

# BRAIN HACKERS APP DEVELOPMENT CURRICULUM

## Lesson 2

### Picture Panel App – Pixels, Pixel Arrays and Screen Layout

#### SUMMARY

This lesson introduces the use of Layout components to achieve an appealing visual display. This will require an understanding that the display screen of an Android phone or device consists of an array of pixels, and that objects displayed on the screen may be sized by setting their height and width in pixels. An app will be created that consists of a panel containing different pictures. When a user taps on one of the pictures, text-to-speech will tell about the picture. This app illustrates the benefits for learning and memory of presenting information in alternative formats.

#### ASSUMPTIONS

For this exercise, students will need images of a dog, coyote, wolf and dingo.

#### PIXELS AND PIXEL ARRAYS

The visual display on an Android phone or device consists of dots, referred to as “Pixels.” These dots may be thought of as little specks of light and by changing the properties of the light, different colors can be produced.

#### *Key Concepts*

**Pixel** - dot on a computer screen

Copyright © 2017 by Brain Hackers Association, a New Mexico Corporation. All rights reserved. The material, including articles, photographs and/or illustrations or diagrams, contained in this publication may be used and/or distributed by the user only to any non-commercial / non-profit organization for teaching and/or training purposes at no cost.

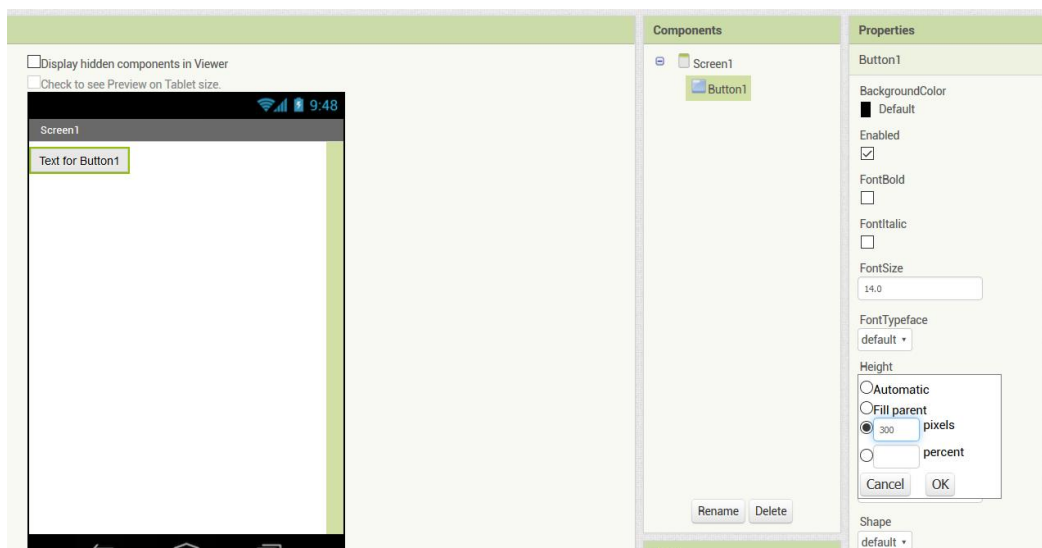
The pixels that make up the visual display are arranged in an array, or grid, from left to right and from top to bottom. Each dot in the array has an address. The visual appearance of the screen is produced by sending instructions to each dot, based on its address, that tell the dot whether or not to light up and what color of light to emit.

### **Key Concepts**

**Pixel Array** –a two-dimensional grid of pixels that make up the display screen

For this lesson, you will need to know how many pixels make up the screen on your Android phone or device.

- Place a Button on the screen – *NOTE: the following steps should be based on the appearance of the Button on the phone or device, and not the App Inventor Viewer panel*
  - Adjust the pixels for the Height setting until the button fills the screen from top to bottom, and record the number of pixels – *NOTE – height will also be referred to as the “y” dimension*



**FIGURE 1.** The height of a button in pixels may be adjusted from the Button properties

- Adjust the pixels for the Width setting until the button fills the screen from left to right, and record the number of pixels – *NOTE – width will also be referred to as the “x” dimension*

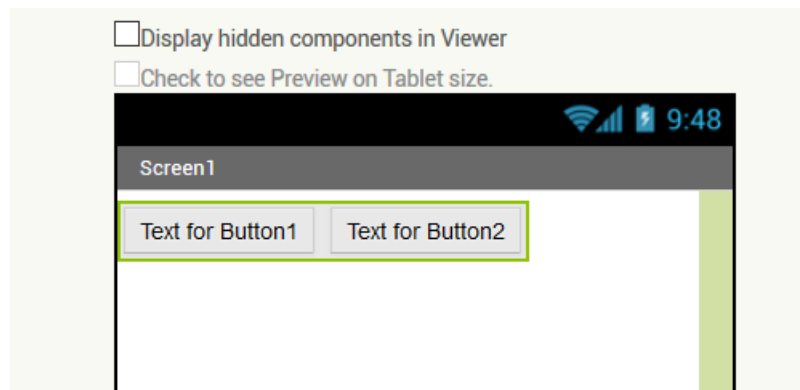
### ***Helpful Tips***

Knowing the size of your screen will help you size buttons, images and other components to achieve an attractive visual design.

## **SCREEN LAYOUT**

App Inventor provides layout components to help organize features on the visual display. The following exercise illustrates how to use these components.

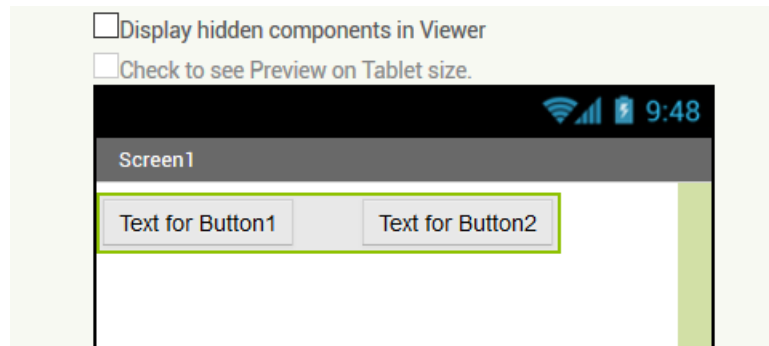
- From the Layout components, drag a HorizontalArrangement onto the screen
  - Drag a Button onto the screen and insert it into the HorizontalArrangement – *NOTE: it can sometimes be tricky getting the Button or other components inserted into a HorizontalArrangement*
  - Drag a second Button onto the screen and insert it into the same HorizontalArrangement next to the first Button
  - Insert a Label between the two Buttons in the HorizontalArrangement – *NOTE: by setting the height or width of a Label and removing the text, Labels may serve as “Spacers”*
    - From the Properties panel for the Label, adjust the Width to “20” pixels
    - Delete the text for the Label



**Figure 2.** As shown, both buttons should be placed within the HorizontalArrangement

### ***Key Concepts***

**Spacer** – a component used to separate other components creating empty space between the components



**Figure 2.** As shown, a Label component with no text and a width of 20 pixels provides a spacer that separates the two buttons.

- From the Layout components, drag a VerticalArrangement onto the screen
  - Insert a Button into the VerticalArrangement
  - Insert a second Button into the VerticalArrangement

### Helpful Tips

Label components without any text are an effective way to create white space (i.e., empty space) on the display to separate components and create a more attractive layout

### DESIGNER WORKSPACE

The Picture Panel App will consist of four pictures and will provide an opportunity to experiment with laying out components on the screen

- From the Layout components, drag a TableArrangement onto the screen – *NOTE: this will serve as the frame for the picture panel*
  - From the Properties panel for the TableArrangement, change the number of columns to “3” and the number of rows “3”

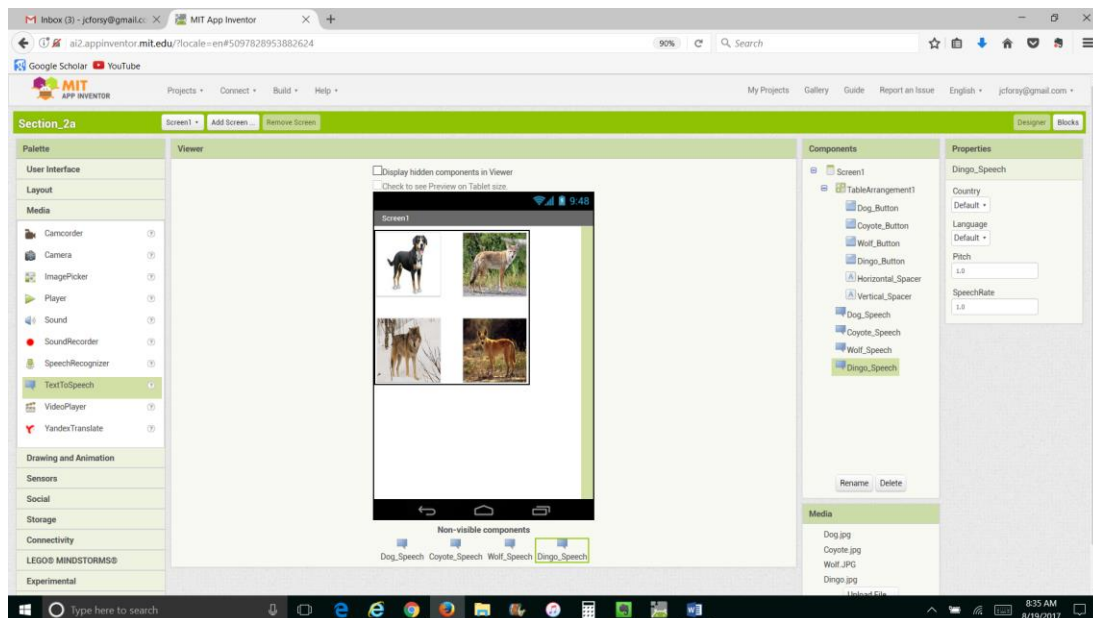
### Key Concepts

**Table** - structure consisting of rows and columns that is used to layout screen components

## Helpful Tips

With App Inventor, it is recommended that the number of rows and columns be set when a TableArrangement component is added to an app, given that App Inventor may respond unreliably if changes are made afterward

- Insert a Button into the first column and row of the TableArrangement – *NOTE: the pictures in the picture panel will actually be buttons*
  - From the Properties panel for the Button, select Image and Upload the file with a picture of a dog
  - From the Properties panel for the Button, adjust the number of pixels for the Height and Width of the image
  - Delete the Text for the Button
- Repeat the previous steps creating a Button in the third column of the first row for the image of the coyote
- Repeat the previous steps creating Buttons in the first and third column of the second row for the images of the wolf and dingo
- Insert Labels with one between the two images in the first row and one between the two images in the first column – *NOTE: the labels will have no text and will create empty space on the display screen*
  - Delete the text in each Label
  - Adjust the Height and Width of each Label to achieve an appealing layout



**FIGURE 3.** This image shows how the Designer workspace with the four images

- From the Media components, drag four Text-to-Speech components onto the Viewer and rename each for the four types of canine (i.e., dog, coyote, wolf and dingo)

## BLOCKS WORKSPACE

- Insert a **when \_\_\_\_ .Click do** block for the Button with the dog image
  - o For the Text-to-Speech to be used with the Button for the dog image, insert a **call \_\_\_\_ .Speak** block into the **when \_\_\_\_ .Click do** block
  - o Attach a text string into the **message** slot and enter the text, "I am a domestic dog. I am closely related to wolves, but over several thousands of years, I have adapted to living with humans."
- Repeat the previous steps for the Button with the image of a coyote and enter the text, "I am a Coyote. I am smaller than a wolf and known for my distinctive howl."
- For the Button with the wolf image, enter the text, "I am a wolf. I am larger and have a less pointed nose and ears than other types of canine."
- For the Button with the dingo image, enter the text, "I am a dingo. I live in Australia and I am the largest land predator on the continent."

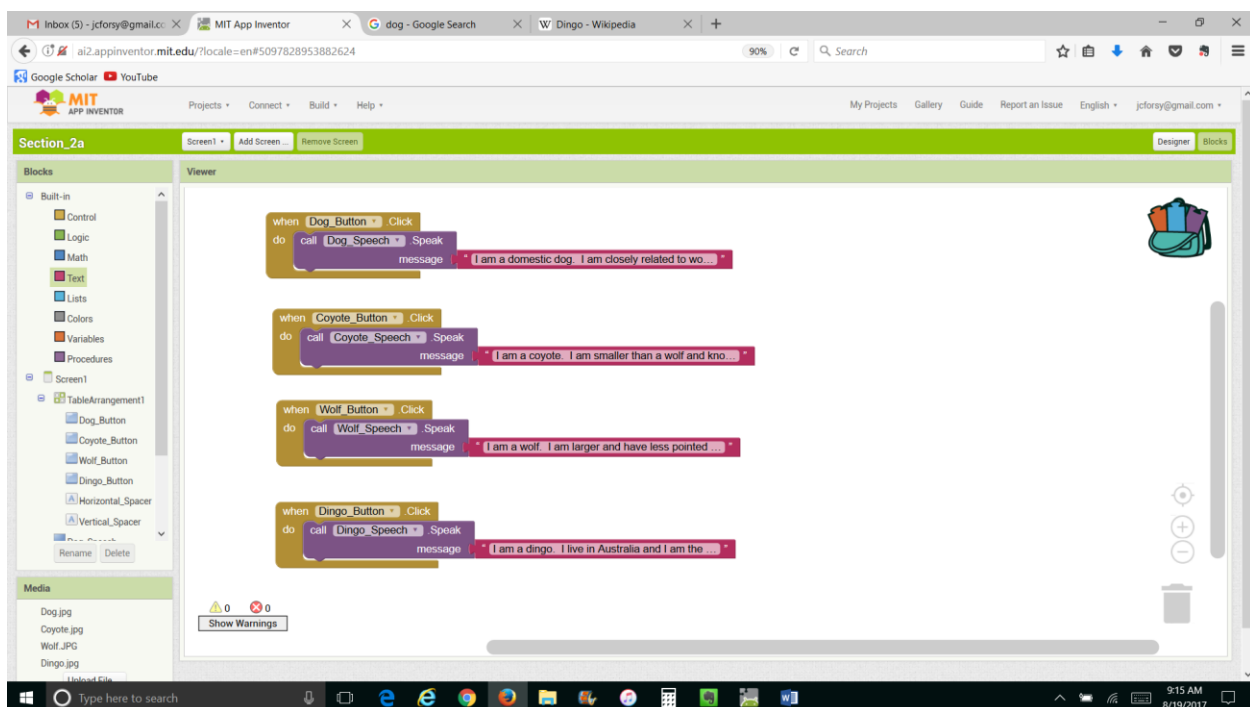


FIGURE 4. This image shows how the Blocks workspace should appear when complete.

## **PICTURE PANEL EXERCISE**

For an assigned topic, download a collection of pictures related to the topic and find one or more facts for each of the pictures. Create a Picture Panel app in which tapping any one of the pictures, tells you about the subject of the picture. NOTE: it may be helpful to draw a picture of the visual display before creating it with App Inventor.