

# Excel Skill Module

- by
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# Introduction

- Please become familiar with keyboard shortcuts. They save time, especially with highly repetitive tasks.
- This module is about developing skills in Excel, that will help in extracting essential information from SAS output.
- Most (or all?) of these work in the OpenOffice equivalent of Excel.

<http://www.openoffice.org/>

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# Warning

- **Do not copy and paste from this document. You must type it in yourself.**
- If you copy and paste, expect that things will not always work properly.
- The copy-paste action works. However, you may get an error popup, or the cell will have # signs to let you know there was a problem.

This is an important issue to recognize, as it occurs now and again in a variety of situations. Once you recognize the problem, it is easy to correct.

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# Shortcuts in moving

- The arrow keys move the active cell one cell down, right, up, or left.
- Ctrl-arrow key moves to the first instance of empty cell to full cell, or full cell to empty cell.
  - Ctrl- ↓ Move down (ctrl down arrow)
  - Ctrl- → Move right (ctrl right arrow)
  - Ctrl- ↑ Move up (ctrl up arrow)
  - Ctrl- ← Move left (ctrl left arrow)

Open a new file, press ctrl, and while holding the ctrl key down press the down arrow. You will jump to the bottom of the file. In Excel 10 this will be row 1048576. Ctrl up arrow will put you back at the top.



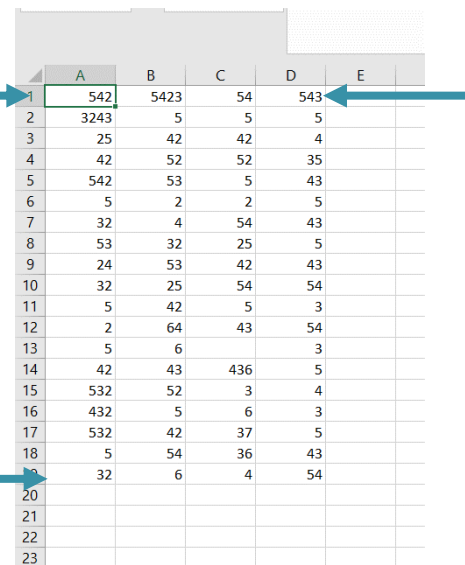
# Shortcuts: moving

Please fill in your Excel worksheet with numbers as in the example below. The values do not matter. The only important feature of the fake data below is that cell C13 is left empty, and columns A through D rows 1 through 19 are not empty.

If the active cell is A1, then Ctrl right arrow will take you to cell D1

Fake data in Excel

Cell A1 is current active cell



	A	B	C	D	E
1	542	5423	54	543	
2	3243	5	5	5	
3	25	42	42	4	
4	42	52	52	35	
5	542	53	5	43	
6	5	2	2	5	
7	32	4	54	43	
8	53	32	25	5	
9	24	53	42	43	
10	32	25	54	54	
11	5	42	5	3	
12	2	64	43	54	
13	5	6		3	
14	42	43	436	5	
15	532	52	3	4	
16	432	5	6	3	
17	532	42	37	5	
18	5	54	36	43	
19	32	6	4	54	
20					
21					
22					
23					

If the active cell is A1, then Ctrl down arrow will take you to cell A19.

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# Shortcuts: moving

Fake data in Excel

Make cell C1 the active cell

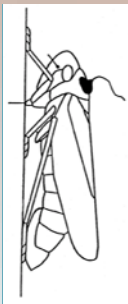
If the active cell is C1, then Ctrl down arrow will take you to cell C12.

Hitting ctrl down arrow again will take you to cell C14

Hitting ctrl down arrow again will take you to cell C19

	A	B	C	D	E
1			54	543	
2	3243	5	5	5	
3	25	42	42	4	
4	42	52	52	35	
5	542	53	5	43	
6	5	2	2	5	
7	32	4	54	43	
8	53	32	25	5	
9	24	53	42	43	
10	32	25	54	54	
11	5	42	5	3	
12	2	64	43	54	
13	5	6		3	
14	42	43	436	5	
15	532	52	3	4	
16	432	5	6	3	
17	532	42	37	5	
18	5	54	36	43	
19	32	6	4	54	
20					
21					
22					
23					

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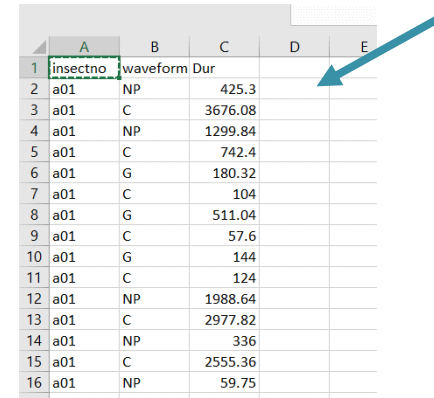


When you have data in rows 1 through 5000, this is a fast way to get to the end of the data. However, be careful. If there is a gap, you will end up at the gap, and you might be tricked into thinking you are at the end of the data.

# A simple IF test

- Open the datafile `PsyllidData1.csv` in Excel.

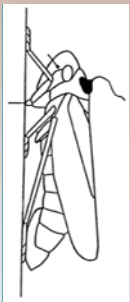
- In cell D2, type in  
`=if(B2="NP",1,0)`



	A	B	C	D	E
1	insectno	waveform	Dur		
2	a01	NP	425.3		
3	a01	C	3676.08		
4	a01	NP	1299.84		
5	a01	C	742.4		
6	a01	G	180.32		
7	a01	C	104		
8	a01	G	511.04		
9	a01	C	57.6		
10	a01	G	144		
11	a01	C	124		
12	a01	NP	1988.64		
13	a01	C	2977.82		
14	a01	NP	336		
15	a01	C	2555.36		
16	a01	NP	59.75		

- This command tests to see if cell B2 contains the letters “NP” and if it does you will see a one. If it does not, you will see a zero.

Quotes tell Excel that the contents are a character or a string of characters



# Selecting many cells

- Place the cursor in cell C2
- Hit ctrl down arrow to move to cell C529.
- Place the cursor in cell D529
- Hold the shift key, then press ctrl up arrow.
- Note highlighted cells.

	A	B	C	D	E
1	insectno	waveform	Dur		
2	a01	NP	425.3		
3	a01	C	3676.08		
4	a01	NP	1299.84		
5	a01	C	742.4		
6	a01	G	180.32		
7	a01	C	104		
8	a01	G	511.04		
9	a01	C	57.6		
10	a01	G	144		
11	a01	C	124		
12	a01	NP	1988.64		
13	a01	C	2977.82		
14	a01	NP	336		
15	a01	C	2555.36		
16	a01	NP	59.75		

	A	B	C	D	E
2	a01	NP	425.3	1	
3	a01	C	3676.08		
4	a01	NP	1299.84		
5	a01	C	742.4		
6	a01	G	180.32		
7	a01	C	104		
8	a01	G	511.04		
9	a01	C	57.6		
10	a01	G	144		
11	a01	C	124		
12	a01	NP	1988.64		
13	a01	C	2977.82		
14	a01	NP	336		
15	a01	C	2555.36		
16	a01	NP	59.75		
17	a01	C	3745.6		
18	a01	NP	1169.92		
19	a01	C	423.2		
20	a01	NP	82.4		
21	a01	C	956.8		
22	a01	G	1052		
23	a01	C	26.4		
24	a01	NP	142.4		

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# Fill down

- Next hit ctrl-d.
- Ctrl-d takes the contents of the first cell and fills all subsequent cells with that value.

	A	B	C	D	E
2	a01	NP	425.3	1	
3	a01	C	3676.08	0	
4	a01	NP	1299.84	1	
5	a01	C	742.4	0	
6	a01	G	180.32	0	
7	a01	C	104	0	
8	a01	G	511.04	0	
9	a01	C	57.6	0	
10	a01	G	144	0	
11	a01	C	124	0	
12	a01	NP	1988.64	1	
13	a01	C	2977.82	0	
14	a01	NP	336	1	
15	a01	C	2555.36	0	

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# Cell References

- Look at cell D2
- Use down arrow to look at contents of cell D3.
- Note B2 was automatically changed to B3 in the fill command.

Contents of cell D2

	A	B	C	D	E	F	G	H
1	insectno	waveform	Dur					
2	a01	NP	425.3	1				
3	a01	C	3676.08	0				
4	a01	NP	1299.84	1				
5	a01	C	742.4	0				
6	a01	G	180.32	0				
7	a01	C	104	0				
8	a01	G	511.04	0				
9	a01	C	57.6	0				
10	a01	G	144	0				
11	a01	C	124	0				
12	a01	NP	1988.64	1				
13	a01	C	2977.82	0				
14	a01	NP	336	1				
15	a01	C	2555.36	0				
16	a01	NP	59.75	1				
17	a01	C	3745.6	0				

Outcome from evaluating contents of cell D2

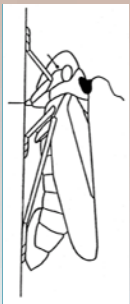
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# A useful check

- We have identified all the NP events.
- We want to find the number of NP events for each insect.
- If the insect number in the current row = the insect number from the previous row, then add the result from the previous row to the result in column D.
- Enter into cell E2  $=\text{if}(a1=a2,e1+d2,d2)$

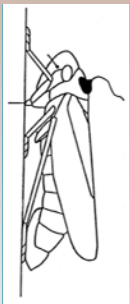
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# A useful check

- Selecting the important parts: another if
- If the insect number of the current row is the same as the next row, print nothing.
- If the insect number of the current row is different than the next row, print the result from the current row.
- Here is the statement for cell F2. `=if(a2=a3,"",E2)`
- Fill columns E and F down to the end of data.

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## Last steps

- Move cursor over the A in column A, so that you get a down pointing arrow.
- Left click mouse, and move cursor over to column F.
- Press ctrl-c to copy.
- Move cursor to cell G1.

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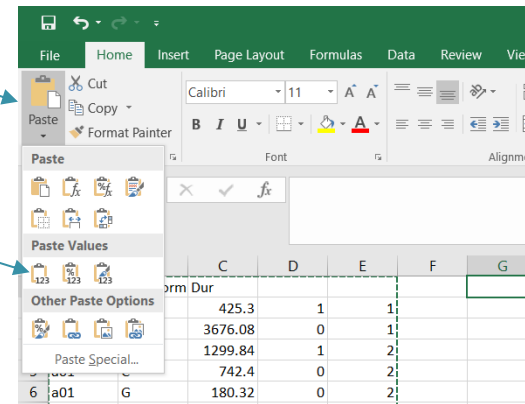


# Finish

- Paste values

Click here first

Then here



- Select columns L through G (start in column L, move left to column G)
- Sort by column L (the default, because you selected L to G)



# Reprise

To sort, click here first

Then here

	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
		a07	C	9690.3	0	3	3									
1		b07	E2	25279.5	0	4	4									
1		b03	C	448.35	0	10	10									
2		b04	C	574.35	0	13	13									
2		a02	NP	10017.6	1	14	14									
2		b05	NP	8764.5	1	14	14									
2		b06	C	701.25	0	15	15									
2		a01	NP	62.9	1	23	23									

You should see this in column L

Select cells G1 through L10, and resort  
(select G to L so default sort is column G)

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# You should now have

	G	H	I	J	K	L	M
a01		NP	62.9	1	23	23	
a02		NP	10017.6	1	14	14	
a06		C	8035.48	0	61	61	
a07		C	9690.3	0	3	3	
a08		NP	902.48	1	25	25	
b03		C	448.35	0	10	10	
b04		C	574.35	0	13	13	
b05		NP	8764.5	1	14	14	
b06		C	701.25	0	15	15	
b07		E2	25279.5	0	4	4	

- What is the mean number of NP events for cohort A and cohort B?
- The formula is =average(L1:L5) to get the average for cohort A. The answer is 25.2.
- Columns H through K are no longer useful, and can be deleted.

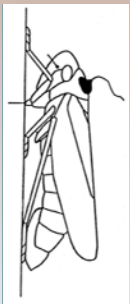




# Improving efficiency

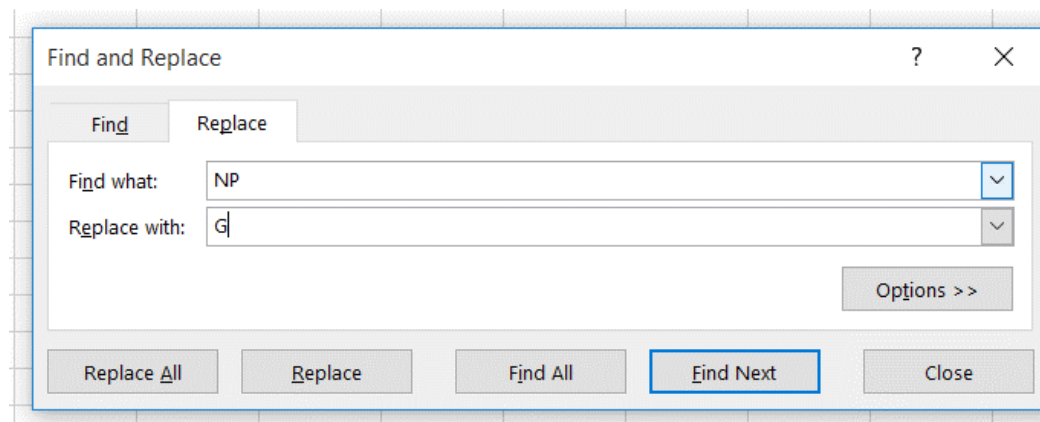
- One might want to look at C or G, rather than NP.
- One could replace “NP” with either C or G as a global replace.
- The problem becomes if one does
  - A global replace “NP” for G.
  - Then does a global replace “G” for “C”
  - Excel will then change =average() to =averace() and give you error messages.

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# Global Replace

- Ctrl-h is the command for global replace, and you get the following pop-up.



- Select all of column D, hit ctrl-h, and fill in the pop-up as shown. Then replace all, and you are done.

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# Global Replace

- To make the replacement more specific enter more text.
- Rather than entering G enter “G”.
- This approach is ok, but one can do even better.

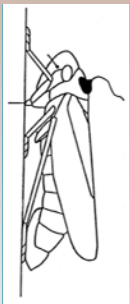
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# Fixed cell references

- In fill commands A1 will be incremented to A2, A3, and so forth filling down, and B1, C1, D1, and so forth filling right.
- \$A1 will still increment as expected filling down, but will remain \$A1 for all columns.
- \$A\$1 will remain \$A\$1 for all columns and rows.

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# Application

- We typed into cell D2 the following  
`=if(b2="NP",1,0)`
- This can be changed to  
`=if(b2=$d$1,1,0)`
- Fill down.
- Now we can change the target behavior just by changing the value in cell D1.
- You will still need to copy the cells, paste special, and sort as was done earlier (starting on slide thirteen).



# A challenge

- Most waveforms can be calculated in this way.
- Calculate the time from the beginning of recording to the first E2 if that E2 was preceded by a G.
- (This is not currently a variable calculated by any of the programs, the point is in the challenge of figuring out how to do this task.)

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# Break it into steps.

- Step 1: find the first G
- Step 2: find if there is an E2 after the first G
- Step 3: calculate the time
- Step 4: clean up the results to be easily managed.

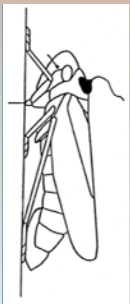
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# Find the first G

- We need an if test to see if we are working with the same insect. If yes, then an if test to see if the current waveform is G.

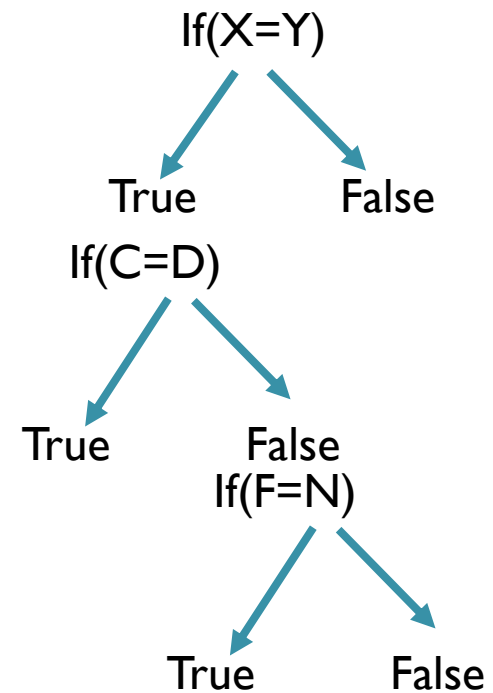
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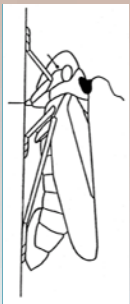


# Nested if

- One can add if statements to build a logical tree.

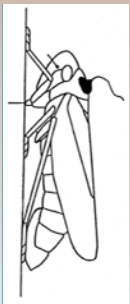


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# Finding G

- The command would be  
$$=if(A1=A2,if(b2="G",1,D1),0)$$
- There is no equal sign for the second if.
- If the first test is false, I start with zero, since the first waveform should not be G.
- If there is a G waveform a one is entered, otherwise the previous value (zero or one) is entered.



## Finding E2

- A very similar strategy is used here, but we make it conditional on the presence of G.
- So in cell E2 we enter

`=if(D2=1,if(B2="E2",1,E1),0)`

Fill down for columns D and E, if you have not done so already



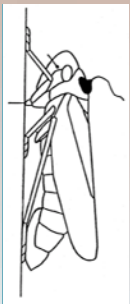
# Time from beginning of recording

- In cell F2 we test if we have a new insect, otherwise we add the current duration to the previous duration.

$$=if(A1=A2,F1+C2,C2)$$

- Fill down

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## Last step

- We only need to find where zero becomes a one for each insect.

`=if(a1=a2,if(e1=0,if(e2=1,F2,""),""),""))`

- Fill down
- Check a few answers to make sure it is correct.
- Use the copy-paste special, sort to get the final result.

a01	37928.23
b03	32297.12
b05	41289.71
b06	67436.64
b07	82772.94



# Quiz

- Figure out why you could not copy and paste my answers into Excel.
- Find the average time to first EI.
- Find the total number of G for each insect
- Find the average duration of NP for each insect.

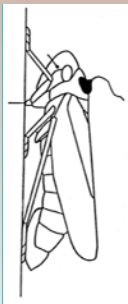
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## Quiz: hints

- Try copying from this PowerPoint file and pasting into Excel. Then manually delete and retype parts of the formula until you find the critical changes.

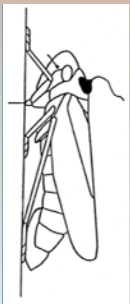
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# Answers

- There are different kinds of quotes. For whatever reason the quotes used by PowerPoint are not the same as those in Excel for the same key on your keyboard.
- Find the average time to first EI.
- Find the total number of G for each insect
- Find the average duration of NP for each insect.

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# A last few shortcuts

- Ctrl-s: save
- Ctrl-p: print
- Ctrl-c: copy
- Ctrl-x: cut
- Ctrl-v: paste
- F4: adds \$. Select a cell reference and hit F4 to change =A1 to =\$A\$1. Hit F4 again to change =\$A\$1 to =A\$1, then to =\$A1 and finally one last time to get back to =A1.

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