Visual Basic Functions for Natural Resource Programming

By David R. Larsen

Lesson 2

Objectives:

In this lesson we will learn:

- Learn to program a basic arithmetic mean function.
- Learn some basic syntax.
- Initialization of variables.
- Looping structures
- Returning values
- Learn to run the function we just made.

Programming lessons

This exercise is provided to programming practice and well as illustrating the procedures used in the programming lessons.

Each lesson will follow these steps:

1. Calculate values in excel spreadsheet.
2. Develop a function based on the spreadsheet.
3. Test to prove that the function is working correctly.

Additionally each lesson will have at least one new concept that will be highlighted.

Mean function

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

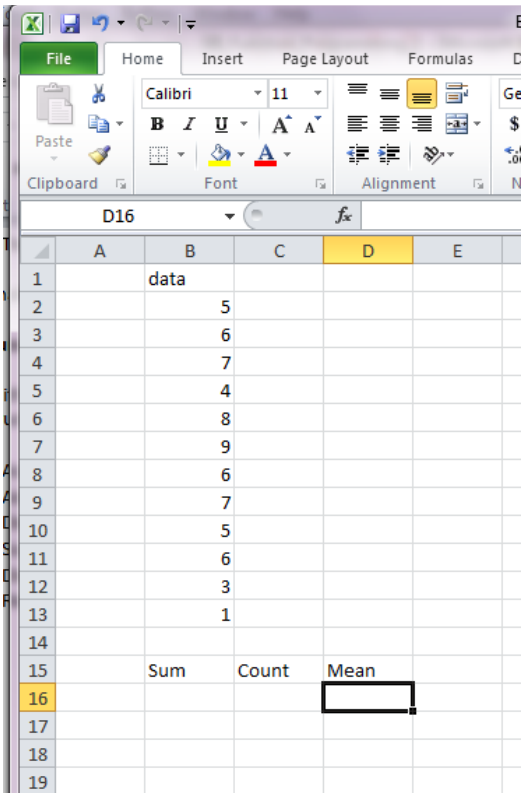

Figure 1. A screenshot of a data set entered into Microsoft Excel.

Then we create a sum of this column under the label sum.

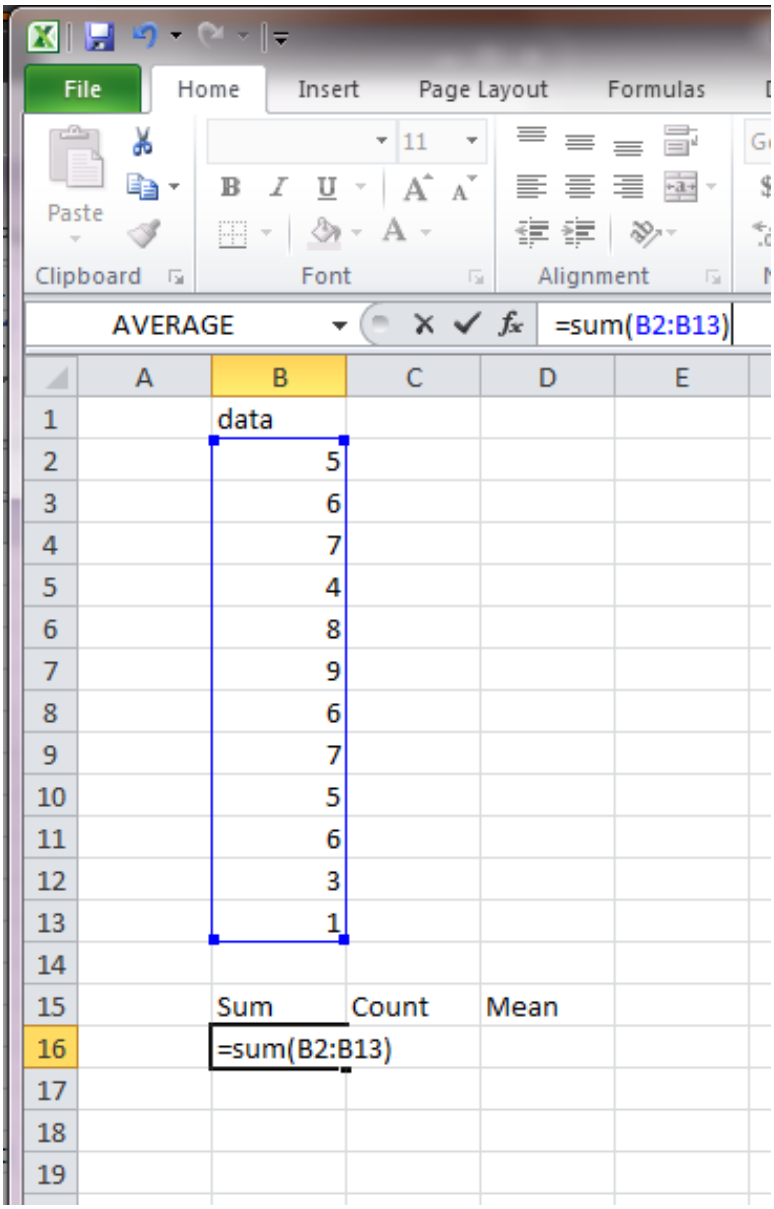

Figure 2. Calculating the sum of the data column.

Then we want to create a count of this column under the label count.

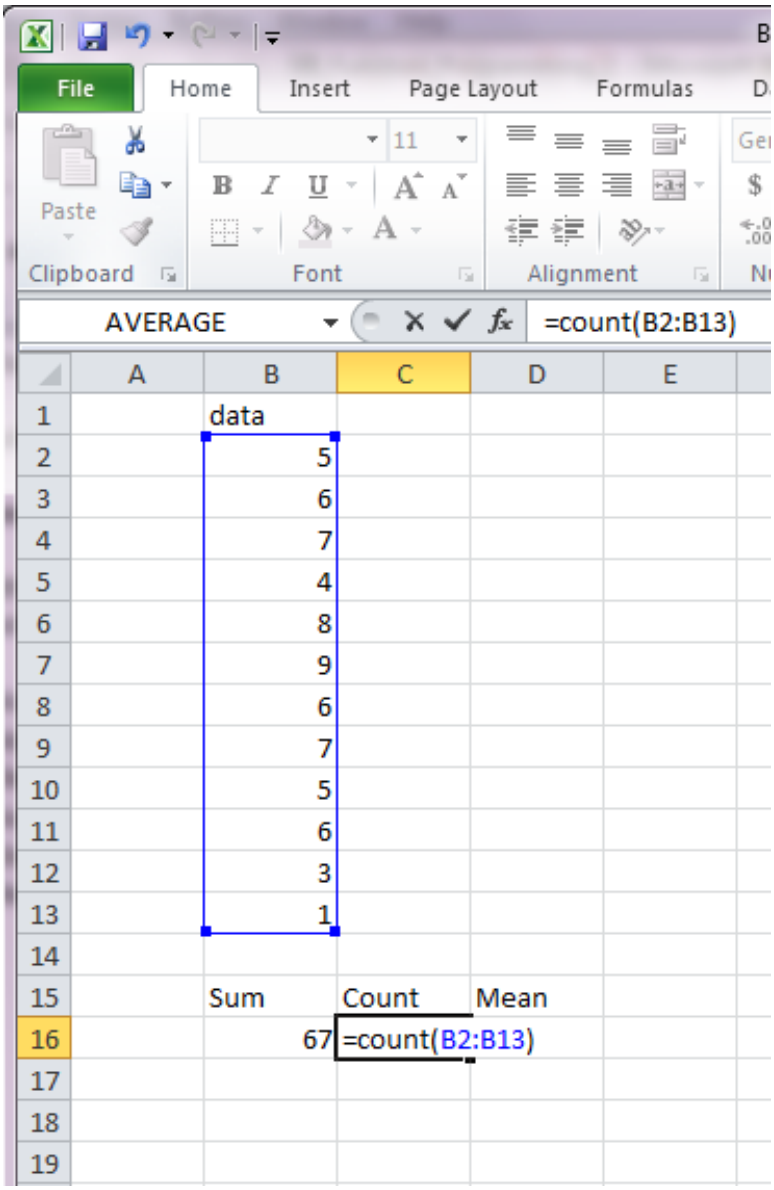

Figure 3. Calculating the count of the data column.

Then we divide the sum by the count.

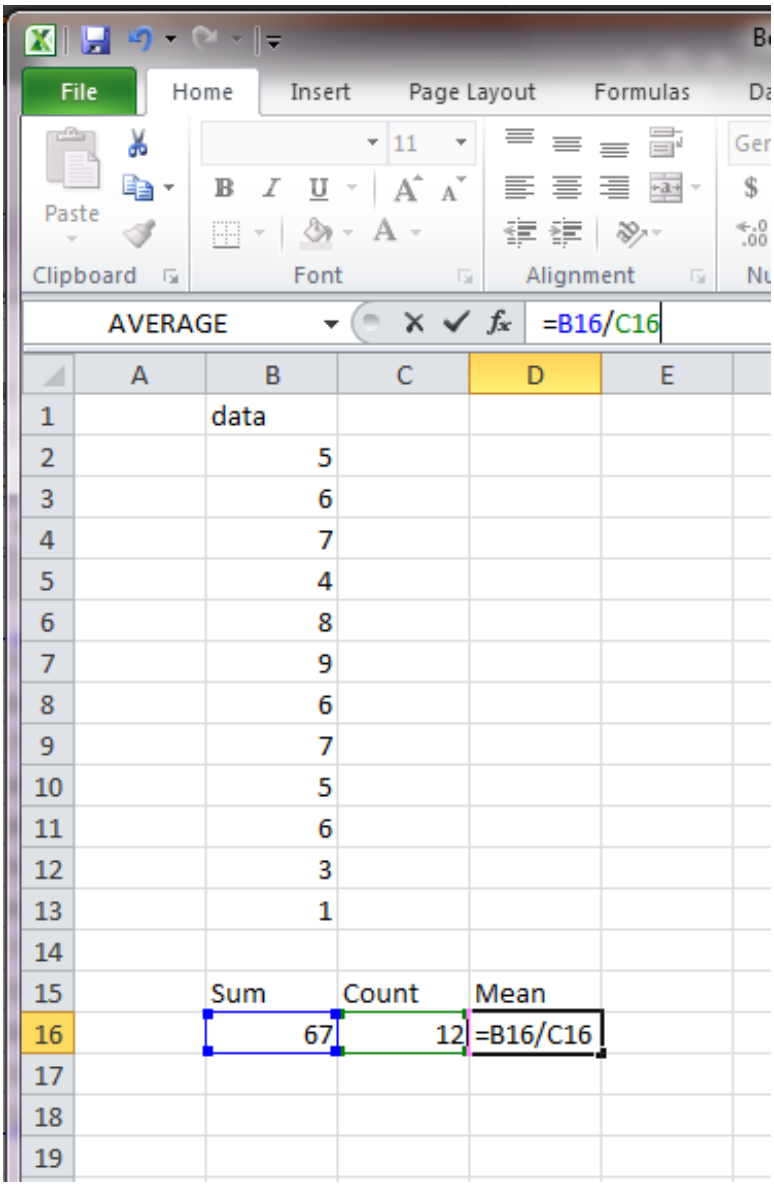

Figure 4. Calculating the sum divided by the count.

Next we use the =AVERAGE() function on the same column of numbers and we see that we get the same value.

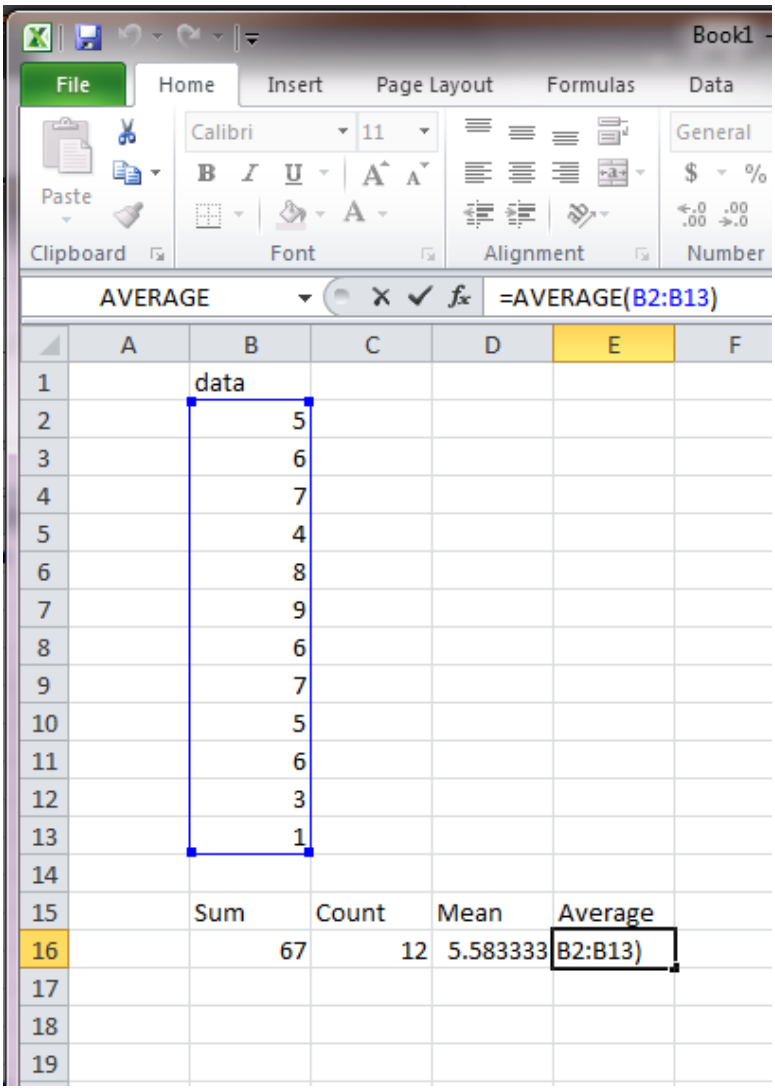

Figure 5. Using the average function to calculate the mean.

Programming the Function

I start with a mean function as most people know the steps of calculating a mean. It also has several basic structures that will be used in other programing projects

- Accept a range of numbers as an argument returning a single number.
- Add appropriate comments.
- Determine the length of the range of numbers.
- Sum the range of number.
- Divide the sum by length.
- 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.

In a Module window type

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

Then enter which will automatically add the

```
End Function
```

Your code steps will go between these two statements. The read the first line states that you are declaring a Function called "mean" that accepts a variable data as a range on numbers, and return a single type number.

In VBA, variable can how the value Integer, String, Single, or Double to name a few, these are called data types.
In VBA , comment start with a single quote ' and continue to the end on the line. When you write a function you should include a short comment about what the piece of code does. I have files that I wrote 20 years ago that I still use. It is very helpful to have these comments to explain what the function is supposed to accomplish. Comments can be inside or outside the function.

```
' Function to calculate an arithmetic mean
' Copyright by David R. Larsen, June 30, 2011
```

Next we are going to use a summing variable, this is a variable that starts at 0 and each value from the range is added into the summing variable. First assign the variable the value 0. Remember that the variable of the same name as the function is the value that is returned a the end of the function.

```
mean = 0#
```

At this point, if you ran the function it would return 0 regardless of the numbers feed into the function.

Next we what to step through the data variable one number at a time. In this case, we do this with a For loop here is an example.

```
For i = 1 To data.Count
```

```
Next
```

This piece of code will assign a number to the variable I starting with 1 and each successive number until you reach the length of data which is determined with data.Count, which counts the items in the variable data. The Next statement denotes the end of the loop. Code statement inside the loop will be executed for each value of i.

Now we will put the summing variable inside the loop using the following command.

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

this statement says assign a new value to the variable mean based on the old value of mean + the value of data at item i, by the time that this loop gets to data.Count the value of mean would equal the sum command in the excel example .

We have one last step.

```
mean = mean / data.Count
```

this statement says that the new value of mean equals the old value of mean divided by data.Count just as we did in the spreadsheet.

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

Now we will use the new mean function.

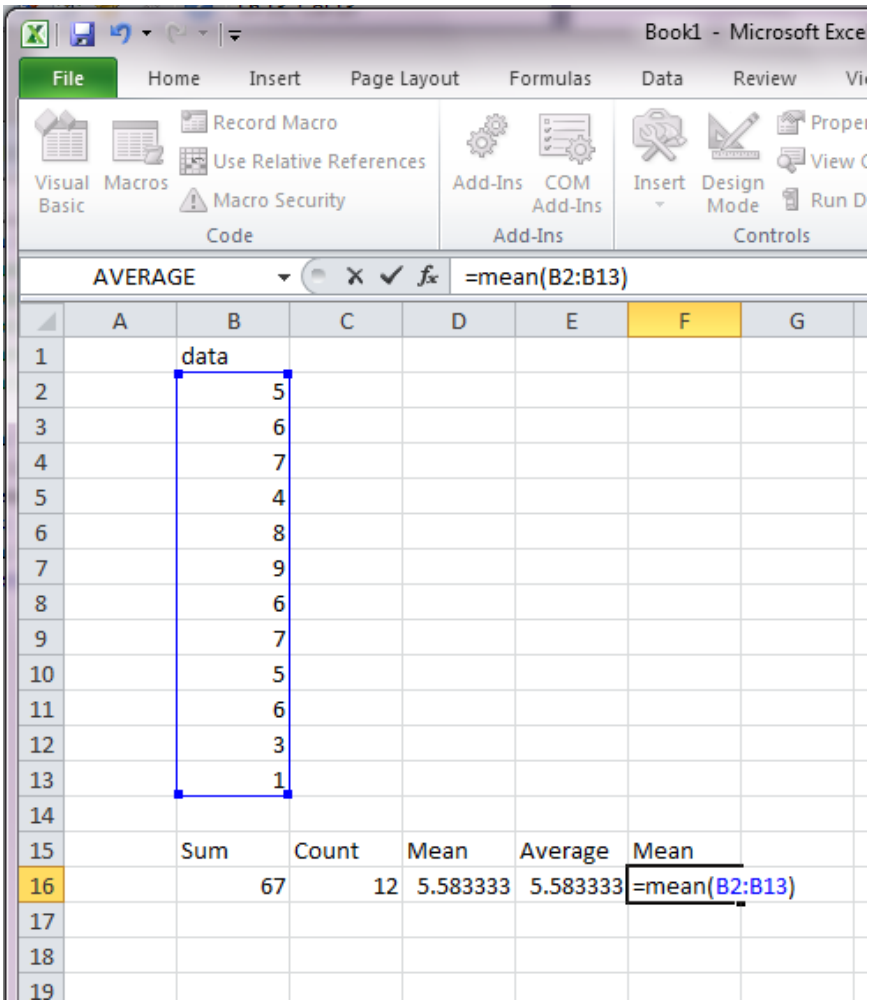

Figure 6. Entering the mean function.

And here is the result of the function.

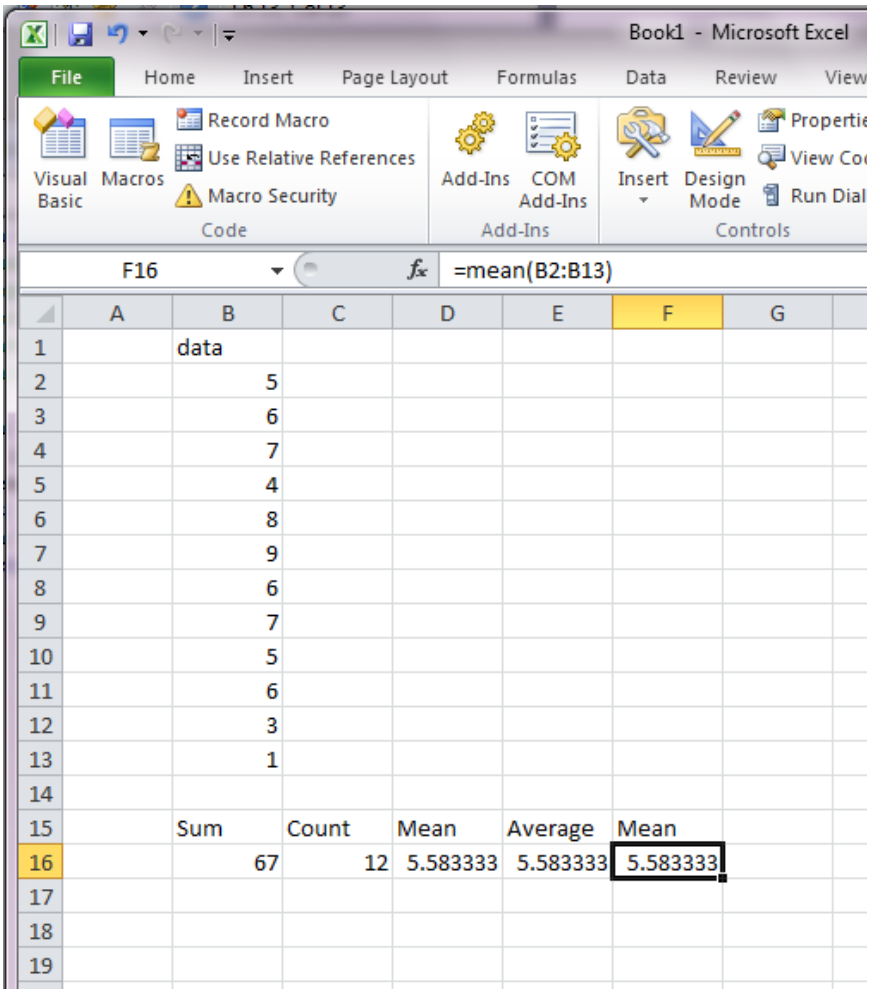

Figure 7. using the mean function we just built.

In this lesson we have learn:

- Learn to program a basic arithmetic mean function.
- Learn some basic syntax.
- Initialization of variables.
- Looping structures
- Returning values
- Learn to run the function we just made.

Please write the mean function the works. Copy and paste the VBA commands into a document and send that to the Blackboard drop box.