Hands-on Activity – VLOOKUP

In one of our online lecture videos, we introduced the function VLOOKUP with a simple example. The formula of the VLOOKUP function is as follows:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

The function can take in values TRUE or FALSE in [range_lookup]. The example in our lecture video used FALSE. You may be wondering about when and how to use the TRUE value. This hands-on activity will explore this option with an example.

About the Dataset

The dataset you will be working on contains information about the scores students received from a course they took in a university. It includes two sheets, Final Grade and Lookup. The student IDs and scores are listed in Final Grade. The file name of this dataset is called ENGG1000 Grade.xlsx.

What you'll do

You will use VLOOKUP to allocate a grade to each student based on the score that they achieved. The grades are A+, A-, B+, B, and so on, and can be found in Lookup.

Before proceeding, make sure you have downloaded and saved the "ENGG1000 Grade.xlsx" file on your computer.

How are the grades allocated?

You should refer to the Lookup sheet in Columns A and B (Grade Table). A student will be allocated:

a) Grade F if they scored **0** – 39 marks.
b) Grade D if they scored **40** – 44 marks.
c) Grade D+ if they scored **45** – 49 marks.
d) Grade C- if they scored **50** – 54 marks.
e) Grade C if they scored **55** – 59 marks.
f) Grade C+ if they scored **60** – 64 marks.
g) Grade B- if they scored **65** – 69 marks.
h) Grade B if they scored **70** – 74 marks.
i) Grade B+ if they scored **75** – 79 marks.
j) Grade A- if they scored **80** – 84 marks.
k) Grade A if they scored **85** – 100 marks.

Activity 1: Assign a Grade to Each Student.

1) First of all, launch the file "ENGG1000 Grade.xlsx" and go to the Final Grade sheet. Type in the following formula in cell C2: =VLOOKUP(B2,

2) Next, go to the Lookup sheet and select cells A2:B12. In the formula bar, you will see that the formula gets updated automatically with =VLOOKUP(B2, Lookup!A2:B12, as shown below:

3) Now, type in a comma (,), followed by 2.

=VLOOKUP(B2,Lookup!A2:B12,2

4) Finally, type in a comma (,), TRUE, and finally a closing bracket. Press Enter to apply the formula.

=VLOOKUP(B2,Lookup!A2:B12,2,TRUE)

5) At this point, you should see that cell C2 has grade A inserted.

6) Edit the formula by inserting the $ signs as follows, and then press Enter.

=VLOOKUP(B2,Lookup!$A$2:$B$12,2,TRUE)

7) Apply this formula to the entire column C by double-clicking on the bottom right of cell C2. You should get the following result:

	A	B	C
1	ID	Total	Grade
2	111090530	95.375	A
3	111090488	94.75	A
4	111090485	94.75	A
5	111050008	94.73	A
6	111090587	94.395	A
7	111090472	94.125	A
8	111090222	94.125	A
9	111010061	93.845	A
10	111090494	93.625	A
11	111090308	93.43	A
12	111090461	93.28	A
13	111040017	92.23	A
14	111090568	92.18	A
15	111090213	91.52	A
16	111090210	91.43	A
17	111090258	91.345	A
18	111010058	91.345	A
19	111090792	91.23	A
20	111040039	91.07	A

Final Grade | Lookup

Here's a detailed explanation of the formula:

- B2 refers to the value that we want to find a match in the Grade Table. In this case, B2 is the scores that the students obtained in the course.
- Lookup!$A$2:$B$12 refers to the Grade Table where we perform the grade lookup on the values of column B (i.e., B2, B3, B4, and so on). In our example, B2 is 95.375. We want to find out what grade this score of 95.375 belongs to by searching in the Grade Table (Columns A and B) in the Lookup sheet.
- The $ signs are meant to "lock" the formula to prevent it from changing when applied to the other cells in column B. Basically, we do not want to change the boundary of the Grade Table.
- The value 2 refers to the values in the Grade Table (Columns A and B) in the Lookup sheet that you would like to return to Column C in Final Grade. In this example, value 2 refers to the content of the **second** column (Column B) of the Grade Table, which contains all the grades.
- TRUE means we are searching for a **range** of numbers in the Grade Table. For example, where does the score 95.375 belongs to in the Grade Table? Well, it falls in the range of 85 – 100, which is grade A. Similarly, there is a student, 111090573, who got 84.98. By referring to the Grade Table, this score falls in the range of 80 – 84, which is grade A-.

Activity 2: Generate Basic Statistics of the Grade

1) In this activity, you will fill in columns E and F in the Lookup sheet. Column E gives the Total number of students for each grade, while Column F is the %.
2) Click on cell E2 and type in this formula: =COUNTIF('Final Grade'!C:C, "A"). Note that you count the number of A grades in column C of the Final Grade sheet.
3) Apply the same formula but change the grade to "A-" in cell E3, grade "B+" in cell E4, and all the way to E12.
4) Sum up the values of column E in cell E13. You should get the following result:

	A	B	C	D	E	F
1	Grade Table			Grade	Total	Percentage
2	0 F			A	145	
3	40 D			A-	155	
4	45 D+			B+	190	
5	50 C-			B	120	
6	55 C			B-	45	
7	60 C+			C+	28	
8	65 B-			C	20	
9	70 B			C-	9	
10	75 B+			D+	9	
11	80 A-			D	6	
12	85 A			F	16	
13				Grand Total	743	
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Final Grade   **Lookup**   (+)

5) Next, you will calculate the percentage of students who obtained grades A, A- and so on in Column F. Go to cell F2 and type in the formula: =E2/$E$13

6) You should get the value 0.1951548. Select this cell -> Home tab -> format this cell as %. Increase the decimal places to 2.
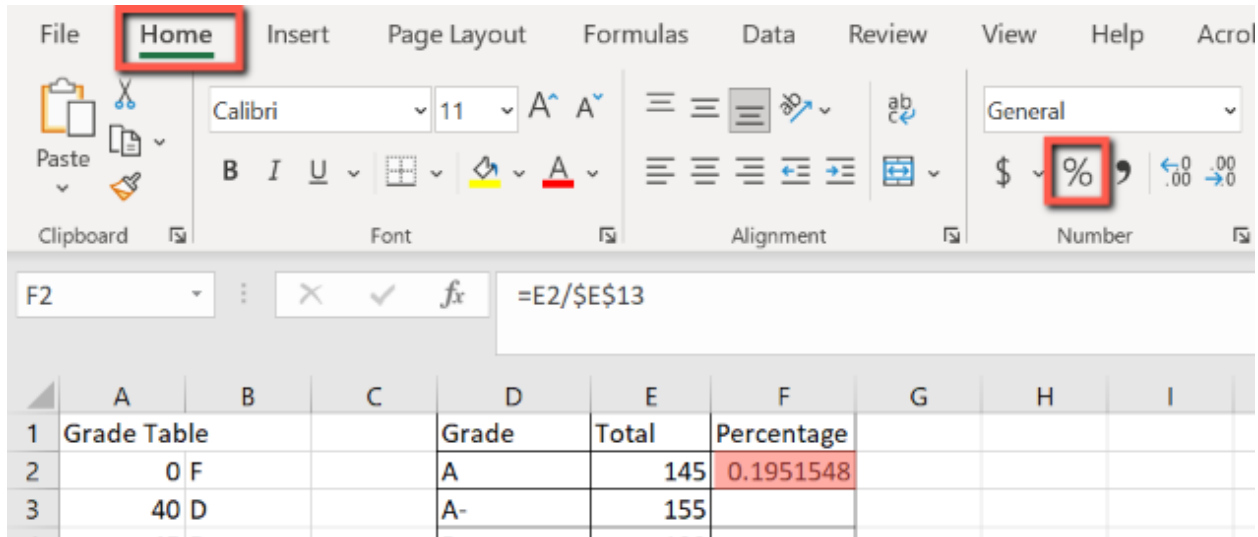
7) Apply the formula in cell F2 to F3:F12 by double-clicking on the bottom right of cell F2. You should get the following result:

Grade	Total	Percentage
A	145	19.52%
A-	155	20.86%
B+	190	25.57%
B	120	16.15%
B-	45	6.06%
C+	28	3.77%
C	20	2.69%
C-	9	1.21%
D+	9	1.21%
D	6	0.81%
F	16	2.15%
Grand Total	743	

Congratulations!

Well done! You have completed this hands-on activity. You may save your file and close it now.