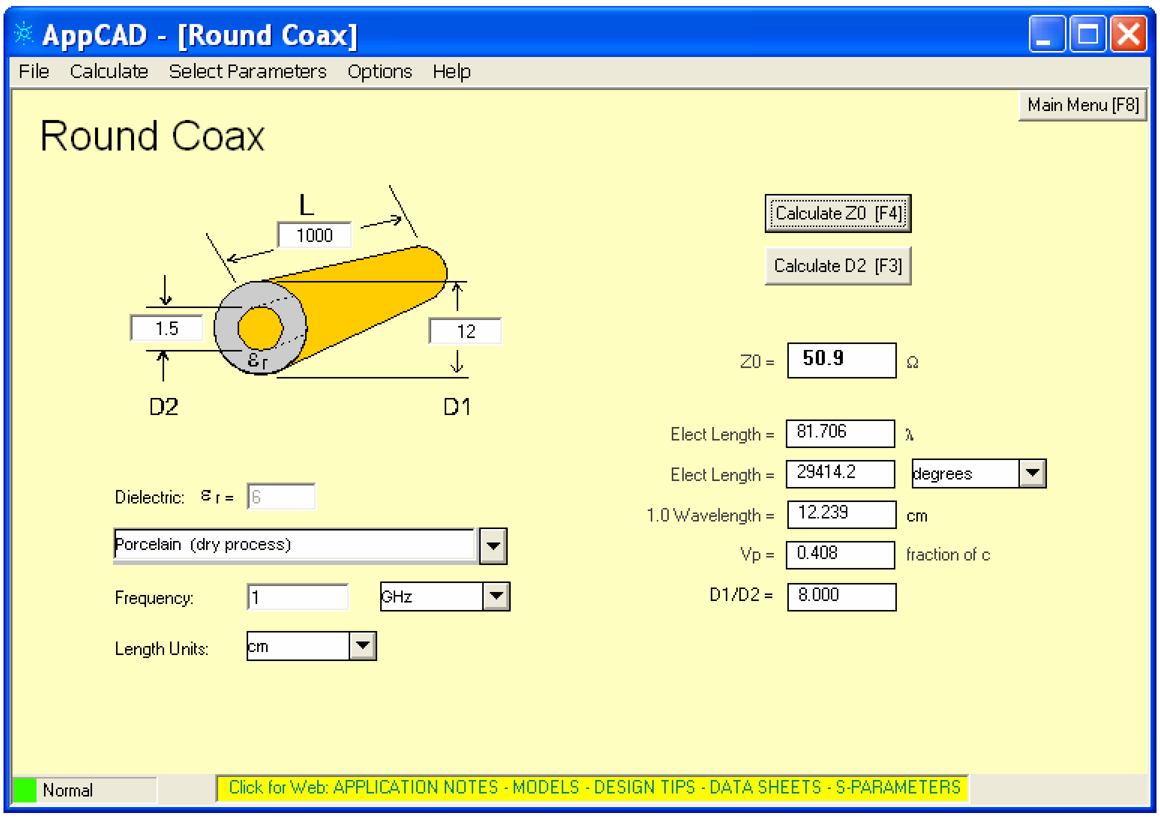
Homework #4
Due 14 March

Before beginning this homework assignment, read over HW4 from Spring 2006. We will be using both the AppCAD software and the spreadsheet approach to electrostatic problem solving in this assignment. AppCAD can be downloaded from

- http://www.hp.woodshot.com/ or
- http://www.rfcascade.com/appcad.html

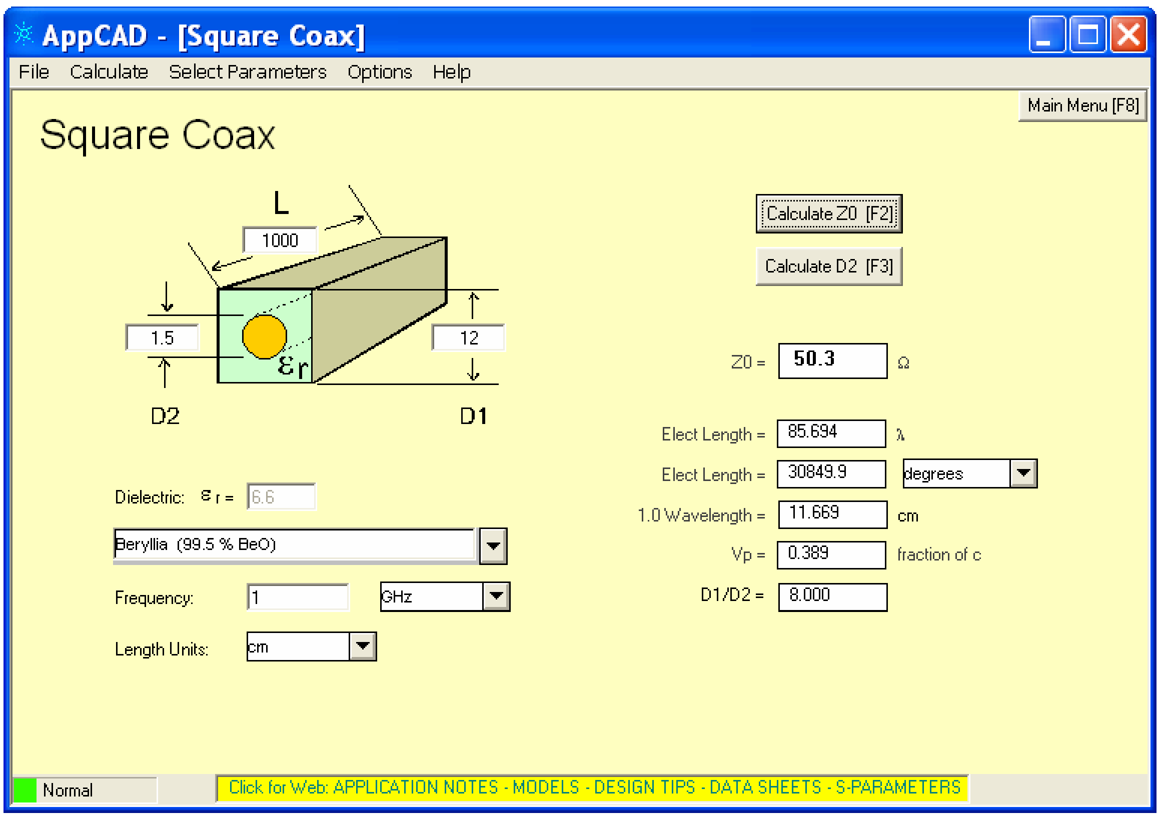
1. **Using AppCAD to find the Parameters of a Simple Transmission Line**

Begin by using AppCAD to analyze the following two configurations. For each case, we have assumed that the dimensions are as given (these are the dimensions of a standard compact disk). Find the dielectric material for each case that produces a characteristic impedance as close to 50 Ohms as possible. It is likely that you will have to use different materials for the two geometries. Also determine the capacitance for each cable. AppCAD does not give this information directly. You have to figure it out from the information they do give you. *Hint: You will need what you learned about transmission lines.*



From the options available, porcelain gives the best result. Beryllia give 48.5 Ohms, so it is the second best choice. With a wave propagation speed of .408 the speed of *light, we can figure out the capacitance and inductance per unit length.* $Z_o = \sqrt{\frac{l}{c}}$,

$v = \frac{1}{\sqrt{lc}}$, *so that* $c = \frac{1}{Z_o v} = \frac{1}{(50.9)(.408)(3e8)} = 160\, {}^{pF}\!/_{m}$. Also, calculate the capacitance per unit length for this line using the formulas in the text or class notes. Compare your answer to what is determined by AppCAD. *From the class notes or text, the capacitance per unit length is* $c = \frac{2\pi\varepsilon}{\ln\frac{b}{a}} = \frac{2\pi 6\varepsilon_o}{\ln\frac{12}{1.5}} = 160\, {}^{pF}\!/_{m}$



From the options available, beryllia gives the best result. With a wave propagation speed of .389 the speed of light, we can figure out the capacitance and inductance per unit length. $Z_o = \sqrt{\frac{l}{c}}$, $v = \frac{1}{\sqrt{lc}}$, *so that* $c = \frac{1}{Z_o v} = \frac{1}{(50.3)(.389)(3e8)} = 170\, {}^{pF}\!/_{m}$.

2. Spreadsheet

Using the spreadsheet finite difference method, determine the capacitance per unit length for the two cases. Compare your answer to the answers determined by AppCAD and analytically (in the case of the coax). Are your answers larger or smaller? Can you explain the difference?

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2	2	3	3	3	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	2	3	4	5	6	6	6	6	6	5	4	3	2	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	2	3	4	6	7	8	9	9	9	9	9	8	7	6	4	3	2	0	0	0	0	0	0	0
5	0	0	0	0	0	0	2	4	6	7	9	10	11	12	13	13	13	12	11	10	9	7	6	4	2	0	0	0	0	0	0
6	0	0	0	0	0	2	4	6	8	10	12	14	15	16	16	17	16	16	15	14	12	10	8	6	4	2	0	0	0	0	0
7	0	0	0	0	2	4	7	9	11	13	15	17	19	20	21	21	21	20	19	17	15	13	11	9	7	4	2	0	0	0	0
8	0	0	0	2	4	6	9	11	14	16	19	21	23	24	25	26	25	24	23	21	19	16	14	11	9	6	4	2	0	0	0
9	0	0	0	3	6	8	11	14	17	20	23	25	28	29	31	31	31	29	28	25	23	20	17	14	11	8	6	3	0	0	0
10	0	0	2	4	7	10	13	16	20	23	27	30	33	35	37	37	37	35	33	30	27	23	20	16	13	10	7	4	2	0	0
11	0	0	3	6	9	12	15	19	23	27	31	35	38	42	44	45	44	42	38	35	31	27	23	19	15	12	9	6	3	0	0
12	0	2	4	7	10	14	17	21	25	30	35	40	45	49	53	54	53	49	45	40	35	30	25	21	17	14	10	7	4	2	0
13	0	2	5	8	11	15	19	23	28	33	38	45	51	58	63	65	63	58	51	45	38	33	28	23	19	15	11	8	5	2	0
14	0	3	6	9	12	16	20	24	29	35	42	49	58	68	78	80	78	68	58	49	42	35	29	24	20	16	12	9	6	3	0
15	0	3	6	9	13	16	21	25	31	37	44	53	63	78	100	100	100	78	63	53	44	37	31	25	21	16	13	9	6	3	0
16	0	3	6	9	13	17	21	26	31	37	45	54	65	80	100	100	100	80	65	54	45	37	31	26	21	17	13	9	6	3	0
17	0	3	6	9	13	16	21	25	31	37	44	53	63	78	100	100	100	78	63	53	44	37	31	25	21	16	13	9	6	3	0
18	0	3	6	9	12	16	20	24	29	35	42	49	58	68	78	80	78	68	58	49	42	35	29	24	20	16	12	9	6	3	0
19	0	2	5	8	11	15	19	23	28	33	38	45	51	58	63	65	63	58	51	45	38	33	28	23	19	15	11	8	5	2	0
20	0	2	4	7	10	14	17	21	25	30	35	40	45	49	53	54	53	49	45	40	35	30	25	21	17	14	10	7	4	2	0
21	0	0	3	6	9	12	15	19	23	27	31	35	38	42	44	45	44	42	38	35	31	27	23	19	15	12	9	6	3	0	0
22	0	0	2	4	7	10	13	16	20	23	27	30	33	35	37	37	37	35	33	30	27	23	20	16	13	10	7	4	2	0	0
23	0	0	0	3	6	8	11	14	17	20	23	25	28	29	31	31	31	29	28	25	23	20	17	14	11	8	6	3	0	0	0
24	0	0	0	2	4	6	9	11	14	16	19	21	23	24	25	26	25	24	23	21	19	16	14	11	9	6	4	2	0	0	0
25	0	0	0	0	2	4	7	9	11	13	15	17	19	20	21	21	21	20	19	17	15	13	11	9	7	4	2	0	0	0	0
26	0	0	0	0	0	2	4	6	8	10	12	14	15	16	16	17	16	16	15	14	12	10	8	6	4	2	0	0	0	0	0
27	0	0	0	0	0	0	2	4	6	7	9	10	11	12	13	13	13	12	11	10	9	7	6	4	2	0	0	0	0	0	0
28	0	0	0	0	0	0	0	2	3	4	6	7	8	9	9	9	9	9	8	7	6	4	3	2	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	2	3	4	5	6	6	6	6	6	5	4	3	2	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	2	2	3	3	3	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The capacitance calculated to about 145-150PF/m. This is less than the calculated capacitance. Some of the error can be due to the approximate solution method we are using but that error can go either way. The general tendency of smaller values is probably real since the center conductor size is under-estimated. The formula for the capacitance shows a smaller value when the center conductor is smaller.

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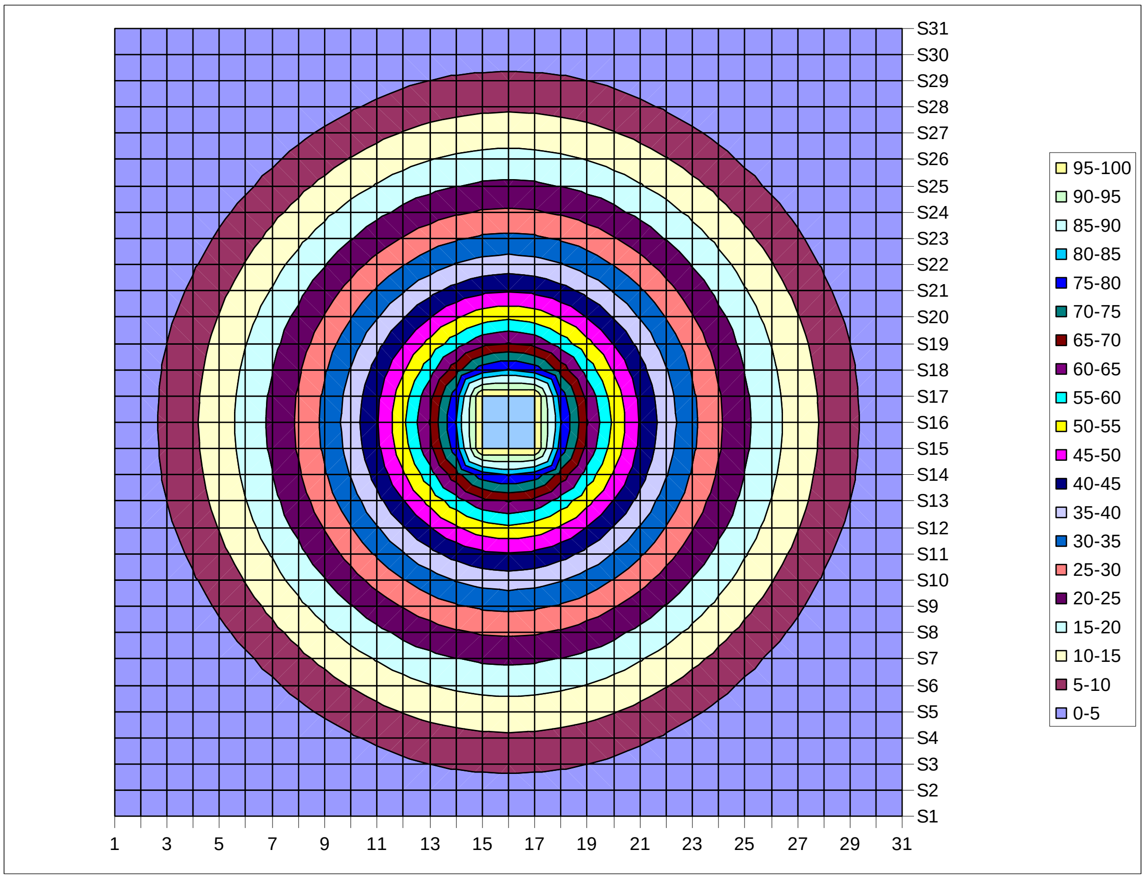
AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
	epsilon o	8.84195E-12		epsilon r	6			cell size		0.004				
	Center Voltage		100			charge	1.49892E-08			cap calc	1.60299E-10			
	average center voltage		76			cap	1.49892E-10				look!			
	Average Inner field		5995.669072											
	Average Outer Voltage		2.890			charge	1.44517E-08							
	Average Outer Field		722.5863932			cap	1.44517E-10							



For the square outer conductor, the solution is similar to a problem done in the lecture slides. For the specific case considered, we have the following, shown sideways on the next page. The inner and outer capacitance values are not in agreement and, again, both are smaller than found with AppCAD.

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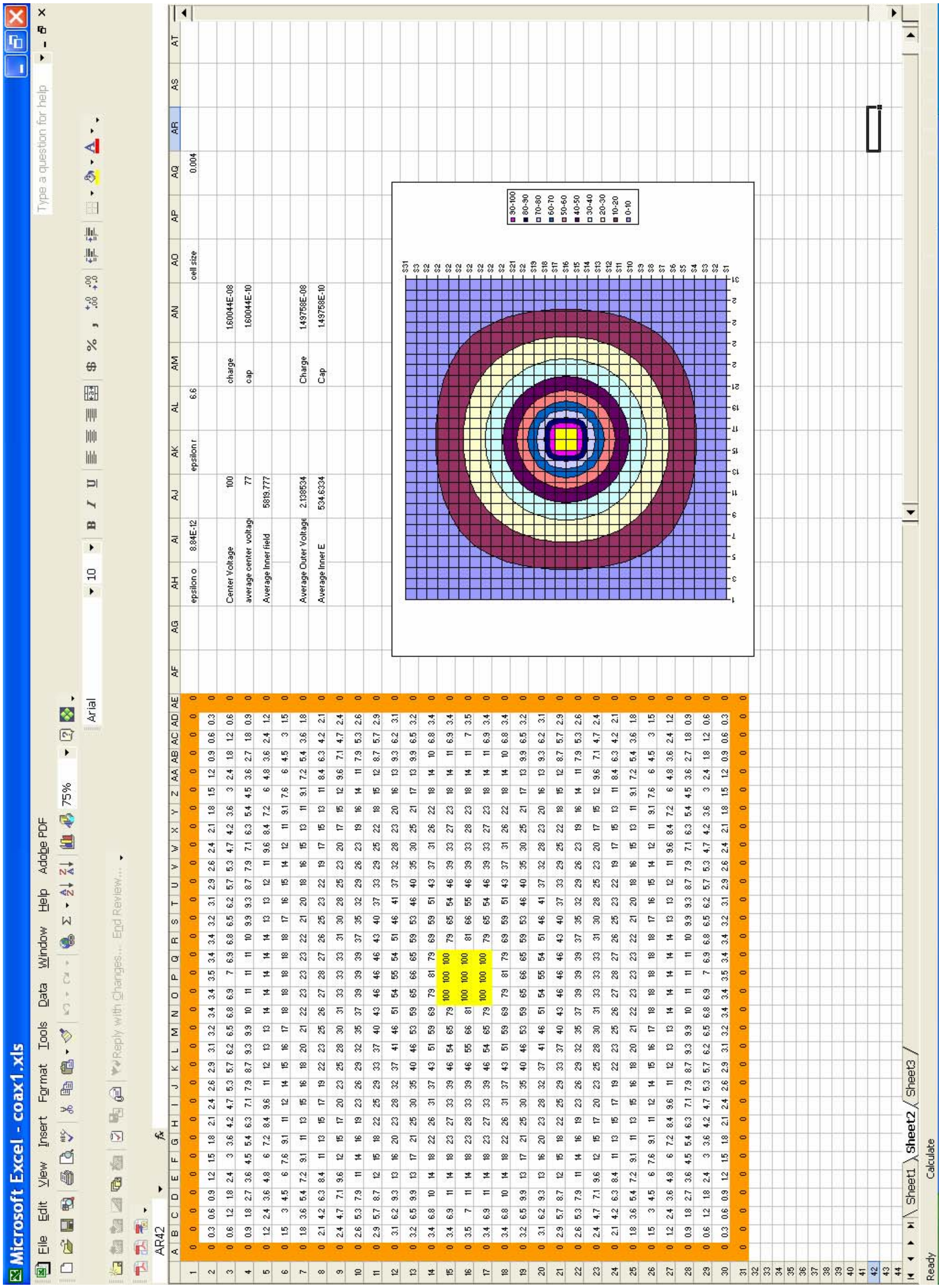

3. Spreadsheet

On the next page, shown sideways, is the spreadsheet setup for a configuration that addresses how capacitance can be used to determine something about the makeup of the insulating materials found between the plates. This is the principle of the stud finder tool used to locate the wooden or metal studs behind a wall when you wish to hang a picture or mount a shelf. This is also the basic idea behind some types of medical imaging modalities that use electrodes to locate objects within a human torso. For this configuration, assume that the structure is 31 cells wide and 31 cells high and that each cell is 1mm by 1mm. The positive electrode is shown in red and the negative electrode is shown in blue. The space between the plates is empty except for the four dielectric blocks. The blocks are 7 cells wide and 5 cells high. The dielectric constant of the blocks is 80. To help you think about how to set up this problem, the color of the cells indicates that a particular type of formula is found there.

Note that in the following, two values of capacitance per unit length are determined. One is found using the charge on the smaller positive plate and one is found on the larger negative plate. The actual value is probably bracketed by these two calculations.

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
2	-0.6	-26	-32	-33	-34	-34	-34	-34	-34	-34	15.8	28.2	31.2	31.9	32.1	32.1	32.1	32.2	32.2	32.4	32.5	-17	-30	-33	-34	-34	-34	-34	-34	-34	-34
3	-1.1	-7.4	-11	-12	-12	-12	-12	-12	-12	-13	-0.3	5.74	7.74	8.41	8.61	8.68	8.71	8.75	8.87	9.21	9.47	-2.9	-9	-11	-12	-12	-12	-12	-12	-12	-12
4	-1.7	-3.2	-4.4	-5	-5.3	-5.4	-5.5	-5.6	-5.7	-5.8	-2.9	-1	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	0.05	1.13	-1.6	-3.7	-4.8	-5.2	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4
5	-2.2	-2.6	-3	-3.3	-3.4	-3.5	-3.6	-3.7	-3.8	-3.9	-3.3	-2.9	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-2.5	-1.8	-2.3	-2.9	-3.3	-3.4	-3.5	-3.5	-3.5	-3.5	-3.4	-3.4
6	-2.8	-2.9	-3	-3.1	-3.2	-3.3	-3.3	-3.4	-3.5	-3.6	-3.5	-3.4	-3.7	-3.7	-3.6	-3.6	-3.6	-3.6	-3.6	-3.3	-3	-3	-3.1	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2
7	-3.3	-3.3	-3.4	-3.4	-3.5	-3.5	-3.6	-3.7	-3.7	-3.8	-3.8	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.6	-3.6	-3.6	-3.6	-3.5	-3.5	-3.5	-3.4	-3.4	-3.4	-3.4
8	-3.8	-3.8	-3.8	-3.9	-3.9	-4	-4	-4.1	-4.1	-4.2	-4.1	-4	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-4	-4.1	-4.1	-4.1	-4.1	-4	-4	-3.9	-3.9	-3.8	-3.8	-3.8
9	-4.3	-4.3	-4.3	-4.3	-4.4	-4.5	-4.5	-4.6	-4.6	-4.7	-4.6	-4.5	-4.4	-4.3	-4.3	-4.3	-4.3	-4.3	-4.4	-4.5	-4.6	-4.6	-4.6	-4.6	-4.5	-4.4	-4.4	-4.3	-4.3	-4.2	-4.2
10	-4.7	-4.7	-4.7	-4.8	-4.9	-5	-5.1	-5.1	-5.2	-5.2	-5.2	-5.1	-5	-5	-4.9	-4.9	-4.9	-5	-5	-5.1	-5.2	-5.2	-5.2	-5.1	-5	-5	-4.9	-4.8	-4.7	-4.7	-4.7
11	-5.1	-5.1	-5.2	-5.2	-5.4	-5.5	-5.6	-5.7	-5.8	-5.8	-5.8	-5.7	-5.6	-5.6	-5.5	-5.5	-5.5	-5.6	-5.6	-5.7	-5.8	-5.8	-5.7	-5.7	-5.6	-5.5	-5.3	-5.2	-5.1	-5.1	-5.1
12	-5.5	-5.5	-5.5	-5.7	-5.8	-6	-6.2	-6.3	-6.4	-6.4	-6.4	-6.3	-6.3	-6.1	-6.1	-6	-6.1	-6.1	-6.3	-6.3	-6.4	-6.4	-6.4	-6.3	-6.2	-6	-5.8	-5.6	-5.5	-5.5	-5.5
13	-5.8	-5.8	-5.9	-6	-6.2	-6.5	-6.8	-7	-7	-7	-7	-7	-6.9	-6.7	-6.5	-6.5	-6.5	-6.7	-6.9	-7	-7	-7	-7	-6.9	-6.8	-6.5	-6.2	-6	-5.8	-5.8	-5.8
14	-6	-6	-6.1	-6.3	-6.6	-7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.2	-6.9	-6.9	-6.9	-7.2	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-6.9	-6.5	-6.3	-6.1	-6	-6
15	-6.2	-6.2	-6.3	-6.4	-6.7	-7.1	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.3	-7.1	-7.1	-7.1	-7.3	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.1	-6.7	-6.4	-6.2	-6.1	-6.1
16	-6.2	-6.2	-6.3	-6.5	-6.8	-7.2	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.4	-7.2	-7.1	-7.2	-7.4	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.2	-6.8	-6.5	-6.3	-6.2	-6.2
17	-6.2	-6.2	-6.3	-6.4	-6.7	-7.1	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.3	-7.1	-7.1	-7.1	-7.3	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.1	-6.7	-6.4	-6.2	-6.1	-6.1
18	-6	-6	-6.1	-6.3	-6.6	-7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.2	-6.9	-6.9	-6.9	-7.2	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.6	-6.9	-6.5	-6.3	-6.1	-6	-6
19	-5.8	-5.8	-5.9	-6	-6.2	-6.5	-6.8	-7	-7	-7	-7	-7	-6.9	-6.7	-6.6	-6.5	-6.6	-6.7	-6.9	-7	-7	-7	-7	-6.9	-6.8	-6.5	-6.2	-6	-5.8	-5.8	-5.8
20	-5.5	-5.5	-5.5	-5.7	-5.8	-6	-6.2	-6.3	-6.4	-6.4	-6.4	-6.4	-6.3	-6.2	-6.1	-6.1	-6.1	-6.2	-6.3	-6.4	-6.4	-6.4	-6.4	-6.3	-6.2	-6	-5.8	-5.6	-5.5	-5.5	-5.5
21	-5.1	-5.1	-5.2	-5.3	-5.4	-5.5	-5.6	-5.7	-5.8	-5.8	-5.8	-5.8	-5.7	-5.6	-5.6	-5.6	-5.6	-5.6	-5.7	-5.8	-5.8	-5.8	-5.8	-5.7	-5.6	-5.5	-5.3	-5.2	-5.1	-5.1	-5.1
22	-4.7	-4.7	-4.7	-4.8	-4.9	-5	-5.1	-5.2	-5.2	-5.2	-5.2	-5.2	-5.1	-5.1	-5	-5	-5	-5.1	-5.1	-5.2	-5.2	-5.2	-5.2	-5.1	-5.1	-5	-4.9	-4.8	-4.7	-4.7	-4.7
23	-4.3	-4.3	-4.3	-4.3	-4.4	-4.5	-4.6	-4.6	-4.7	-4.7	-4.7	-4.6	-4.5	-4.5	-4.4	-4.4	-4.4	-4.5	-4.5	-4.6	-4.7	-4.7	-4.7	-4.6	-4.5	-4.5	-4.4	-4.3	-4.3	-4.2	-4.2
24	-3.8	-3.8	-3.8	-3.8	-3.9	-4	-4	-4.1	-4.2	-4.2	-4.2	-4.1	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-4.1	-4.2	-4.2	-4.1	-4.1	-4	-3.9	-3.9	-3.8	-3.8	-3.8	-3.8
25	-3.3	-3.3	-3.3	-3.3	-3.4	-3.4	-3.5	-3.6	-3.6	-3.7	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.7	-3.6	-3.6	-3.5	-3.4	-3.4	-3.3	-3.3	-3.3	-3.3
26	-2.8	-2.8	-2.8	-2.8	-2.8	-2.9	-3	-3	-3.1	-3.2	-3.4	-3.6	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.6	-3.4	-3.2	-3.1	-3	-3	-2.9	-2.8	-2.8	-2.8	-2.8	-2.8
27	-2.2	-2.2	-2.2	-2.3	-2.3	-2.3	-2.4	-2.5	-2.6	-2.7	-3	-3.3	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.3	-3	-2.7	-2.6	-2.5	-2.4	-2.3	-2.3	-2.3	-2.2	-2.2	-2.2
28	-1.7	-1.7	-1.7	-1.7	-1.7	-1.8	-1.8	-1.9	-2	-2.2	-2.4	-2.9	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8	-2.9	-2.4	-2.2	-2	-1.9	-1.8	-1.8	-1.7	-1.7	-1.7	-1.7	-1.7
29	-1.1	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2	-1.3	-1.4	-1.5	-1.7	-2	-2.3	-2.4	-2.5	-2.5	-2.5	-2.4	-2.3	-2	-1.7	-1.5	-1.4	-1.3	-1.2	-1.2	-1.2	-1.1	-1.1	-1.1	-1.1
30	-0.6	-26	-32	-33	-34	-34	-34	-34	-34	-34	-34	-34	-34	-35	-35	-35	-35	-35	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34
31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
32																															
33																															

Homework #4
Due 14 March

The red and blue cells are electrodes so they contain fixed voltages. Also the white and yellow cells contain the formula for the average of the near neighbors. The purple cells contain the formulas for the open edge of the region with no conductors. The orange and pink cells contain the formulas for the boundary between two dielectric media. For each of the following configurations, you normally would be free to use either the charge on the positive plate or the charge on the negative plate to find the capacitance. However, for completeness and to see that similar methods can give different results, you are to find the capacitance both ways here. That is, find the charge on the positive plate and use it to find C and then find the charge on the negative plate and use it to find C. Remember also that you are really finding the charge and capacitance per unit length. When you have finished calculating all of these capacitances, discuss the differences in the values you have obtained. Do they make sense and why?

a. First find the capacitance of this structure for the case where the entire internal region is empty (no dielectric blocks)

AG42

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100
2	-93	-93	-93	-92	-91	-89	-86	-80	-68	-41	30.8	57.4	68.7	74.1	76.6	77.3
3	-87	-87	-86	-85	-83	-79	-74	-65	-51	-28	6.95	30	43.5	51.1	54.9	56.1
4	-81	-81	-80	-78	-76	-71	-65	-56	-44	-26	-5	12.2	24.2	31.8	36	37.3
5	-76	-76	-75	-73	-70	-66	-60	-51	-41	-28	-13	-0.5	9.27	16	19.8	21.1
6	-71	-71	-71	-69	-66	-62	-56	-49	-40	-30	-20	-10	-2.5	3.01	6.31	7.4
7	-68	-68	-67	-65	-63	-59	-54	-48	-41	-33	-26	-18	-12	-7.7	-5	-4.1
8	-66	-66	-65	-63	-61	-57	-53	-48	-43	-37	-31	-25	-20	-17	-15	-14
9	-64	-64	-63	-62	-60	-57	-53	-49	-45	-40	-35	-31	-27	-24	-23	-22
10	-63	-63	-62	-61	-59	-57	-54	-51	-47	-43	-39	-36	-33	-31	-30	-29
11	-62	-62	-62	-61	-59	-57	-55	-52	-49	-46	-43	-41	-38	-37	-36	-35
12	-63	-63	-62	-61	-60	-58	-56	-54	-52	-49	-47	-45	-43	-42	-41	-41
13	-63	-63	-63	-62	-61	-60	-58	-56	-54	-52	-50	-49	-47	-46	-46	-45
14	-64	-64	-64	-63	-62	-61	-60	-58	-57	-55	-54	-52	-51	-50	-50	-50
15	-65	-65	-65	-64	-64	-63	-62	-61	-59	-58	-57	-56	-55	-54	-54	-54
16	-67	-67	-66	-66	-65	-65	-64	-63	-62	-61	-60	-59	-58	-58	-57	-57
17	-68	-68	-68	-68	-67	-67	-66	-65	-64	-64	-63	-62	-62	-61	-61	-61
18	-70	-70	-70	-70	-69	-69	-68	-68	-67	-66	-66	-65	-65	-64	-64	-64
19	-72	-72	-72	-72	-71	-71	-71	-70	-70	-69	-69	-68	-68	-67	-67	-67
20	-74	-74	-74	-74	-74	-73	-73	-73	-72	-72	-71	-71	-71	-70	-70	-70
21	-76	-76	-76	-76	-76	-76	-75	-75	-75	-74	-74	-74	-73	-73	-73	-73
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31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
32																
33																

	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	
2	76.6	74.1	68.7	57.4	30.8	-41	-68	-80	-86	-89	-91	-92	-93	-93	-93	
3	54.9	51.1	43.5	30	6.95	-28	-51	-65	-74	-79	-83	-85	-86	-87	-87	
4	36	31.8	24.2	12.2	-5	-26	-44	-56	-65	-71	-76	-78	-80	-81	-81	
5	19.8	16	9.27	-0.5	-13	-28	-41	-51	-60	-66	-70	-73	-75	-76	-76	
6	6.31	3.01	-2.5	-10	-20	-30	-40	-49	-56	-62	-66	-69	-71	-71	-71	
7	-5	-7.7	-12	-18	-26	-33	-41	-48	-54	-59	-63	-65	-67	-68	-68	
8	-15	-17	-20	-25	-31	-37	-43	-48	-53	-57	-61	-63	-65	-66	-66	
9	-23	-24	-27	-31	-35	-40	-45	-49	-53	-57	-60	-62	-63	-64	-64	
10	-30	-31	-33	-36	-39	-43	-47	-51	-54	-57	-59	-61	-62	-63	-63	
11	-36	-37	-38	-41	-43	-46	-49	-52	-55	-57	-59	-61	-62	-62	-62	
12	-41	-42	-43	-45	-47	-49	-52	-54	-56	-58	-60	-61	-62	-63	-63	
13	-46	-46	-47	-49	-50	-52	-54	-56	-58	-60	-61	-62	-63	-63	-63	
14	-50	-50	-51	-52	-54	-55	-57	-58	-60	-61	-62	-63	-64	-64	-64	
15	-54	-54	-55	-56	-57	-58	-59	-61	-62	-63	-64	-64	-65	-65	-65	
16	-57	-58	-58	-59	-60	-61	-62	-63	-64	-65	-65	-66	-66	-67	-67	
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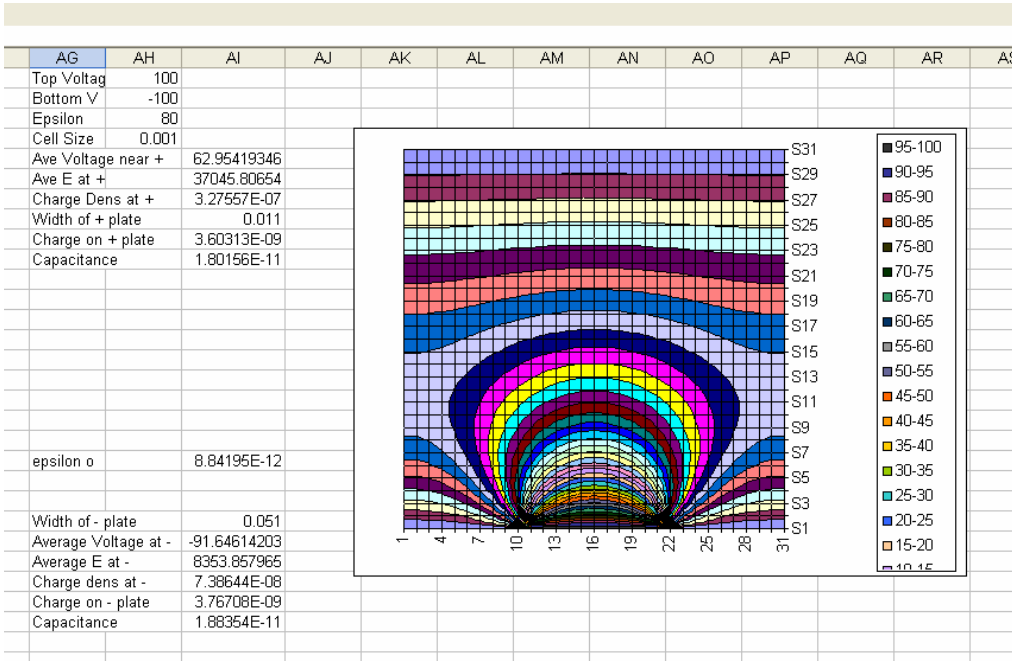
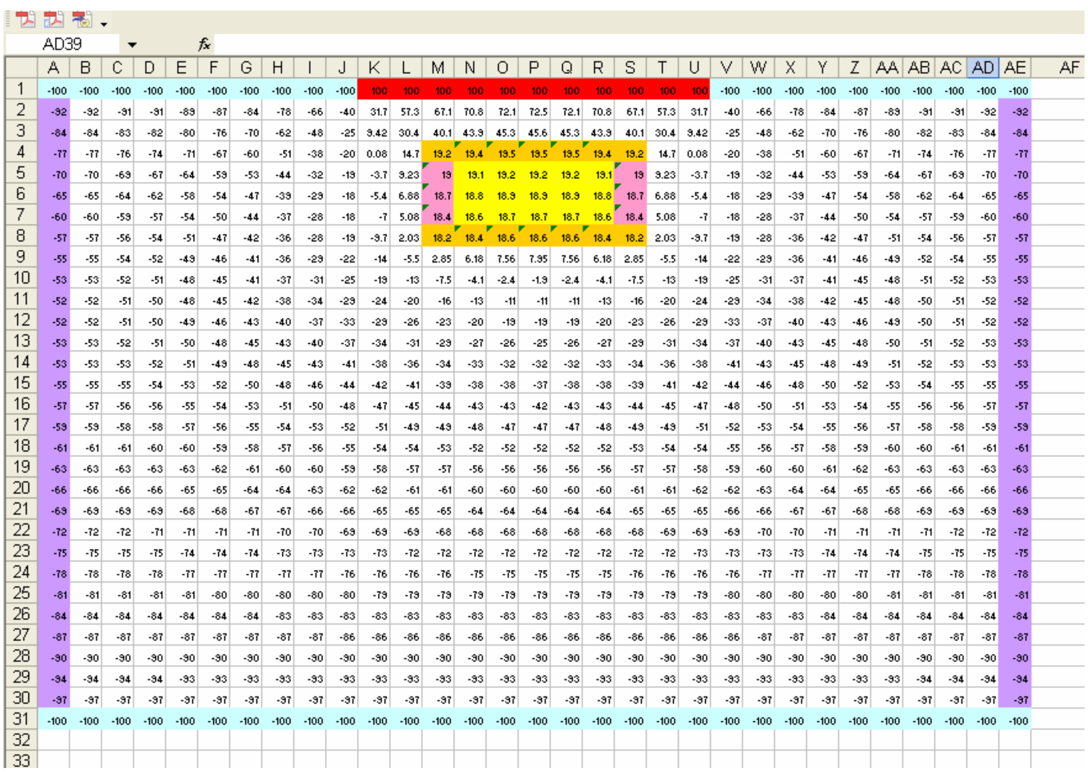
19	-67	-67	-68	-68	-69	-69	-70	-70	-71	-71	-71	-72	-72	-72	-72	
20	-70	-70	-71	-71	-71	-72	-72	-73	-73	-73	-74	-74	-74	-74	-74	
21	-73	-73	-73	-74	-74	-74	-75	-75	-75	-76	-76	-76	-76	-76	-76	
22	-76	-76	-76	-76	-77	-77	-77	-77	-78	-78	-78	-78	-78	-78	-78	
23	-79	-79	-79	-79	-79	-80	-80	-80	-80	-80	-80	-81	-81	-81	-81	
24	-82	-82	-82	-82	-82	-82	-82	-82	-83	-83	-83	-83	-83	-83	-83	
25	-84	-84	-84	-84	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	
26	-87	-87	-87	-87	-87	-87	-87	-87	-88	-88	-88	-88	-88	-88	-88	
27	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	
28	-92	-92	-92	-92	-92	-92	-92	-92	-93	-93	-93	-93	-93	-93	-93	
29	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	
30	-97	-97	-97	-97	-97	-97	-97	-97	-98	-98	-98	-98	-98	-98	-98	
31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	
32																
33																



AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		62.95419346
Ave E at +		37045.80654
Charge Dens at +		3.27557E-07
Width of + plate		0.011
Charge on + plate		3.60313E-09
Capacitance		1.80156E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-91.64614203
Average E at -		8353.857965
Charge dens at -		7.38644E-08
Charge on - plate		3.76708E-09
Capacitance		1.88354E-11

b. Second find the capacitance for the four cases where there is one dielectric block, addressing each possible location separately. If you have done this correctly, two of your answers should be the same.


AD39

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
2	-92	-92	-91	-91	-89	-87	-84	-78	-66	-40	31.7	57.3	67.1	70.8	72.1	72.5	72.1	70.8	67.1	57.3	31.7	-40	-66	-78	-84	-87	-89	-91	-91	-92	-92
3	-84	-84	-83	-82	-80	-76	-70	-62	-48	-25	9.42	30.4	40.1	43.9	45.3	45.6	45.3	43.9	40.1	30.4	9.42	-25	-48	-62	-70	-76	-80	-82	-83	-84	-84
4	-77	-77	-76	-74	-71	-67	-60	-51	-38	-20	0.08	14.7	19.2	19.4	19.5	19.5	19.5	19.4	19.2	14.7	0.08	-20	-38	-51	-60	-67	-71	-74	-76	-77	-77
5	-70	-70	-69	-67	-64	-59	-53	-44	-32	-19	-3.7	9.23	19	19.1	19.2	19.2	19.2	19.1	19	9.23	-3.7	-19	-32	-44	-53	-59	-64	-67	-69	-70	-70
6	-65	-65	-64	-62	-58	-54	-47	-39	-29	-18	-5.4	6.88	18.7	18.8	18.9	18.9	18.9	18.8	18.7	6.88	-5.4	-18	-29	-39	-47	-54	-58	-62	-64	-65	-65
7	-60	-60	-59	-57	-54	-50	-44	-37	-28	-18	-7	5.08	18.4	18.6	18.7	18.7	18.7	18.6	18.4	5.08	-7	-18	-28	-37	-44	-50	-54	-57	-59	-60	-60
8	-57	-57	-56	-54	-51	-47	-42	-36	-28	-19	-9.7	2.03	18.2	18.4	18.6	18.6	18.6	18.4	18.2	2.03	-9.7	-19	-28	-36	-42	-47	-51	-54	-56	-57	-57
9	-55	-55	-54	-52	-49	-46	-41	-36	-29	-22	-14	-5.5	2.85	6.18	7.56	7.95	7.56	6.18	2.85	-5.5	-14	-22	-29	-36	-41	-46	-49	-52	-54	-55	-55
10	-53	-53	-52	-51	-48	-45	-41	-37	-31	-25	-19	-13	-7.5	-4.1	-2.4	-1.9	-2.4	-4.1	-7.5	-13	-19	-25	-31	-37	-41	-45	-48	-51	-52	-53	-53
11	-52	-52	-51	-50	-48	-45	-42	-38	-34	-29	-24	-20	-16	-13	-11	-11	-11	-13	-16	-20	-24	-29	-34	-38	-42	-45	-48	-50	-51	-52	-52
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14	-53	-53	-53	-52	-51	-49	-48	-45	-43	-41	-38	-36	-34	-33	-32	-32	-32	-33	-34	-36	-38	-41	-43	-45	-48	-49	-51	-52	-53	-53	-53
15	-55	-55	-55	-54	-53	-52	-50	-48	-46	-44	-42	-41	-39	-38	-38	-37	-38	-38	-39	-41	-42	-44	-46	-48	-50	-52	-53	-54	-55	-55	-55
16	-57	-57	-56	-56	-55	-54	-53	-51	-50	-48	-47	-45	-44	-43	-43	-42	-43	-43	-44	-45	-47	-48	-50	-51	-53	-54	-55	-56	-56	-57	-57
17	-59	-59	-58	-58	-57	-56	-55	-54	-53	-52	-51	-49	-49	-48	-47	-47	-47	-48	-49	-49	-51	-52	-53	-54	-55	-56	-57	-58	-58	-59	-59
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19	-63	-63	-63	-63	-63	-62	-61	-60	-60	-59	-58	-57	-57	-56	-56	-56	-56	-56	-57	-57	-58	-59	-60	-60	-61	-62	-63	-63	-63	-63	-63
20	-66	-66	-66	-66	-65	-65	-64	-64	-63	-62	-62	-61	-61	-60	-60	-60	-60	-60	-61	-61	-62	-62	-63	-64	-64	-65	-65	-66	-66	-66	-66
21	-69	-69	-69	-69	-68	-68	-67	-67	-66	-66	-65	-65	-65	-64	-64	-64	-64	-64	-65	-65	-65	-66	-66	-67	-67	-68	-68	-69	-69	-69	-69
22	-72	-72	-72	-71	-71	-71	-71	-70	-70	-69	-69	-69	-68	-68	-68	-68	-68	-68	-68	-69	-69	-69	-70	-70	-71	-71	-71	-71	-72	-72	-72
23	-75	-75	-75	-75	-74	-74	-74	-73	-73	-73	-73	-72	-72	-72	-72	-72	-72	-72	-72	-72	-73	-73	-73	-73	-74	-74	-74	-75	-75	-75	-75
24	-78	-78	-78	-78	-77	-77	-77	-77	-77	-76	-76	-76	-76	-75	-75	-75	-75	-75	-76	-76	-76	-76	-77	-77	-77	-77	-77	-78	-78	-78	-78
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29	-94	-94	-94	-94	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-94	-94	-94	-94
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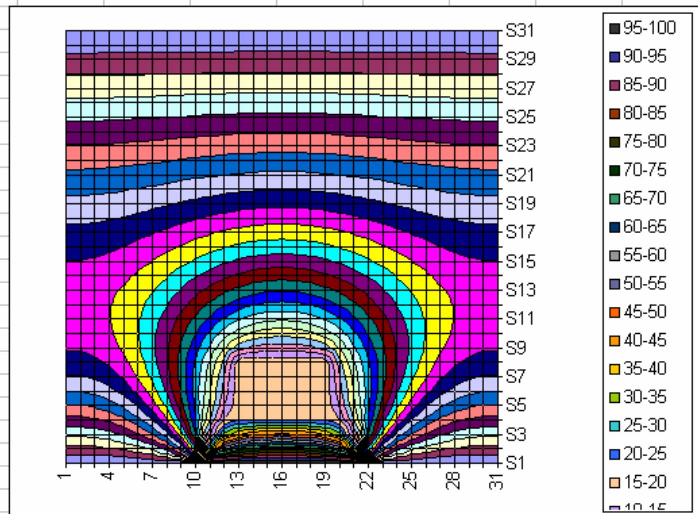
31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100

Homework #4
Due 14 March

AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		60.94317079
Ave E at +		39056.82921
Charge Dens at +		3.45338E-07
Width of + plate		0.011
Charge on + plate		3.79872E-09
Capacitance		1.89936E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-90.5329442
Average E at -		9467.055804
Charge dens at -		8.37072E-08
Charge on - plate		4.26907E-09
Capacitance		2.13453E-11



AG45

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100
2	-93	-93	-93	-92	-91	-89	-86	-80	-68	-41	30.6	57.2	68.6	73.9	76.4	77.1
3	-87	-87	-86	-85	-83	-79	-74	-66	-52	-28	6.57	29.6	43.1	50.7	54.6	55.8
4	-81	-81	-80	-79	-76	-72	-66	-57	-44	-27	-5.6	11.6	23.6	31.2	35.4	36.7
5	-76	-76	-75	-73	-70	-66	-60	-52	-41	-28	-14	-1.3	8.44	15.2	19	20.3
6	-72	-72	-71	-69	-66	-62	-57	-50	-41	-31	-21	-11	-3.6	1.94	5.29	6.45
7	-68	-68	-67	-66	-63	-60	-55	-49	-42	-35	-27	-20	-14	-9.1	-6.3	-5.3
8	-66	-66	-65	-63	-61	-58	-54	-49	-44	-38	-32	-27	-22	-18	-16	-15
9	-64	-64	-63	-62	-60	-57	-54	-50	-46	-42	-37	-33	-29	-26	-24	-24
10	-63	-63	-62	-61	-59	-57	-55	-52	-49	-45	-42	-39	-36	-33	-32	-31
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12	-62	-62	-61	-61	-60	-59	-57	-56	-54	-53	-51	-49	-47	-45	-44	-43
13	-62	-62	-62	-61	-60	-60	-59	-58	-57	-56	-55	-54	-53	-51	-49	-48
14	-62	-62	-62	-62	-61	-60	-60	-60	-60	-60	-60	-60	-60	-55	-53	-52
15	-63	-63	-63	-62	-62	-61	-60	-60	-60	-60	-60	-60	-60	-58	-56	-55
16	-64	-64	-64	-63	-62	-61	-60	-60	-60	-60	-60	-60	-60	-59	-59	-58
17	-65	-65	-65	-64	-63	-62	-60	-60	-60	-60	-60	-60	-60	-61	-61	-61
18	-67	-67	-67	-66	-65	-63	-60	-60	-60	-60	-60	-60	-60	-62	-63	-64
19	-69	-69	-68	-68	-67	-66	-65	-64	-64	-64	-64	-64	-64	-65	-66	-66
20	-71	-71	-71	-70	-70	-69	-68	-67	-67	-67	-67	-67	-68	-68	-69	-69
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23	-78	-78	-78	-78	-78	-77	-77	-77	-77	-77	-77	-77	-77	-77	-77	-78
24	-81	-81	-81	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80
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31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
32																

	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
2	76.4	74	68.6	57.2	30.6	-41	-68	-80	-86	-89	-91	-92	-93	-93	-93
3	54.6	50.8	43.2	29.7	6.72	-28	-51	-66	-74	-79	-83	-85	-86	-87	-87
4	35.5	31.3	23.8	11.8	-5.4	-26	-44	-57	-66	-72	-76	-79	-80	-81	-81
5	19.1	15.4	8.71	-1	-14	-28	-41	-52	-60	-66	-70	-73	-75	-76	-76
6	5.43	2.22	-3.3	-11	-20	-31	-41	-49	-56	-62	-66	-69	-71	-72	-72
7	-6.1	-8.7	-13	-19	-26	-34	-42	-49	-55	-59	-63	-66	-67	-68	-68
8	-16	-18	-21	-26	-31	-37	-43	-49	-54	-58	-61	-64	-65	-66	-66
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29	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95
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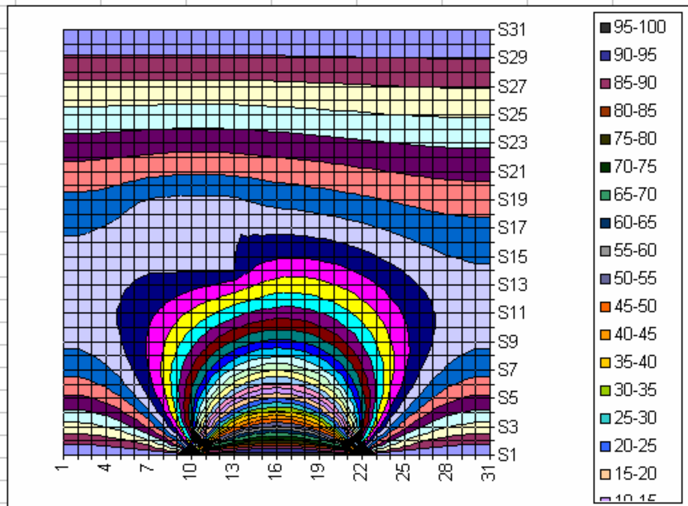
31	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
32															

Homework #4
Due 14 March

AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		62.76858427
Ave E at +		37231.41573
Charge Dens at +		3.29198E-07
Width of + plate		0.011
Charge on + plate		3.62118E-09
Capacitance		1.81059E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-91.59049096
Average E at -		8409.509038
Charge dens at -		7.43564E-08
Charge on - plate		3.79218E-09
Capacitance		1.89609E-11



AJ40

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
2	-93	-93	-93	-92	-91	-89	-86	-80	-68	-41	30.6	57.2	68.6	73.9	76.4	77.1	76.4	73.9	68.5	57.2	30.5	-42	-68	-80	-86	-89	-91	-92	-93	-93	-93
3	-87	-87	-86	-85	-83	-79	-74	-66	-51	-28	6.7	29.7	43.2	50.8	54.6	55.7	54.5	50.7	43.1	29.6	6.53	-28	-52	-66	-74	-80	-83	-85	-86	-87	-87
4	-81	-81	-80	-79	-76	-72	-66	-57	-44	-26	-5.4	11.7	23.7	31.3	35.4	36.7	35.3	31.1	23.5	11.5	-5.7	-27	-44	-57	-66	-72	-76	-79	-80	-81	-81
5	-76	-76	-75	-73	-70	-66	-60	-52	-41	-28	-14	-1.1	8.65	15.3	19.1	20.3	19	15.1	8.36	-1.4	-14	-28	-41	-52	-60	-66	-70	-73	-75	-76	-76
6	-72	-72	-71	-69	-66	-62	-57	-49	-41	-31	-20	-11	-3.3	2.14	5.36	6.37	5.2	1.85	-3.7	-11	-21	-31	-41	-50	-57	-62	-66	-69	-71	-72	-72
7	-68	-68	-68	-66	-63	-59	-55	-49	-42	-34	-26	-19	-13	-8.8	-6.2	-5.4	-6.4	-9.2	-14	-20	-27	-35	-42	-49	-55	-60	-63	-66	-68	-68	-68
8	-66	-66	-65	-64	-61	-58	-54	-49	-43	-37	-31	-26	-21	-18	-16	-15	-16	-18	-22	-27	-32	-38	-44	-50	-54	-58	-61	-64	-65	-66	-66
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17	-69	-69	-68	-68	-68	-67	-66	-66	-65	-64	-63	-63	-62	-62	-61	-61	-61	-61	-60	-60	-60	-60	-60	-60	-60	-62	-64	-65	-65	-66	-66
18	-70	-70	-70	-70	-70	-69	-69	-68	-67	-67	-66	-65	-65	-65	-64	-64	-63	-62	-60	-60	-60	-60	-60	-61	-61	-64	-65	-66	-67	-67	-67
19	-72	-72	-72	-72	-72	-71	-71	-70	-70	-69	-69	-68	-68	-67	-67	-66	-66	-65	-64	-64	-64	-64	-64	-64	-65	-66	-67	-68	-69	-69	-69
20	-74	-74	-74	-74	-74	-73	-73	-73	-72	-72	-71	-71	-70	-70	-70	-69	-69	-68	-68	-68	-67	-67	-67	-68	-68	-69	-70	-70	-71	-71	-71
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22	-79	-79	-79	-78	-78	-78	-78	-77	-77	-77	-77	-76	-76	-76	-75	-75	-75	-74	-74	-74	-74	-74	-74	-74	-74	-75	-75	-75	-76	-76	-76
23	-81	-81	-81	-81	-81	-80	-80	-80	-80	-79	-79	-79	-79	-78	-78	-78	-78	-77	-77	-77	-77	-77	-77	-77	-77	-78	-78	-78	-78	-78	-78
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25	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-84	-84	-84	-84	-84	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83	-83
26	-88	-88	-88	-88	-88	-88	-88	-87	-87	-87	-87	-87	-87	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86	-86
27	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89
28	-93	-93	-93	-93	-93	-93	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-91	-91	-91	-92	-92	-92	-92	-92	-92	-92	-92
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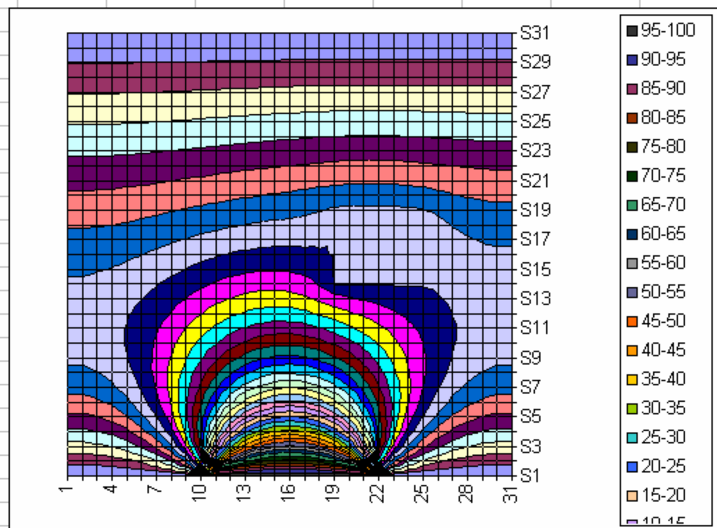
32																															
33																															
34																															

Homework #4
Due 14 March

AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		62.76927291
Ave E at +		37230.72709
Charge Dens at +		3.29192E-07
Width of + plate		0.011
Charge on + plate		3.62111E-09
Capacitance		1.81056E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-91.58983646
Average E at -		8410.163543
Charge dens at -		7.43622E-08
Charge on - plate		3.79247E-09
Capacitance		1.89624E-11



Reply with Changes... End Review...

AJ42

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	
2	-93	-93	-93	-92	-91	-89	-86	-80	-68	-41	30.6	57.2	68.6	74	76.4	77.2	76.4	74	68.6	57.2	30.6	-41	-68	-80	-86	-89	-91	-92	-93	-93	-93	
3	-87	-87	-86	-85	-83	-80	-74	-66	-52	-28	6.64	29.7	43.2	50.8	54.6	55.8	54.6	50.8	43.2	29.7	6.64	-28	-52	-66	-74	-80	-83	-85	-86	-87	-87	
4	-81	-81	-80	-79	-76	-72	-66	-57	-44	-26	-5.5	11.7	23.7	31.3	35.5	36.8	35.5	31.3	23.7	11.7	-5.5	-26	-44	-57	-66	-72	-76	-79	-80	-81	-81	
5	-76	-76	-75	-74	-71	-66	-60	-52	-41	-28	-14	-1.1	8.64	15.3	19.2	20.5	19.2	15.3	8.64	-1.1	-14	-28	-41	-52	-60	-66	-71	-74	-75	-76	-76	
6	-72	-72	-71	-69	-66	-62	-57	-50	-41	-31	-21	-11	-3.3	2.21	5.51	6.6	5.51	2.21	-3.3	-11	-21	-31	-41	-50	-57	-62	-66	-69	-71	-72	-72	
7	-69	-69	-68	-66	-64	-60	-55	-49	-42	-34	-26	-19	-13	-8.7	-6	-5.1	-6	-8.7	-13	-19	-26	-34	-42	-49	-55	-60	-64	-66	-68	-69	-69	
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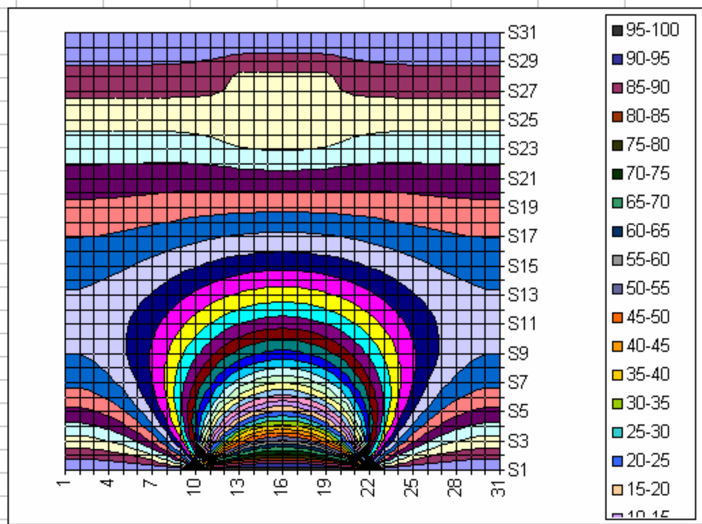
32																																
33																																

AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		62.79765215
Ave E at +		37202.34785
Charge Dens at +		3.28941E-07
Width of + plate		0.011
Charge on + plate		3.61835E-09
Capacitance		1.80918E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-91.63061194
Average E at -		8369.388061
Charge dens at -		7.40017E-08
Charge on - plate		3.77409E-09
Capacitance		1.88704E-11



c. Third, find the capacitance for the case where all four blocks are included.

AH40

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	100	100	100	100	100	100	100	100	100	100	100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
2	-91	-91	-91	-90	-89	-87	-83	-77	-66	-39	32.3	57.9	67.8	71.5	72.9	73.3	72.9	71.5	67.8	57.9	32.3	-39	-66	-77	-83	-87	-89	-90	-91	-91	-91
3	-83	-83	-82	-81	-78	-75	-69	-61	-47	-23	10.6	31.7	41.6	45.4	46.8	47.2	46.8	45.4	41.6	31.7	10.6	-23	-47	-61	-69	-75	-78	-81	-82	-83	-83
4	-75	-75	-74	-72	-69	-65	-58	-49	-36	-19	1.73	16.6	21.6	21.7	21.8	21.9	21.8	21.7	21.5	16.6	1.73	-19	-36	-49	-58	-65	-69	-72	-74	-75	-75
5	-68	-68	-67	-65	-62	-57	-50	-42	-30	-17	-1.6	11.4	21.3	21.4	21.5	21.5	21.5	21.4	21.3	11.4	-1.6	-17	-30	-42	-50	-57	-62	-65	-67	-68	-68
6	-62	-62	-61	-59	-55	-51	-45	-37	-27	-16	-3.1	9.19	21	21.2	21.3	21.3	21.2	21.2	21	9.19	-3.1	-16	-27	-37	-45	-51	-55	-59	-61	-62	-62
7	-56	-56	-56	-54	-50	-46	-41	-34	-25	-15	-4.5	7.5	20.8	20.9	21	21.1	21	20.9	20.8	7.49	-4.5	-15	-25	-34	-41	-46	-51	-54	-56	-57	-57
8	-52	-52	-51	-50	-47	-43	-38	-32	-25	-17	-7	4.52	20.6	20.8	20.9	20.9	20.9	20.8	20.6	4.52	-7	-17	-25	-32	-38	-43	-47	-50	-52	-52	-52
9	-49	-49	-48	-47	-44	-41	-37	-32	-26	-19	-11	-3	5.17	8.42	9.78	10.2	9.78	8.42	5.16	-3	-11	-19	-26	-32	-37	-41	-44	-47	-48	-49	-49
10	-47	-47	-46	-45	-42	-40	-36	-32	-27	-22	-16	-11	-5.3	-2.1	-0.4	0.16	-0.4	-2.1	-5.3	-11	-16	-22	-27	-32	-36	-40	-43	-45	-46	-47	-47
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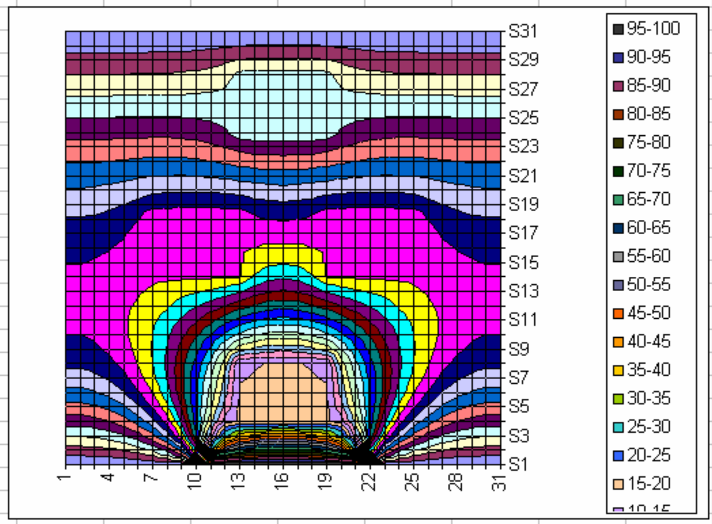
32																															
33																															

AG	AH	AI
Top Voltag	100	
Bottom V	-100	
Epsilon	80	
Cell Size	0.001	
Ave Voltage near +		59.95083349
Ave E at +		40049.16651
Charge Dens at +		3.54113E-07
Width of + plate		0.011
Charge on + plate		3.89524E-09
Capacitance		1.94762E-11
epsilon o		8.84195E-12
Width of - plate		0.051
Average Voltage at -		-90.32365736
Average E at -		9676.342643
Charge dens at -		8.55577E-08
Charge on - plate		4.36344E-09
Capacitance		2.18172E-11



Summary of Capacitance Results

	Empty	*Top*	*Mid-Left*	*Mid-Right*	*Bottom*	*All Four*
Pos-Plate	*18pF*	*19pF*	*18.1pF*	*18.1pF*	*18.1pF*	*19.5pF*
Neg Plate	*18.8pF*	*21.3pF*	*19pF*	*19pF*	*18.9pF*	*21.8pF*

For all of the calculations, the number of iterations was set at 10000 and the maximum change was set at 0.000001. The F9 key was pushed until the maximum change criterion was met.

Note that the capacitance is indeed largest for the four block case and also is largest when the block is near the positive electrode. This method is not very good for looking at blocks located away from the smaller electrode.