NYU

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Physical Computing Review Questions 1: Basic Electronics F2025
1 message

Google Forms <forms-receipts-noreply@google.com> Thu, Sep 11, 2025 at 9:54 AM
To: ay3020@nyu.edu

Google Forms

Thanks for filling out Physical Computing Review Questions 1: Basic Electronics F2025

Here's what was received.

Edit response

Physical Computing Review Questions 1: Basic Electronics F2025

The following are questions you should be able to answer by the respective weeks in Introduction to Physical Computing. Try to answer all of the questions without resorting to copying external code or diagrams.

If you don't know where to start on a given question, first review the lab and material from the syllabus and then consult with your instructor in office hours.

Since some of the questions below require you to draw the circuit, you'll need to draw it and upload it.

Your email (**ay3020@nyu.edu**) was recorded when you submitted this form.

Your name? *

arjun

Which section are you in? *

- ○ Tues 09:30am to 12:00pm Yeseul Song
- ○ Tues 09:30am to 12:00pm Danny Rozin
- ○ Tues 12:20pm to 2:50pm Jeff Feddersen
- ○ Tues 12:20pm to 2:50pm Pedro Oliveira
- ○ Tues 3:20pm to 5:50pm David Rios
- ○ Tues 3:20pm to 5:50pm Danny Rozin
- ◉ Tues 3:20pm to 5:50pm Tom Igoe

There are three electrical properties that we've described in class so far. They are the elements of a formula called Ohm's Law. Name and define them. How do they relate to each other? *

v (voltage): pushing force of electrons in a circuit. this is generated by a power source, such as a battery. this means that the power source (or between point-a to point-b) can send electrons with a certain force (the potential energy of the circuit). measured in volts.
i (current or intensitè): flow of electrons through a conductor. a circuit can afford to push x electrons, but how much is actually flowing between two points? this, as i understand it, is the conversion of potential energy to kinetic energy. measured in amperes, where 1 ampere = 1 coulomb (which is ~6.25 × 10^18 electrons).
r (resistance): opposition to current flowing in a circuit. this is usually created by intentionally or unintentionally (because every material has some resistance) causing collisions of electrons, and getting them to expend heat. air has resistance, but an infinitely higher one, and therefore does not allow any current to pass through the conductive-points it touches. a resistor on the other hand has a lower resistance, and, therefore, allows some current to pass through.
ohm's law expresses the relationship between them as i = v / r; meaning that current is directly proportional to voltage (increase the voltage, higher current can go through) and current is inversely proportional to resistance (decrease the resistance, more current can go through).

Explain how electrical energy flows in a properly working circuit. What are the minimum necessary components? From where does it flow, and to where? What must happen to the energy as it moves through the circuit? *

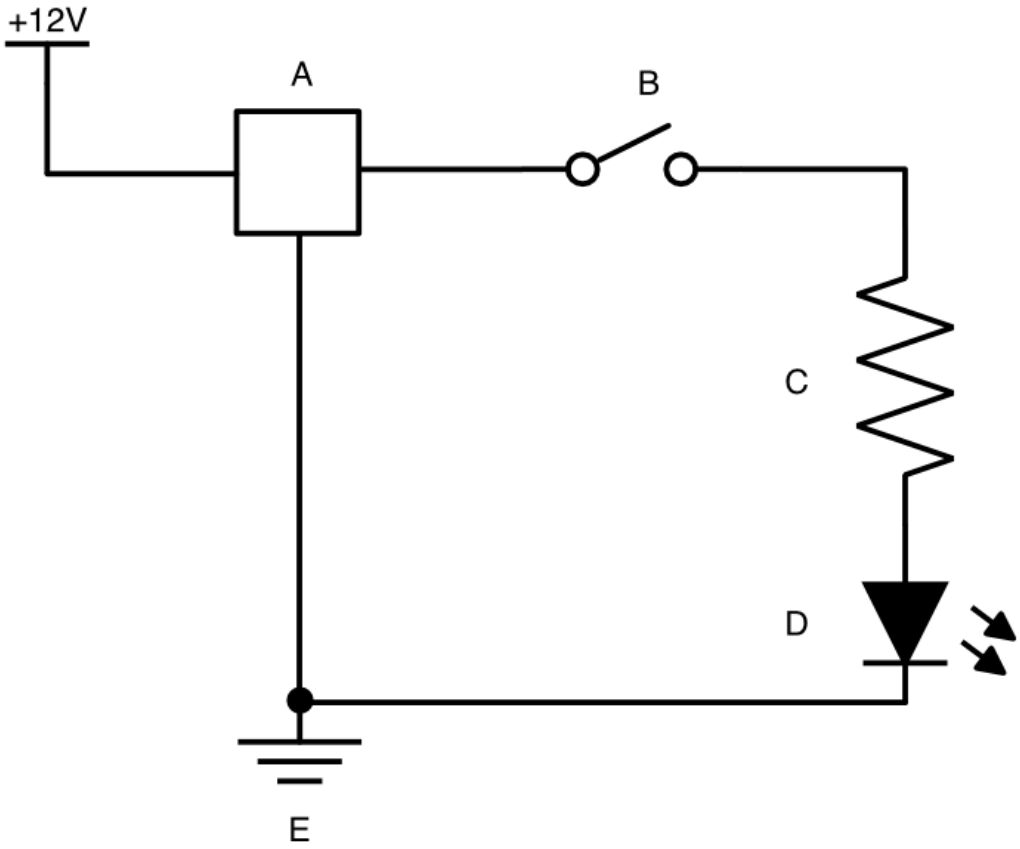
energy is generated in a power source, and flows from the positive side of the power-source to

the ground.
while moving, energy is consumed by the parts it powers up. if there are no parts in the middle, and you connect the positive side of a power source to the ground of itself, it'll blow up (because it overloads the power source).
if there are components in the middle, they consume the electricity meaning that very little energy (or none) is passed into the ground.

What is a short circuit? How does it differ from a properly working circuit? *

i think i've technically defined it above.
while moving, energy is consumed by the parts it powers up. if there are no parts in the middle, and you connect the positive side of a power source to the ground of itself, it'll blow up (because it overloads the power source) > this means a short-circuit?

In the next question, identify the components in the circuit shown below:



What are the components in the circuit shown above? *

power source (12v).
a = this could be anything really. i don't know. transistor, voltage regulator, internet-research says fuse. i don't know.
b = switch.
c = resistor.
d = led (output).
e = ground.

How are each of the components above, A, B, C, D, and E, commonly used in a circuit? *

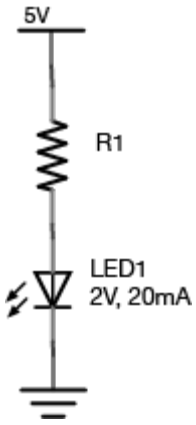
if (a==transistor) {

takes in low voltage, and converts it into higher voltage & current.
} else if (a==voltage_regulator) {
changes fluctuating voltage to a consistent voltage.
} else if (a==fuse) {
safeguard tool; used to protect circuits by breaking the connection when the current exceeds a certain level.
}

What formula would you use to calculate the value for the resistor in the circuit below? What is the ideal resistance value R1, given the rated voltage and amperage marked on LED1 ? What happens if the resistance is too low? *

i = v (source - destination) / r
so, 5v comes into the resistor. the led requires 2.
v = 5-2 = 3.
current required is 20ma.
i = 0.02.
therefore, resistance = v / i.
r = 3 / 0.02 = 150 ohms.
you can use a 3-band resistor where (band 1 = 1 brown, band 2 = green, band 3 = brown). that has a resistance of 150; mum = 120, max = 180. i think.

Circuit



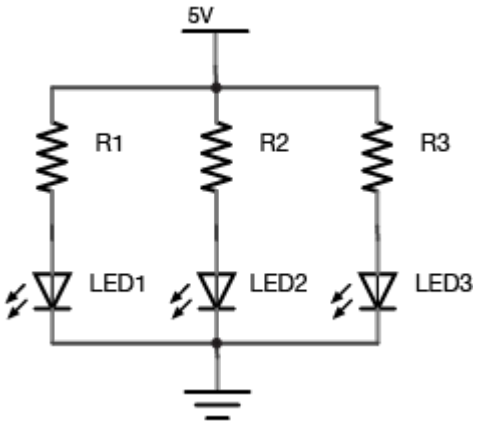
If you wanted to decrease the brightness of the LED in the circuit above, what change would you make? *

higher resistance resistor, decrease voltage, add more leds before it, damage the led, light it up a light-polluted room ...

What are the first things you should check when troubleshooting any circuit? *

jeez.
first, draw the diagram to avoid big mistakes. ensure it's a complete circuit.
for components, first check continuity (if electricity can pass through them).
then between each connection, see the voltage and compare it to the schematic.
then see if the required current is being passed to any of the output-things.
ask for help.

In the next question, identify the components that are in in the drawing below, and those that are in parallel:



Identify the components that are in in the drawing above, and those that are in parallel: *

5v: power-source.
r1, r2, r3: resistors.
led1, led2, led3: leds.
gnd: ground.
parallel:
r1, r2, r3
led1, led, led3/

so: (r1, led1), (r2, led2), (r3, led3).

Fill in the blank: When components are in series, the [blank] through them is the same. *

- (●) current
- ( ) voltage
- ( ) resistance

Fill in the blank: When components are in parallel, the [blank] across them is the same. *

- ( ) current
- (●) voltage
- ( ) resistance

Fill in the blank: When you put batteries in series the [blank] adds up. *

- ( ) current
- (●) voltage
- ( ) resistance

Fill in the blank: When you put batteries in parallel the [blank] adds up. *

- (●) current
- ( ) voltage
- ( ) resistance

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