

TEAM NUMBER: 44

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Introduction:

We are creating a project which reads an analog value from the photoresistor and dims the LED if the value is greater than 500 and otherwise it lights up the LED.

We used 500 as our threshold, because when we tested the photoresistor, dim light averaged at 400-480, and when the photoresistor was covered it went down to 85, however when a flashlight was directed above the photoresistor the value reaches 1023.

Our photoresistor reads analog values which then converted to digital and stored in ADCH and ADCL

THE CODE

```
sbi DDRB, 5 //led output
cbi DDRC, 0 //LDR input
sbi PORTC, 0 //pull up resistor

//---- Conversion starts here ----//

LDI R16 , 0x87
STS ADCSRA, R16
LDI R16 , 0x40
STS ADMUX, R16 // HERE we are setting THE VREF to AVCC and ADLAR to 0 for right
//adjustment

//configurations done

READ_ADC:
//CBI PORTB,5
LDS R18, ADCSRA
SBR R18,0b01000000 //starting conversion //ADSC will read as one as long as a
//conversion is in progress.
STS ADCSRA,R18

KEEP_POLING :
LDS R19, ADCSRA
SBR R19, 4
//
RJMP KEEP_POLING // loop bc conversion not completed ADIGF =0

LDS R16, ADCSRA
SBR R16,0b00010000
STS ADCSRA,R16

// above is setting bit 4 to 1 indicating that conversion over

//below is reading the high and low byte of the ADC
LDS R16,ADCL //8 bits
LDS R17,ADCH // read 2 bits

LDI R20, 0xf4
CP R16,R20 //IF R16>=R20
```

```
BRGE greateq // The low bits are greater than 244 so if ADCH has a value of one which is
//2^8=256+244=500
CP R20,R16 //IF R20> R16 (It's dim)
BRGE check //BRANCH IF ABOVE STATEMENT CORRECT
```

```
greateq:
LDI R21,0X01 //Here we are checking if it is greater than or equal to one (2^8 on or more)
CP R17,R21 //R17>=R21
brge light // the room is lit if r17>=r21
CP R21, R17
brge dim
```

```
check: // The ADCL has a decimal value lower than 244 so we need either 2^9 or both 2^8
//and 2^9 but ( 2^8 alone is not enough )
LDI R23,0x02 // Greater than or equal to 2 aka either (2^9 is on) or (2^8 and 2^9 together
//are on)
CP R17,R23
brge light // the room is lit
CP R23, R17
brge dim
```

```
light:
CBI PORTB, 5 // Turns OFF the LED
NOP
NOP
NOP
NOP //ABOVE IS ADDING DELAY
RJMP READ_ADC // GO BACK TO READING ANALOG SIGNAL FROM THE SENSOR
```

```
dim:
SBI PORTB, 5 // Turns ON the LED*
NOP
NOP
NOP
NOP
```

```
RJMP READ_ADC // GO BACK TO READING ANALOG SIGNAL FROM THE SENSOR
```