

MODULE 10: Student Presentations

SUMMER CHALLENGE

Electrical Engineering: Smart Lighting

Prachi Shukla

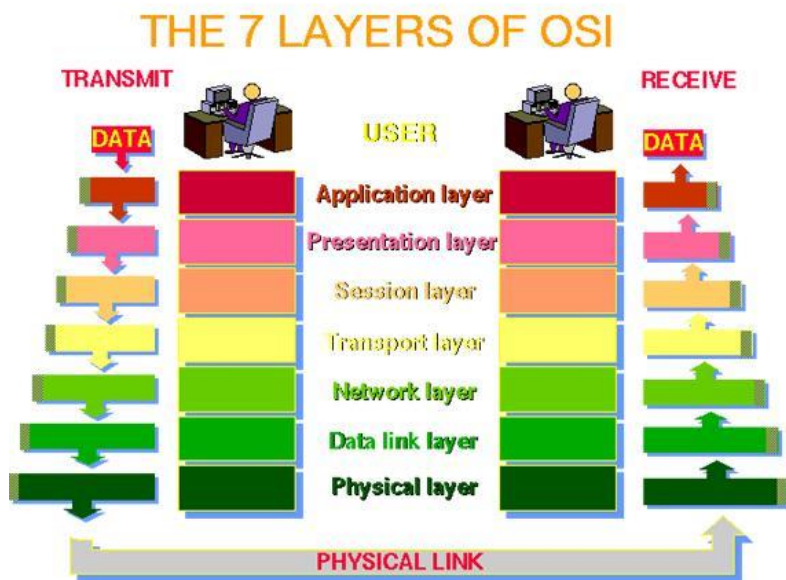
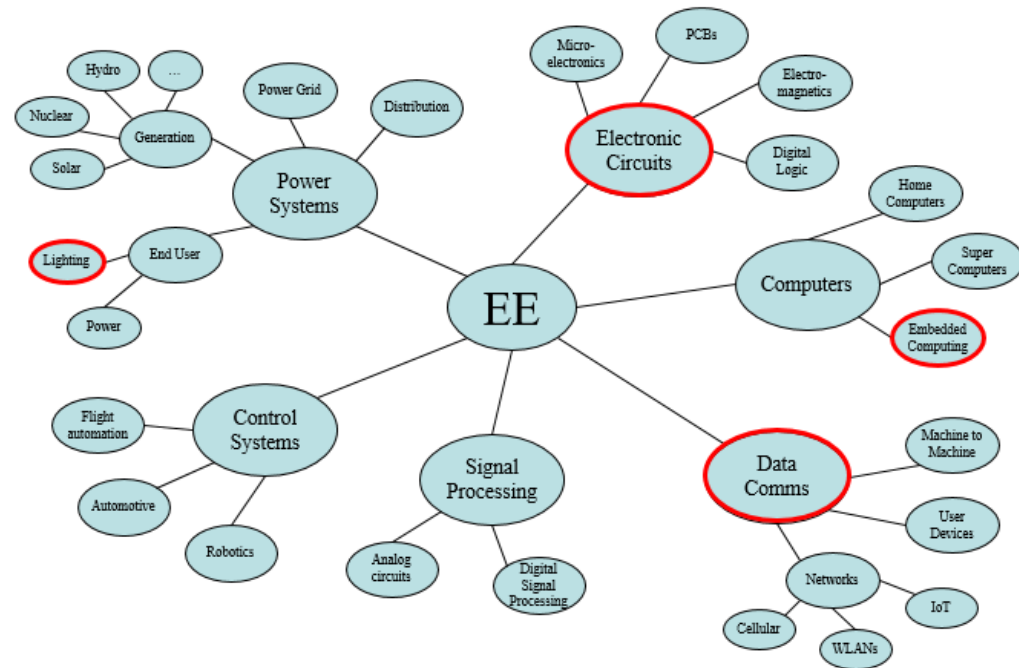
PhD Student

Boston University

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We have covered...

- Electrical Engineering
- Communications
- Smart Lighting



Common 60W Incandescent Bulb



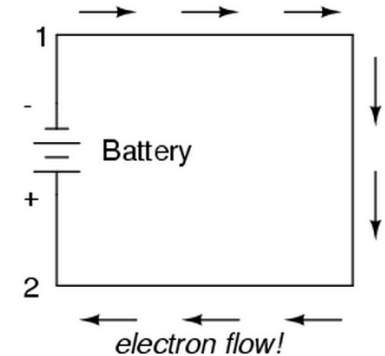
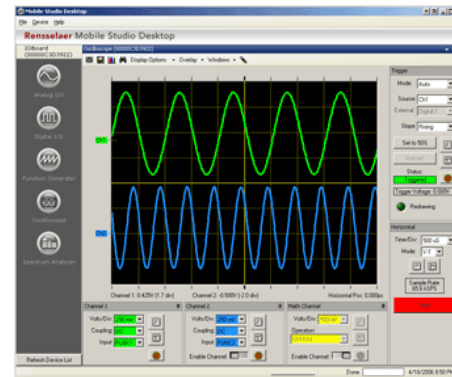
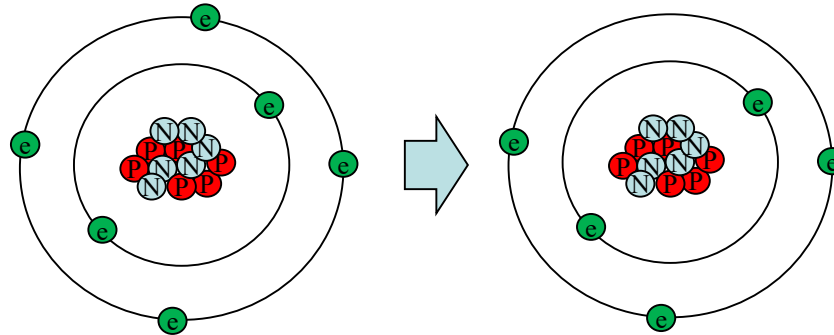
Common 14W CFL Bulb



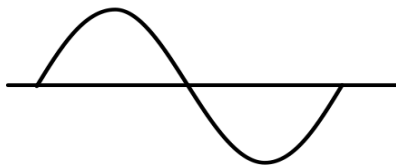
Philips 12.5W AmbientLED Bulb

We have covered...

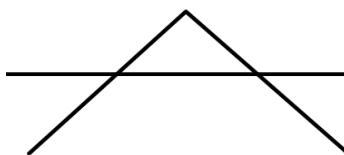
- Electricity
- Circuits
- Voltage
- Signals
- Tools



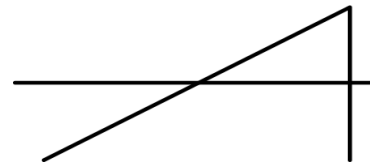
Sine



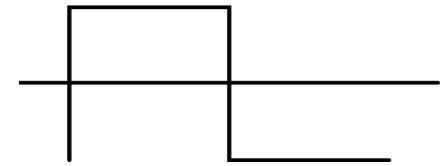
Triangle



Sawtooth

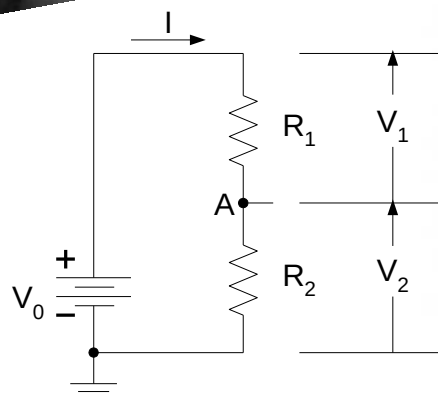
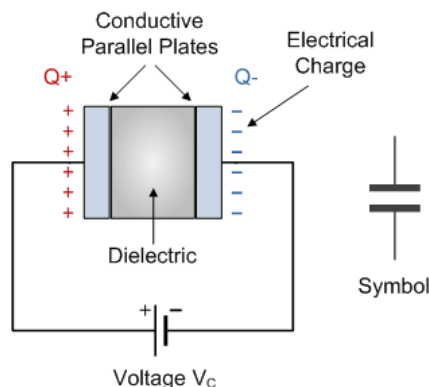
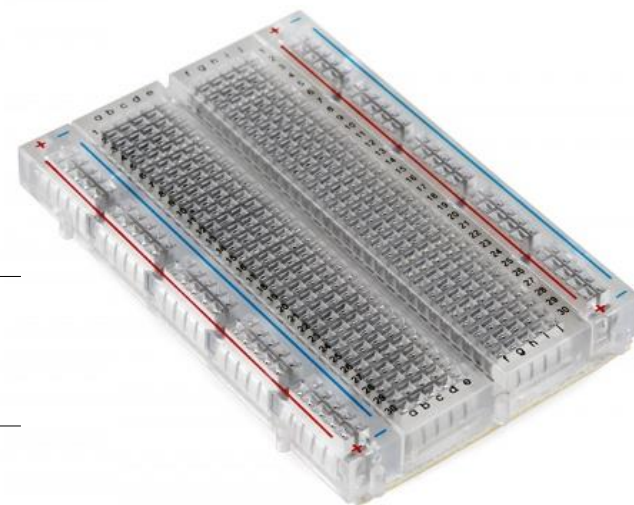
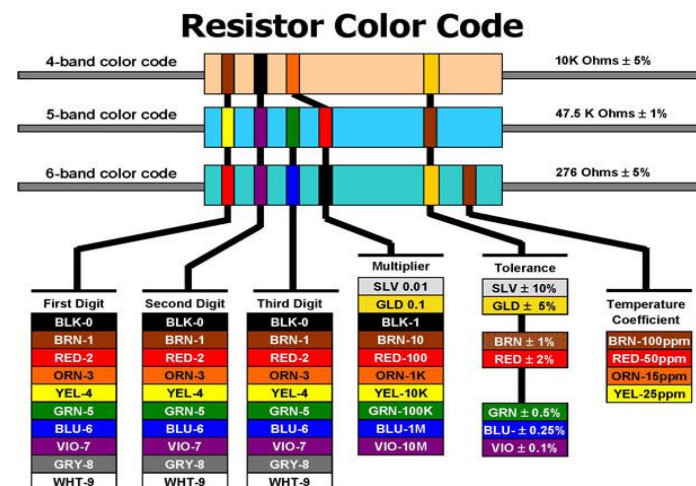


Square



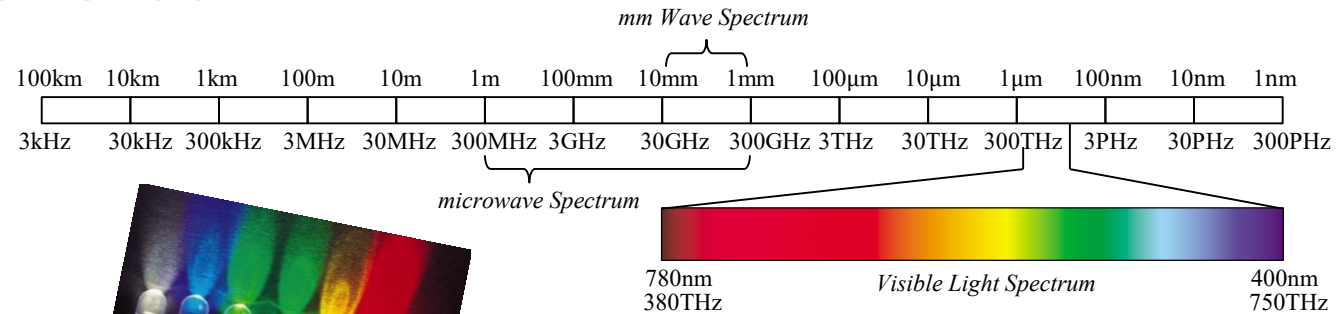
We have covered...

- Resistance and Resistors
- Ohms Law
- Capacitance
- Breadboards
- Voltage Dividers



We have covered...

- Spectrum



- Lighting

- LEDs

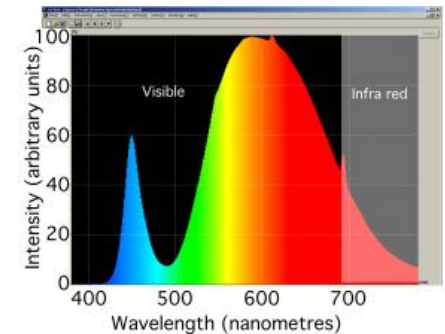
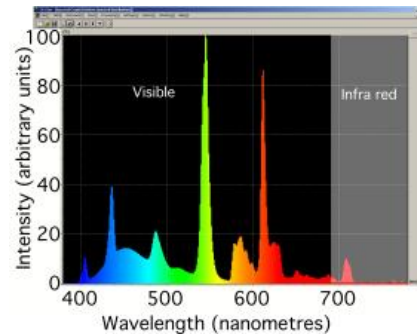
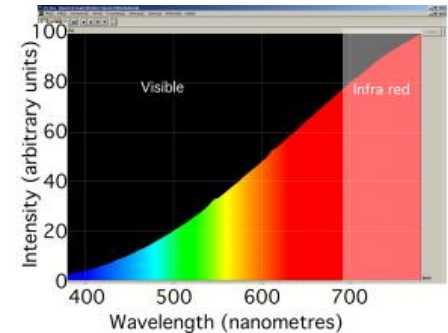
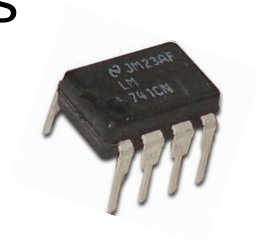


- Electrical Power

- Photodiodes

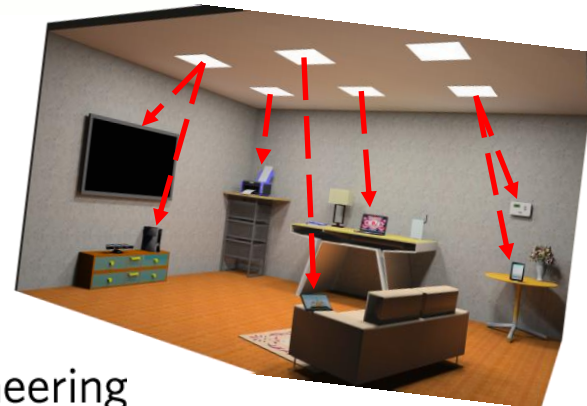
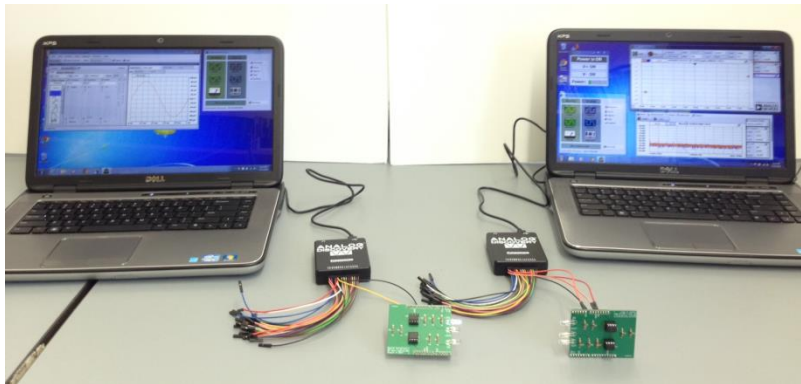
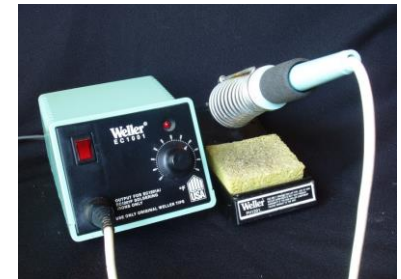
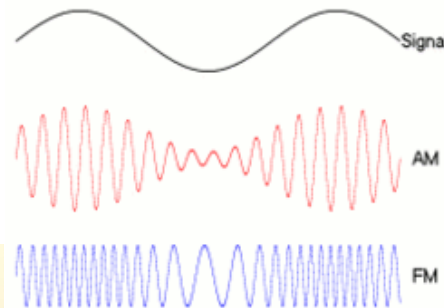
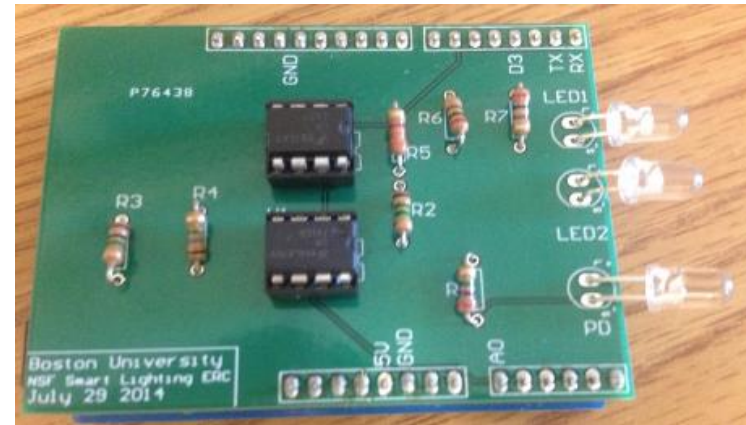
$$P = VI$$

- ICs



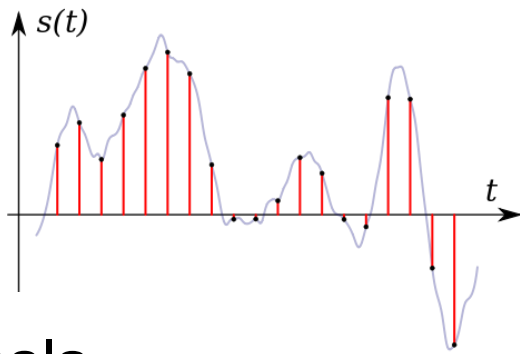
We have covered...

- PCBs
- Soldering
- Visible Light Communication
- AM / FM
- Audio Communication

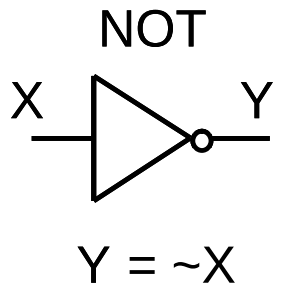


We have covered...

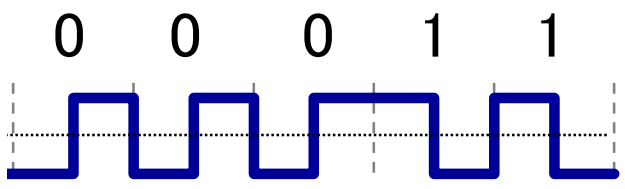
- Binary
- ASCII
- Digital Signals
- Digital Logic
- Modulation



0	0011 0000	O	0100 1111	m	0110 1101
1	0011 0001	P	0101 0000	n	0110 1110
2	0011 0010	Q	0101 0001	o	0110 1111
3	0011 0011	R	0101 0010	p	0111 0000
4	0011 0100	S	0101 0011	q	0111 0001
5	0011 0101	T	0101 0100	r	0111 0010
6	0011 0110	U	0101 0101	s	0111 0011
7	0011 0111	V	0101 0110	t	0111 0100
8	0011 1000	W	0101 0111	u	0111 0101
9	0011 1001	X	0101 1000	v	0111 0110
A	0100 0001	Y	0101 1001	w	0111 0111
B	0100 0010	Z	0101 1010	x	0111 1000
C	0100 0011	a	0110 0001	y	0111 1001
D	0100 0100	b	0110 0010	z	0111 1010
E	0100 0101	c	0110 0011	.	0010 1110
F	0100 0110	d	0110 0100	,	0010 0111
G	0100 0111	e	0110 0101	:	0011 1010
H	0100 1000	f	0110 0110	;	0011 1011
I	0100 1001	g	0110 0111	?	0011 1111
J	0100 1010	h	0110 1000	!	0010 0001
K	0100 1011	i	0110 1001	'	0010 1100
L	0100 1100	j	0110 1010	"	0010 0010
M	0100 1101	k	0110 1011	{	0010 1000
N	0100 1110	l	0110 1100	}	0010 1001
				space	0010 0000



Binary Form					Decimal Form
16	8	4	2	1	
0	0	0	0	0	0
0	0	0	0	1	1
0	0	0	1	0	2
0	0	0	1	1	3
0	0	1	0	0	4
0	0	1	0	1	5
0	0	1	1	0	6
0	0	1	1	1	7
0	1	0	0	0	8
1	0	0	0	0	16
1	1	1	1	1	31



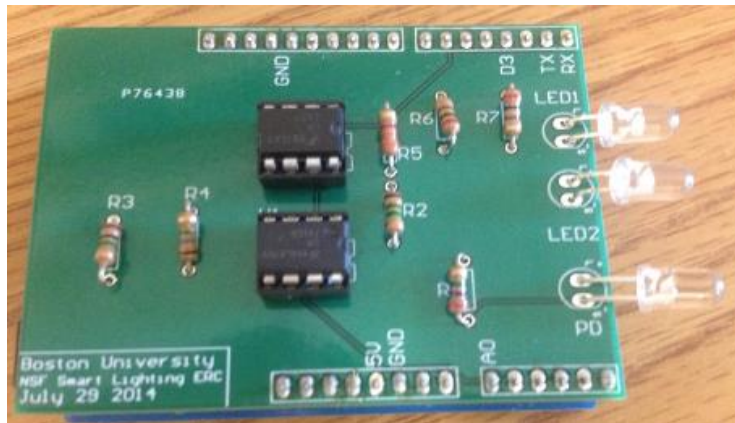
We have covered...

- Arduino Microcontroller
- Optical Communication

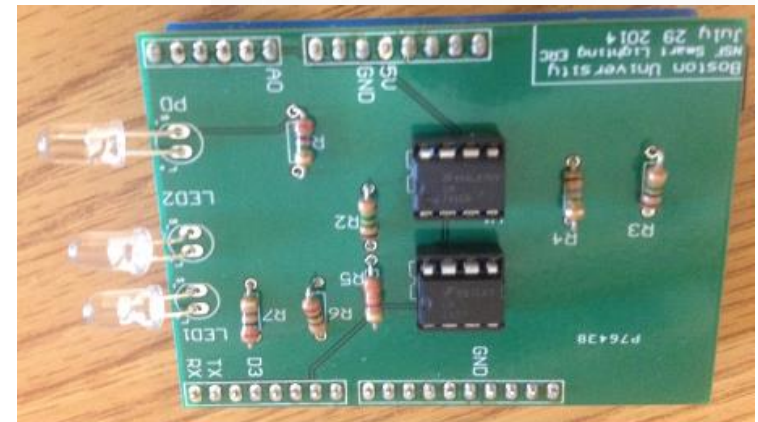
```
Test
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
}

void loop() {
  // put your main code here, to run repeatedly:

  // check for incoming serial data:
  if (Serial.available() > 0) {
    // read incoming serial data and print "Hello!"
    char inChar = Serial.read();
    Serial.println("Hello!");
  }
}
```



Link 1
→
←
Link 2



We have covered...

A LOT

Reference Websites

- Physics Classroom: www.physicsclassroom.com
- All About Circuits: www.allaboutcircuits.com
- Khan Academy: www.khanacademy.org
- Code Academy: www.codecademy.com
- Arduino: www.arduino.cc/
- Digilent Course:
www.digilentinc.com/Classroom/RealAnalog/

Student Presentations

■ Presentation Order

- | | |
|---------------------------------------|------------------------------|
| ■ Team 6 (Krish and Mark) | Soldering |
| ■ Team 1 (Ricky and Sean) | Visual Light Communication |
| ■ Team 3 (Charlotte and Genie) | LEDs |
| ■ Team 5 (Tucker and William) | Analog signals |
| ■ Team 4 (Eliza and Madeline) | Resistors |
| ■ Team 7 (Bing and Ethan) | Parallel and series circuits |
| ■ Team 8 (Ian and Youtai) | Photo-diodes |
| ■ Team 2 (Becca and Yutong) | Resistors and Capacitors |