#	Question	Answer(s)
1	Is J = Watts * Second	Yes!
2	How is integral of p(t)dt= p * delta t?	We assume p is a constant over the time delta t.
3	are we going to be taking derivatives and integrals in this class or are we just going to use the PIV equation	Mostly in this class, we'll just use P=IV. We won't be doing much in continuous time.
4	In the passive sign convention, what's the current of the battery, does it also go from positive to negative?	We draw the current as going from + / -, and we expect it to be a negative value.
5	What happens if power is 0?	It means no power is dissipated or gained.
6	What is amperes equal to?	Ampere is charge in Coulomb per unit time in second
7	is this the top view?	yes
8	Could you clarify what the black and white regions of the plate are?	The white region is the resistive material. The black region is some conductive material, basically a really wide wire
9	What am I looking at?	This is a top view of the 1D touch screen
10	What are the black bands and why are they conductive?	live answered
11	What is the yellow part called?	live answered
12	Why is rho greater than 0	rho is the resistivity of the resistive sheet. It is saying it has some non-zero resistivity.
13	Are the two black strips connected through the conductive plate? If they are, won't there be almost no current through the yellow region, since it'll mostly go through the conductive plate?	yes they are conductive plates. The lines at the left and right edges are not actually wires though; we're just outlining the resistive sheet. All the current has to flow through the sheet
14	The black bar in Figure 2 is not the same as the black bars in Figure 1 right?	yes, the big black bar at the bottom of the side view is another resistive sheet, underneath the sheet seen in the top view
15	Where do the green and red wires come from	This is from bending the resistive sheet by touching it
16	Shouldn't L - X suppopsed to be on the other side?	l-x is on the positive terminal side of the voltage source (the green part)
17	Is Vtouch equal to the voltage at the node in between the two resistors or equal to the voltage across the second resistor?	both of these values are equal. If we talk about the node between the two resistors relative to ground, we're talk about the difference between the same two nodes as across the resistor.
18	What do u use to measure the voltage is it is your finger touching the scree	The finger touching the screen results in the contanct between the resistive sheet and the conductive sheet. The voltage is measured by something like a voltmeter.
19	Why do we need the horizontal resistors?	live answered
20	wait why do we have two Vs and is shje saying that we should do that or that we should not?	We want to see what happens if we apply a voltage in the left-right direction instead of the top-down direction. We will show we get the same behavior as the resistive divider from top down.
21	With resistors in parallel, will current just go through the smallest resistor and ignore the other ones? (Because it is the path of least resistance)	The smallest resistor will have the largest current, but other resistors will still have some current. If the smallest is zero (a short circuit), then current will completely go through it.
22	So we can use the grid of resistors right?	to model the 2D sheet, we will need to
23	R is the length of the resistor right?	R is the resistance. It is proportional to the length.
24	How did she get that equation for u_1?	That's from the voltage divider equation. The voltage divider has R1 and R4, and the Vs voltage source.

25	Might be a dumb question, but why wouldn't applying your finger press apply the same resistance in ohms regardless of where you touch?	Different finger press positions will result in different resistance of the two sections. The sum of them will be the same though.
26	Why does U1 equal to R4/(R1+R4)v but not R1/(R1+R4)v?	We implicitly set the +/- for Vs to match the +/- inside the source, and ground is implicitly at the bottom
27	What does voltage divider mean?	This voltage divider circuit is this circuit with 2 resistors and a voltage source that we've been analyzing for the last couple lectures. See yesterday's discussion and note 12 for a thorough review.
28	how do the multiple points get touched at the same time though so that the ratio is the same?	We are looking at one of the dimension of the touchscreen. So think about we are touching a horizontal line instead of multiple points.
29	Why must the ratio between the top and bottom resistors be the same across all the resistors?	Physically, in the 2D touch screen, if we touch along the same horizontal coordinate, we will split the top and bottom lengths the same. Since resistance is proportional to length, they will have the same resistance
30	please can you explain what we are doing	What we want to show is that when we have the resistive sheet (2D grid of resistors), the left-right resistors has no effect
31	is the horizontal one supposed to have 3 resistors in series?	live answered
32	why there is no current	No difference in voltage, no difference in current. Current is like a ball rolling down a hill; voltage is like the difference in height between two places on a hill.
33	does this mean the current for the in between resistors are all 0	Yes
34	Why is there an arrow under R in the yellow V=IR?	We're skipping the full annotation of the circuit, since we know the voltage divider equation from previous lecture
35	how do we know that the voltage drop is zero across the horizontal resistors?	i think because u1 - u2 = 0 (voltage drop across is 0)
36	why isn't the bottom node = 0? isn't it the ground node?	Yes it is the ground node and the node voltage is 0.
37	There is no voltage drop because they have the same resistivity and are cut at the same place?	The vertical resistors are cut at the same place (so the upper and lower ones have the same ratio), so the horizontal ones have no voltage across them.
38	How does a short circuit work again? There must be a voltage drop for current to flow right?	There is a voltage drop, since the voltage source ensures there's a difference in potential between its two terminals.
39	Would an actual touchscreen have a grid of real resistors? Or is each resistor symbolic of our finger at a particular point in time (i.e. a single touch would only have a single resistor in our model)?	An actual resistive touchscreen has a resistive sheet which is continuous. We model it by multiple discrete resistors. A single touch will give us all the resistors in the model, different touch points will result in different values of the resistors.
40	is R1 = R2???	Not necessarily. But the ratio between the upper and lower ones (like R1 vs kR2, R2 vs kR2) is the same.
41	DOes this represent the grid model?	yes, we will use the grid model for these resistive sheets
42	is this still 2d touchscreen or 3d?	This is now 2D touchscreen. We're using the same principle of 1D touchscreen, but now in a 2nd dimension
43	why are x and y switched?	We're looking at the bottom plate now as the sheet being driven the source
44	so we are using top for y and bottom for x?	yes!
45	what is between the 2 thigs	Often, just an air gap is between the sheets

46	wait why did we cross out the resistive lasagna?	In that version, we had 5 layers of material, which is "too many". We wanted to find a version that can be done in fewer
47	What are the dangling resistors for if they have no current going through them?	We can still sense voltage through them, which we will use for the 2D touchscreen measurement
48	shouldnt we be using Rx and kRx since this isnt the blue bottom plate	This is the blue bottom plate, measuring horizontal position.
49	What is the purpose of the dangling resistors if they have no current?	live answered
50	What is the point of the resistors in the middle if there is 0 voltage or current?	We have a resistive sheet, so we have resistors in both directions. Those middle resistors have 0 voltage across so they have no effects, but they physical resistors do exist.
51	she said with THE SAME CIRCUIT that this only gives us vertical then now she said that t meaures both. I am a bit confused	We can physically use the same circuitn to measure both vertical and horizontal. What we have to do is switch which source is on and off and switch which sheet we are measuring.
52	Why is there no constant in front of the first Ry?	k is the ratio between the left and right resistor. It means the right one is k times the left one.
53	What is h?	h is the height of the resistive sheet
54	Does the current from the second voltage source get in the way of the current from the first voltage source?	live answered
55	Does the current flowing through the voltage source just flow in the opposite direction as the rest of the current flow in the circuit?	by passive sign convention, yes
56	in that case, why are they even in the circuit?	Since we have a resistive sheet, both directions have resistance. They are physically there, although they may have no effect on the circuit
57	what is insulator?	Insulator is something to prevents current flow. its the opposite of a conductor.
58	Ohh, so we can treat the grid as two separate parallel-circuits (one measures horizontal distance & ignores vertical resistors, one measures vertical distance & ignores horizontal resistors)?	Yes
59	Do real resistive displays use time multiplexing or do they use two sources on at the same time?	live answered
60	So you bascially measure the x position first, and then switch the power source to measure the y position?	Yes
61	What are these switches?	live answered
62	why do we even need two resistor sheets?	live answered
63	what is this circuit diagram being drawn right now supposed to represent?	It shows how we use one power source to supply voltage to the two resistive sheets at different moments.
64	Would there be a way to measure horizontal & vertical distance at exactly the same time with one voltage source, or do we need to do one after the other?	With this setup, we cannot do both at the same time
65	Why do need 4 switches? Shouldn't we need 2 switches?	It depends on they way of setting up the circuit, but 2 should be okay.
66	Can we have one sheet and two power sources perpendicular to each other?	live answered

67	How could we know which resistor change when we change the tough	As long as we keep the voltage source in the same orientiation, the voltage output will be proportional to some length from one of the sides, from our voltage divider equation
68	So the horizontal resistors for the top layer correspond to the vertical resistors for the bottom layer?	yes!
69	why did we put an insulator in the 'fake' model that she crossed	We don't want the top resistive sheet/conductor plate to touch the bottom resistive sheet/conductor plate, so the signals stay independent.
70	How do the two sheets interact? One sheet hits the bottom one to transfer the "touch" so to say and measure another distance?	One sheet hits the other one, we supply voltage on one of them, and read out the node voltage of the touch point from the other one.
71	i still dont get why we need the horizontal resistors. i thought prof showed that there's no voltage drop, so why not make it just a wire?	We're keeping it as a part of the model, since we need them when we do the horizontal direction for example.
72	What are the subscripts of the two resistors in the diagram?	Rh and Rv (horizontal and vertical)
73	what should i do if i didn't understand anything. any tips? videos?	This is a tricky topic, so don't be too disappointed if you don't get it the first time through. Checkout the notes, especially 12 and 14, go to discussion, and come to OH. We'll also do this again in lab, which will make it more physically clear.
74	Isn't I usually on the y-axis?	yes, but it doesn't matter for this discussion
75	is I test wrng?	I_test shows the actual current direction. It's not an element current labeling by the passive sign convention.
76	if you're trying to measure between R1 and R2, then can you mush them together?	In that case we can still use the Req to figure out the current I_test, but we cannot use Req to figure out the node voltage between R1 and R2.
77	why is I test going into the node	
78	Why is I_test = I_1 + I_2? Aren't they all leaving the node?	
79	Isn't Itest going out	
80	What point did we pick for KCL? It seems like any point we pick, all currents are exiting the point, meaning Itest + I1 + I2 = 0, no?	
81	Why is i test = i1 + i2?	