EE16A Imaging 1

You must use a lab station computer!
Waitlisted / EECS47D wait by round table

IMPORTANT: WAITLIST POLICY

If lab is full, we will kick out **all** waitlisted folks

If full: We will check CalCentral enrollment after the presentation

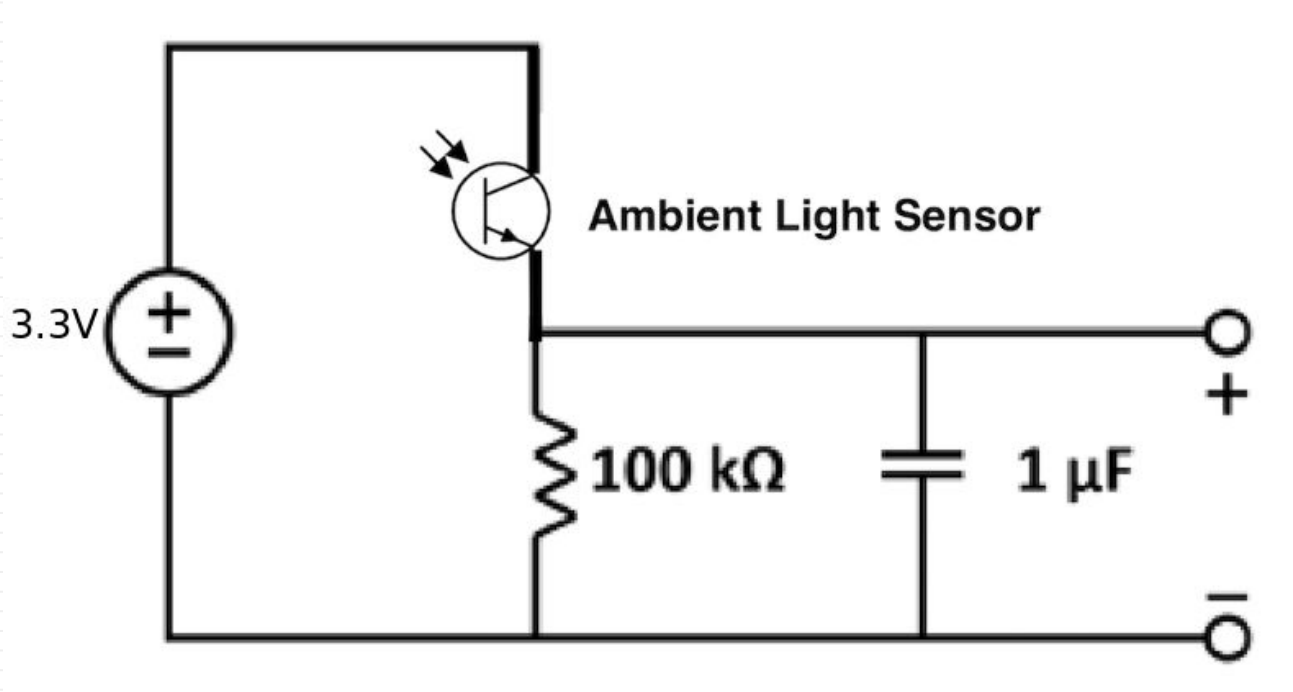
Why?

- Imaging 1:
  - Finding a link between physical quantities and voltage is powerful
  - If you can digitize it, you can do anything (IOT devices, internet, code, processing)

Today's Lab: Imaging Part 1

- ✘ Distribute materials (TI MSP430F5529)
  - ✗ Bring your kit **every week**
- ✘ Breadboarding 101
- ✘ Build circuit that reacts to light intensity
  - ✗ Use Oscilloscope and MSP430 to see how the circuit behaves
- ✘ Graded checkoff starts today!

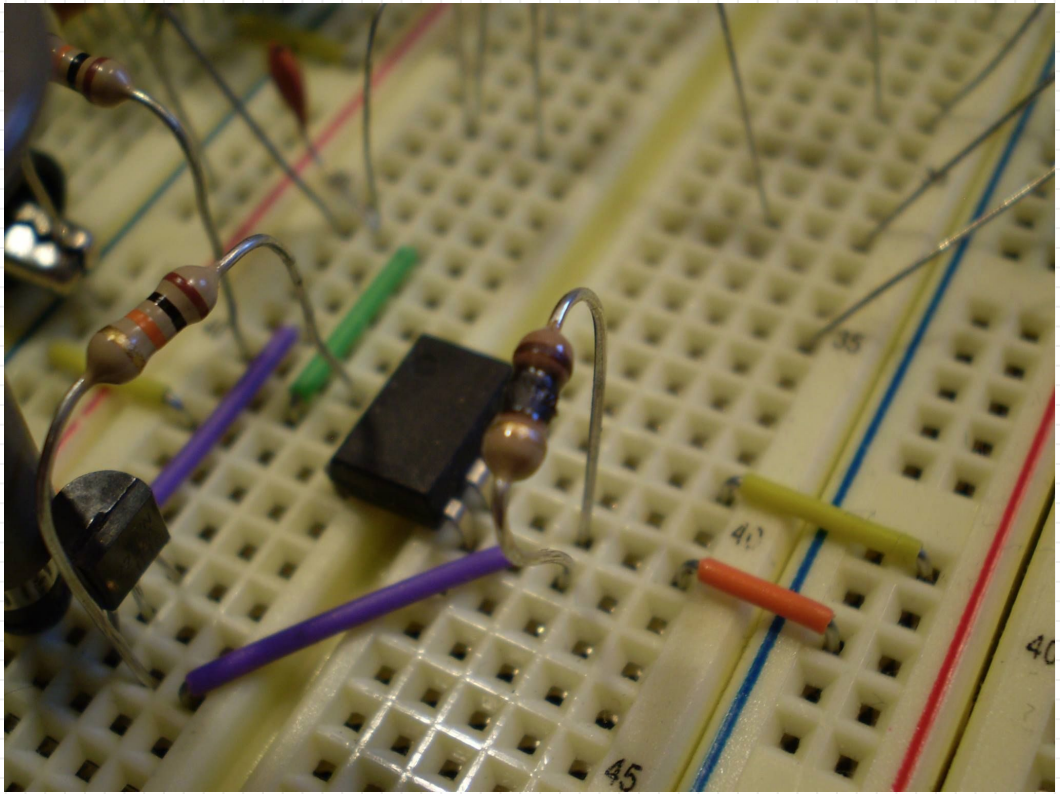
Light-detecting Circuit



Simple Circuit

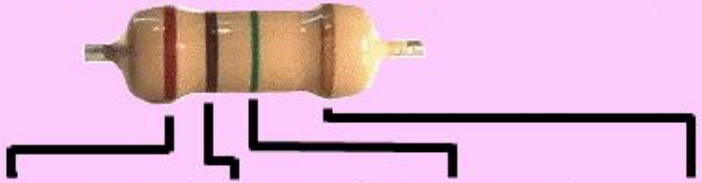
- ✘ Components
  - ✗ Resistors
  - ✗ Capacitors
  - ✗ Voltage Source
- ✘ Wires / Jumpers [male-to-male vs male-to-female]

What's in your bag? : Resistors



What's in your bag? : Resistors

4 Band Resistor Color Coding

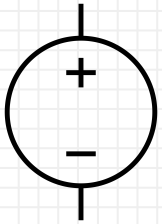


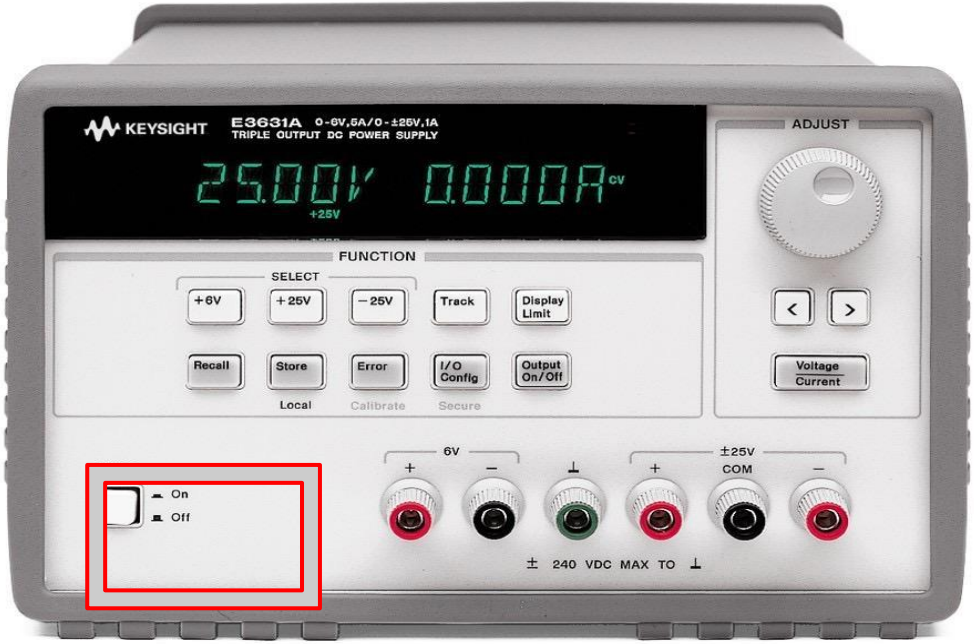
COLOR	1ST BAND	2ND BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	x1Ω	
BROWN	1	1	x10Ω	±1%
RED	2	2	x100Ω	±2%
ORANGE	3	3	x1000Ω	
YELLOW	4	4	x10000Ω	
GREEN	5	5	x100000Ω	±0.5%
BLUE	6	6	x1000000Ω	±0.25
VIOLET	7	7	x10000000Ω	±0.10
GREY	8	8		±0.05
WHITE	9	9		
GOLD			0.1	±5%
SILVER			0.01	±10%

Equipment for Today: Capacitors

Equipment for Today: Wires/Jumpers

Equipment for Today: Voltage Source (0.1 A Limit)



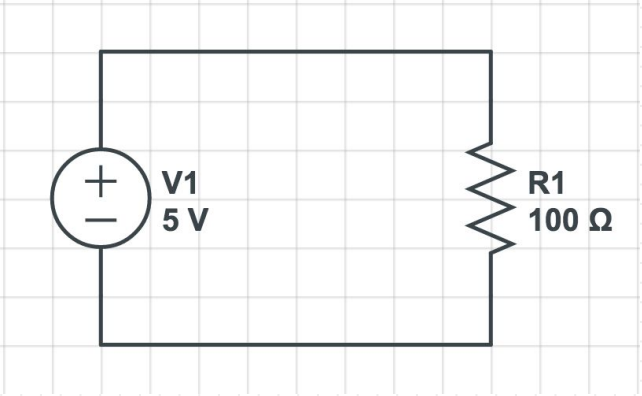


Simple Circuit

- Components
- Nodes
  - Point in circuit where circuit elements meet
  - Wire between components are considered part of one node
- We know you don't know much about circuits yet; we've given you very detailed instructions on how to build the circuit in the lab

Simple Circuit

- ✘ Components (Resistors, LEDs, Capacitors)
- ✘ Nodes
  - ✗ Point in circuit where circuit elements meet
  - ✗ Wire between components are considered part of one node



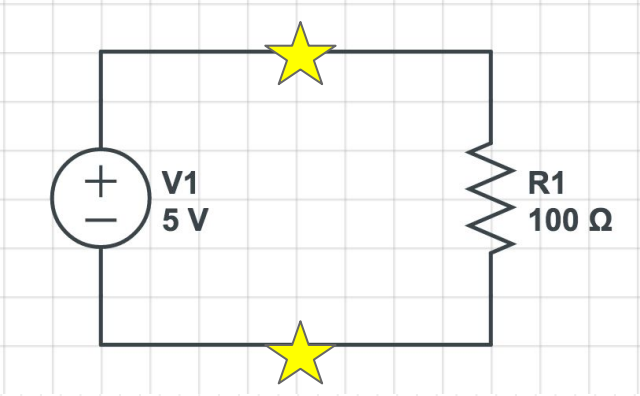
What components?

How many nodes?

Where are these nodes?

Simple Circuit

- Components (Resistors, LEDs, Capacitors)
- Nodes
  - Point in circuit where circuit elements meet
  - Wire between components are considered part of one node



What components?

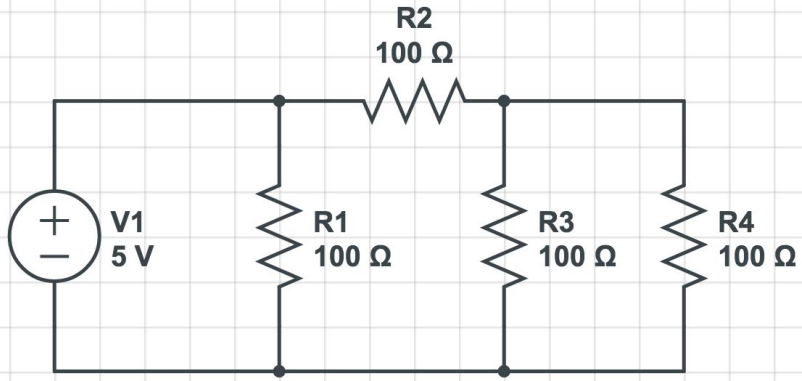
Resistor, Voltage source

How many nodes? **2**

Where are these nodes?

Simple Circuit

- ✘ Components (Resistors, LEDs, Capacitors)
- ✘ Nodes
  - ✗ Point in circuit where circuit elements meet
  - ✗ Wire between components are considered part of one node



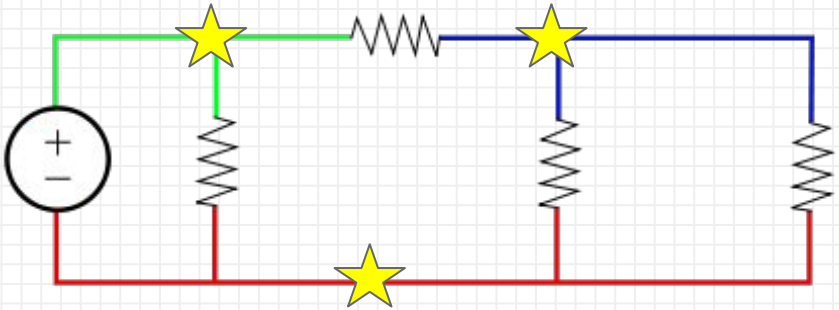
What components?

How many nodes?

Where are these nodes?

Simple Circuit

- ✘ Components (Resistors, LEDs, Capacitors)
- ✘ Nodes
  - ✗ Point in circuit where circuit elements meet
  - ✗ Wire between components are considered part of one node

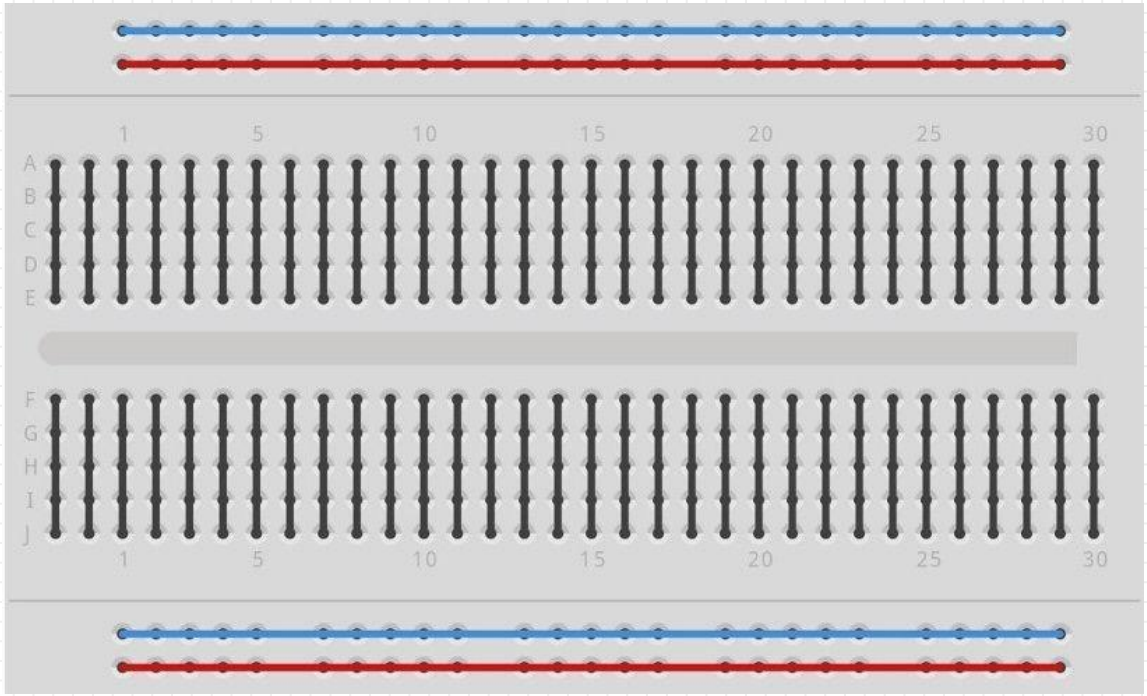


What components?

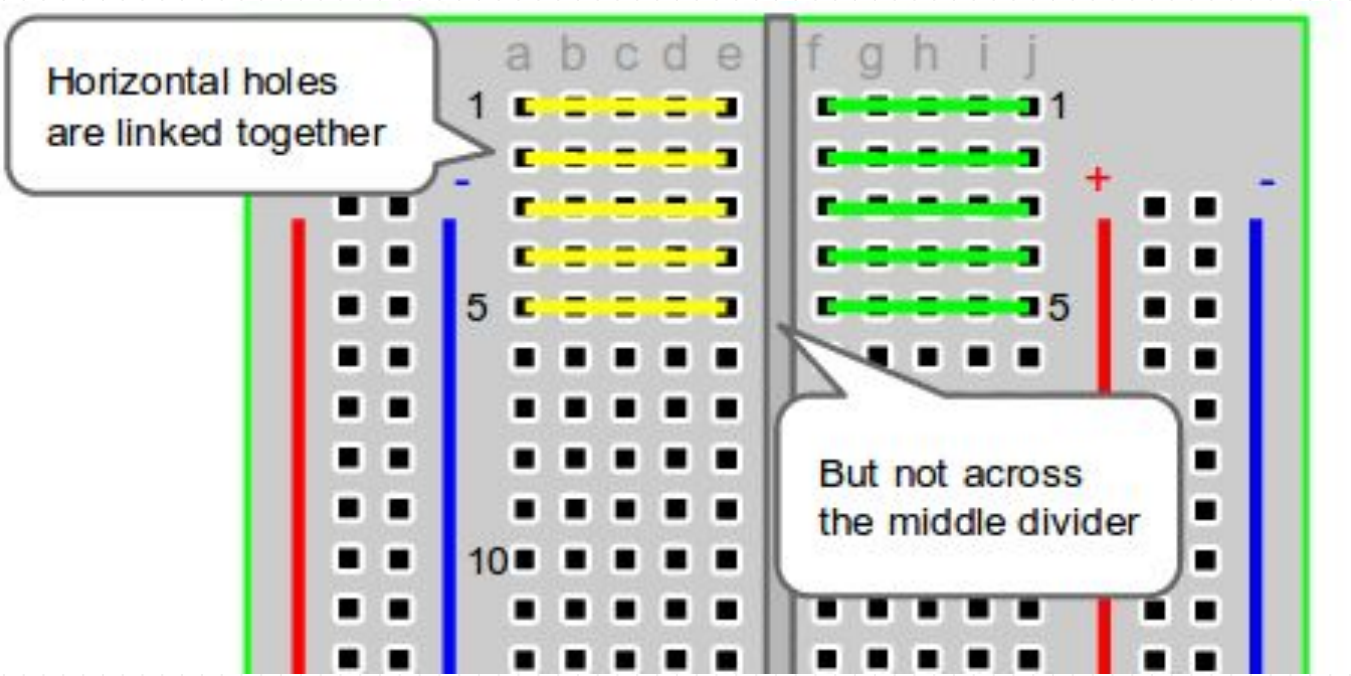
How many nodes? **3**

Where are these nodes?

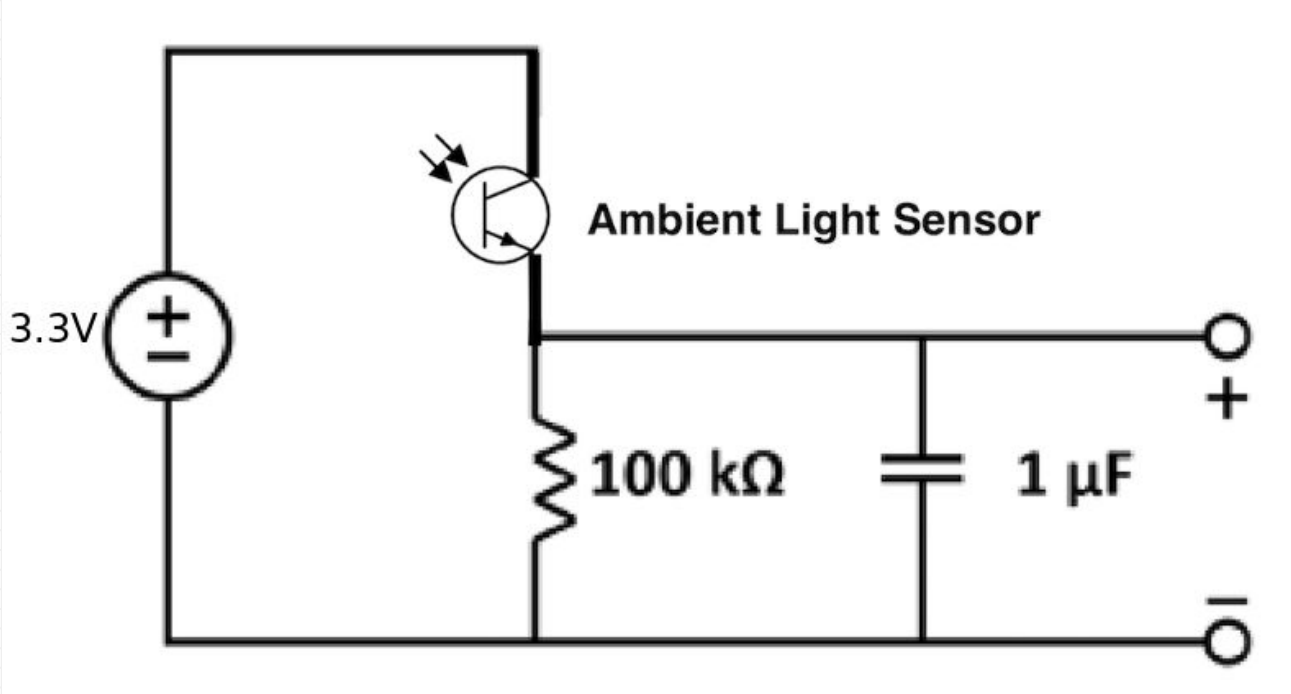
Breadboard



Breadboard

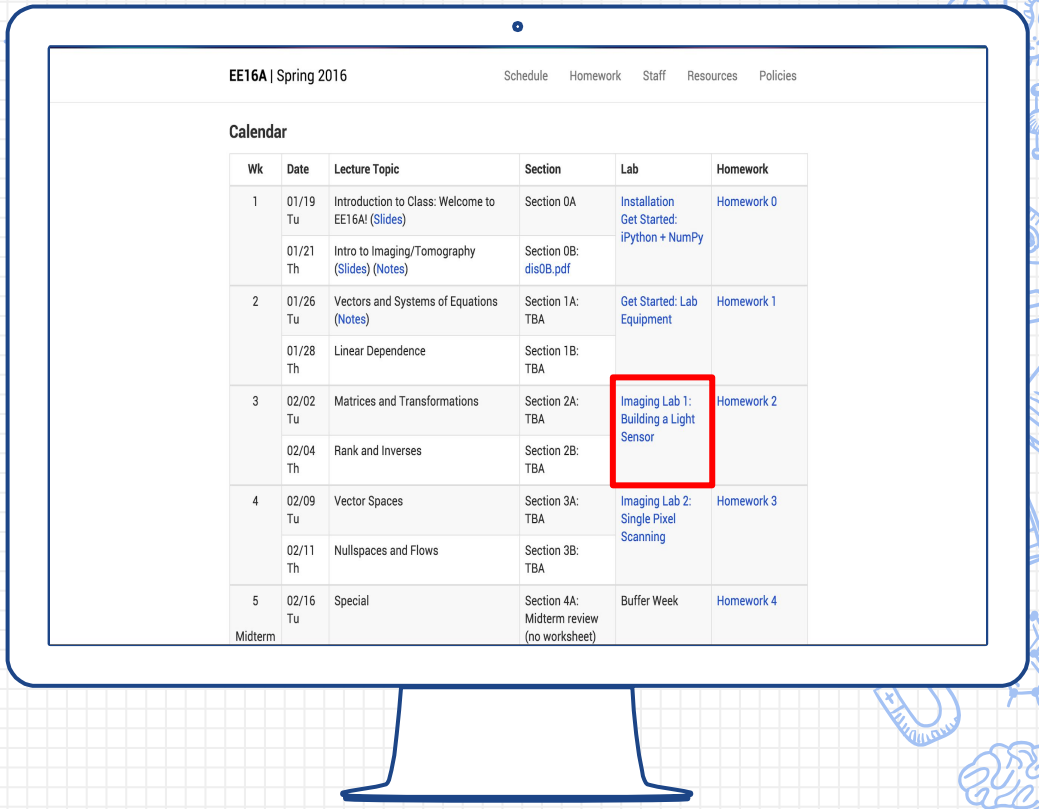

Horizontal holes
are linked together
a b c d e
f g h i j
1
5
10
1
5
+
-
-
But not across
the middle divider

Light-detecting Circuit



Begin!

- ✘ Please use the station desktops for this lab.
- ✘ This week's lab is listed as **"Imaging Lab 1"**



EE16A | Spring 2016 — Schedule | Homework | Staff | Resources | Policies

Calendar

Wk	Date	Lecture Topic	Section	Lab	Homework
1	01/19 Tu	Introduction to Class: Welcome to EE16A! (Slides)	Section 0A	Installation Get Started: iPython + NumPy	Homework 0
	01/21 Th	Intro to Imaging/Tomography (Slides) (Notes)	Section 0B: dis0B.pdf		
2	01/26 Tu	Vectors and Systems of Equations (Notes)	Section 1A: TBA	Get Started: Lab Equipment	Homework 1
	01/28 Th	Linear Dependence	Section 1B: TBA		
3	02/02 Tu	Matrices and Transformations	Section 2A: TBA	Imaging Lab 1: Building a Light Sensor	Homework 2
	02/04 Th	Rank and Inverses	Section 2B: TBA		
4	02/09 Tu	Vector Spaces	Section 3A: TBA	Imaging Lab 2: Single Pixel Scanning	Homework 3
	02/11 Th	Nullspaces and Flows	Section 3B: TBA		
5 Midterm	02/16 Tu	Special	Section 4A: Midterm review (no worksheet)	Buffer Week	Homework 4

FAQ

- ✘ **UNZIP the downloaded file before doing anything - ask us if you have questions**
- ✘ **SHIFT+RIGHT CLICK** on a folder window to open in **CMD**
  - ✗ '**ipython notebook**' to open ipython notebook
  - ✗ Let us know **IMMEDIATELY** if you're having trouble with this
- ✘ Never have the output of the voltage source on while you are moving things around
- ✘ Probes are in the back
- ✘ **Make sure you are using the right resistor (Brown Black Gold) - get at TA desk**
- ✘ **Make sure your Phototransistor is the right direction**
- ✘ **DO NOT MESS WITH THE INSTALL - DO NOT PIP INSTALL ANYTHING**
- ✘ Complete the lab in **PAIRS**, do ONE setup per group