer key	fy0CUn3kNRixRkSmT2X91Q
Consumer secret	hJYGYKo3jUw7rh2Et2EAg4JO2PEwZ9QIHwXjNx5YE9O
Request token URL	https://api.twitter.com/oauth/request_token
Authorize URL	https://api.twitter.com/oauth/authorize
Access token URL	https://api.twitter.com/oauth/access_token
Callback URL	http://twitter.com

Your access token

It looks like you haven't authorized this application for your own Twitter account yet. For your convenience, we give you the opportunity to create your OAuth access token here, so you can start signing your requests right away. The access token generated will reflect your application's current permission level.

Create my access token

EN 14:50 01/06/2012

Inbox (431) - krtrivedi@gm | App Inventor for Android - | ICTP m-learning Workshop | Twitter / Home | CDSAGENDA V.5 Scientific

https://dev.twitter.com/apps/2419263/show

sharmanj all Videos | Moto X Madness - F... | Gmail - Mobile Deve... | Mobile Speech-to-S... | Bio-Sensing | Italy train schdule | Tilvus - Single Switc... | Web Authentication... | singham songs.pk - ...

twitter developers | Search | API Health | Blog | Discussions | Documentation | krtrivedi

OAuth settings

Your application's OAuth settings. Keep the "Consumer secret" a secret. This key should never be human-readable in your application.

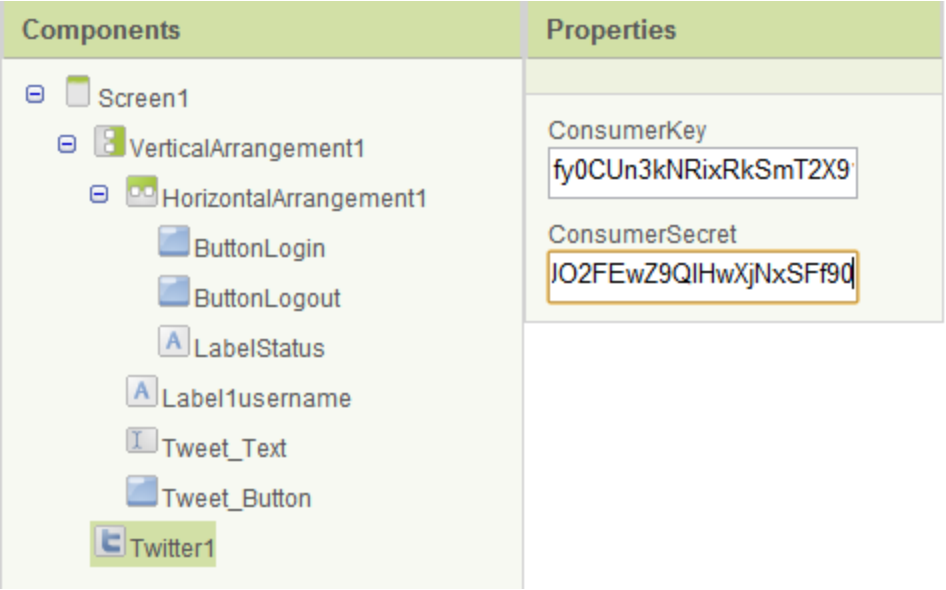
Access level	Read, write, and direct messages About the application permission model
Consumer key	`fy0CUn3kNRixRkSmI2X91Q`
Consumer secret	`n2YGTKo3jUw7rh2EtZEAg4JO2FEwZ9QIHwXjNxSFf90`
Request token URL	`https://api.twitter.com/oauth/request_token`
Authorize URL	`https://api.twitter.com/oauth/authorize`
Access token URL	`https://api.twitter.com/oauth/access_token`
Callback URL	`http://twitter.com`

Your access token

Use the access token string as your "`oauth_token`" and the access token secret as your "`oauth_token_secret`" to sign requests with your own Twitter account. Do not share your `oauth_token_secret` with anyone.

Access token	26739783-olGZyl5qhKyWQvBkKtyPYShZg2MDpG6vZltNt9fMX
Access token secret	BZN0EhnbLLb3rqUa2a8ZHnV4SsZ9OknXq9exdHEnup0
Access level	Read, write, and direct messages

EN 15:41 01/06/2012


Components
Screen1
VerticalArrangement1
HorizontalArrangement1
ButtonLogin
ButtonLogout
LabelStatus
Label1username
Tweet_Text
Tweet_Button
Twitter1
Properties
ConsumerKey
fy0CUn3kNRixRkSmT2X9
ConsumerSecret
JO2FEwZ9QlHwXjNxSFf90

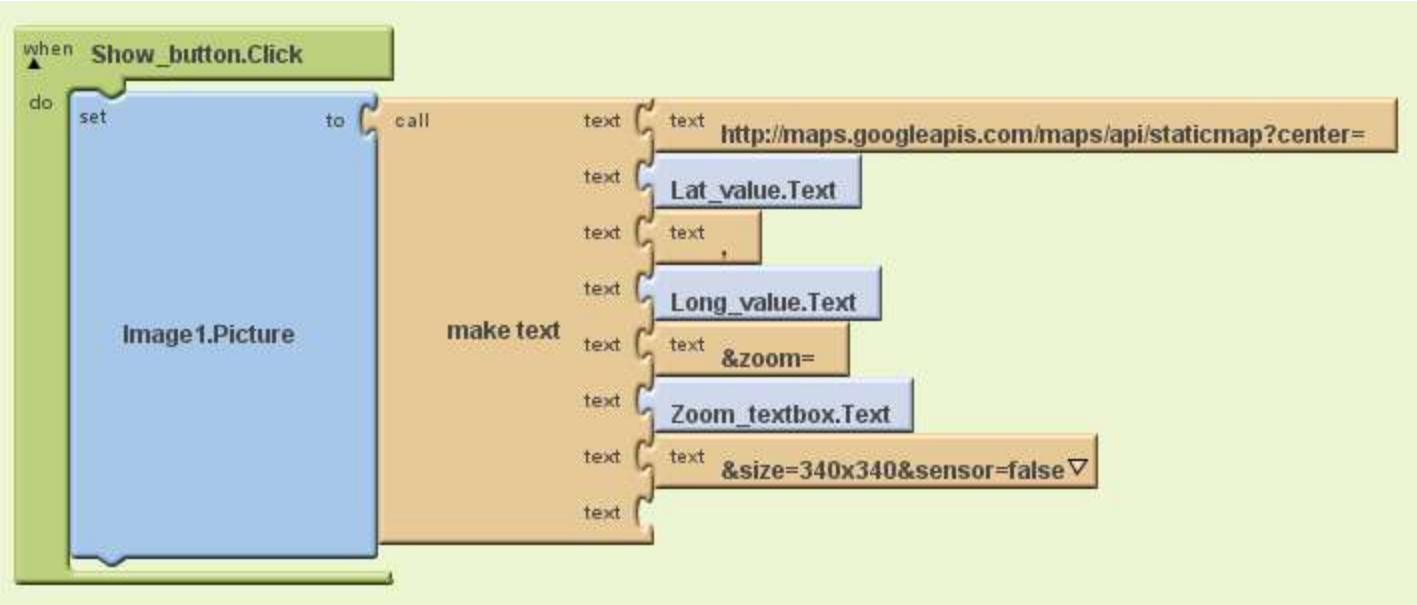

3:43 PM
AppInventorPhoneApp
twitter
Authorize ICTP m-learning Workshop to use your account?
ICTP m-learning Workshop
By Kiran Trivedi
mobapps.org
← Cancel, and return to app
This application will be able to:
• Read Tweets from your timeline.
• See who you follow, and follow new people.
• Update your profile.
• Post Tweets for you.
• Access your direct messages.
Authorize app
No, thanks


3:44 PM
AppInventorPhoneApp
twitter
Redirecting you back to the application. This may take a few moments.
You can revoke access to any application at any time from the Applications tab of your Settings page.
By authorizing an application you continue to operate under Twitter's Terms of Service. In particular, some usage information will be shared back with Twitter. For more, see our Privacy Policy.

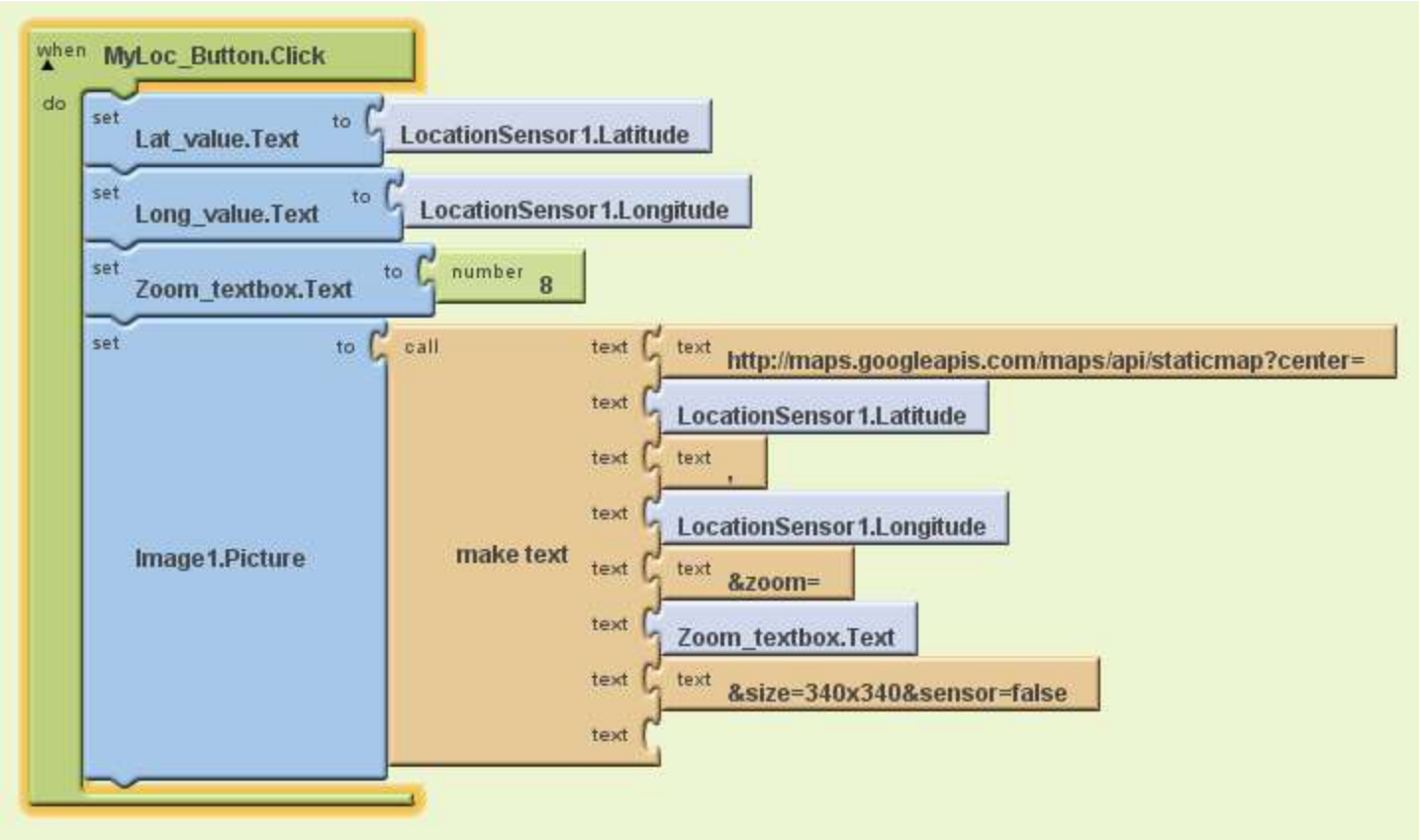

3:45 PM
Tweets...
Login
Logout
Logged in as krtrivedi
Hello Italy, this is my first tweet from emulator for Android device
Tweet

Google Static Map App

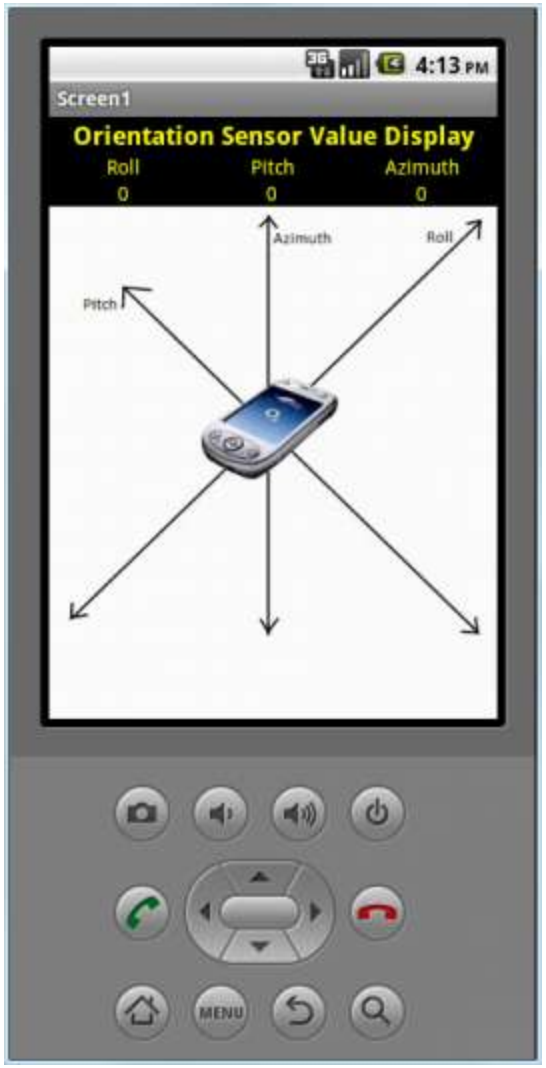
Show Location (Manual Entry)

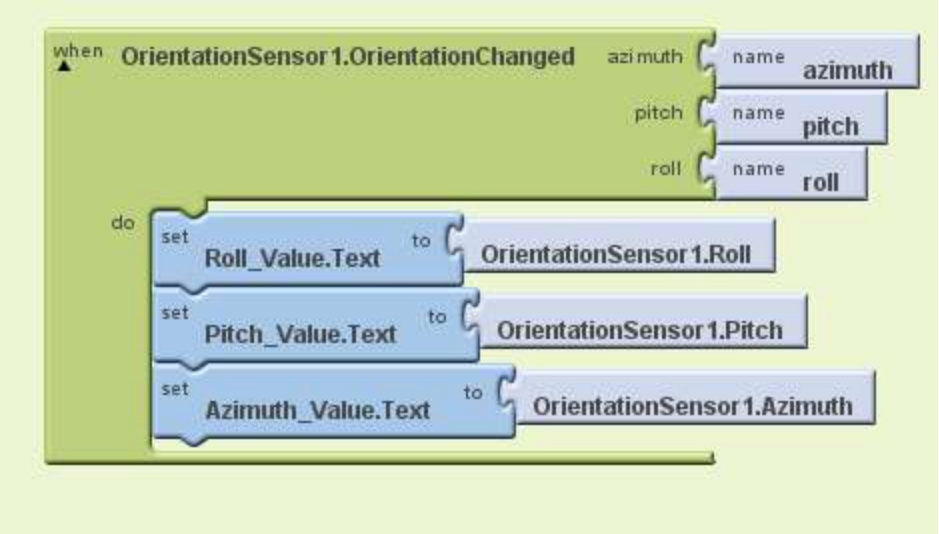


Show My Location (GPS)



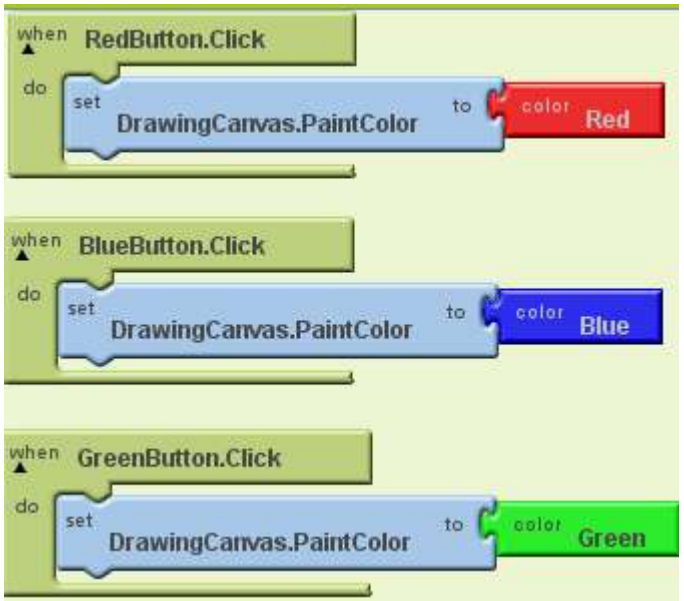
Orientation Sensor Example



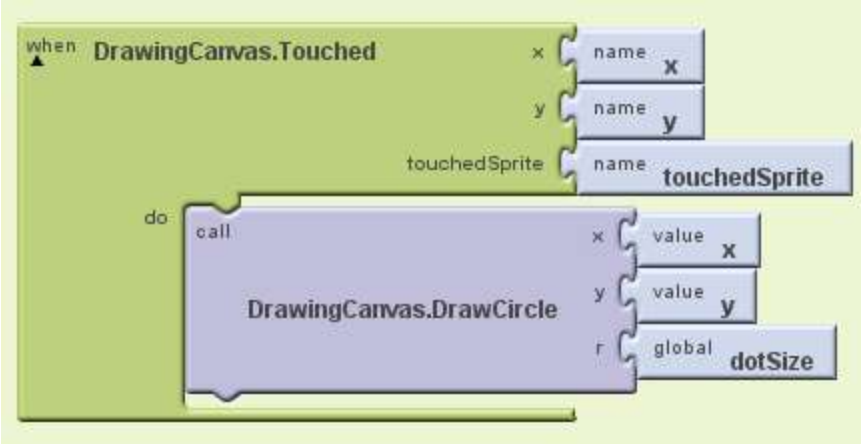


Drawing on Canvas

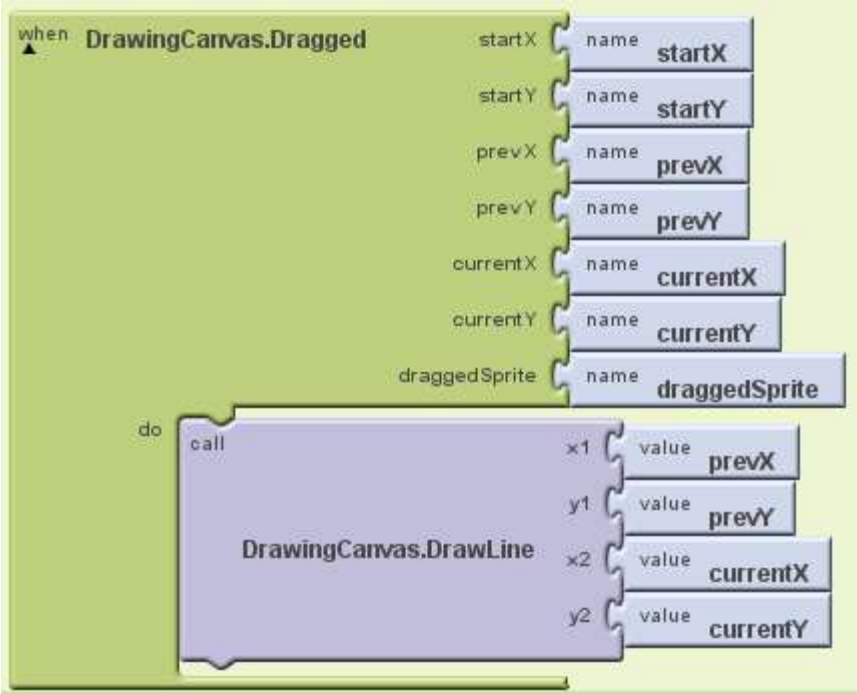
Setting Colors



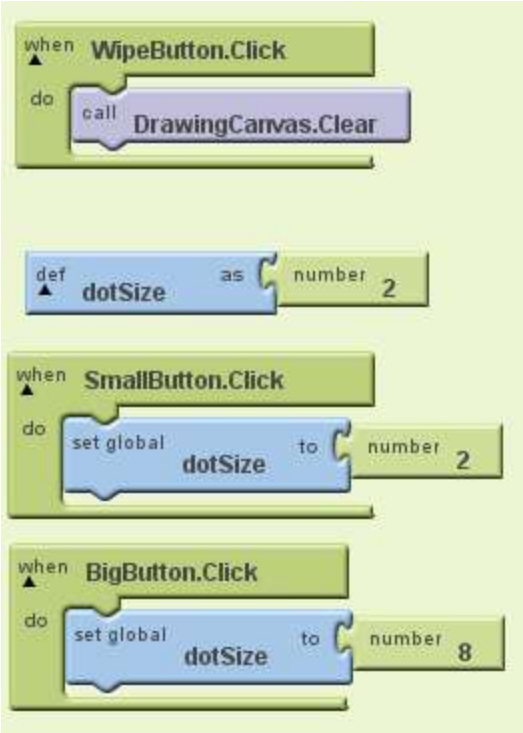
Canvas Touched Event



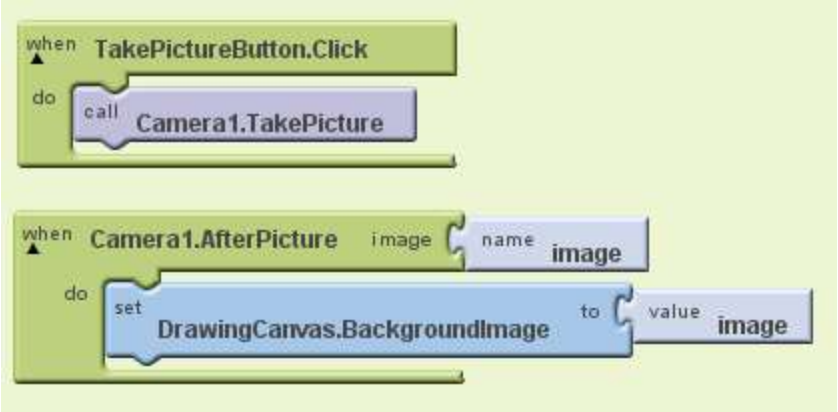
Canvas Dragged Event



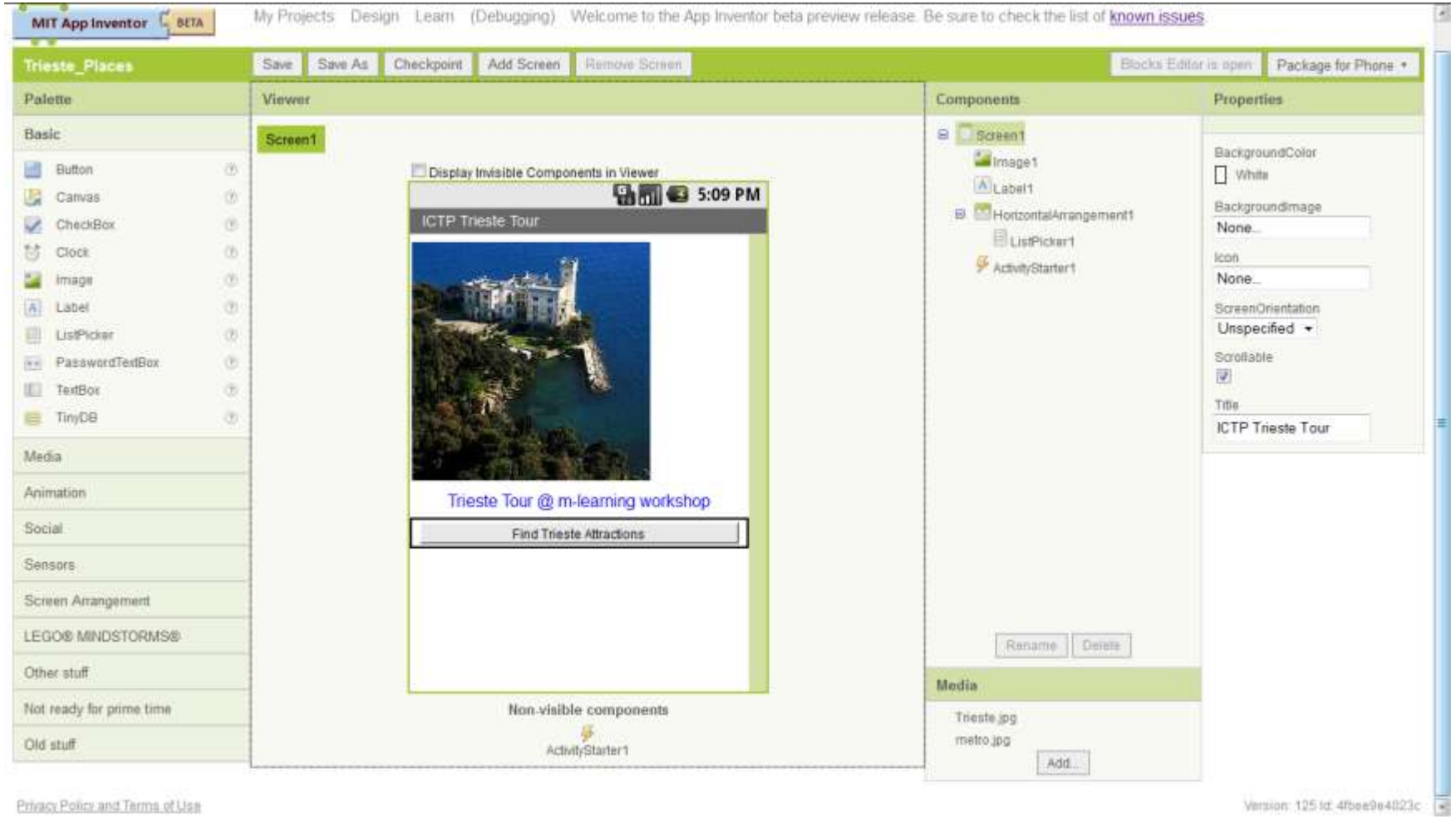
Setting Dot Size



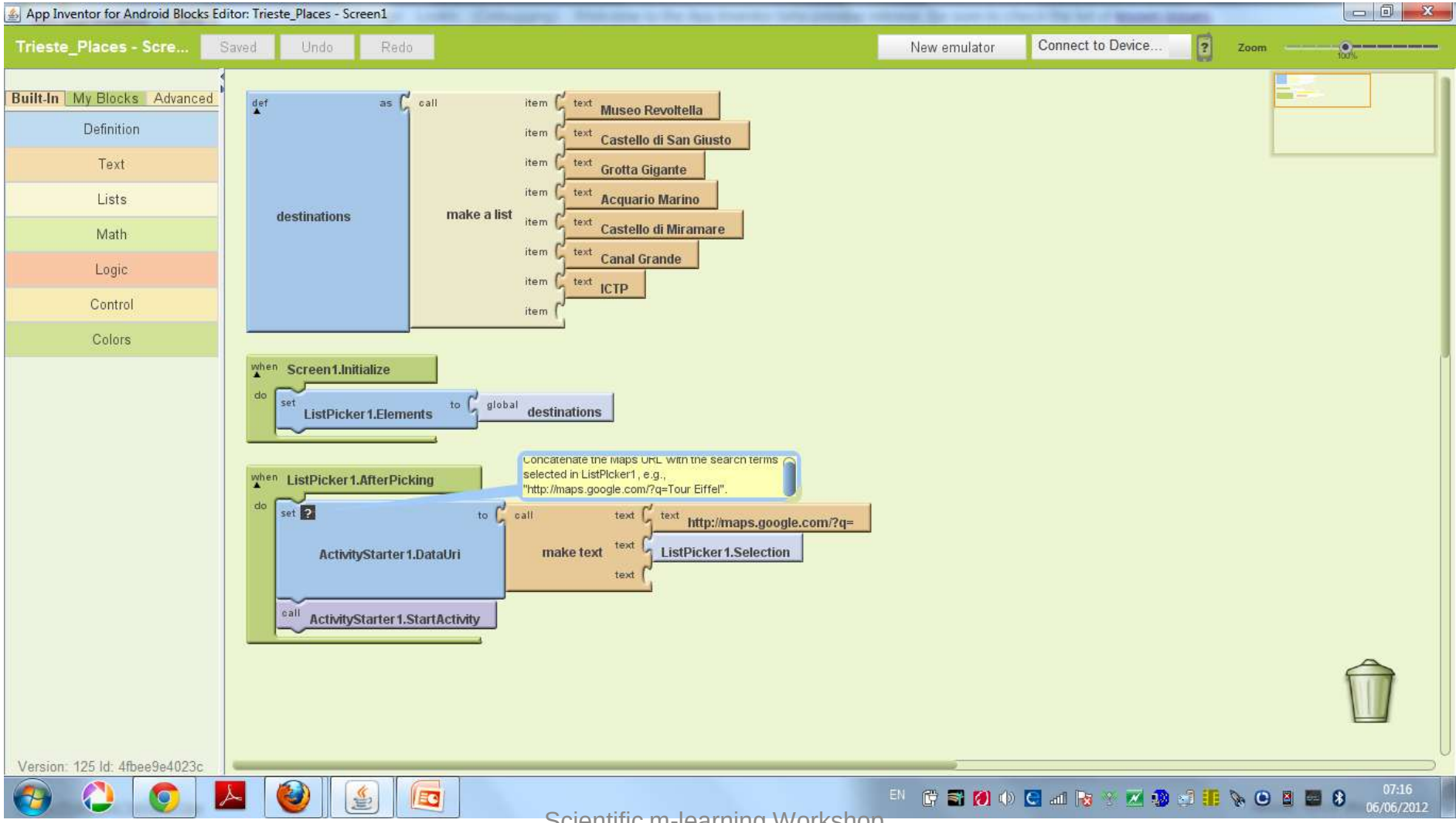
Using Camera



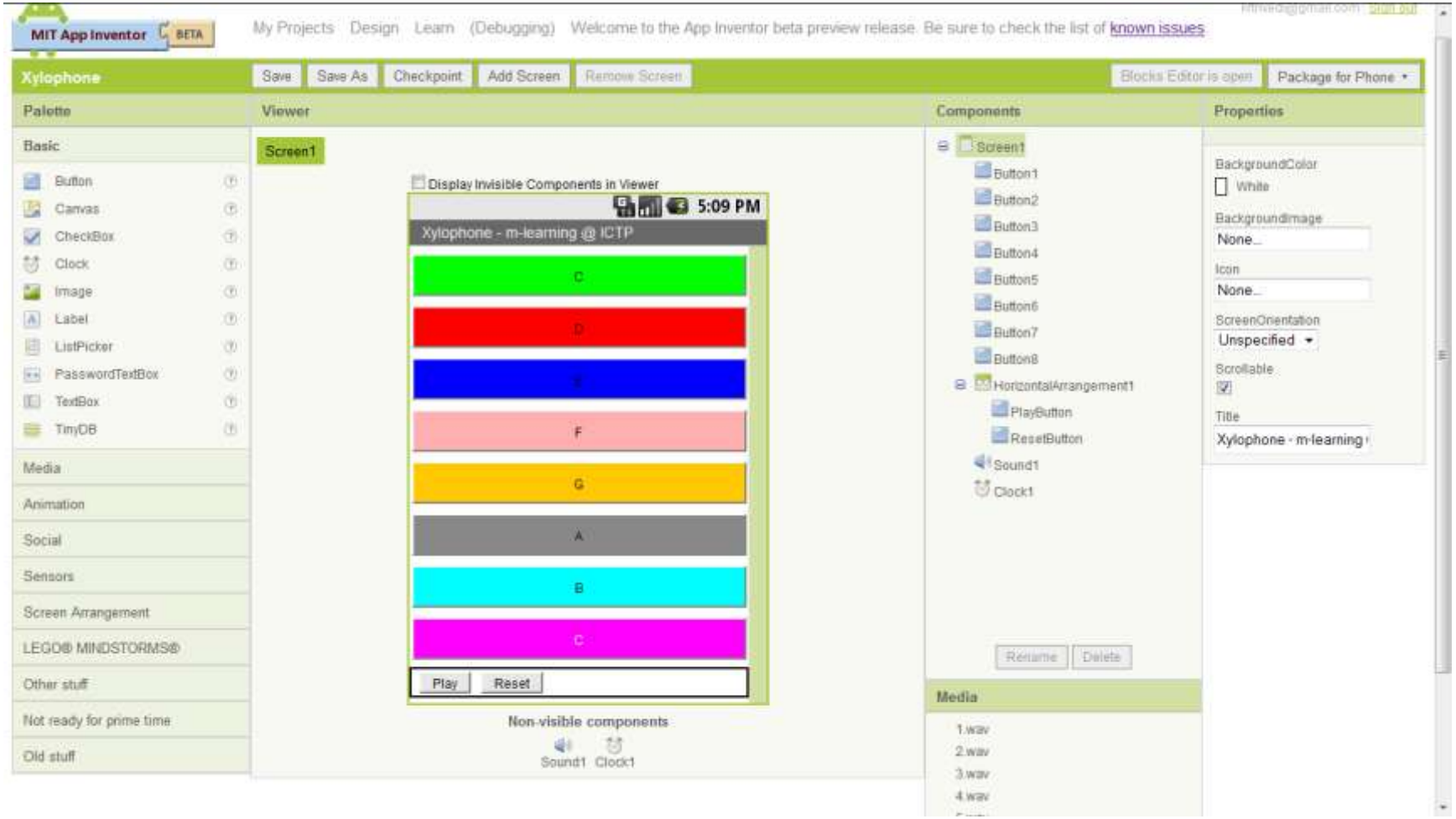
Trieste Tour



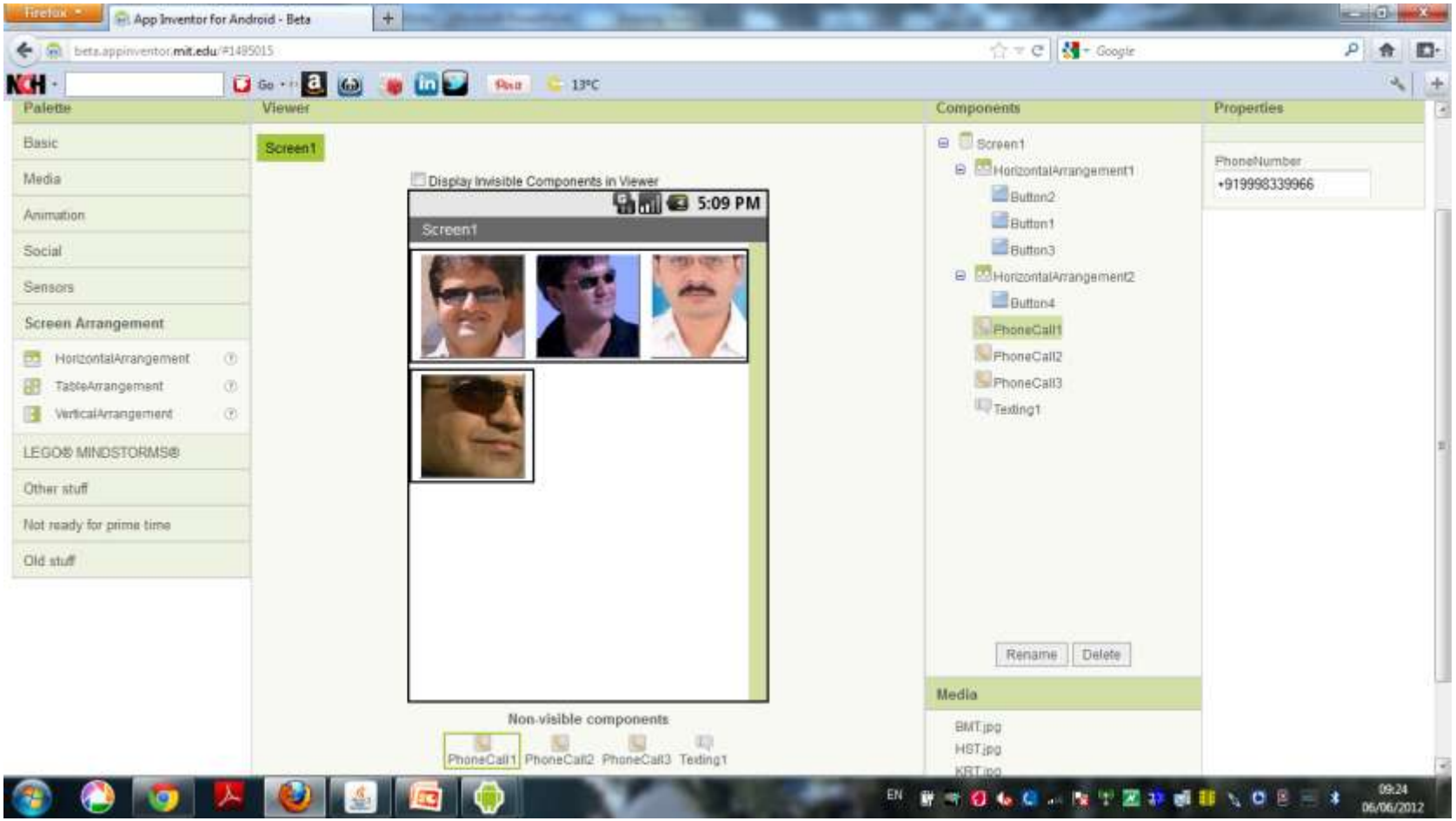
Blocks for Trieste Tour App



Xylophone


MIT App Inventor
BETA
My Projects
Design
Learn
(Debugging)
Welcome to the App Inventor beta preview release. Be sure to check the list of known issues
Xylophone
Save
Save As
Checkpoint
Add Screen
Remove Screen
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
Screen1
Display Invisible Components in Viewer
5:09 PM
Xylophone - m-learning @ ICTP
C
D
E
F
G
A
B
C
Play
Reset
Non-visible components
Sound1
Clock1
Screen1
Button1
Button2
Button3
Button4
Button5
Button6
Button7
Button8
HorizontalArrangement1
PlayButton
ResetButton
Sound1
Clock1
Rename
Delete
Media
1.wav
2.wav
3.wav
4.wav
BackgroundColor
White
BackgroundImage
None...
Icon
None...
ScreenOrientation
Unspecified
Scrollable
Title
Xylophone - m-learning

Call / Text App



Blocks for the App