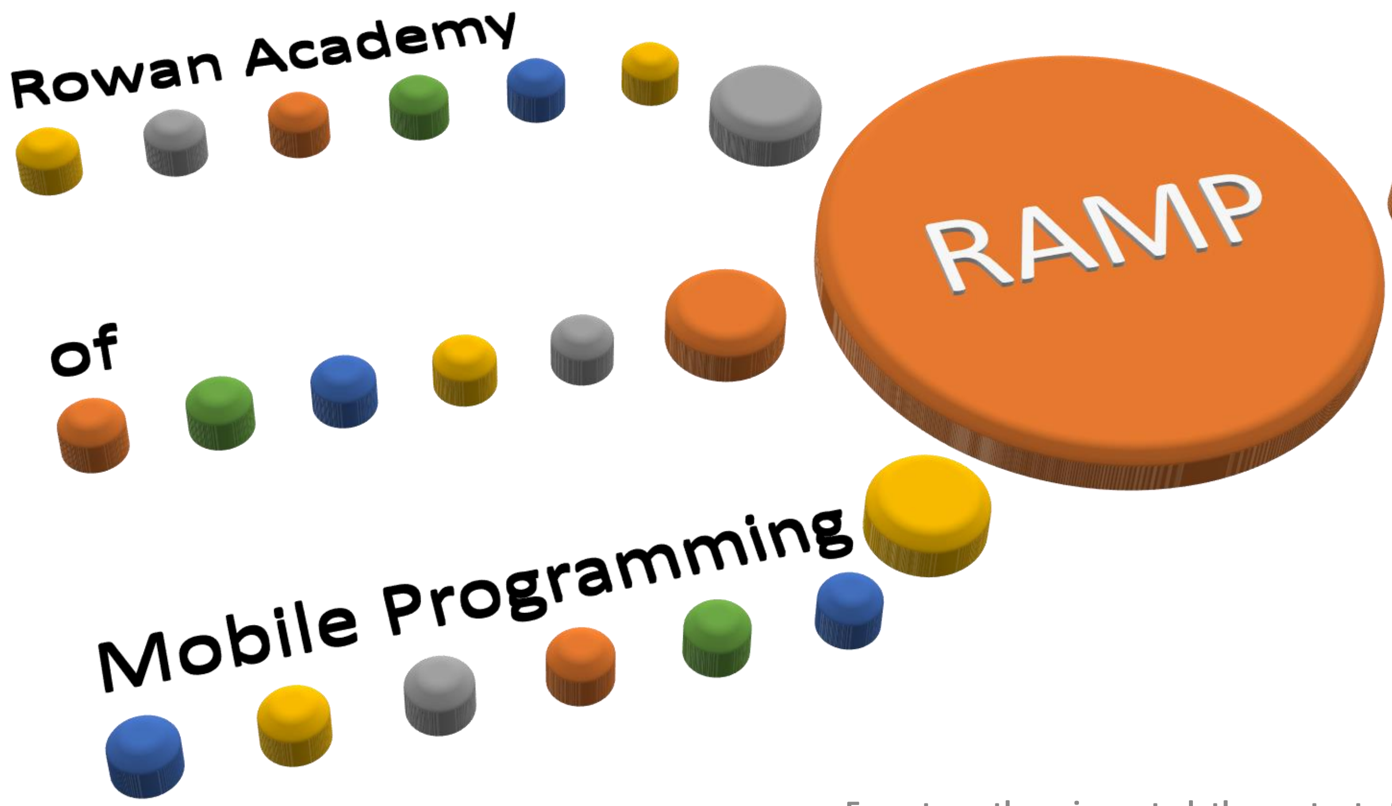
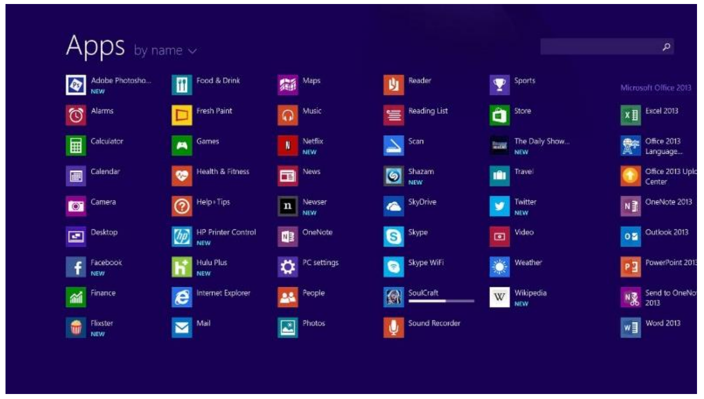

Rowan Academy
of
Mobile Programming
RAMP

2011
2010
2009


Apps by name

Agenda – Day 1

- Introduction
- What is a computer program?
- Introducing App Inventor
- Getting hands on with App Inventor
- Lunch Break
- Creating the Mole Mash Game

Rowan Academy of Mobile Programming (RAMP)

- Mobile application programming can provide an authentic and engaging hook into computer science. The MIT App Inventor is a visual programming environment that enables students with no programming background to build apps for Android mobile devices. We will use this at Rowan University to teach CS Principles to K-12 students and educators by empowering them to create their own mobile apps and engage them personally, as well as infusing energy and excitement into computer science education.

For more information contact:

John Robinson, robinsonj@rowan.edu, 856-256-4778

The College Board and NSF CS Big Ideas

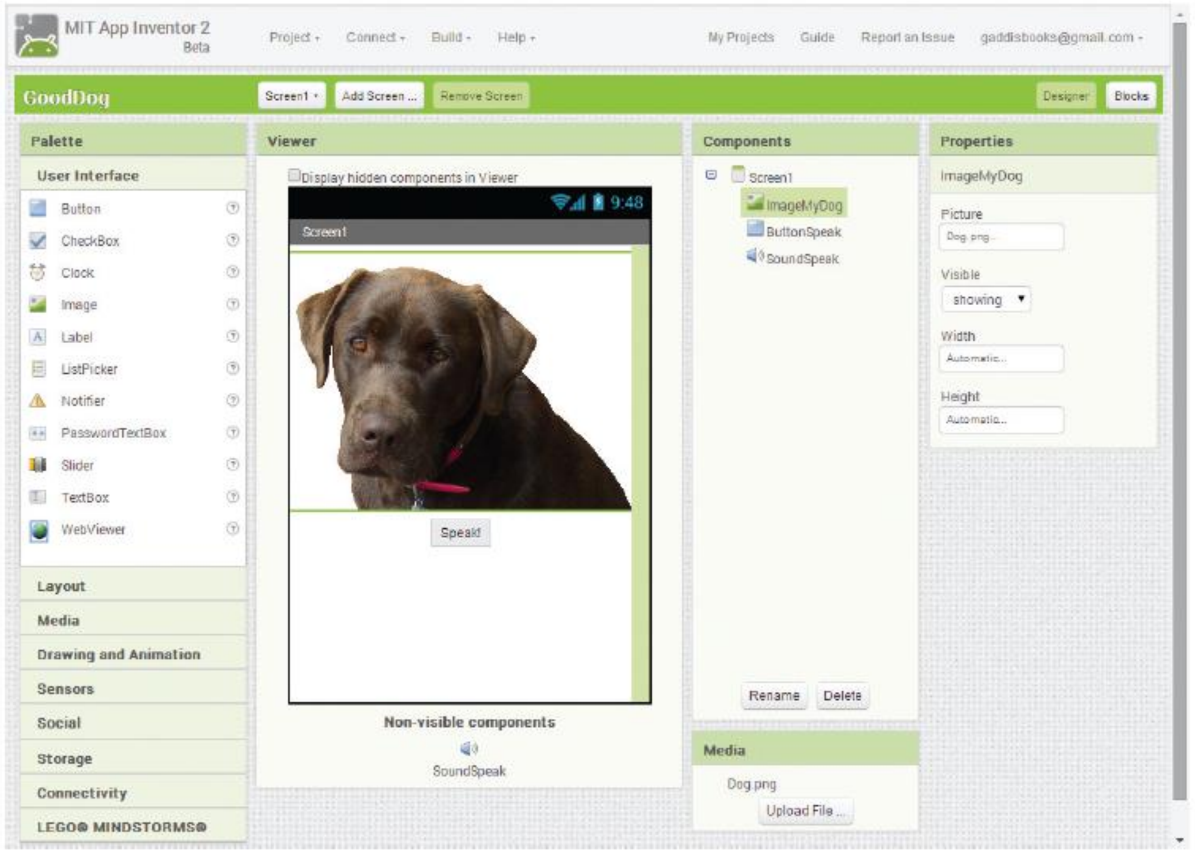
- Big Idea I: Creativity
- Big Idea II: Abstraction
- Big Idea III: Data
- Big Idea IV: Algorithms
- Big Idea V: Programming
- Big Idea VI: Internet
- Big Idea VII: Global Impact

Introduction

- You may quickly and easily create applications or “apps” for android smartphones and tablets.
- With App Inventor, you use a screen designer to visually create an app’s screen (Figure 1-1).
- Then you use a special editor known as the Blocks Editor to create the actions.
- You visually assemble *code blocks* (Figure 1-2).

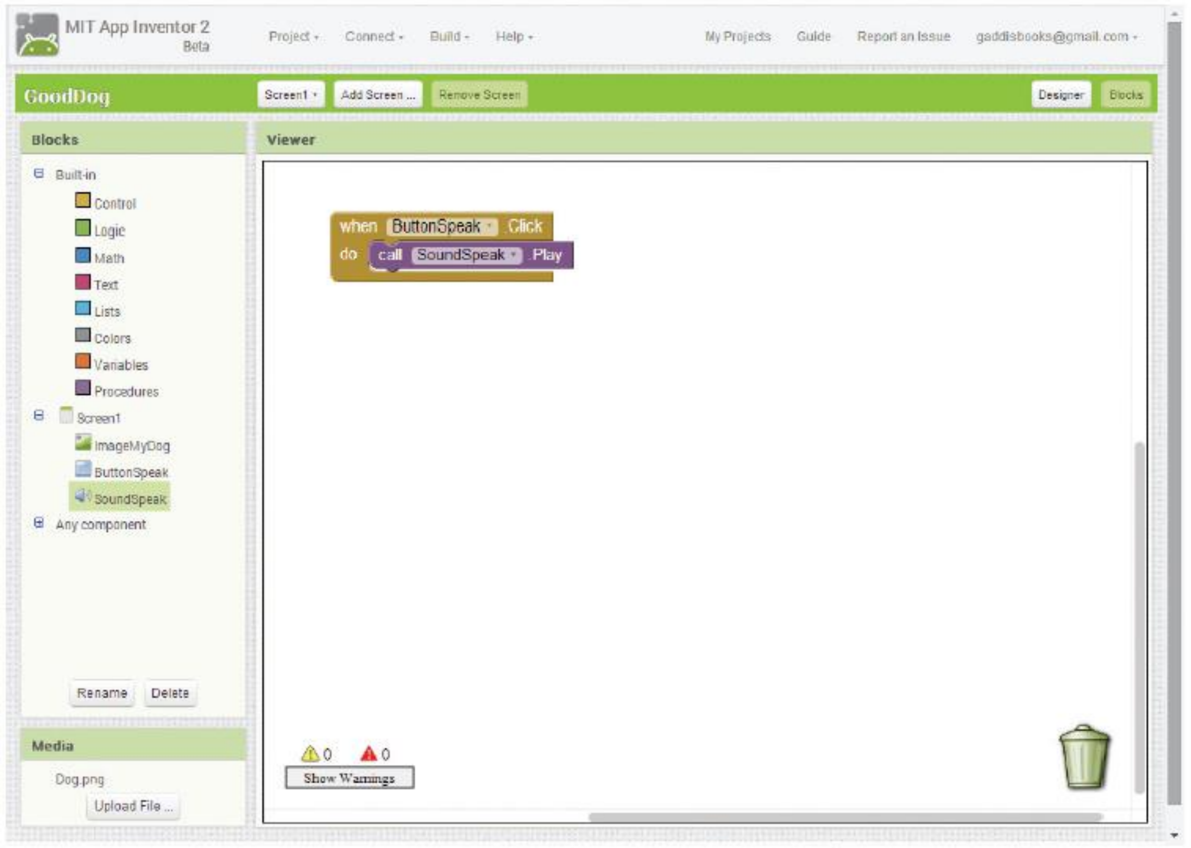
Introduction

Figure 1-1 The App Inventor Designer (*Source:* MIT App Inventor 2, Pearson Education, Inc.)



Introduction

Figure 1-2 The Blocks Editor (*Source:* MIT App Inventor 2)

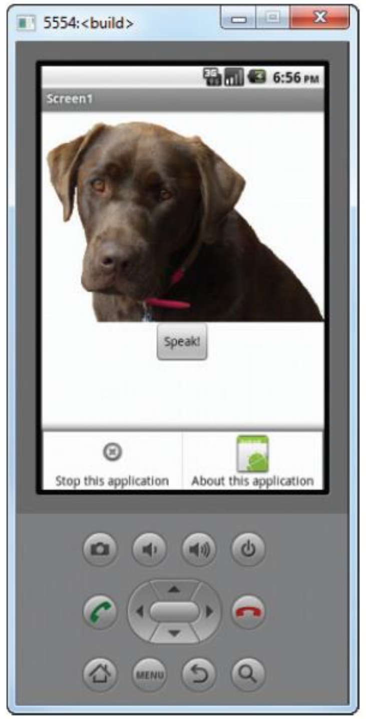


when ButtonSpeak .Click
do call SoundSpeak .Play

Introduction

- App Inventor provides an Android emulator that runs on your computer.
- The emulator (Figure 1-3) is a simulated Android phone.

Figure 1-3 The Android Emulator (*Source:* MIT App Inventor 2, Pearson Education, Inc.)



Introduction

- App Inventor Runs in the Cloud.
- App Inventor is part of MIT’s Center for Mobile Learning.
- Advantages of the cloud-based approach
- You can access App Inventor from any computer connected to the Internet.
- Your files are maintained and backed up by the host.
- You can be sure you are always running the most recent version of App Inventor.

What Is a Computer Program?

- A computer program is a set of instructions that a computer follows to perform a task.
- A computer is a device that follows instructions for manipulation and storing data.
- When a computer is performing the instructions, we say it is *running* or *executing* the program.

What Is a Computer Program?

Algorithms and Programming Languages

- An algorithm is a set of well-defined, logical steps that must be taken in order to perform a task.
- The instructions have to be translated into machine language.
- In machine language, each instruction is represented by a binary number.
- A binary number is a number that has only ones and zeros. Here is an example.

```
1011010000000101
```

What Is a Computer Program?

Algorithms and Programming Languages

- Each language has its own syntax.
- Syntax is a set of rules that must be strictly followed.
- In traditional programming languages you convert your algorithm into a set of *statements*.
- Programmers call the statements *code.*
- An *executable program* is a file containing machine language instructions that can be directly executed by the computer.

What Is a Computer Program?

- Programming with App Inventor
- Beginning programmers frequently make typing mistakes resulting in *syntax errors*.
- In App Inventor, syntax errors never happen, because you do not type programming statements.
- Instead you drag and drop *code blocks*.
- The blocks can be “snapped” together like pieces of a puzzle.

Introducing App Inventor

- Each time you work with App Inventor you will perform the following steps:
  - Open a browser and go to the App Inventor website.
  - Either create a new project or open an existing project.
  - Open The Blocks Editor.
  - Connect either the Android emulator or an actual Android device.

Introducing App Inventor

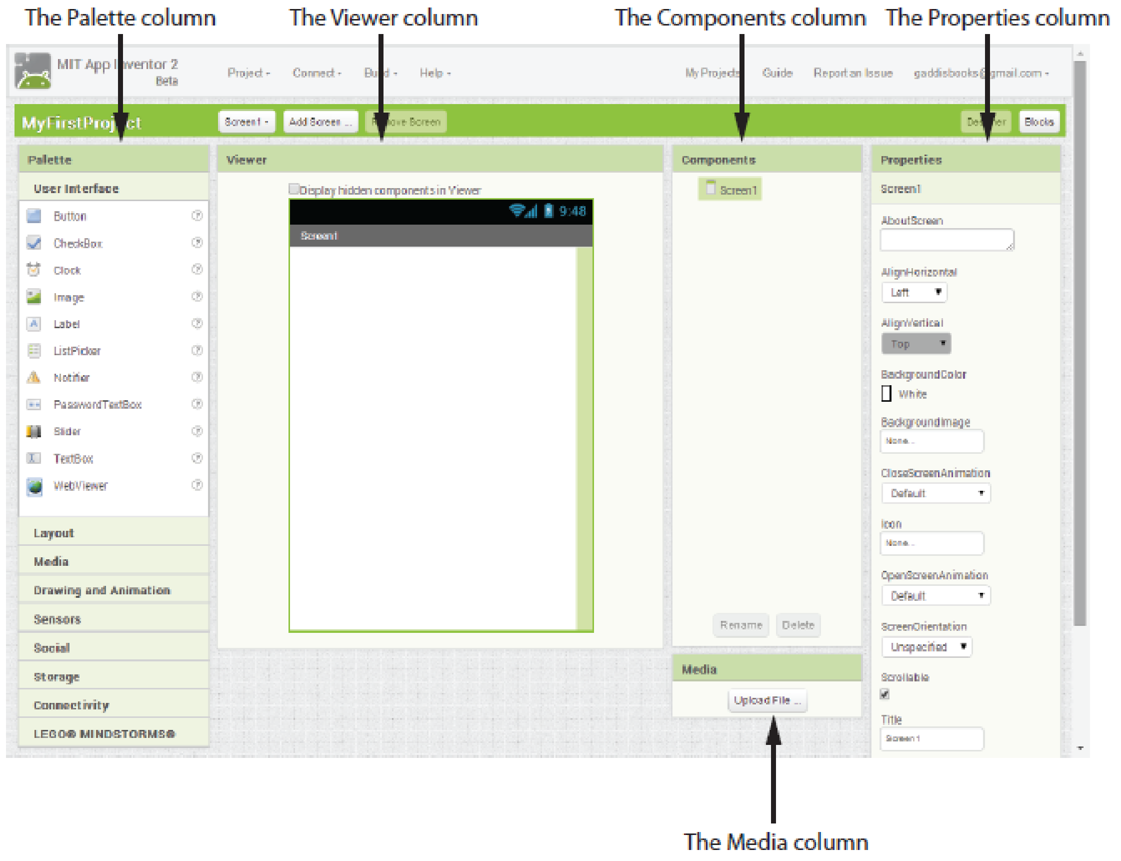
The Designer

The Designer is organized into the following columns:

- The Pallet column.
- The Viewer column.
- The Components column.
- The Media column.
- The Properties column.

Introducing App Inventor

Figure 1-16 The Designer (*Source:* MIT App Inventor 2)



Introducing App Inventor

The Palette Column

- The Pallet provides a list of components.
- A *component* is an item that performs a specific purpose within an app.

Introducing App Inventor

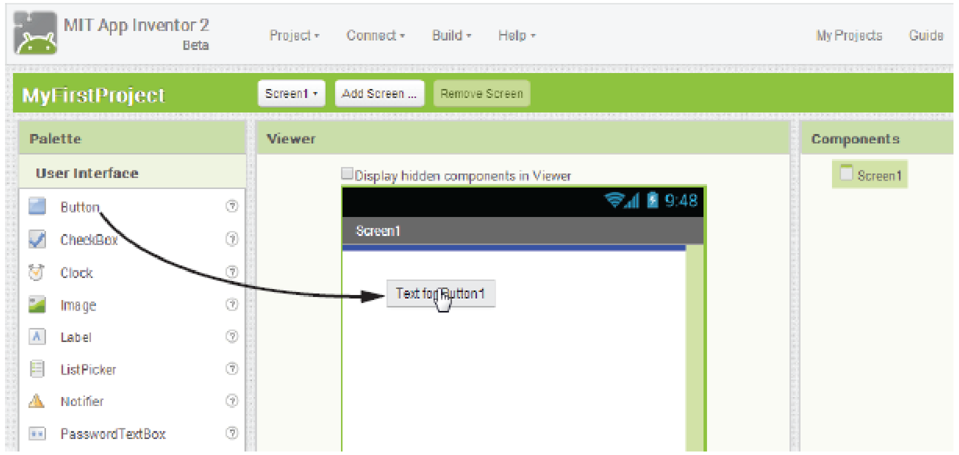
- The different sections of the palette are:
  - ***User interface*** – The fundamental component for building an app’s screen.
  - ***Layout*** – Provides components for organizing other components on the app’s screen.
  - ***Media*** –
    - Provides components for taking photos.
    - Recording and playing videos.
    - Recording and playing sounds.
    - Picking Images.

Introducing App Inventor

- The different sections of the palette are:
  - ***Drawing and Animation*** – Provides components for creating simple drawings and animations.
  - ***Sensors*** – Allows your app to access the device's accelerometer.
  - ***Social*** – Works with the phones contact list.
  - ***Storage*** – These components store data locally on a device or remotely on the Web server.
  - ***Connectivity*** – Provides components for launching external applications.

Introducing App Inventor

Figure 1-17 Creating a Component by Dragging it from the Palette to the Viewer (*Source:* MIT App Inventor 2)

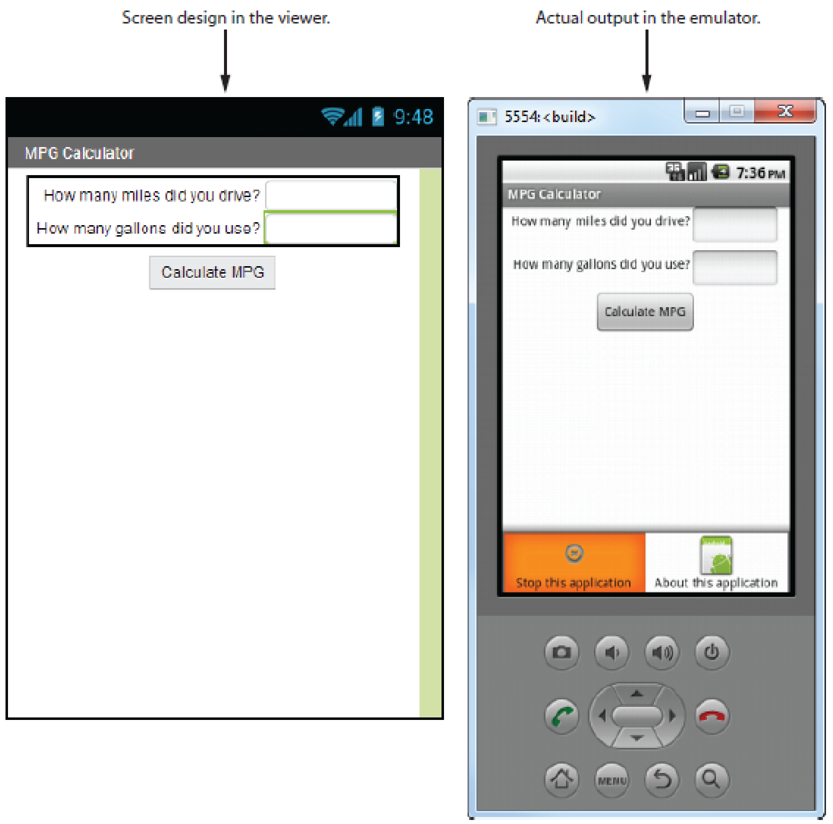


- The Viewer Column
  - You design an apps *user interface* by dragging components from the Pallet onto the simulated screen in the Viewer.
  - Components you place on the simulated screen in the Viewer might appear slightly different on the emulator screen.

Introducing App Inventor

- Notice the shapes of the text boxes and buttons are slightly different between the two screens.

Figure 1-18 A Screen in the Viewer and the Emulator (*Source:* MIT App Inventor 2)


Screen design in the viewer.
Actual output in the emulator.
9:48
MPG Calculator
How many miles did you drive?
How many gallons did you use?
Calculate MPG
5554:<build>
7:36 PM
MPG Calculator
How many miles did you drive?
How many gallons did you use?
Calculate MPG
Stop this application
About this application

Introducing App Inventor

The Components Column

- Shows a hierarchical tree listing all of the components that you have placed your app.

The Media Column

- Allows you to manage the media files (images, videos, and audio files).

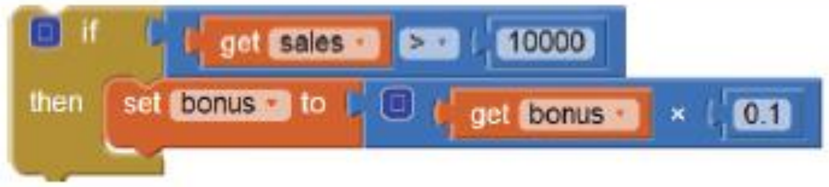
Introducing App Inventor

- The Properties Column
- A Components appearance and other characteristics are determined here. Here are some examples:
- ***Label component*** – To display text on your devices screen.
- ***Image component*** – To display an image under the device’s screen.
- ***Sound component*** – If you want the app to play a sound.

Introducing App Inventor

- Block's Editor
- A block is a shape that looks like a puzzle piece.

Figure 1-20 A Programming Statement Constructed from Code Blocks
(*Source:* MIT App Inventor 2)



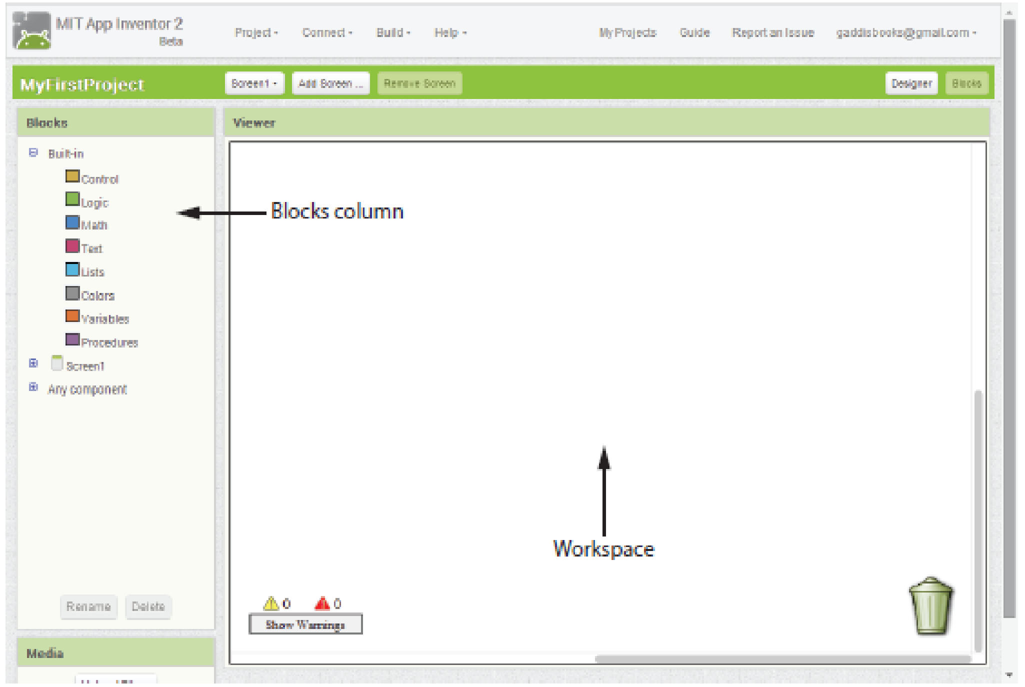
```
if    get sales > 10000
then  set bonus to  get bonus × 0.1
```

Introducing App Inventor

- The blocks column is organized in the following manner:
- ***Built-In*** – The basic blocks that make up the App Inventor language.
- ***Screen1*** – Each time you add a component to Screen1 in the Designer, a set of component blocks are added to the section.
- ***Any component*** – Allows a programmer to work with any component in the app.

Introducing App Inventor

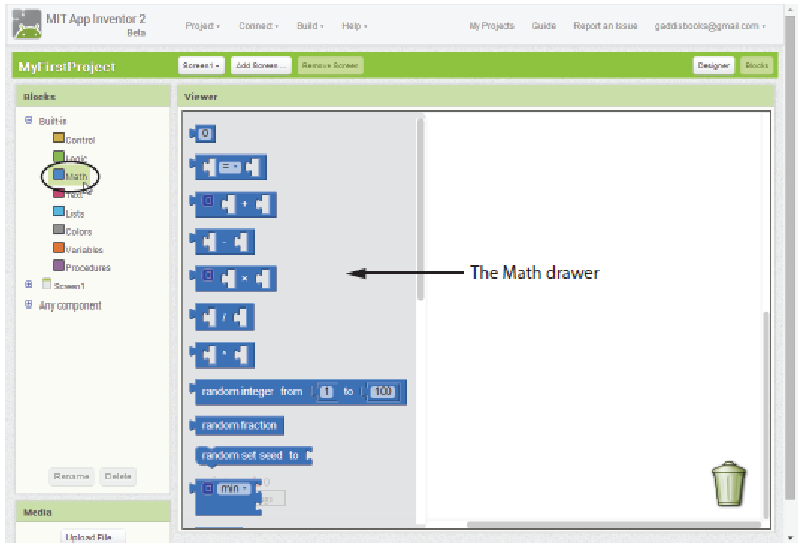
Figure 1-21 The Blocks Editor (*Source:* MIT App Inventor 2)



Introducing App Inventor

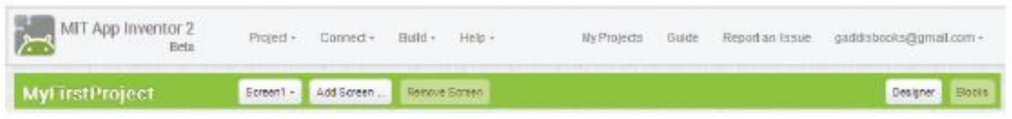
- The Built-in blocks
- Figure 1-23 Shows what happens when you click *Math*

Figure 1-23 The Math Drawer Opened *(Source:* MIT App Inventor 2)



Introduction

Figure 1-24 Top Part of the App Inventor Screen (*Source:* MIT App Inventor 2)



- The top part of the App Inventor screen shows the following items:
- ***Project*** – Start, save, and export projects.
- ***Connect*** – Connect to an Android device or the Android emulator.
- ***Build*** – Package an app so it can be shared.
- ***Help*** – Provides access to documentation, tutorials, and the App Inventor forum.

Introducing App Inventor

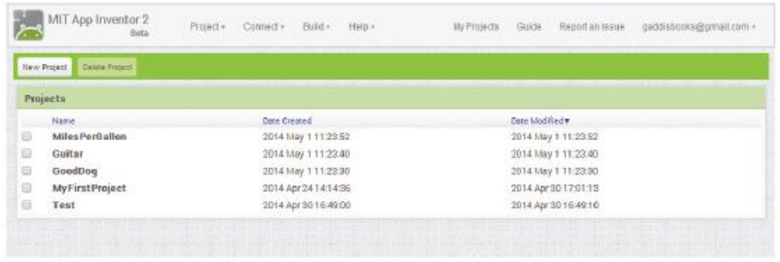
- ***My Projects*** – Displays a list of all the App Inventor projects that you have created.
- ***Guide*** – Opens a separate Web page containing the App Inventor documentation.
- ***Report an Issue*** – Takes you to the App Inventor support forum.

Getting Hands-On with App Inventor

Managing Projects

- Get to the My Projects screen by going to appinventor.mit.edu.
- Click the *Create* button.

Figure 1-26 The My Projects Screen (*Source:* MIT App Inventor 2)



	Name	Date Created	Date Modified▼
☐	MilesPerGallon	2014 May 1 11:23:52	2014 May 1 11:23:52
☐	Guitar	2014 May 1 11:23:40	2014 May 1 11:23:40
☐	GoodDog	2014 May 1 11:23:30	2014 May 1 11:23:30
☐	MyFirstProject	2014 Apr 24 14:14:36	2014 Apr 30 17:01:13
☐	Test	2014 Apr 30 16:49:00	2014 Apr 30 16:49:10

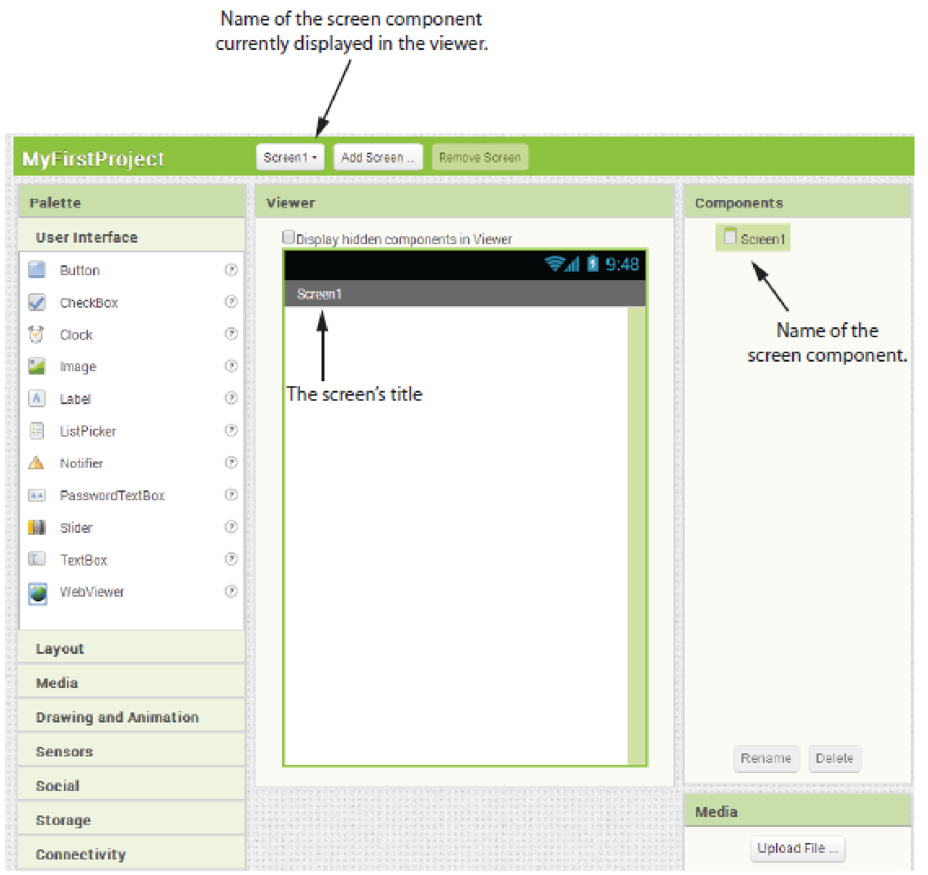
- The *New* button creates a new project.
- The *Delete* button deletes the project.

Getting Hands-On with App Inventor

- The App's `Screen1` Component
- A `Screen` is the most fundamental type of component.
- Each component in the app must have a unique name.
- By default an empty `Screen` component is named `Screen1`.
- You will want to change the default name to something meaningful.

Getting Hands-On with App Inventor

Figure 1-28 An App's Screen in the Viewer (*Source:* MIT App Inventor 2)

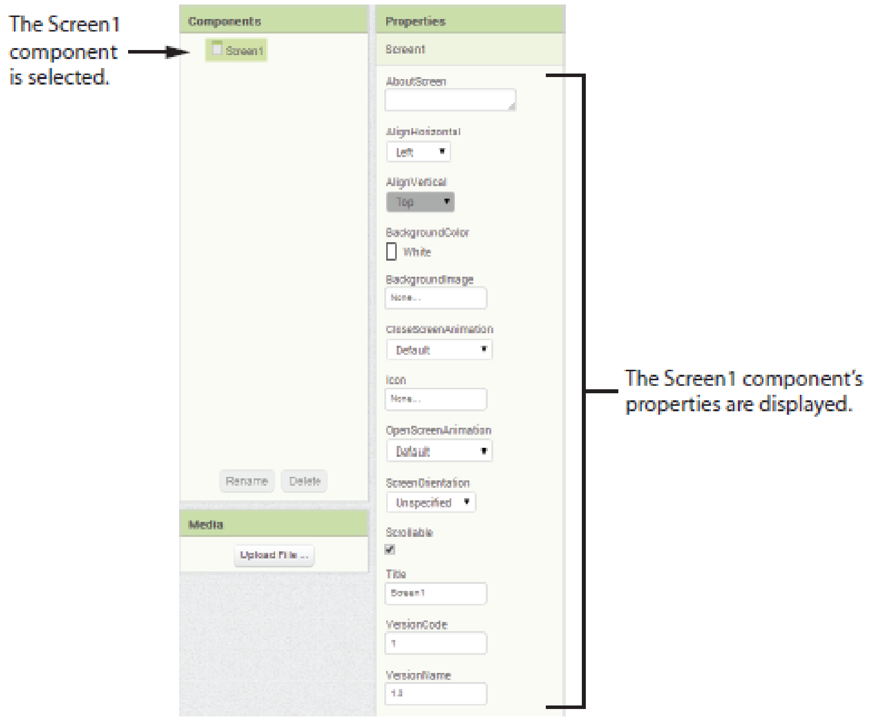


Getting Hands-On with App Inventor

- Working with the Properties Column
- Component properties are displayed in the Properties column.
- In Figure 1-29 notice the propertie's name is `Title`.
- Usually you will want to change the value of `Screen1` one complements the title property or something meaningful.

Getting Hands-On with App Inventor

Figure 1-29 The Properties Column, Showing the Selected Component's Properties (*Source:* MIT App Inventor 2)


The Screen1 component is selected.
The Screen1 component's properties are displayed.
Components
Screen1
Rename
Delete
Media
Upload File ...

Properties

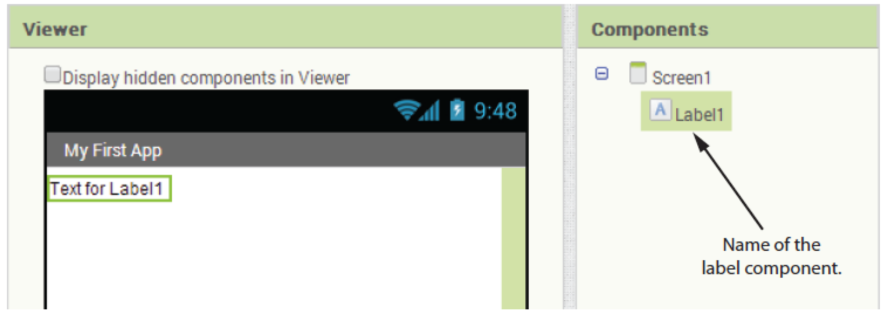
Screen1

AboutScreen	
AlignHorizontal	Left
AlignVertical	Top
BackgroundColor	White
BackgroundImage	None...
CloseScreenAnimation	Default
Icon	None...
OpenScreenAnimation	Default
ScreenOrientation	Unspecified
Scrollable	✓
Title	Screen1
VersionCode	1
VersionName	1.0

Getting Hands-On with App Inventor

- Label Components
- A `Label` compound it displays text on the app’s screen.
- Create a `Label` component by dragging it from the User Interface section of the Pallet onto the app’s screen in the Viewer.
- Figure 1-33 shows the Components column after a `Label` component has been created.

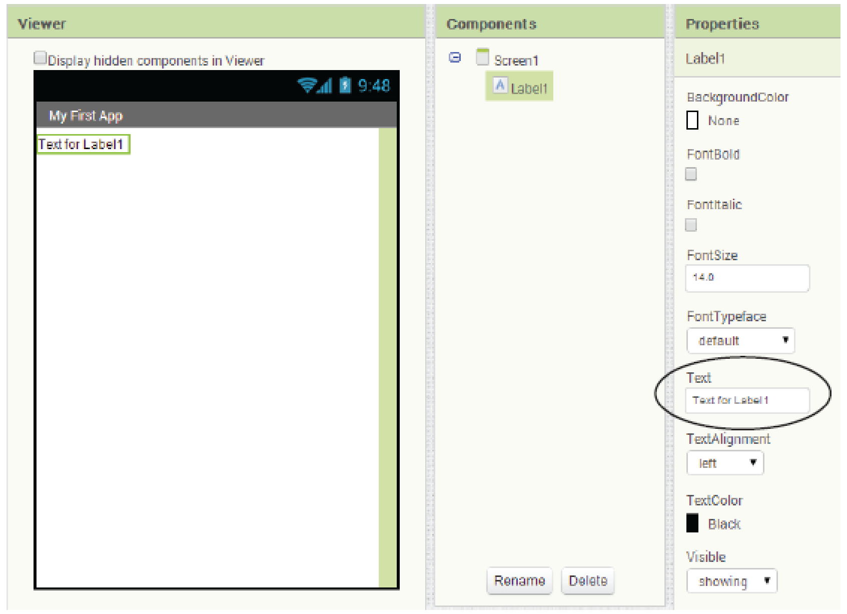
Figure 1-33 The Name of the Component Shown in the Components Column
(*Source:* MIT App Inventor 2)


Viewer
Display hidden components in Viewer
9:48
My First App
Text for Label1
Components
Screen1
Label1
Name of the label component.

Getting Hands-On with App Inventor

- Once you have created a `Label` component, set it's text property to the text you want.

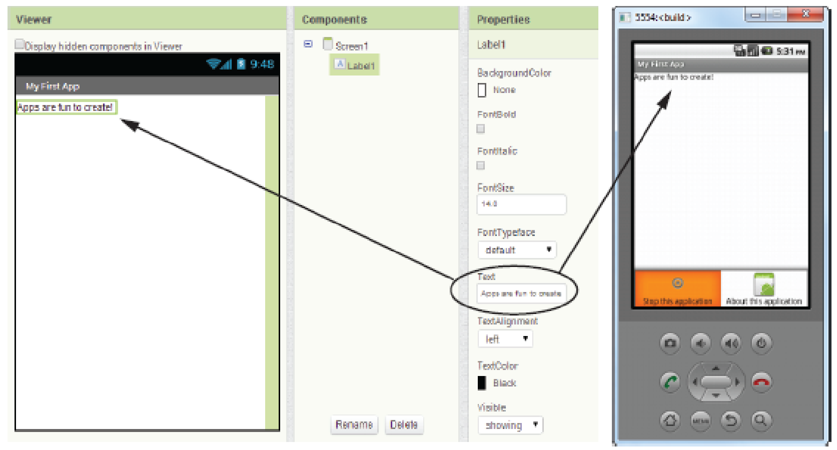
Figure 1-34 A Label Component's Text Property Determines the Text that the Component Displays (*Source:* MIT App Inventor 2)



Getting Hands-On with App Inventor

- Figure 1-35 Shows an app with the `Label` component.
- The text property is set to *Apps are fun to create!*

Figure 1-35 A Label Component Displaying the Text *Apps are fun to create!*
(*Source:* MIT App Inventor 2)

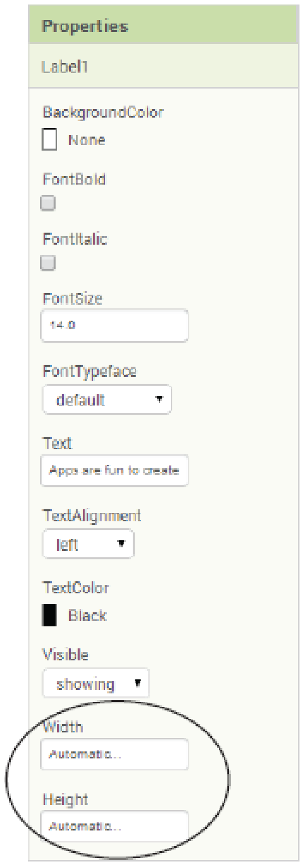


Label1
BackgroundColor: None
FontBold: ☐
FontItalic: ☐
FontSize: 14.0
FontTypeface: default
Text: Apps are fun to create
TextAlignment: left
TextColor: ■ Black
Visible: showing

Getting Hands-On with App Inventor

- Label Width and Height

Figure 1-36 The Label Component's Width and Height Properties
(Source: MIT App Inventor 2)



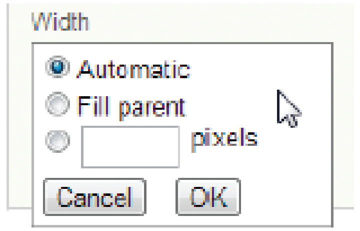
Properties
Label1
BackgroundColor
None
FontBold
FontItalic
FontSize
14.0
FontTypeface
default
Text
Apps are fun to create
TextAlignment
left
TextColor
Black
Visible
showing
Width
Automatic...
Height
Automatic...

Getting Hands-On with App Inventor

- Property values you can set are `Width` and `Height`
- ***Automatic*** – The component’s width will automatically adjust to accommodate the size of the label’s text.
- ***Fill parent*** – The component will be as wide as the container.
- ***A specified number of pixels*** – You can specify a number of pixels for a components width and/or height. You should avoid this in most cases, because different devices have different screen sizes.

Getting Hands-On with App Inventor

Figure 1-37 Dialog Box to Set the Width Property (Source: MIT App Inventor 2)


Width

(● Automatic) ○ Fill parent ○ pixels

Getting Hands-On with App Inventor

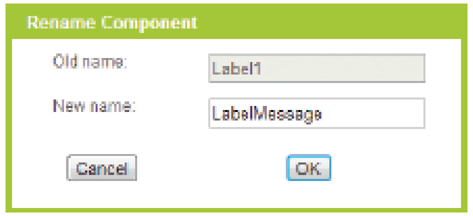
- Changing a Component’s name
- When you create a component, App Inventor automatically gives it a name.
- Default names are not very descriptive.
- Change the component’s name to something that is more meaningful.

Getting Hands-On with App Inventor

- Changing a Components Name
- In the Designer, you can use the Components column to change the name of any component (Except the `Screen1` component). Do so by:
- Clicking the name of the component in the Components column to select it.
- Click the *Rename* button at the bottom of the components column.
- The *Rename Component* dialog box shown in Figure 1-38 will appear.
- Enter the component’s new name and click OK.

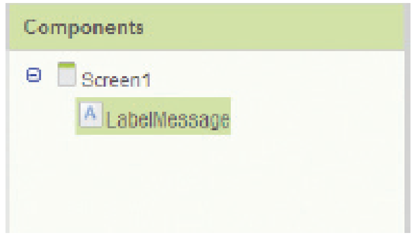
Getting Hands-On with App Inventor

Figure 1-38 Rename Component Dialog Box (Source: MIT App Inventor 2)



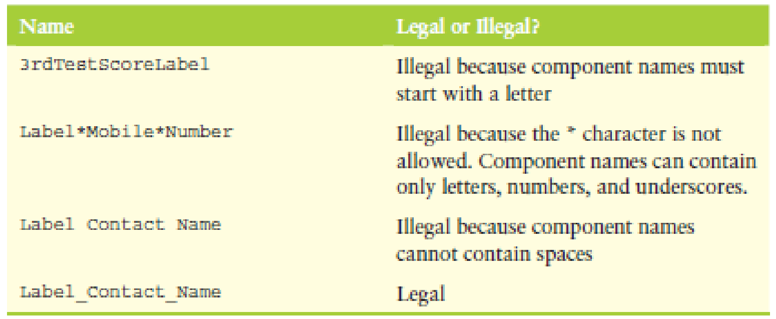
Old name: Label1
New name: LabelMessage

Figure 1-39 The Component's Name is Changed to `LabelMessage` (Source: MIT App Inventor 2)



Getting Hands-On with App Inventor

Table 1-1 Legal and illegal component names (Source: Pearson Education, Inc.)



Name	Legal or Illegal?
`3rdTestScoreLabel`	Illegal because component names must start with a letter
`Label*Mobile*Number`	Illegal because the * character is not allowed. Component names can contain only letters, numbers, and underscores.
`Label Contact Name`	Illegal because component names cannot contain spaces
`Label_Contact_Name`	Legal

Rules and Conventions for Naming Components

- Component names can contain only letters, numbers, and underscores (_).
- The first character of the component name must be a letter.
- Component names cannot contain spaces.

Getting Hands-On with App Inventor

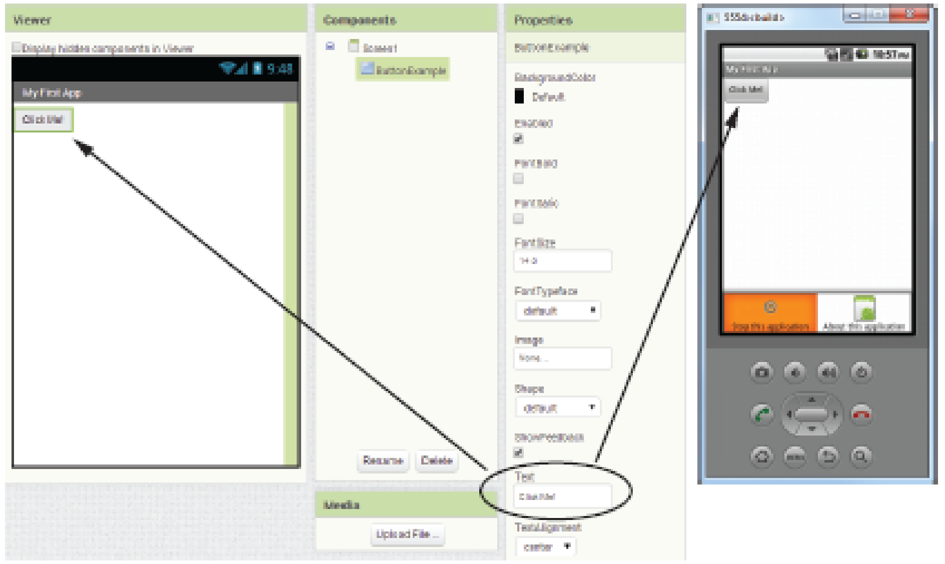
- Deleting Components
- To delete a component, click the *Delete* button that appears at the bottom of the Component’s column.

Getting Hands-On with App Inventor

- `Button` Components
- Create a `Button` component by dragging it from the User Interface section of the Pallet to the app’s screen in the Viewer.
- Once you create a `Button` component, you should change its name to something more descriptive.
- You should also change the component’s `text` property to indicate what the button will do when it is clicked.

Getting Hands-On with App Inventor

Figure 1-41 A Button Component Displaying the Text *Click Me!* (Source: MIT App Inventor 2)



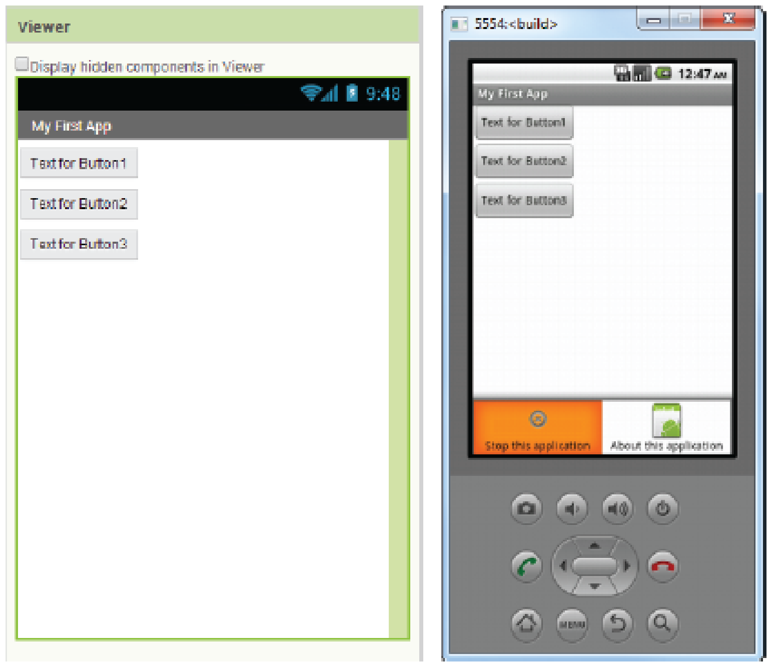
BackgroundColor: Default
Enabled: ✓
FontBold:
FontItalic:
FontSize: 14.0
FontTypeface: default
Image: None...
Shape: default
ShowFeedback: ✓
Text: Click Me!
TextAlignment: center

Getting Hands-On with App Inventor

•Screen Alignment

- Components are arranged vertically, from the top of the screen to the bottom of the screen.
- By default they are aligned along the left edge of the screen.

Figure 1-42 An App with Three Button Components (Source: MIT App Inventor 2)

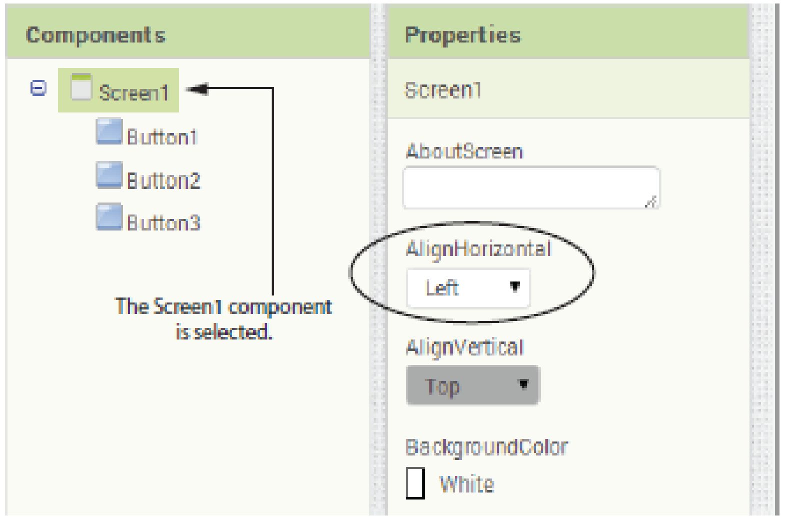


Getting Hands-On with App Inventor

- Screen alignment
- Screen components and have an `AlignHorizontal` Property.
- You can set the `AlignHorizontal` property to one of the following values:
- ***Left*** – along the left edge of the screen.
- ***Center*** – in the center of the screen.
- ***Right*** – Along the right edge of the screen.

Getting Hands-On with App Inventor

Figure 1-43 The AlignHorizontal Property *(Source: MIT App Inventor 2)*

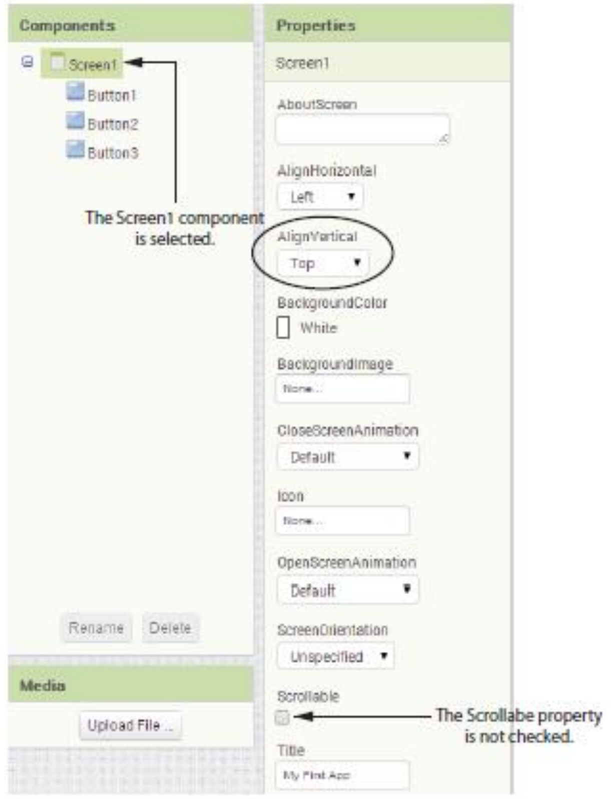


Getting Hands-On with App Inventor

- Screen Alignment
- Screen components also have an `AlignVertical` property.
- You can change the `AlignVertical` property only if the screen is not scrollable.
- You can set the `AlignVertical` property to one of the following values:
- ***Top*** – Along the top of the screen.
- ***Center*** – In the center of the screen.
- ***Bottom*** – Along the bottom of the screen.

Getting Hands-On with App Inventor

Figure 1-45 The AlignVertical Property (Source: MIT App Inventor 2)



Components
Screen1
Button1
Button2
Button3

The Screen1 component is selected.

Rename Delete

Media
Upload File ...

Properties
Screen1
AboutScreen
AlignHorizontal: Left
AlignVertical: Top
BackgroundColor: White
BackgroundImage: None...
CloseScreenAnimation: Default
Icon: None...
OpenScreenAnimation: Default
ScreenOrientation: Unspecified
Scrollable: ☐
Title: My First App

The Scrollabe property is not checked.

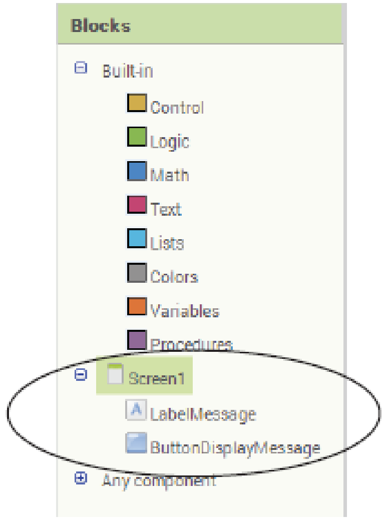
Getting Hands-On with App Inventor

- Programming with Blocks
- Apps are *event-driven* programs.
- When an app is running, it waits for a specific event to happen.
- An event is an action such as the user clicking a button or sliding his or her finger across the device's screen.
- An incoming text message is also an event.
- An event also occurs when the user tilts or shakes the phone.

Getting Hands-On with App Inventor

- Programming with Blocks
- The Hello World app has a `Button` component named `ButtonDisplayMessage`.
- And a `Label` component named `LabelMessage`
- We need a block that executes when user clicks the `ButtonDisplayMessage` component.

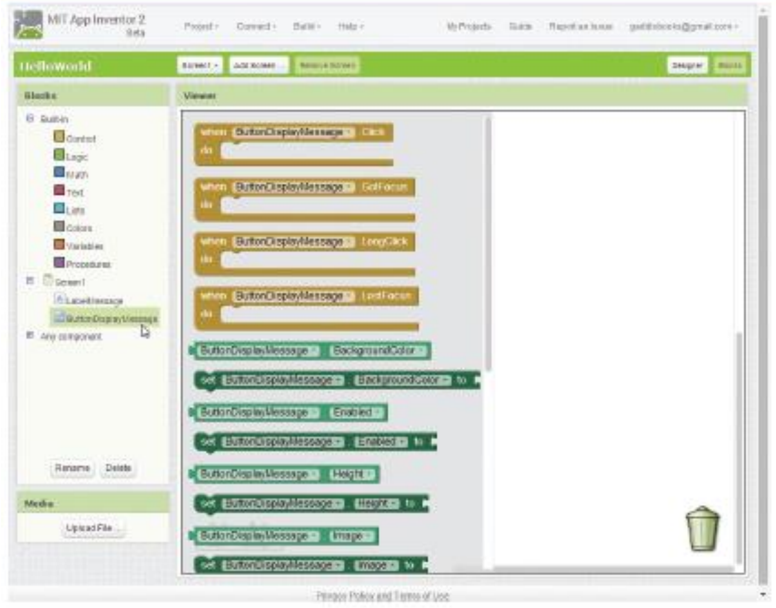
Figure 1-59 The Component Entries in the Blocks Column (Source: MIT App Inventor 2)



Getting Hands-On with App Inventor

- Programming with Blocks
- Because you want to create a block that executes when the `ButtonDisplayMessage` component is clicked, you need to click the `ButtonDisplayMessage` entry.

Figure 1-60 The ButtonDisplayMessage Drawer Open (Source: MIT App Inventor 2)


MIT App Inventor 2
HelloWorld
Blocks
Viewer
Built-in
Control
Logic
Math
Text
Lists
Colors
Variables
Procedures
Screen1
LabelMessage
ButtonDisplayMessage
Any component
Rename
Delete
Media
Upload File
when ButtonDisplayMessage.Click do
when ButtonDisplayMessage.GotFocus do
when ButtonDisplayMessage.LongClick do
when ButtonDisplayMessage.LostFocus do
ButtonDisplayMessage.BackgroundColor
set ButtonDisplayMessage.BackgroundColor to
ButtonDisplayMessage.Enabled
set ButtonDisplayMessage.Enabled to
ButtonDisplayMessage.Height
set ButtonDisplayMessage.Height to
ButtonDisplayMessage.Image
set ButtonDisplayMessage.Image to
Designer
Blocks

Getting Hands-On with App Inventor

Programming with Blocks

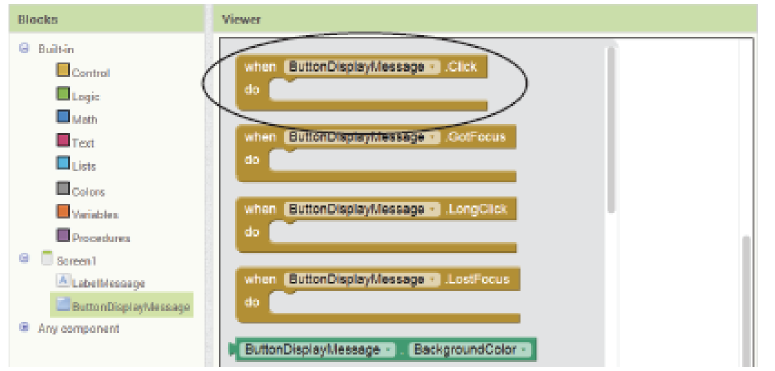
There are numerous blocks in this drawer. Here is a summary of the meaning of the colors.

- ***Brown blocks*** are called *event handlers*.
  - An *event handler* is a block that automatically executes when he specific event takes place.
- ***Light green blocks*** represent values that are related to the component.
- ***Dark green blocks*** perform actions with the component.

Getting Hands-On with App Inventor

Figure 1-61 The `when ButtonDisplayMessage.Click do` Block

(Source: MIT App Inventor 2)


Blocks
Built-in
Control
Logic
Math
Text
Lists
Colors
Variables
Procedures
Screen1
LabelMessage
ButtonDisplayMessage
Any component
Viewer
when ButtonDisplayMessage .Click
do
when ButtonDisplayMessage .GotFocus
do
when ButtonDisplayMessage .LongClick
do
when ButtonDisplayMessage .LostFocus
do
ButtonDisplayMessage . BackgroundColor

Programming with Blocks

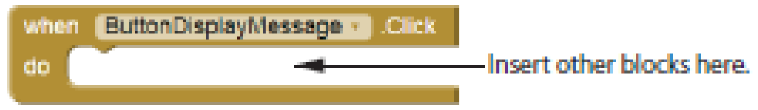
- Figure 1-61 Shows the topmost block inside the drawer. It reads:

  `when ButtonDisplayMessage.Click do`

- This means when the `ButtonDisplayMessage` is clicked, *do this block*.

Getting Hands-On with App Inventor

Figure 1-63 You Complete the Block by Snapping Other Blocks into the Empty Space. *(Source: MIT App Inventor 2)*



Programming with Blocks

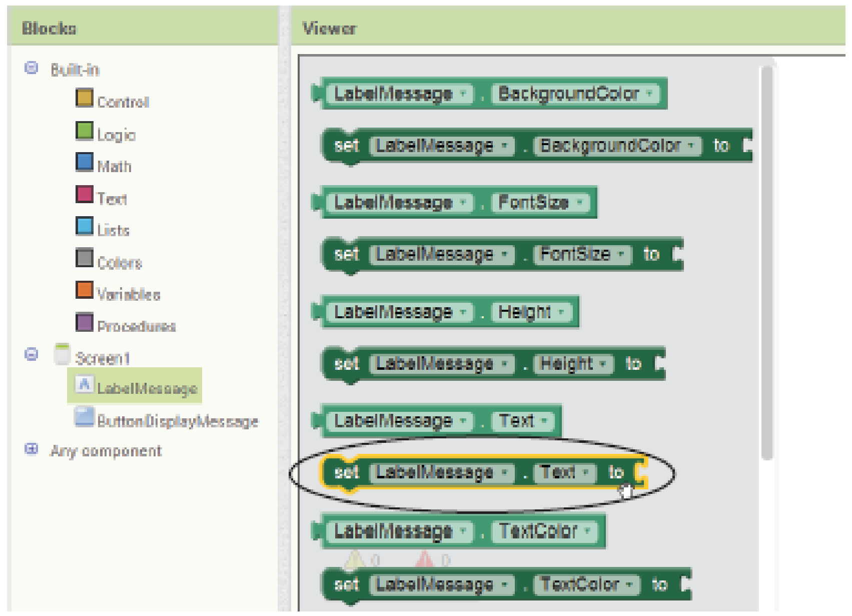
- The `ButtonDisplayMessage.Click do` block has an odd-shaped space in the middle.
- You can snap another block or set of blocks into this space.

Getting Hands-On with App Inventor

- Programming with Blocks
- A `Label` component has a `Text` property.
- Find a block that sets the `LabelMessage` component's `Text` property.
- Snap it into the `when ButtonDisplayMessage.Click do` block.
- Open the drawer containing the blocks for the `LabelMessage` component. It reads:
    - `set LabelMessage.Text to`

Getting Hands-On with App Inventor

Figure 1-64 The `set LabelMessage.Text to` Block (Source: MIT App Inventor 2)



Getting Hands-On with App Inventor

Programming in Blocks

- To insert the block you click and drag it to the empty space inside the `when ButtonDisplayMessage.Click do` block.
- The `set LabelMessage.Text to` block is not a complete instruction.
- Noticed the opening on the right edge of the set `LabelMessage.Text to` block.
- You need to snap another block specifying a value into the socket.

Getting Hands-On with App Inventor

Figure 1-65 The `set LabelMessage.Text to` Block Inserted
(*Source:* MIT App Inventor 2)

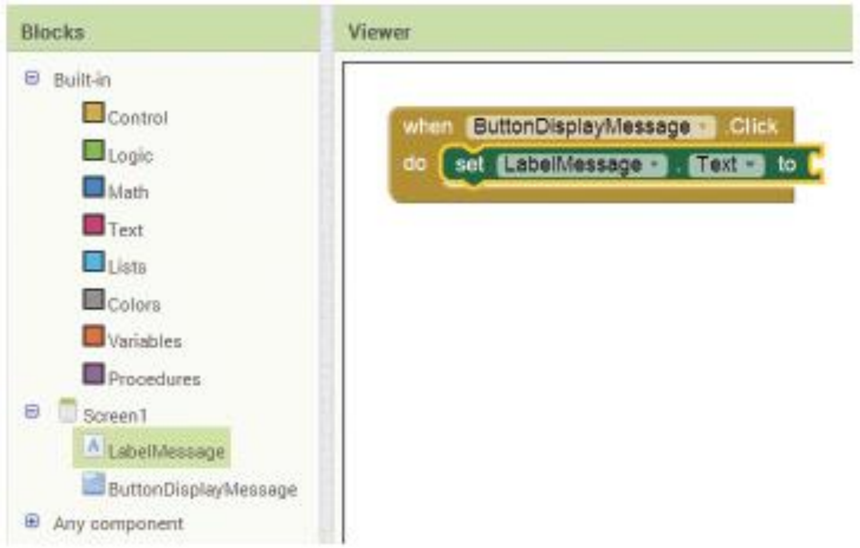
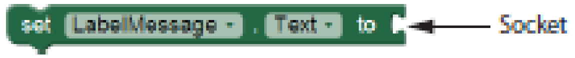


Figure 1-66 An Empty Socket (*Source:* MIT App Inventor 2)



Getting Hands-On with App Inventor

Programming in Blocks

- Click *Text* under *Built-in* in the Blocks column.
- A drawer will open as shown in Figure 1-67.
- In the figure is the *text string* block.
- Click the empty space, type *Hello World* then press enter.

Getting Hands-On with App Inventor

Figure 1-67 The Built-in `text string` Block (Source: MIT App Inventor 2)

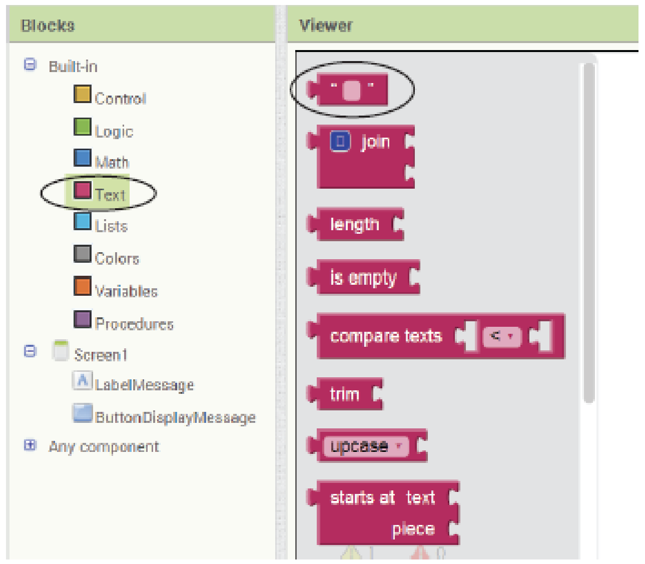


Figure 1-68 The Text String Block Snapped into the Socket of the `set LabelMessage.Text to` Block (Source: MIT App Inventor 2)

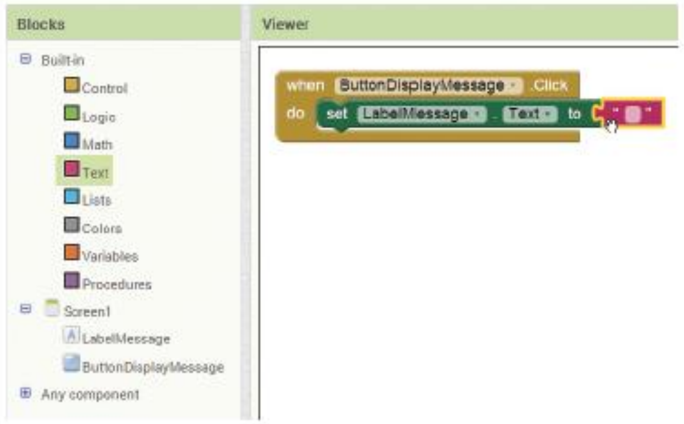
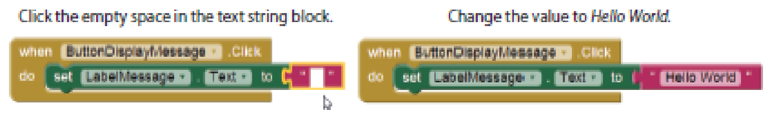
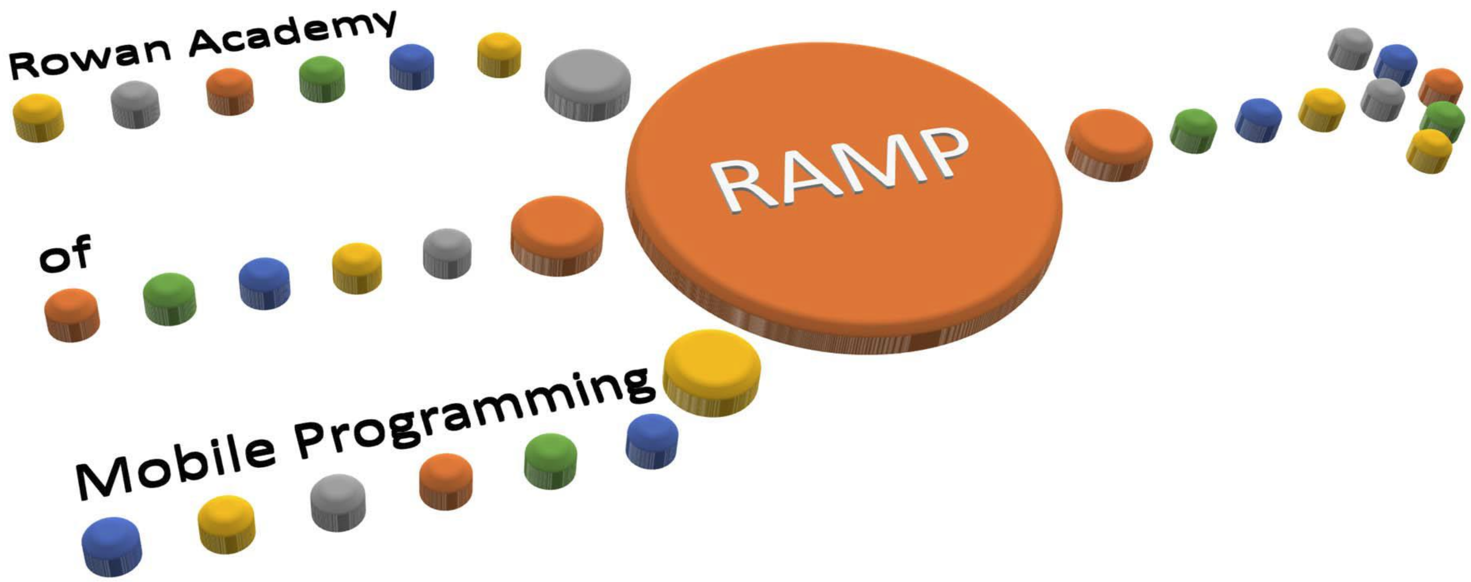


Figure 1-69 Changing the Value of the Text String Block to *Hello World* (Source: MIT App Inventor 2)


Click the empty space in the text string block.
Change the value to Hello World.
when ButtonDisplayMessage .Click
do set LabelMessage . Text to
Hello World



Mole Mash Game

Mole Mash Game Description

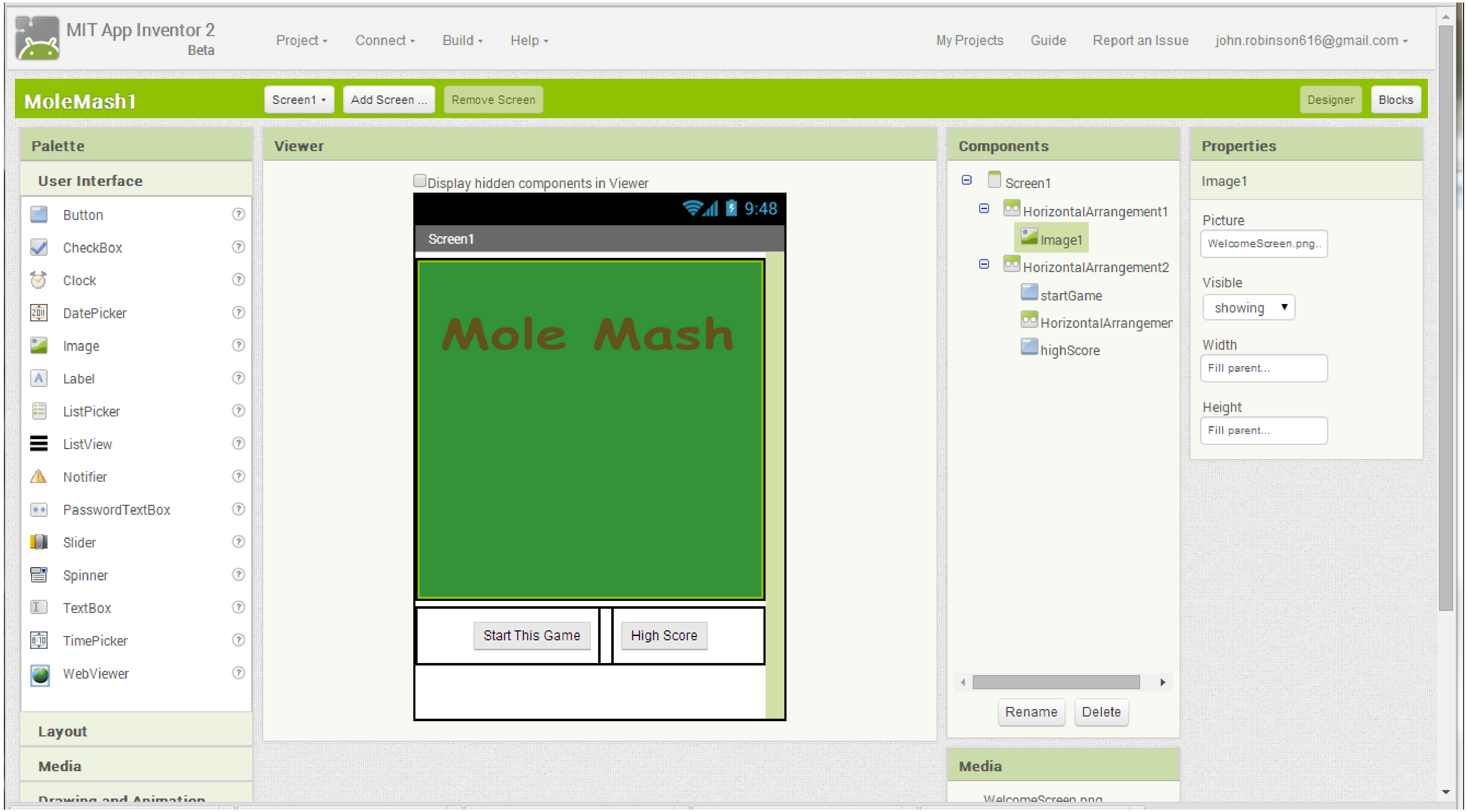
In our version of whack a mole, you will have thirty seconds to try and get the highest score you can. If your total score after the thirty seconds is high enough, you will be able to collect bonus points by shaking your device! Final Scores are then displayed on another we will call the ScoreScreen. On the ScoreScreen page, the high score is displayed along with the score from the previous game.

Android & Computer Science Concepts Covered in Mole Mash Game

This Android App will include the following Computer Science concepts and Android principles:

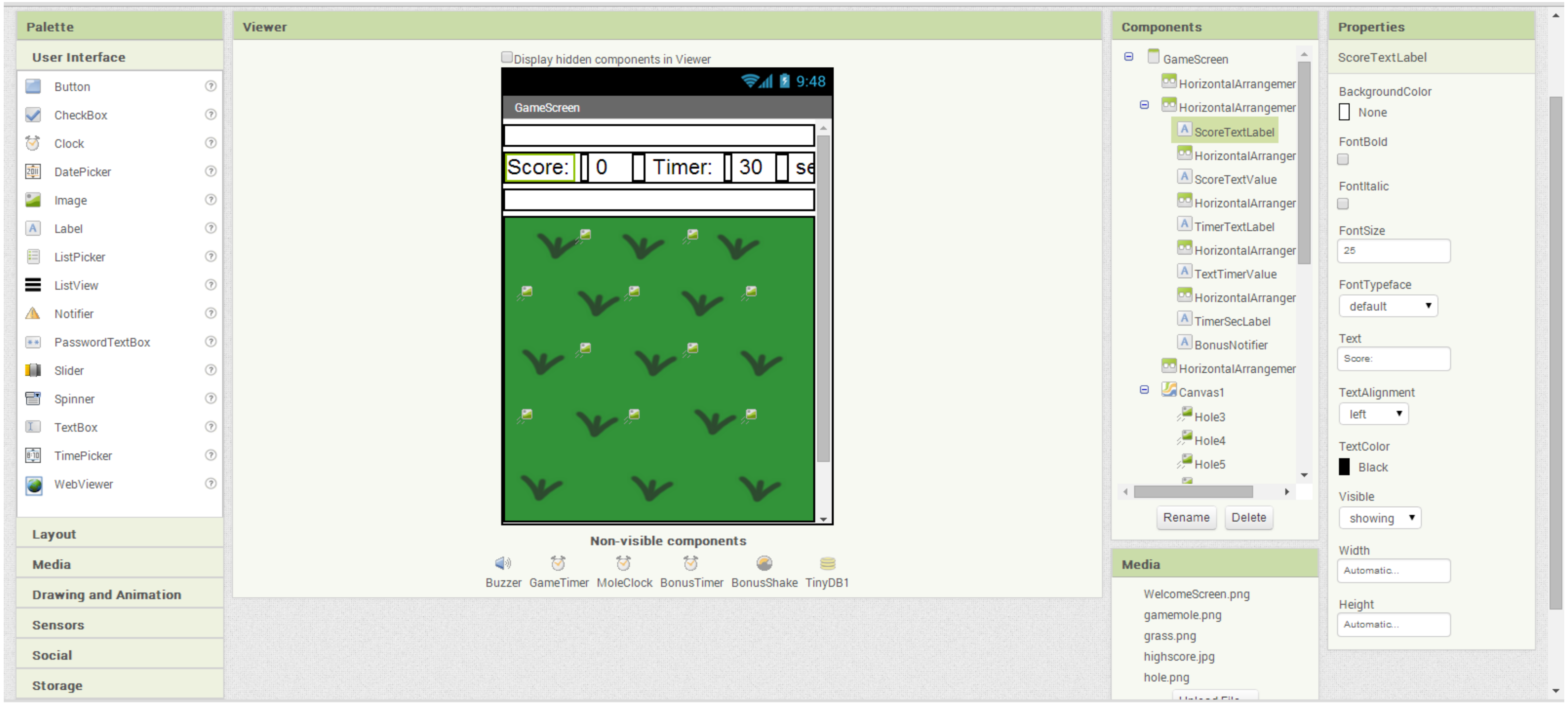
- The Android accelerometer sensor
- Android event handling
- How conditional and control statements are used
- Data structures and Abstractions
- Parameter passing and Data Storage
- High level languages translated into low level languages.

Screen 1



Picture: WelcomeScreen.png...
Visible: showing
Width: Fill parent...
Height: Fill parent...

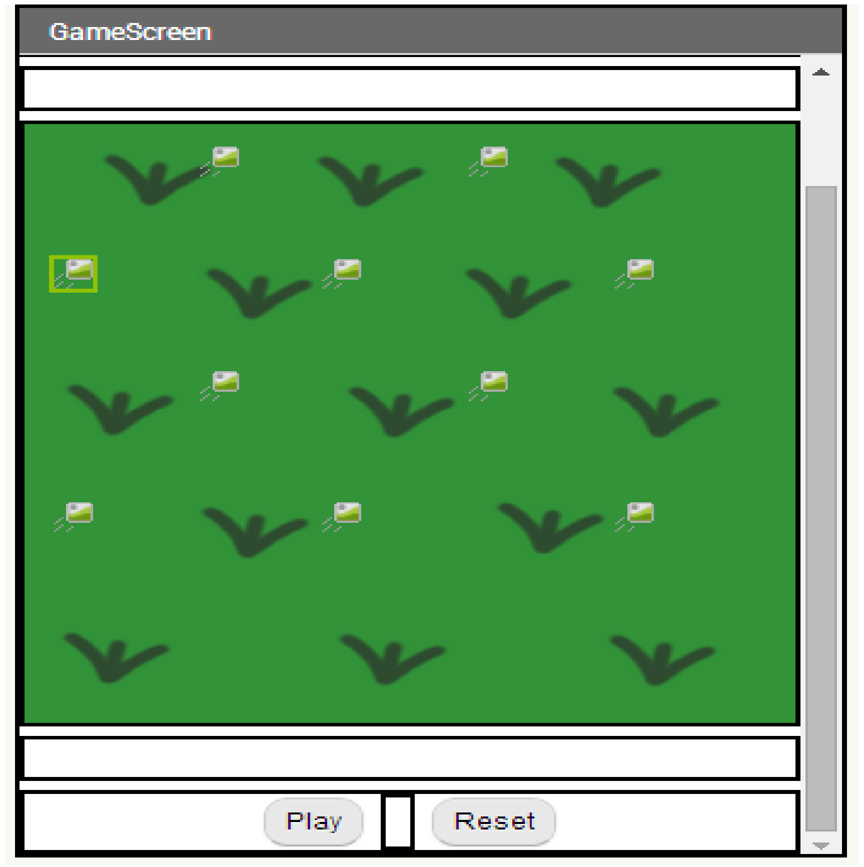
Game Screen top



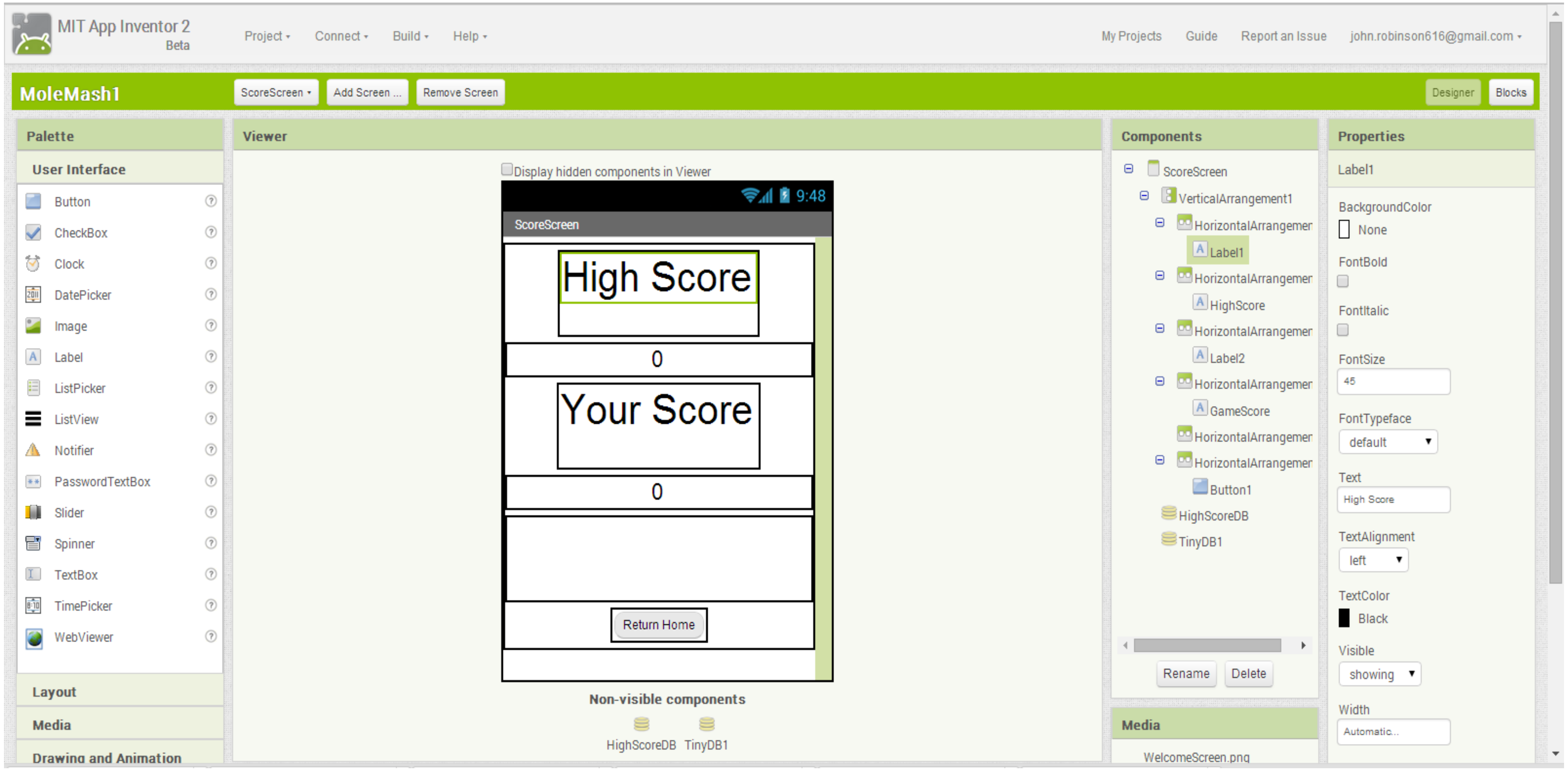
ScoreTextLabel

BackgroundColor: None
FontBold: ☐
FontItalic: ☐
FontSize: 25
FontTypeface: default
Text: Score:
TextAlignment: left
TextColor: Black
Visible: showing
Width: Automatic...
Height: Automatic...

Game Screen bottom



Score Screen



Components

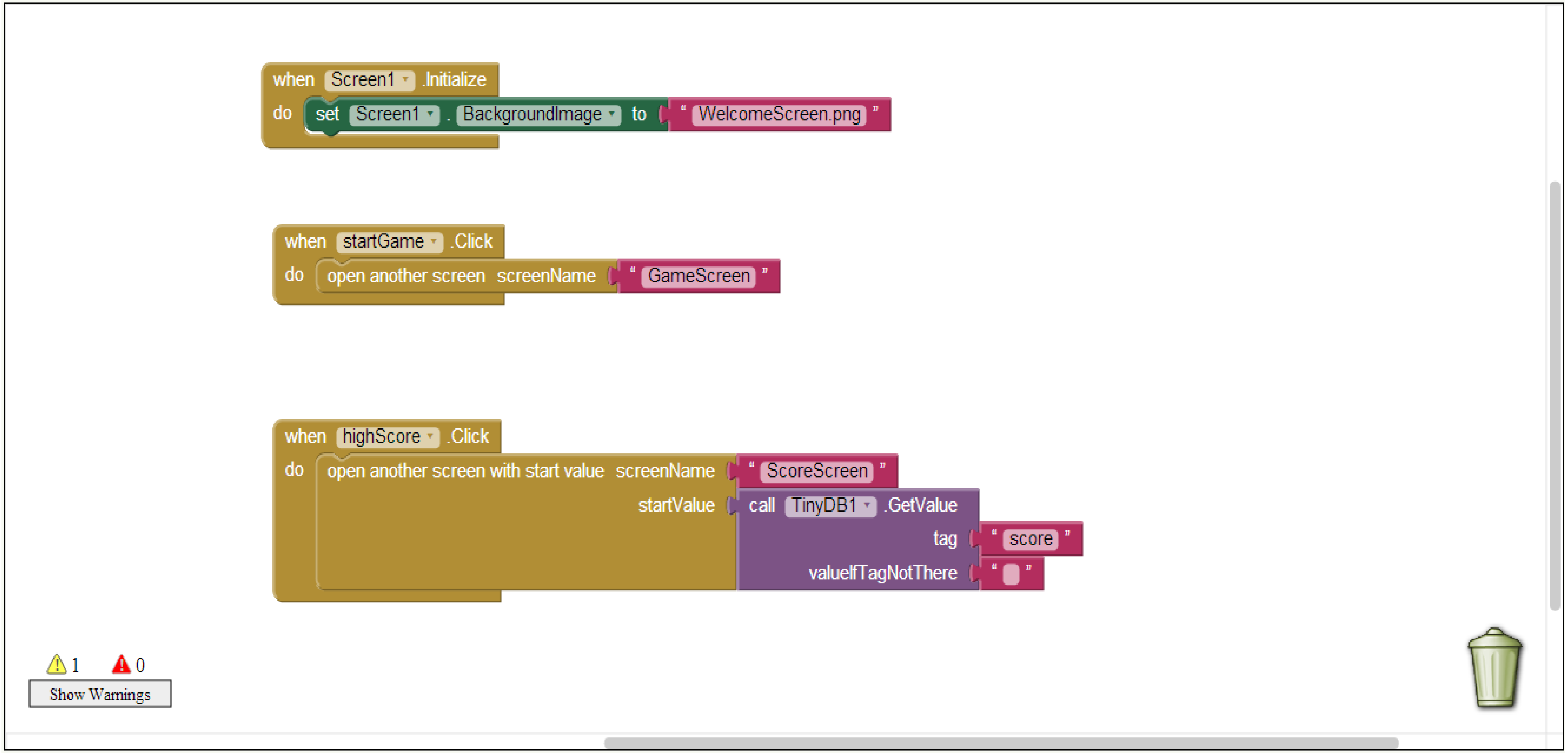
- ScoreScreen
  - VerticalArrangement1
    - HorizontalArrangemer
      - Label1
    - HorizontalArrangemer
      - HighScore
    - HorizontalArrangemer
      - Label2
    - HorizontalArrangemer
      - GameScore
    - HorizontalArrangemer
    - HorizontalArrangemer
      - Button1
  - HighScoreDB
  - TinyDB1

Properties

Label1

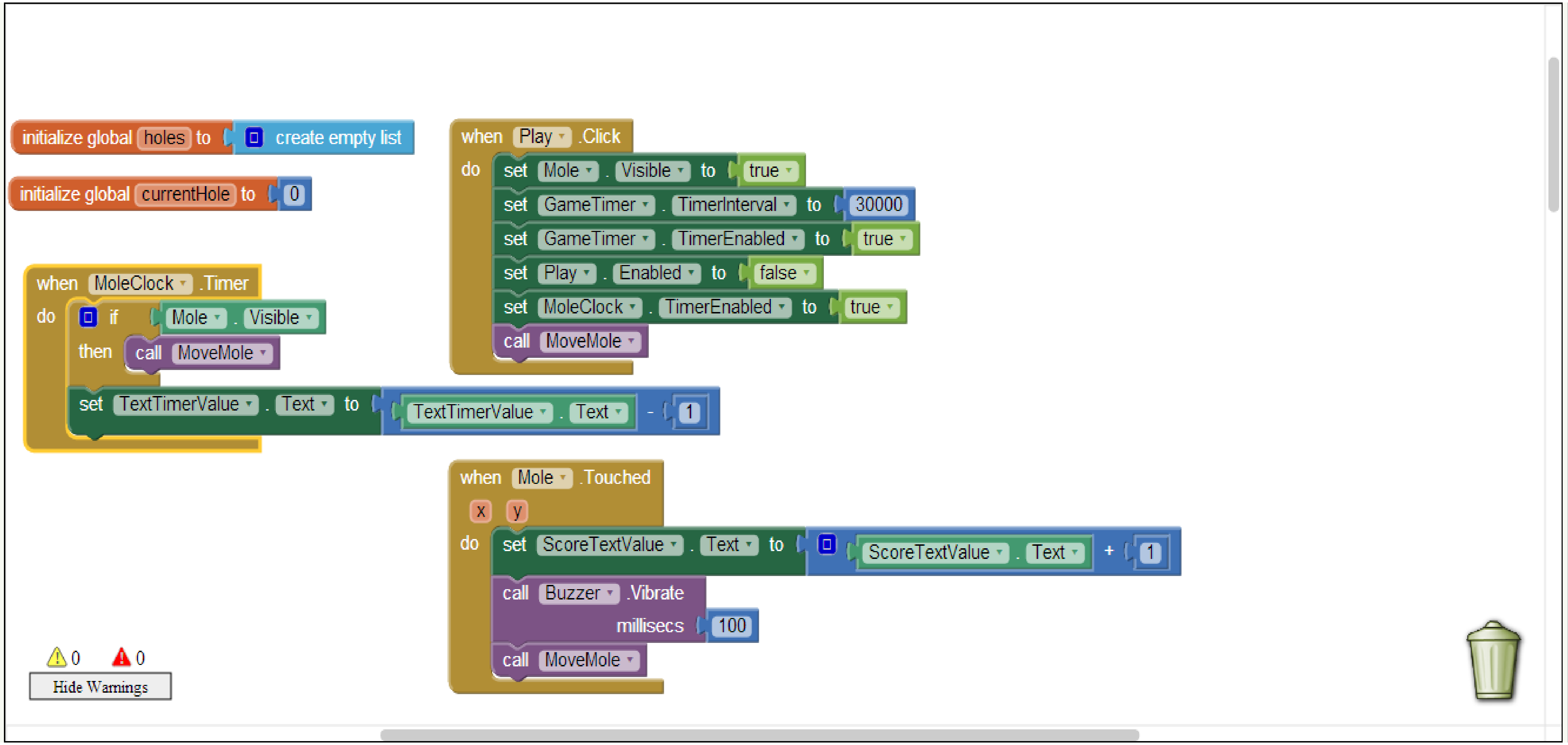
BackgroundColor	None
FontBold	☐
FontItalic	☐
FontSize	45
FontTypeface	default
Text	High Score
TextAlignment	left
TextColor	Black
Visible	showing
Width	Automatic...

Screen 1 Logic



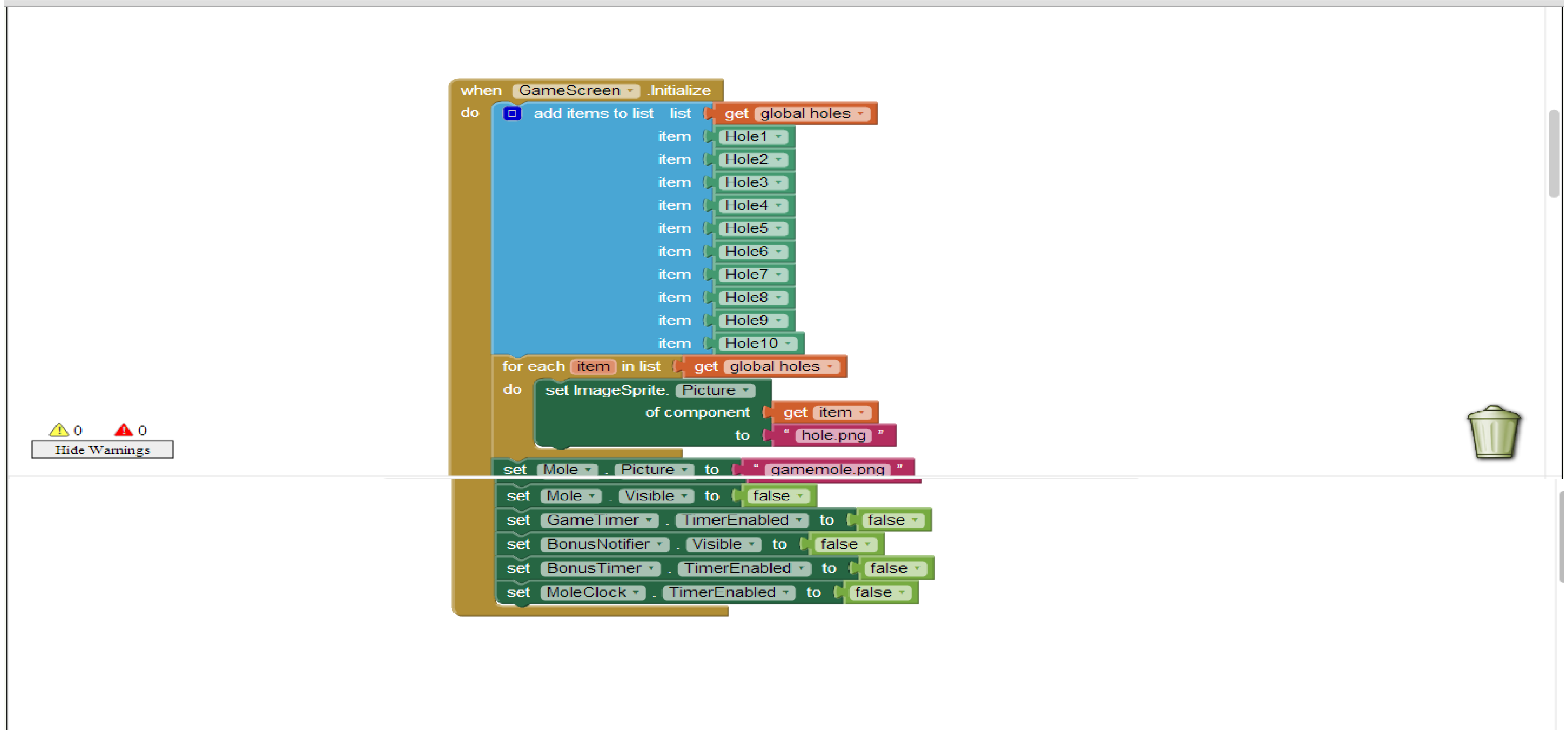
```
when Screen1 .Initialize
do  set Screen1 . BackgroundImage to " WelcomeScreen.png "

when startGame .Click
do  open another screen  screenName " GameScreen "

when highScore .Click
do  open another screen with start value  screenName " ScoreScreen "
                                           startValue call TinyDB1 .GetValue
                                                                  tag " score "
                                                    valueIfTagNotThere " "
```

Game Screen Logic



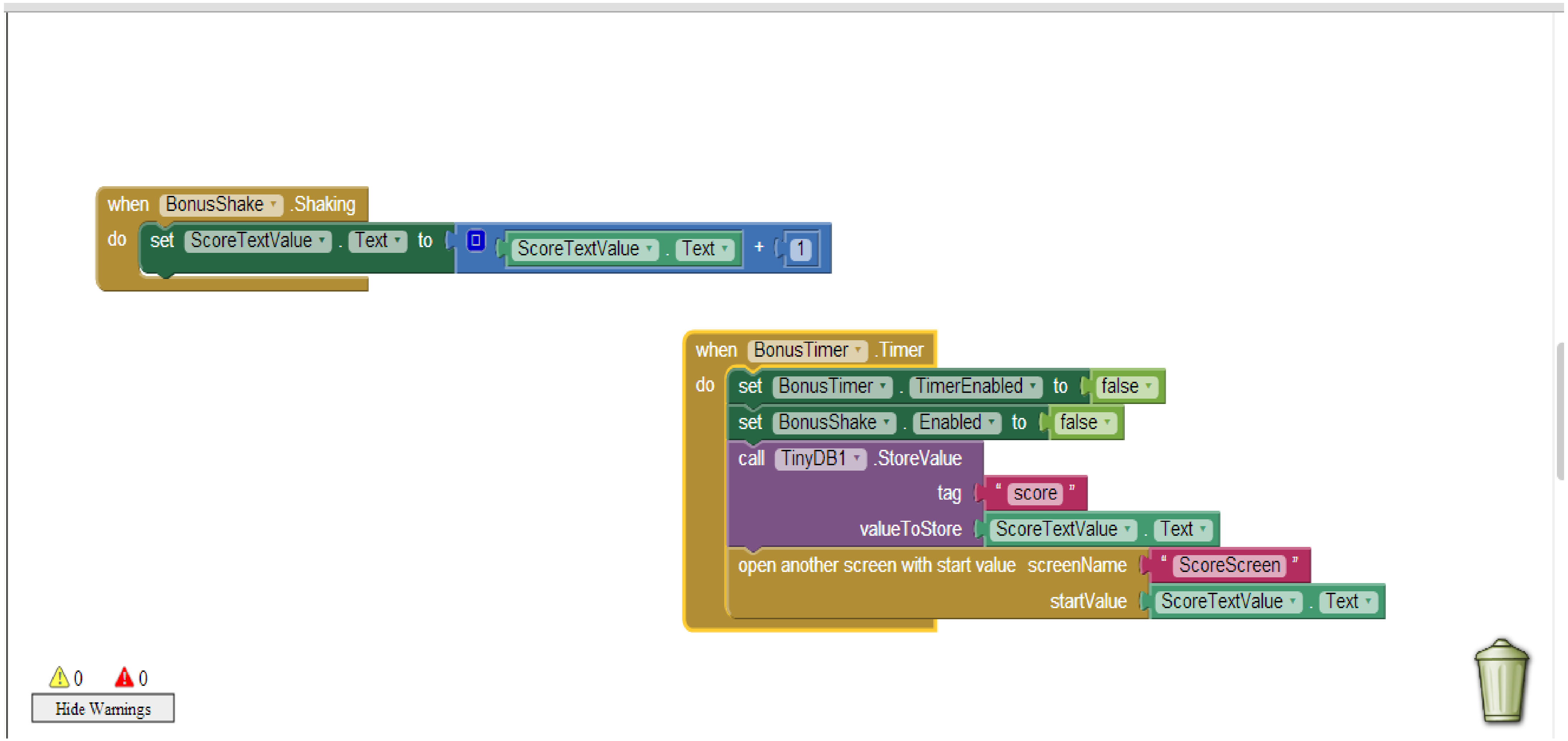
```
initialize global holes to create empty list

initialize global currentHole to 0

when MoleClock.Timer
do  if Mole.Visible
    then call MoveMole
    set TextTimerValue.Text to TextTimerValue.Text - 1

when Play.Click
do  set Mole.Visible to true
    set GameTimer.TimerInterval to 30000
    set GameTimer.TimerEnabled to true
    set Play.Enabled to false
    set MoleClock.TimerEnabled to true
    call MoveMole

when Mole.Touched
  x  y
do  set ScoreTextValue.Text to ScoreTextValue.Text + 1
    call Buzzer.Vibrate
                millisecs 100
    call MoveMole
```

Game Screen Logic



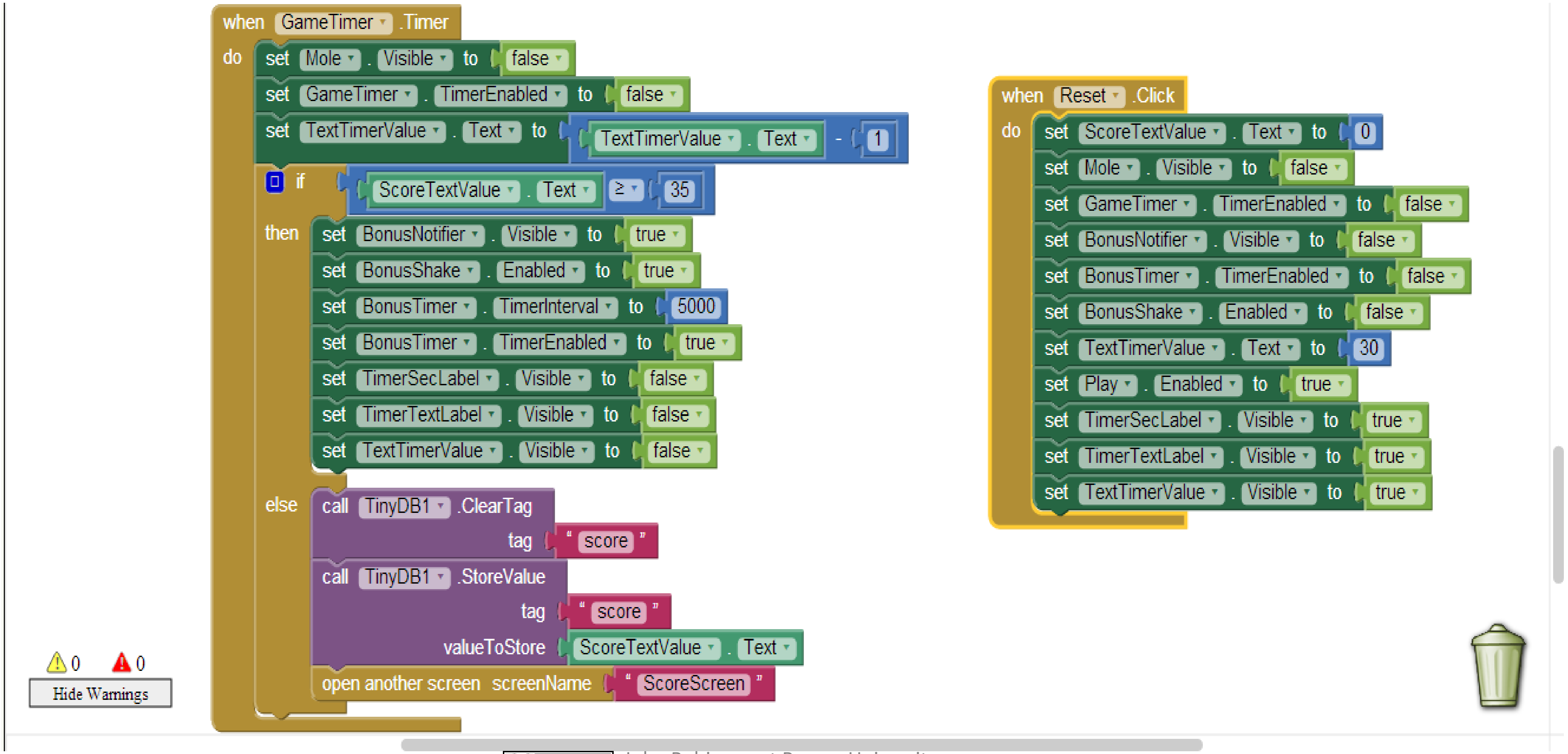
```
when GameScreen .Initialize
do  add items to list  list  get global holes
                       item   Hole1
                       item   Hole2
                       item   Hole3
                       item   Hole4
                       item   Hole5
                       item   Hole6
                       item   Hole7
                       item   Hole8
                       item   Hole9
                       item   Hole10
    for each item in list  get global holes
    do  set ImageSprite. Picture
            of component  get item
            to  " hole.png "
    set Mole . Picture to " gamemole.png "
    set Mole . Visible to false
    set GameTimer . TimerEnabled to false
    set BonusNotifier . Visible to false
    set BonusTimer . TimerEnabled to false
    set MoleClock . TimerEnabled to false
```

Game Screen Logic



```
when BonusShake .Shaking
do  set ScoreTextValue . Text to ( ScoreTextValue . Text + 1 )

when BonusTimer .Timer
do  set BonusTimer . TimerEnabled to false
    set BonusShake . Enabled to false
    call TinyDB1 .StoreValue
                     tag  " score "
            valueToStore  ScoreTextValue . Text
    open another screen with start value  screenName  " ScoreScreen "
                                          startValue  ScoreTextValue . Text
```

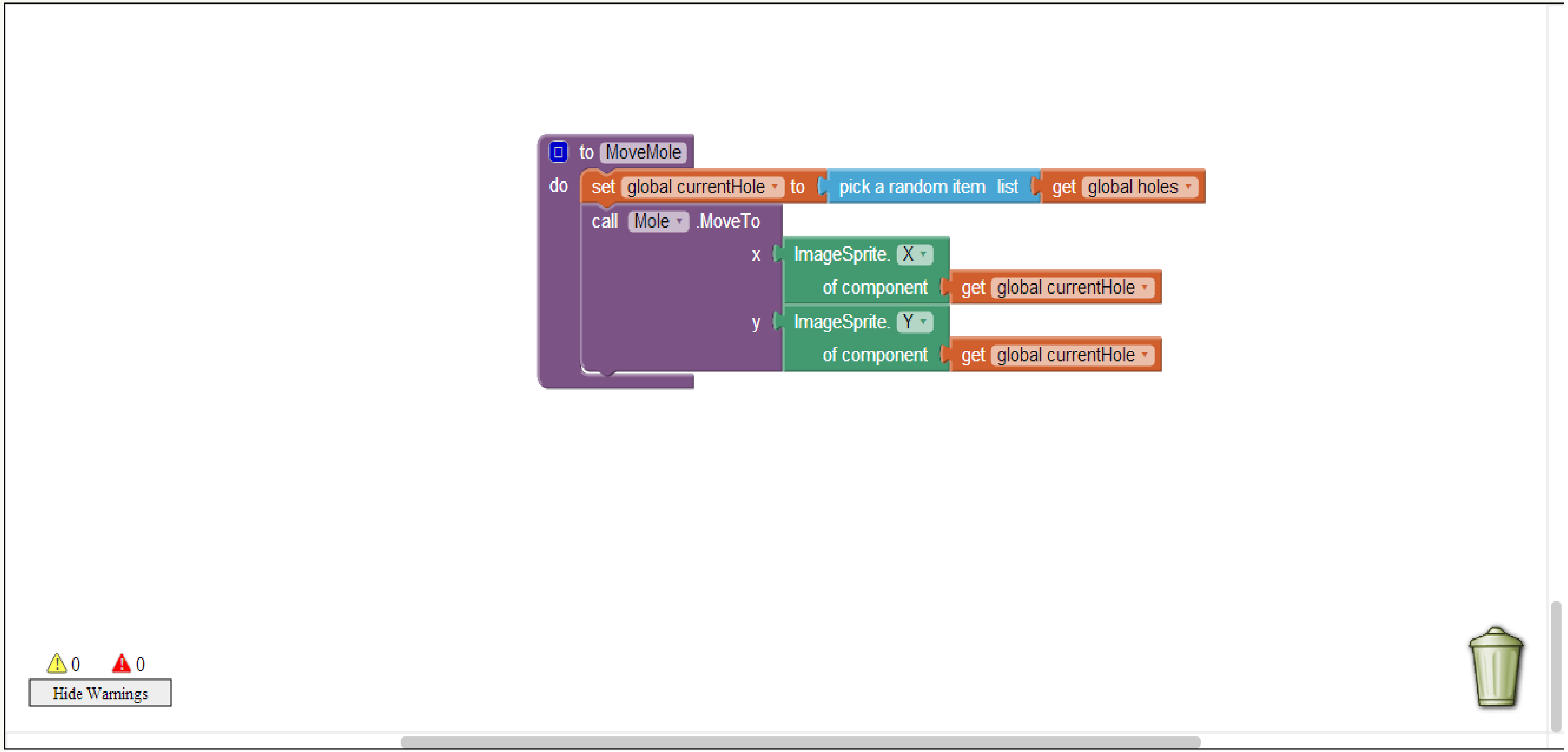
Game Screen Logic



```
when GameTimer .Timer
do  set Mole . Visible to false
    set GameTimer . TimerEnabled to false
    set TextTimerValue . Text to  TextTimerValue . Text - 1
    if  ScoreTextValue . Text ≥ 35
    then  set BonusNotifier . Visible to true
          set BonusShake . Enabled to true
          set BonusTimer . TimerInterval to 5000
          set BonusTimer . TimerEnabled to true
          set TimerSecLabel . Visible to false
          set TimerTextLabel . Visible to false
          set TextTimerValue . Visible to false
    else  call TinyDB1 .ClearTag
                          tag  " score "
          call TinyDB1 .StoreValue
                          tag  " score "
                 valueToStore  ScoreTextValue . Text
          open another screen  screenName  " ScoreScreen "
```

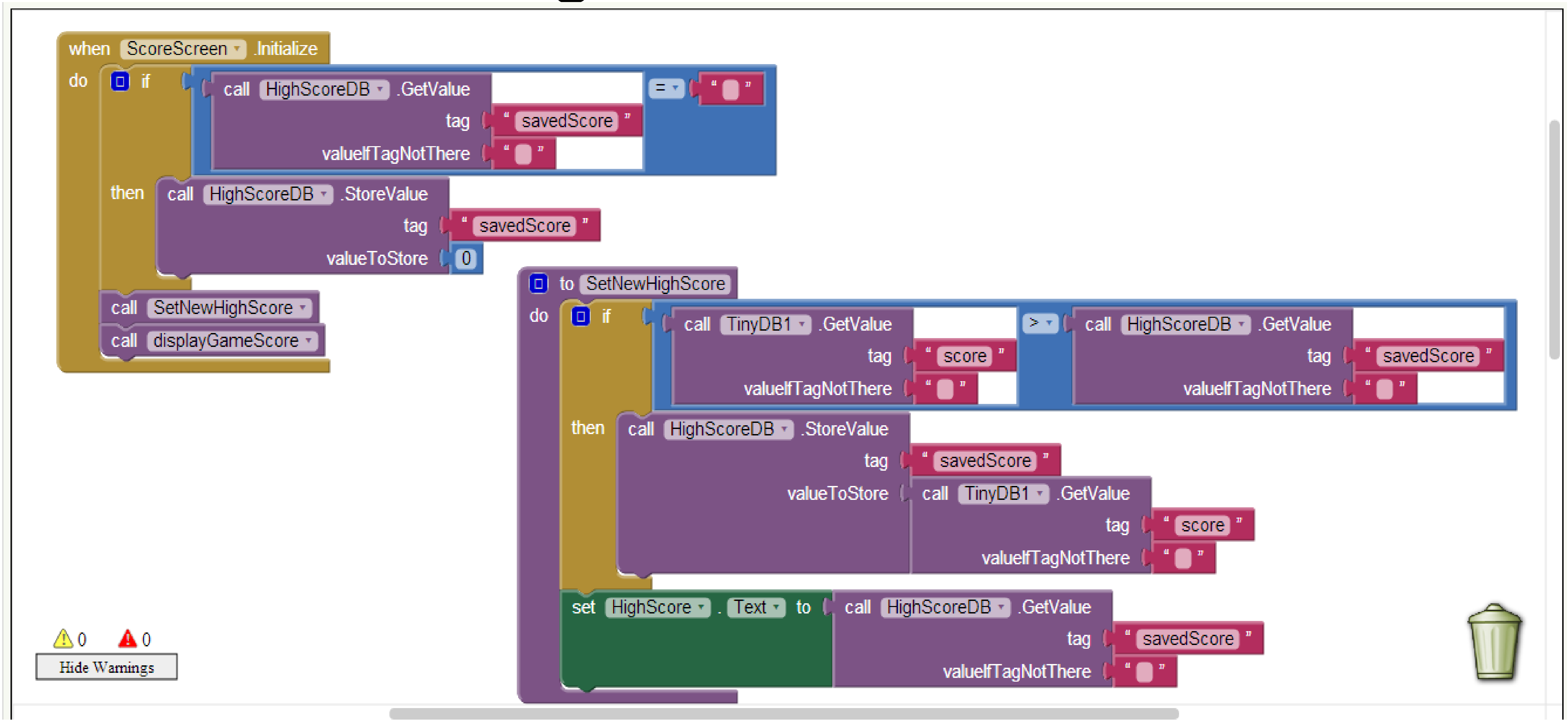
```
when Reset .Click
do  set ScoreTextValue . Text to 0
    set Mole . Visible to false
    set GameTimer . TimerEnabled to false
    set BonusNotifier . Visible to false
    set BonusTimer . TimerEnabled to false
    set BonusShake . Enabled to false
    set TextTimerValue . Text to 30
    set Play . Enabled to true
    set TimerSecLabel . Visible to true
    set TimerTextLabel . Visible to true
    set TextTimerValue . Visible to true
```

Game Screen Logic



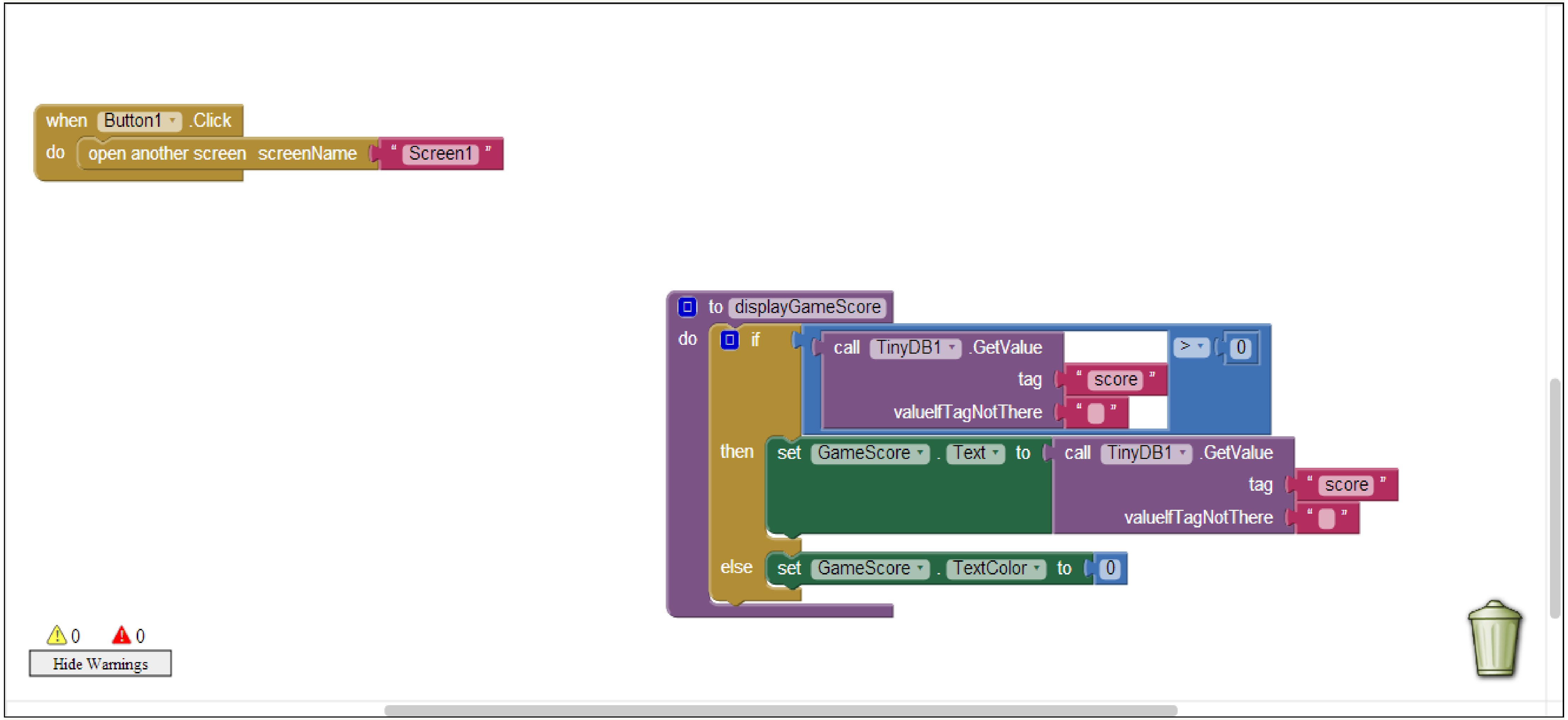
```
to MoveMole
do  set global currentHole to  pick a random item list  get global holes
    call Mole .MoveTo
                   x  ImageSprite. X
                         of component  get global currentHole
                   y  ImageSprite. Y
                         of component  get global currentHole
```

Score Screen Logic



```
when ScoreScreen .Initialize
do  if    call HighScoreDB .GetValue
                          tag  " savedScore "
              valueIfTagNotThere  "  "
          = "  "
    then  call HighScoreDB .StoreValue
                       tag  " savedScore "
              valueToStore  0
    call SetNewHighScore
    call displayGameScore

to SetNewHighScore
do  if    call TinyDB1 .GetValue
                     tag  " score "
              valueIfTagNotThere  "  "
          >  call HighScoreDB .GetValue
                          tag  " savedScore "
              valueIfTagNotThere  "  "
    then  call HighScoreDB .StoreValue
                       tag  " savedScore "
              valueToStore  call TinyDB1 .GetValue
                                         tag  " score "
                            valueIfTagNotThere  "  "
    set HighScore . Text to  call HighScoreDB .GetValue
                                             tag  " savedScore "
                                valueIfTagNotThere  "  "
```

Score Screen Logic



```
when Button1 .Click
do  open another screen  screenName  " Screen1 "

to displayGameScore
do  if    call TinyDB1 .GetValue
                        tag  " score "
             valueIfTagNotThere  "  "      >  0
    then  set GameScore . Text to  call TinyDB1 .GetValue
                                                  tag  " score "
                                       valueIfTagNotThere  "  "
    else  set GameScore . TextColor to  0
```