

COSC 251 – Programming Languages

Project 2 - Pi Radio

Spring 2014

Objective: Implement a Raspberry Pi web radio player using Python.

Your Group's Task: Create a web radio player utilizing Python and electronic components run by the Pi.

Parts Supplied:

- Raspberry Pi
- Cobbler
- Breadboard
- 1 Push button
- 16x2 RGB LED display
- 1 Potentiometer
- 1 10k Ω Resistor
- Various jumper Cables

Requirements: Your radio should consist of the following

- A push button that when pressed cycles linearly through the preset radio streams. If the end of the list is reached, the first one should simply be switched to next.
- The current station name should be displayed on the LED display. This should update whenever the station is changed.
- A single Python file which makes everything happen.
- The program should be able to be exited via a KeyboardInterrupt, (ctrl+c), that cleans up any GPIO actions that may have been performed, shuts off the LED screen, and stops the radio player. This should be done with no errors being thrown.
- All audio output should be sent over the 3.3mm jack.
- Your code should be well commented before turnin.

Likely Python Libraries Needed:

- os
- RPi.GPIO
- time
- subprocess

Hints:

- You're going to need RPi.GPIO to do electronics work. Instructions for importing the library to your Pi can be found here: <http://learn.adafruit.com/playing-sounds-and-using-buttons-with-raspberry-pi/install-python-module-rpi-dot-gpio>
- You've been given a RGB LCD screen. Guides online will only utilize these with an accompanying shield but you can wire it without one. This guide is a good place to start: <http://learn.adafruit.com/drive-a-16x2-lcd-directly-with-a-raspberry-pi/overview>.
 - Hint: BLK goes to 5v and an RGB input requires a PWM value
 - Adafruit has a great LCD class which can be found within the same tutorial
- The LCD runs off of 5v. Make sure you run the RW (Read/Write) pin to ground. If you run it back into your Pi you'll fry it!!
- You'll most likely need a streaming service to get at the radio streams. I used MPD along with MPC. Start here: <http://www.musicpd.org/>
- You can issue linux terminal commands in Python by importing the os library.
- Here are some online streams, use any that you would like!
 - <http://108.61.73.117:10002>
 - <http://war.str3am.com:7460/news.mp3>
 - <http://108.61.73.118:8052>
- sudo Everything!

Extra Credit/Style Points: Have your LED backlight cycle through all colors while running.

Demonstrations: You will be required to demo your project to your instructor and fellow students during class on March 12th. You may not use slip days to postpone the demonstration, and all team members must be in attendance. The demonstration is worth 25% of your grade for this project.

Team Reviews: By 11:59pm on March 12th, you must provide a letter grade assessment for your teammates. Do not provide a letter grade for yourself. Team reviews, including getting a team review in on time, are worth 25% of your grade for this project.

DUE: All code due via Blackboard on March 12th, by 11:59pm. Team reviews are due via email by March 12th, 11:59pm.