

Polytechnic University of Puerto Rico
Electrical & Computer Engineering and Computer Sciences Department



COE 4341 Microcomputer Interfacing Laboratory

Laboratory No 7: ANALOG TO DIGITAL CONVERSION

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Introduction

This experiment will expose us to the understanding of analog elements and the conversion of the data that it generates to a digital output. Throughout this experiment, we will learn how to set up an analog device and read the pin accordingly. Furthermore, we will utilize the data it generates and run it through a series of formulas in the code that will generate the result we seek. Finally, we will print this digital data into our serial monitor which will allow us to appreciate the results.

Objective

Our objective for this experiment is to determine the distance between photosensors and a flashlight. We must print this distance in our Arduino serial monitor.

Methods

Procedure C Language Program

For this code, we must initialize the pin we intend to use for our potentiometer. We must then read the analog pin that was initialized, calculate the proper value for distance and print it on the serial monitor for our Arduino.

Source Code for the C Language Program

KY_Distance:

```
//KY018 Photo resistor module

int sensorPin = A12; // select the input pin for the potentiometer
int sensorValue = 0; // variable to store the value coming from the sensor
float calcValue = 0.0;
void setup() {
  Serial.begin(9600);
}
void loop() {
  sensorValue = analogRead(sensorPin);
  calcValue = 0.0000008*(sensorValue^3) - 0.0003*(sensorValue^2) + 0.0621*sensorValue -
1.6487;
  calcValue = calcValue * 2.54;
  Serial.print(calcValue);
  Serial.println(" cm");
}
```

Results

<https://youtu.be/WuJKBca6fG4>

Conclusion

The experiment proved to be a success as it was a very simple setup in general. We placed the photosensors in the appropriate analog pin and then we ran the code to read an input, calculate the distance, and print this on the serial monitor. Once this was done, we tested the setup with a flashlight and uploaded the results. We can see that the Arduino processor generated the desired results.