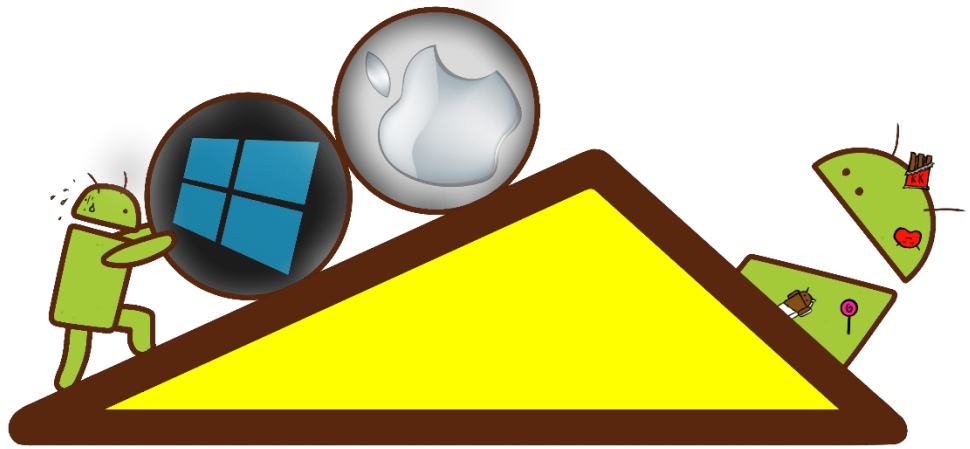

RAMP

Rowan Academy of Mobile Programming

Agenda – Day 1

- Introduction
- What is a computer program?
- Introducing App Inventor
- 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.

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The College Board and NSF CS Big Ideas

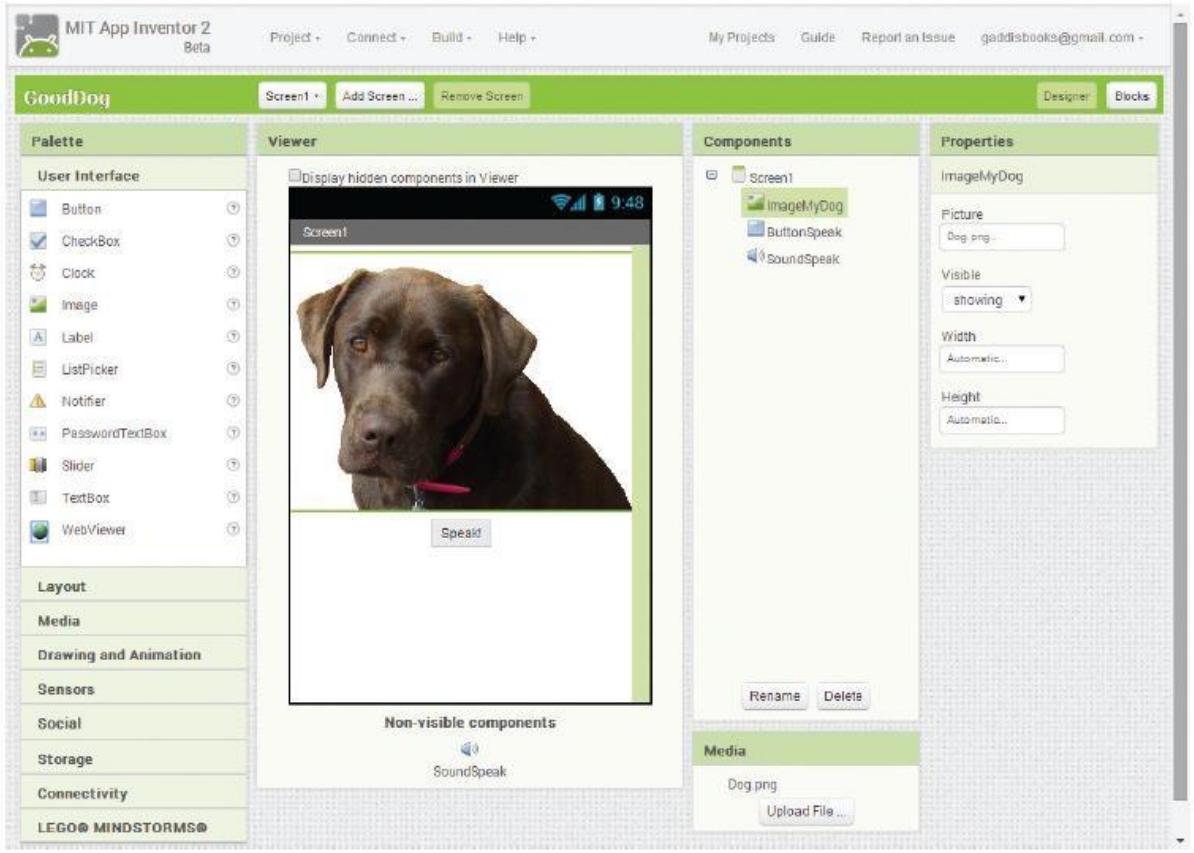
- Big Idea I: Creativity
- Big Idea II: Abstraction
- Big Idea III: Data
- Big Idea IV: Algorithms
- Big Idea V: Programming
- Big Idea VI: Internet
- Big Idea VII: Global Impact

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).

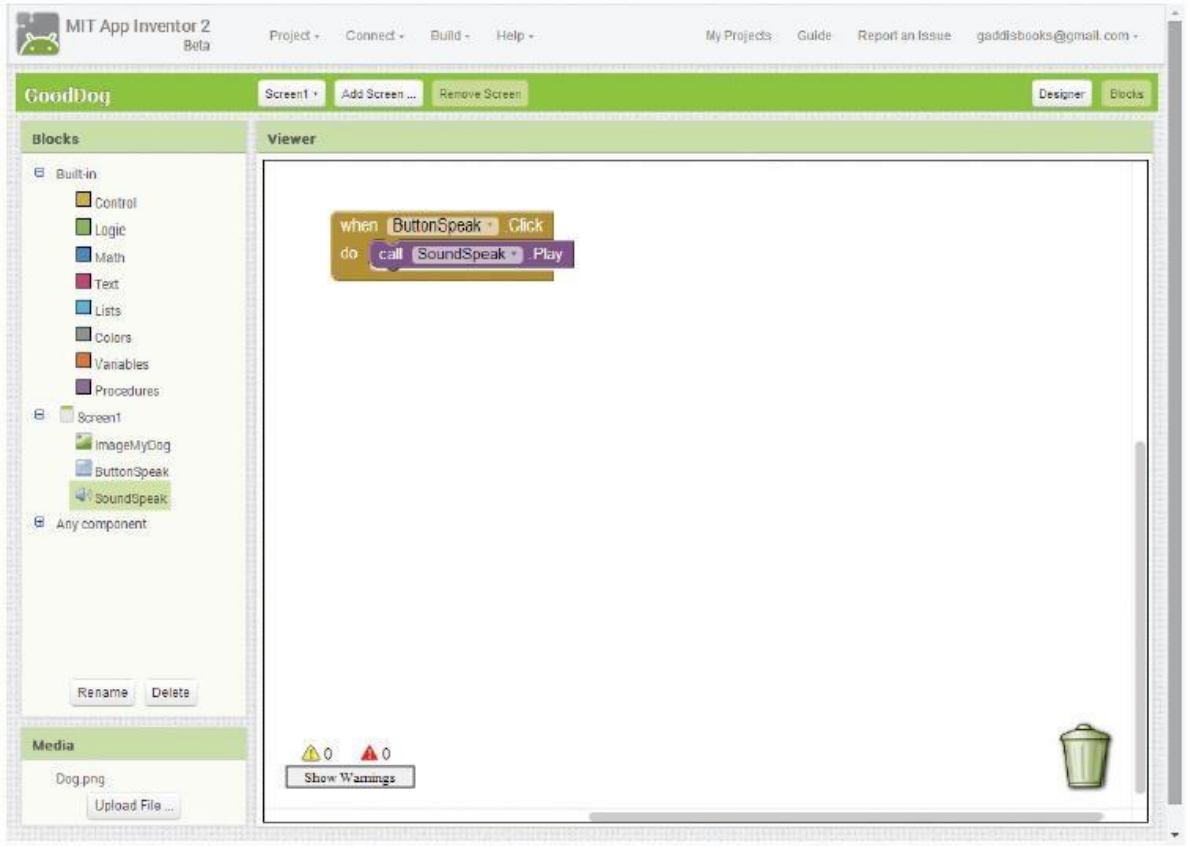
Introduction

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



Introduction

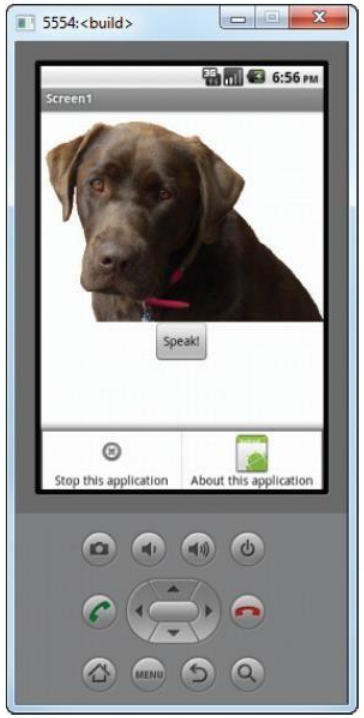
Figure 1-2 The Blocks Editor (*Source:* MIT App Inventor 2)



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

1. You can access App Inventor from any computer connected to the Internet.
2. Your files are maintained and backed up by the host.
3. 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

- 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?

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

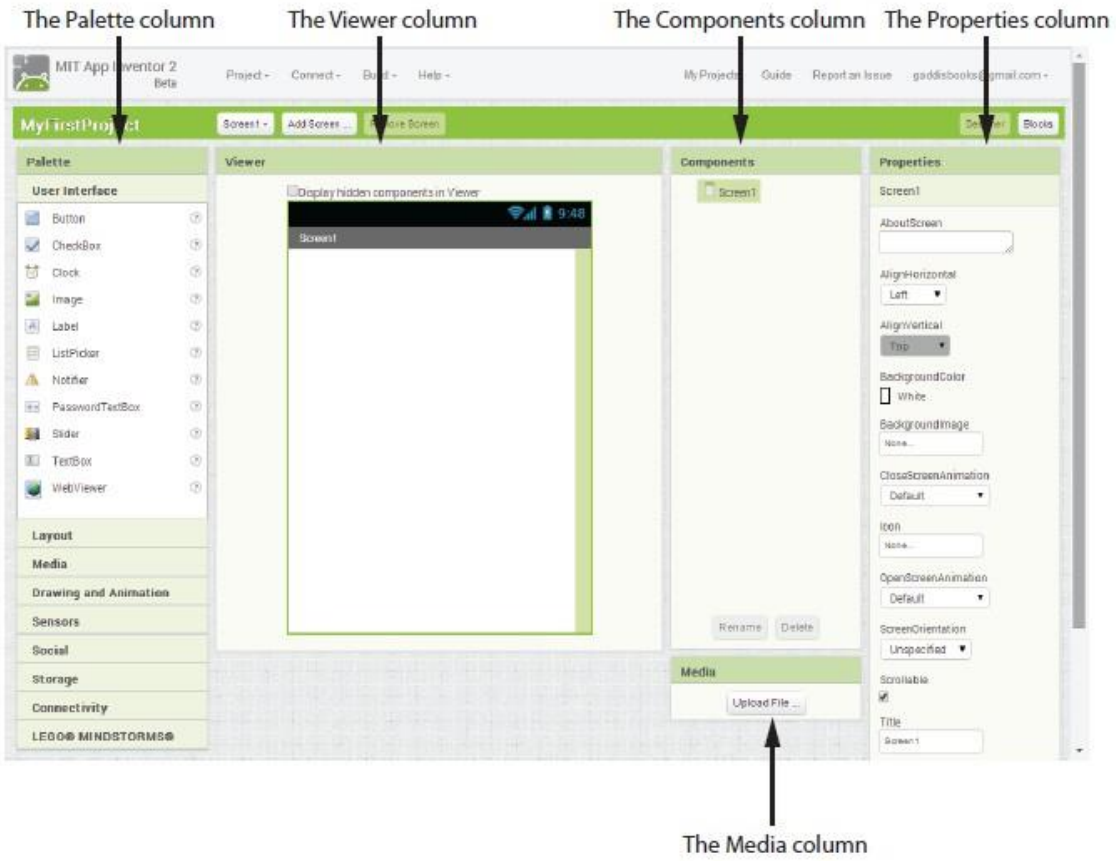
The Designer

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

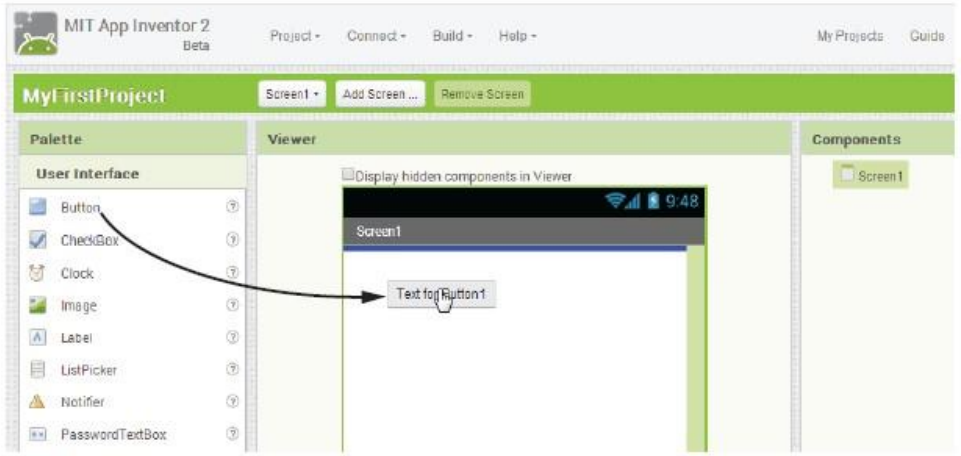
- The different sections of the palette are:
  - ***User interface*** – The fundamental component for building an app's screen.
  - ***Layout*** – Provides components for organizing other components on the app's screen.
  - ***Media*** –
    - Provides components for taking photos.
    - Recording and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

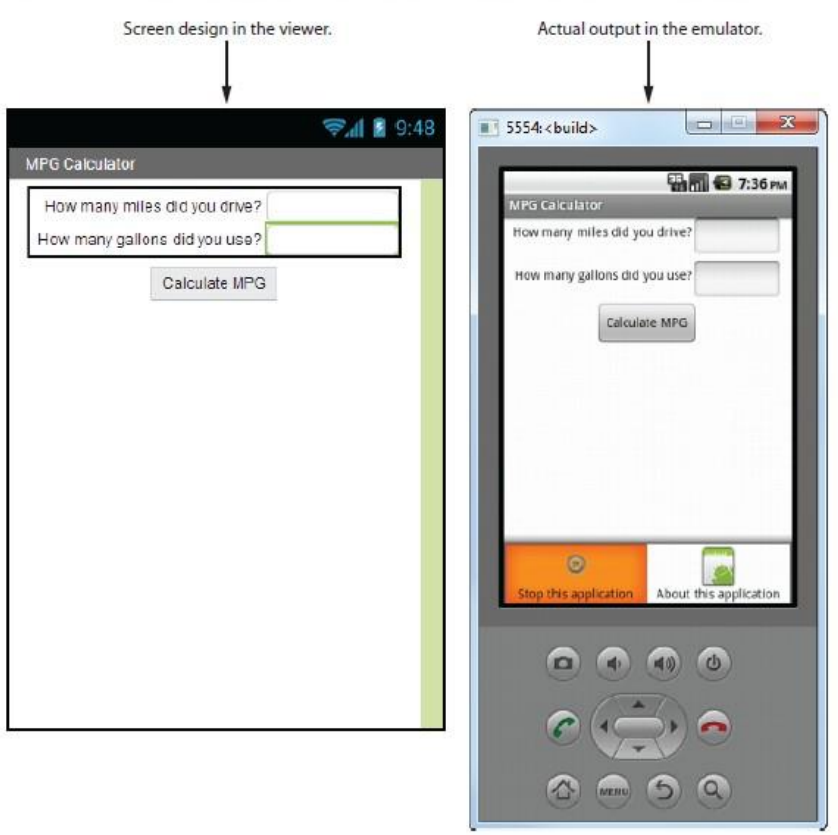


- The Viewer Column
  - You design an apps *user interface* by dragging components from the Pallet onto the simulated screen in the Viewer.
  - Components you place on the simulated screen in the Viewer might appear slightly different on the emulator screen.

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)



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.

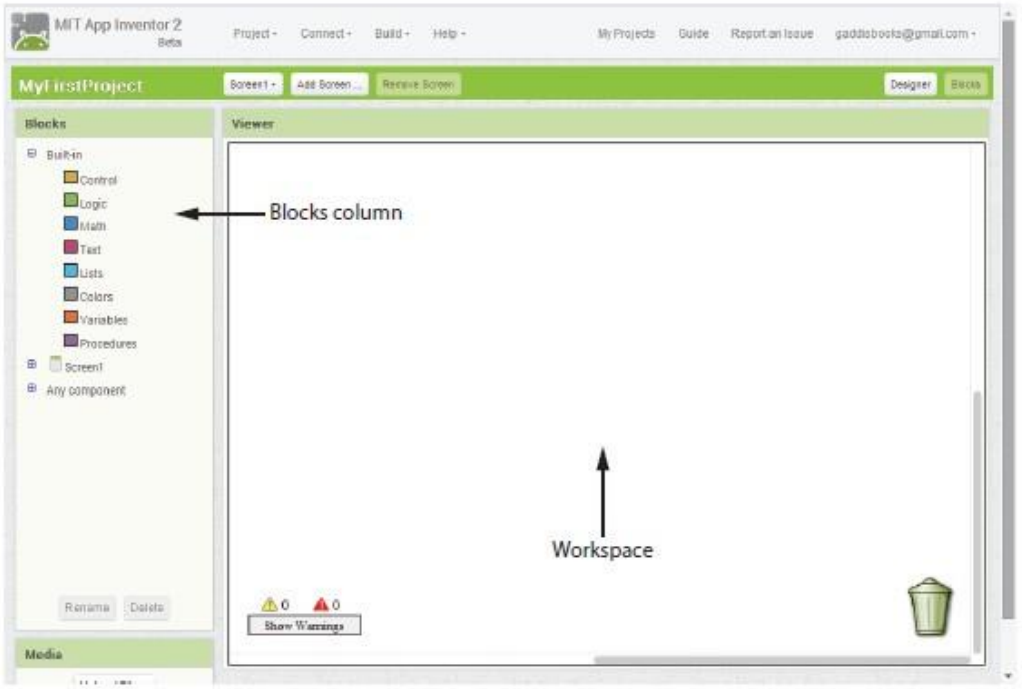
Figure 1-20 A Programming Statement Constructed from Code Blocks
(*Source:* MIT App Inventor 2)

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

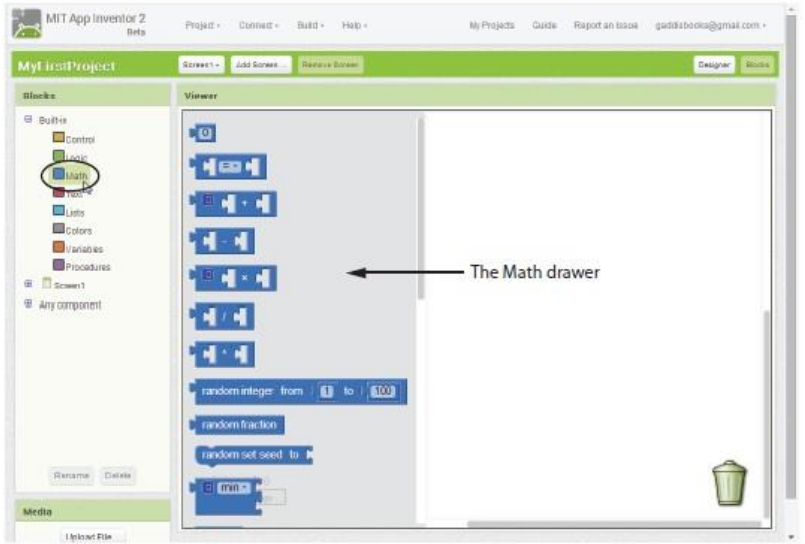
Figure 1-21 The Blocks Editor (*Source:* MIT App Inventor 2)



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.