PLTW COMPUTER SCIENCE

Activity 1.2.3

Creating Mobile Apps

Introduction

Building mobile apps is a creative process. It is not just a matter of laying out the user interface and programming the app's behavior. Truly engaging apps must take advantage of the capabilities of a mobile device. If you were part of a team that was building a new app, what would you consider in the design?

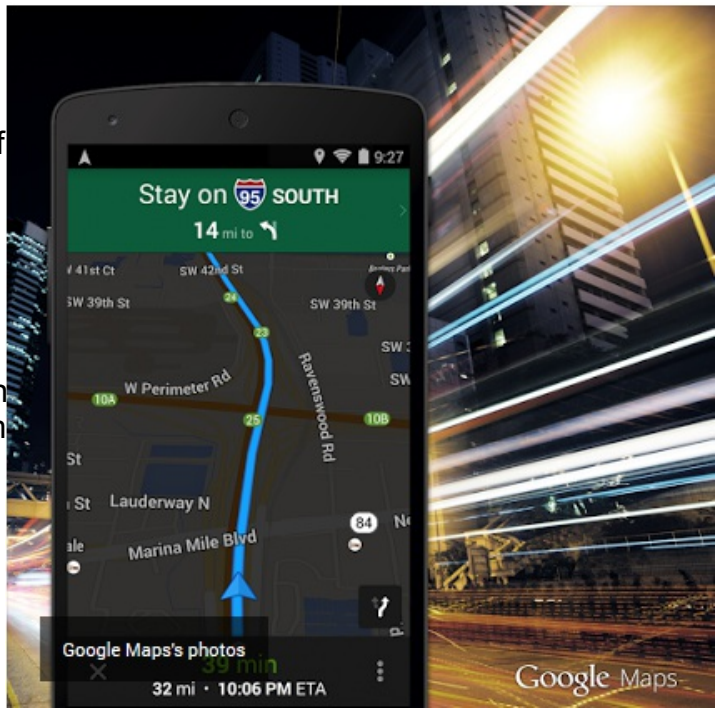


Image courtesy Google ©2014

Remember that tablets and smartphones are miniature computers that can do so much more than laptops and desktops. Mobile devices have sensing and audio-visual capabilities, are location aware, and can give and receive information from the user's hands through the touch screen and the small motor inside that vibrates the phone.

Think about the ColorChooser app that you created in the last activity. How could you enhance the app to take advantage of some of the functionalities of the mobile device? Let's go back to the app and add some new functionality!

Materials

- Android device or emulator
- Computer with Google Chrome™

Procedure

1. Form pairs as directed by your teacher. Practice professional skills by greeting your partner and deciding who will begin navigating and who will begin in the driver role.
2. You will develop an Android app in this activity. You will start with the code for the Color Chooser app you wrote in the previous activity. If you do not have your own working, your teacher will provide starter code for you.
3. Launch App Inventor 2. (See Activity 1.2.2 if you need help doing this.)

4. Log in using the same credentials that you used before. App Inventor will automatically launch the last project you worked on. If it does not load Color Chooser, select **My Projects** and click on the Color Chooser project.

5. If you are able to connect to your Android Device for live testing, do so now. Otherwise proceed with the next step.

6. The sliders on the screen represent RGB color values used for the dots drawn on the canvas. What if you could make another color change just by tilting the phone/tablet? We'll add that functionality now. When the user tilts the phone, the data from the accelerometer will be used to change the screen's background color in real time. The first step is to add an accelerometer component to the GUI Designer.

   Drag an accelerometer component from the Sensors Drawer. When you drop it onto the GUI Designer, it will drop to the bottom because it is a non-visible component.

7. Now go to the Blocks Editor by clicking the Blocks button in the upper right corner.

8. Program the new behavior.

   - Open the blocks drawer for the Accelerometer component by clicking on **Accelerometer** on the left.
   - Look over the blocks available for the Accelerometer component. Which one do you think handles the event for when the phone's orientation is changed?
   - Try to create the new behavior with code, partially demonstrated by your teacher. Code and test iteratively as time permits.

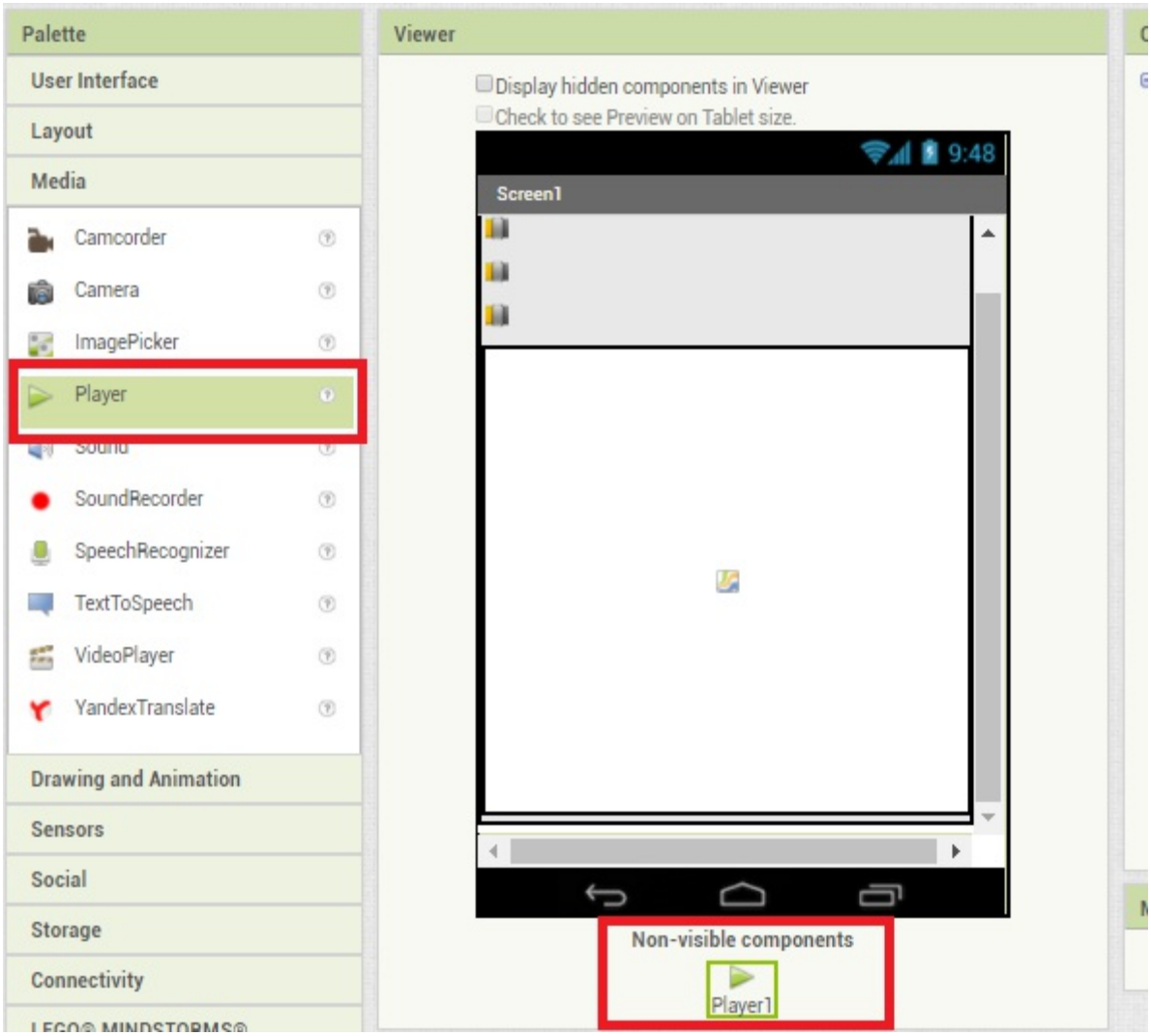
     Hints:

     - The accelerometer returns a decimal value from -9.8 to 9.8, depending on whether you lift up the left side or right side of the device. Colors have to be an integer. Convert the xAccel value to an integer, using the `floor` function in the math drawer.
     - Add 10, since colors have to be positive. The result will be between 0 and 20, depending on the position of the device.
     - Multiply by 10 to get a value between 0 and 200, since color can be between 0 and 255.

9. Skip this step if your device does not have a vibration motor. Most tablets do not have a vibration motor.

   Add another behavior to your program: vibrate the phone when a new dot is placed on the canvas.

- Go back to the Designer view using the **Designer** button in the upper right of the browser. Open the **Media** drawer and drag a **Player** component onto the GUI Designer. The component will appear at the bottom, since it is a non-visible component.



- Now go to the Blocks view by selecting the **Blocks** button in the upper right corner of the browser. Look at the player blocks by selecting the player component in the blocks palette on the left side of the browser. Which block do you think will make the phone vibrate in the user's hand? In order to make the phone vibrate each time a new dot is drawn, in what part of your blocks code would you use this block?

- Add code attempting to implement this feature as demonstrated by your teacher. Iteratively code and test as time permits.

10. Try adding another component in the Designer and corresponding functionality in the Blocks Editor.

Conclusion

1. How is App Inventor similar to or different than Scratch?
2. How is design for a mobile device different than design for a desktop or laptop?