[#include](https://vk.com/im?sel=161047957&st=%23include) <LiquidCrystal.h>  
  
[#define](https://vk.com/im?sel=161047957&st=%23define) analogPin 0 // analog pin for measuring capacitor voltage  
[#define](https://vk.com/im?sel=161047957&st=%23define) chargePin 13 // pin to charge the capacitor - connected to one end of the charging resistor  
[#define](https://vk.com/im?sel=161047957&st=%23define) dischargePin 11 // pin to discharge the capacitor  
[#define](https://vk.com/im?sel=161047957&st=%23define) resistorValue 10000.0F // change this to whatever resistor value you are using  
  
LiquidCrystal lcd(10, 9, 8, 7, 6, 5);  
  
// F formatter tells compiler it's a floating point value  
  
unsigned long startTime;  
unsigned long elapsedTime;  
float microFarads; // floating point variable to preserve precision, make calculations  
float nanoFarads;  
  
void setup(){  
  
lcd.begin(16, 2);  
  
lcd.print("Eugene, Danik:");  
  
pinMode(chargePin, OUTPUT); // set chargePin to output  
  
digitalWrite(chargePin, LOW);  
  
Serial.begin(9600); // initialize serial transmission for debugging  
}  
  
void loop(){  
  
digitalWrite(chargePin, HIGH); // set chargePin HIGH and capacitor charging  
  
startTime = millis();  
  
while(analogRead(analogPin) < 648){ // 647 is 63.2% of 1023, which corresponds to full-scale voltage  
  
}  
  
elapsedTime= millis() - startTime;  
  
// convert milliseconds to seconds ( 10^-3 ) and Farads to microFarads ( 10^6 ), net 10^3 (1000)  
  
microFarads = ((float)elapsedTime / resistorValue) \* 1000;  
  
Serial.print(elapsedTime); // print the value to serial port  
  
Serial.print(" mS "); // print units and carriage return  
  
if (microFarads > 1){  
  
lcd.setCursor(0, 1);  
  
lcd.print((float)microFarads, 2);  
  
lcd.print(" microFarads");  
Serial.print((float)microFarads); // print the value to serial port  
  
Serial.println(" microFarads"); // print units and carriage return  
  
}  
  
else  
  
{  
  
// if value is smaller than one microFarad, convert to nanoFarads (10^-9 Farad).  
  
// This is a workaround because Serial.print will not print floats  
  
nanoFarads = microFarads \* 1000.0; // multiply by 1000 to convert to nanoFarads (10^-9 Farads)  
  
lcd.setCursor(0, 1);  
  
lcd.print((float)microFarads, 2);  
  
lcd.print(" nanoFarads");  
  
Serial.print((long)nanoFarads); // print the value to serial port  
  
Serial.println(" nanoFarads"); // print units and carriage return  
  
}  
  
/\* dicharge the capacitor \*/  
  
digitalWrite(chargePin, LOW); // set charge pin to LOW  
  
pinMode(dischargePin, OUTPUT); // set discharge pin to output  
  
digitalWrite(dischargePin, LOW); // set discharge pin LOW  
  
while(analogRead(analogPin) > 0){ // wait until capacitor is completely discharged  
  
}  
  
pinMode(dischargePin, INPUT);  
} // set disc



