

APPS FOR MOBILE DEVICES

THEME	Arduino – reading a port
FORMAT	Individual, pairs or small groups
PREPARATION TIME	1 hour
ACTIVITY LENGTH	2h – 3h
DIFFICULTY LEVEL	Average - Hard

PEDAGOGICAL GOALS

- Explore communication between a cell phone and an Arduino board
- Develop an application that reads data from an analog sensor connected to the board, obtaining ambient light data
- Explore the use of the light sensor (LDR)
- Explore building a Web Server

NECESSARY MATERIALS

- Computer room with computers connected to the Internet
- Arduino board
- Light sensor (LDR)

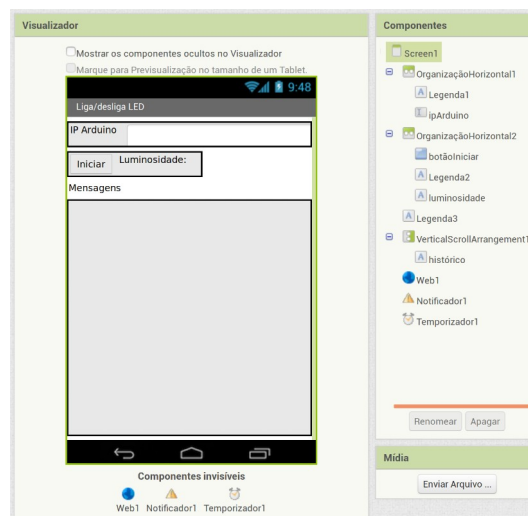
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Preparation:

- Ensure that the computers used already have aiStarter installed, and that there is already an App Inventor account available for use.
- For more information on how to do this, check out the Week 1 Lesson Plan.
- Ensure that Arduino boards and light sensors are installed and working properly.
- Study the application's interface and programming implementation through the Code IoT platform.

Conducting the activity:

- Divide the class into pairs or trios depending on the number of computers available at your school.
- Ask the class to explain what an Arduino board is and what it is capable of.
- Ask what the class thinks a light sensor is, how it works, and where it exists (eg, streetlamps, etc).
- Ask students what an application that obtains luminosity data needs to have and what operations it needs to do, and write the answers on the board.
- Correct any misconceptions about Arduino and light sensors through a brief theoretical exposition on the subject.
- Ask students to connect the Arduino board to the sensor, per the Code IoT platform instructions.
- Ask students to start the Arduino IDE.
- Give students the code that will be implemented in Arduino.
- Ask students to try to access the data through their browser.
- Ask students to access the App Inventor website at the link <http://appinventor.mit.edu/explore/>
- Ask them to click on “**Create apps**”, then on “**Start New Project**”, naming the project “Luminosity – Student Name”.
- Guide students on which interface components they will need to implement the app. This information can be found within the Code IoT platform.
- Guide students on how to arrange components on the screen, and don't forget to coach them on invisible components:



- Now, ask students to enter the programming tab by clicking on “**Blocks**”.
- Teach students the functions of the different blocks needed to implement the app and how they should be organized.

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- Now ask the students to test the app with the emulator, the aiStarter program. Ask students to test communication with the Arduino board, covering the light sensor and verifying if the app displays the correct information.
- As students have already done this process in the previous class, encourage them to do it without guidance.
- Ask students who are able to perform the activity to help those who can't.

Discussion and reflection:

After completing the activity, discuss with your students the concepts covered in this class. See examples of some questions that can be used to start the discussion:

- What changes would we have to make to the board and the application to create a program capable of identifying the sound volume?
- What was the hardest part of the activity?
- And the easiest one?

Tip and extra activity:

- If you like, ask students to share the apps with you. In this way, it is possible to verify which students and/or groups had more difficulties and in which part of the development these difficulties occurred.
- If time permits, have students try to develop the application that flashes the LED, and applications that flash the LED at specific frequencies. Students can choose the frequency, and this activity can be submitted as homework. The goal is not for them to create a perfect application, but for them to explore the possibilities that have been learned so far, to use creativity, and for you to be able, through these activities, to diagnose the reception and understanding of the class regarding the contents.

Credits:

Ohanna Jade do Amaral (LSITec/USP)
Irene Ficheman (LSITec/USP)