Visual Basic Functions for Natural Resource Programming

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Lesson 4

Objective:

In this lesson we will learn:

- Learn to program a Simpson's index of Diversity function.
- Learn some basic syntax.
- Learn to use two loops.
- Learn to run the function we just made.

Please refer to the previous lessons for detail not described here.

Simpson's index of diversity function

Let's calculate a Simpson's index of diversity in the spreadsheet, first we have a column of data:

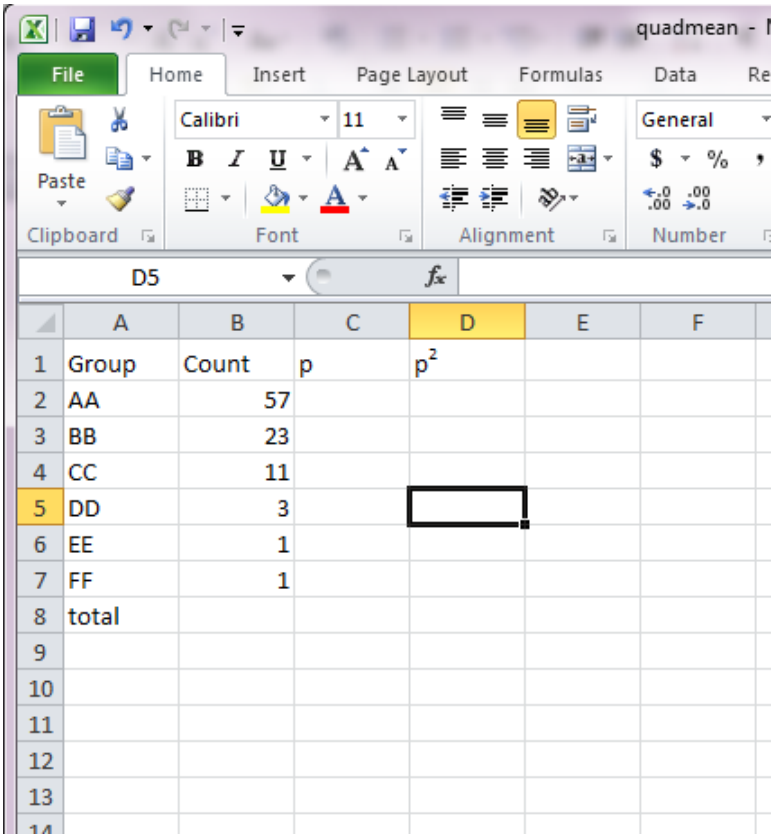


Figure 1, Count data entered in a spreadsheet

Now we sum the count data.

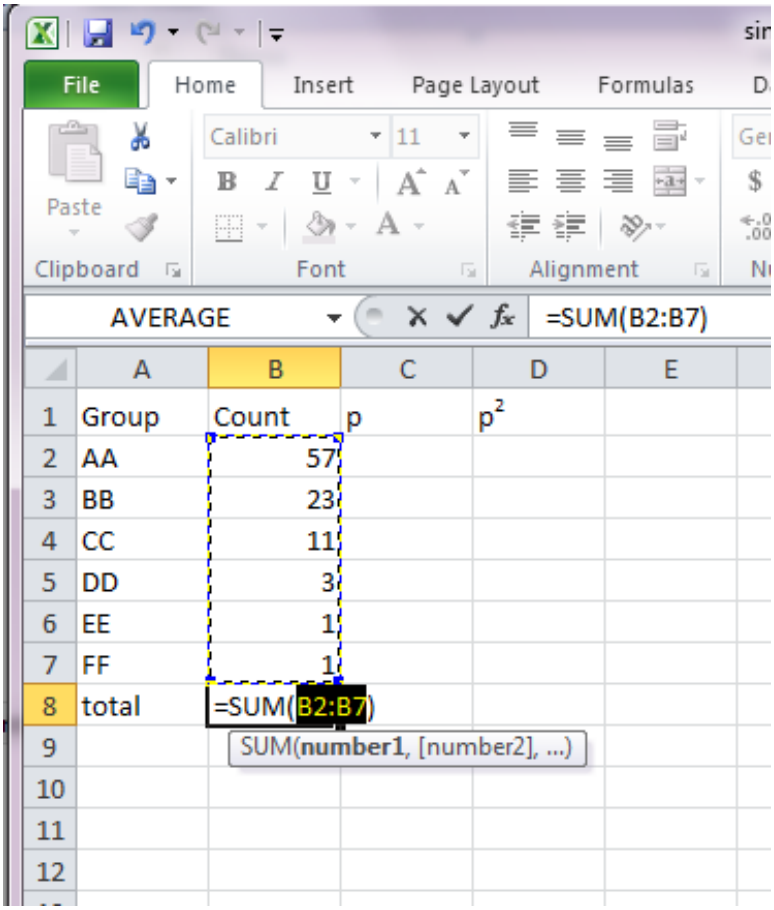


Figure 2. Sum the count data.

Then we calculate the group propositions by dividing each count by the total

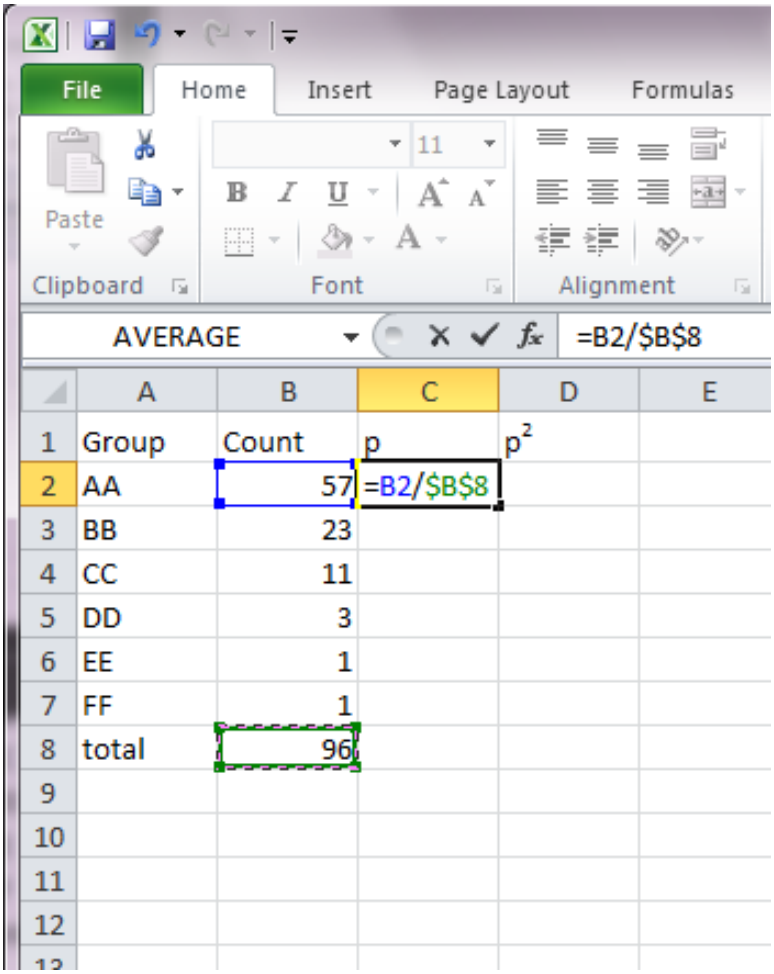


Figure 3. Calculate the proportions for each group.

This is a view of the calculated proportions.

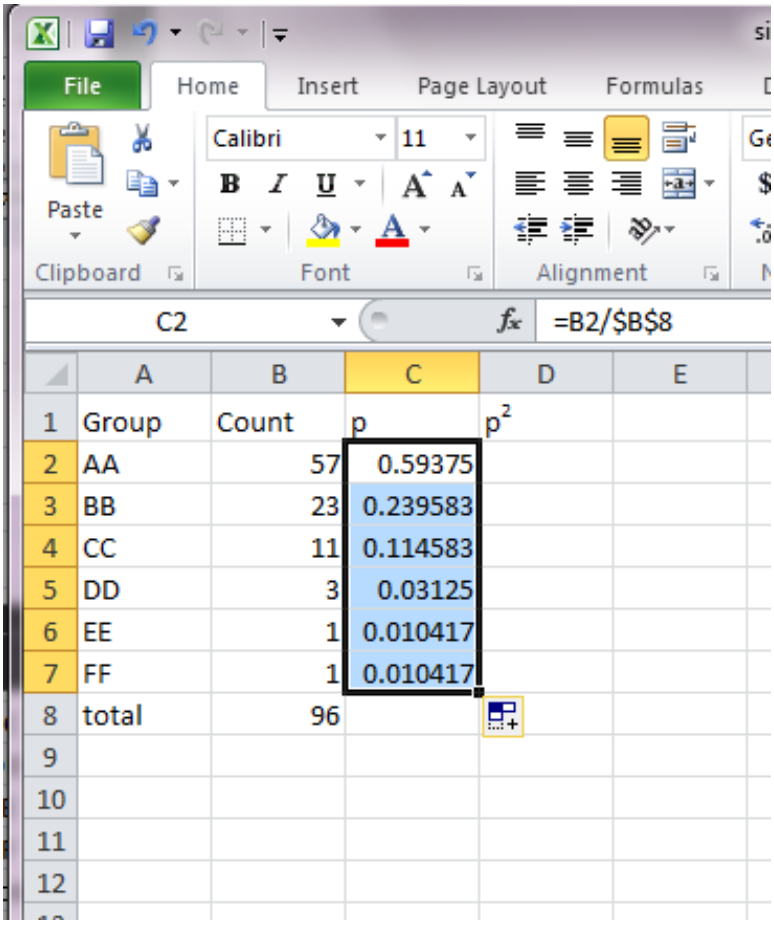


Figure 4. The calculated proportions.

Next we square each proportion.

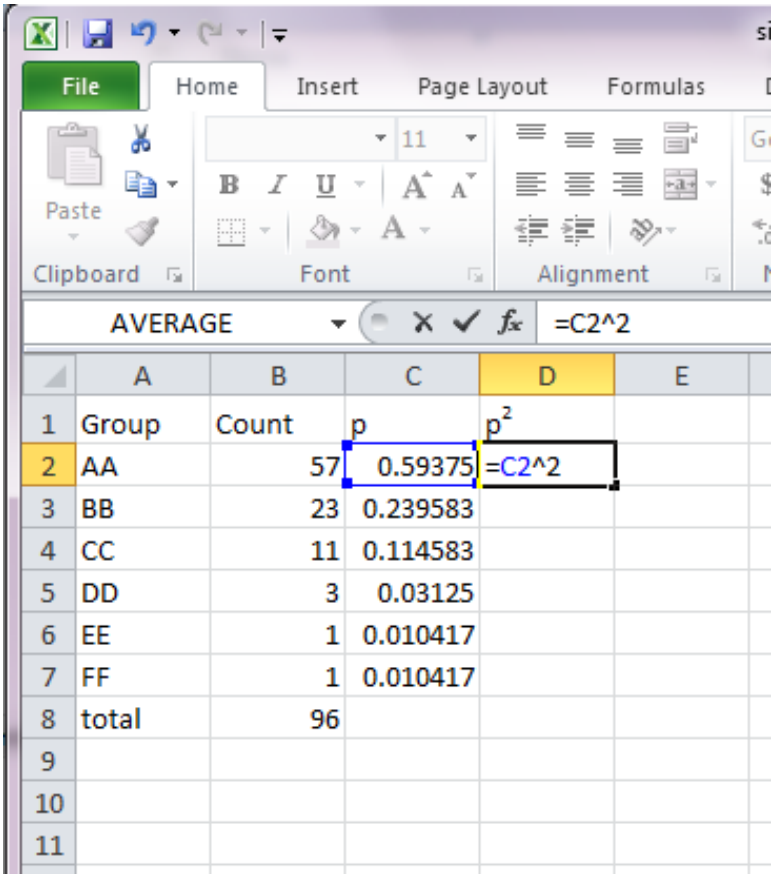


Figure 5. Square each proportion.

And then sum the squared proportions. This number is Simpson's D a measure of similarity.

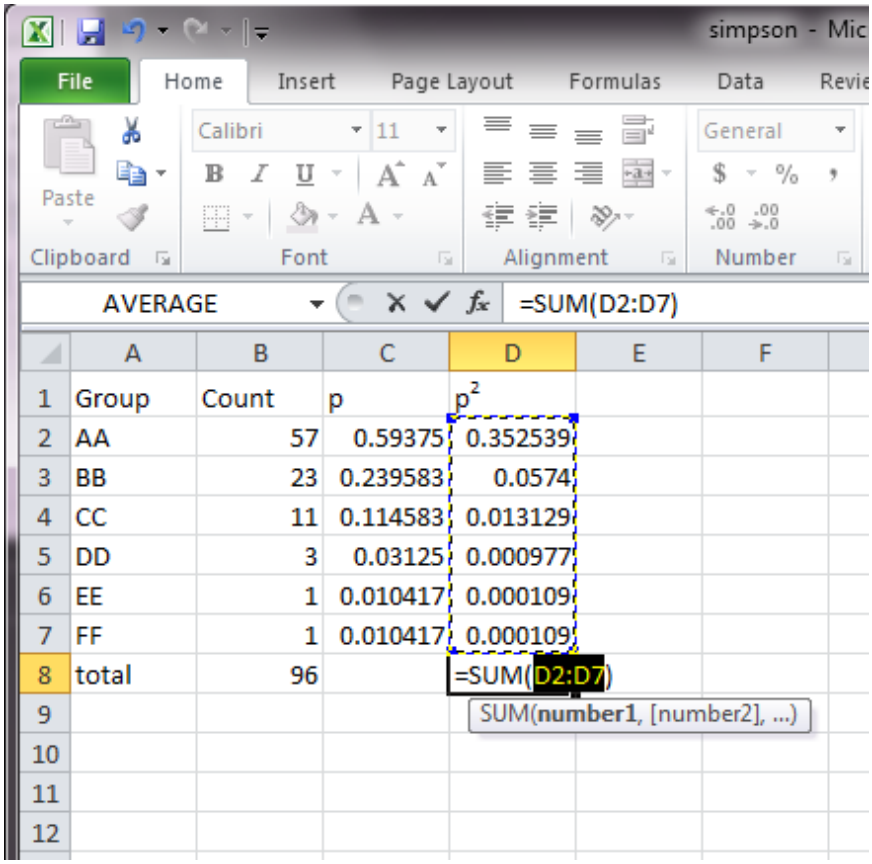
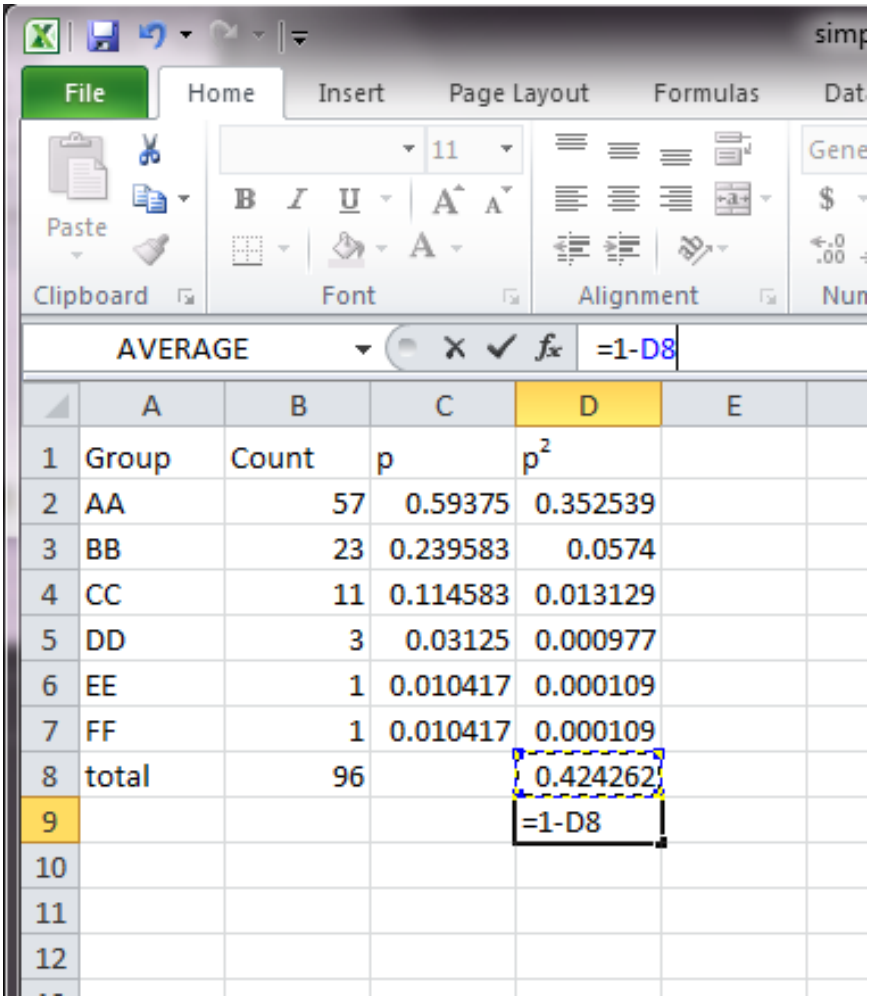


Figure 6. Sum the squared proportions, this is Simpson's D

To get simpson's index of diversity we subtract D from 1.



	A	B	C	D	E
1	Group	Count	p	p^2	
2	AA	57	0.59375	0.352539	
3	BB	23	0.239583	0.0574	
4	CC	11	0.114583	0.013129	
5	DD	3	0.03125	0.000977	
6	EE	1	0.010417	0.000109	
7	FF	1	0.010417	0.000109	
8	total	96		0.424262	
9				=1-D8	
10					
11					
12					

Figure 7. Calculate Simpson's index of Diversity (1-D)

Programming the Function

I start with a mean function from lesson 2.

- Accept a range of numbers as an argument returning a single number. (Note: the input data is count by category)
- Add appropriate comments.

- Determine the sum of the counts
- Divide each input number by the sum of the counts to get a proportion.
- Sum the squared proportions.
- Take the 1 - result.
- Return the answer as a number of type single.

During this these tutorials, I will give you short examples to help you learn the process. I will only give examples on items that are new, please refer to previous lessons of steps already covered.

In a Module window type

```
Function simpsons(data As Range) As Single
```

Please reuse your code from the mean example as the function is very similar.

In this function we need the total of the input counts. To do this we will need 2 For Loops

Initialize a variable sumcount to 0 as in the previous examples
In the first For loop enter:

```
sumcount = sumcount + data.Item(i)
```

then close the loop.

In the second For loop, replace the mean statement with the following statement.

```
prop = data.Item(i) / sumcount
```

this statement says a variable prop equals the number is data item i divided by the total count . Also in the second For loop enter the following command.

```
simpsons = simpsons + (prop * prop)
```

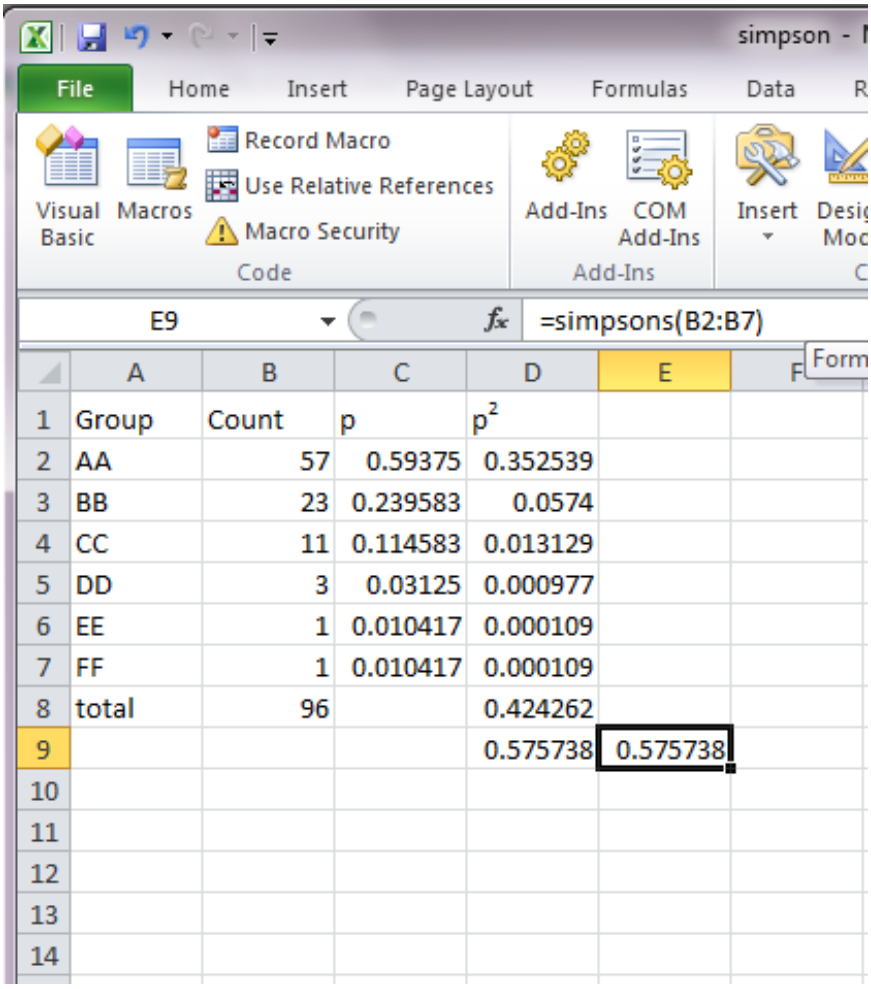
This statement says a variable simpsons equals the old value of simpsons + the prop value squared. At this point the simpsons variable hold the value D (simpsons index) which is an index of similarty. To get Simpson's index of diversity we need to subtract simpsons from 1. Place the following statement outside the second For loop.

```
simpsons =  1 - simpsons
```

this statement says that the new value of simpsons equals 1 - old value of simpsons , just as we did in the spreadsheet.

Now remember that the variable simpsons is returned to the spreadsheet. My actual working code need only 5 line of instructions.

Now we will use the new simpsons function.



	A	B	C	D	E
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5	DD	3	0.03125	0.000977	
6	EE	1	0.010417	0.000109	
7	FF	1	0.010417	0.000109	
8	total	96		0.424262	
9				0.575738	0.575738
10					
11					
12					
13					
14					

Figure 8. Using the Sinpsons function.

In this lesson we have learn:

- Learn to program a Simpson's index of Diversity function.
- Learn some basic syntax.
- Learn to use two loops.
- Learn to run the function we just made.

Please write the simpsons function the works. Copy and paste the VBA commands into a document be sure your name is in the comments and send that to the Blackboard drop box.