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SCHOOL OF COMPUTING
Faculty of Engineering

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SECJ3133 - HIGH PERFORMANCE DATA PROCESSING

ASSIGNMENT: CASE STUDY 1

REPORT

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SECTION : 01

SUBMISSION DATE : 22/12/2021

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Data Preparation

1. To import the .txt file type data into Microsoft Excel, first choose ‘Data’ tab and click ‘From text/CSV’. Then it will appear as the figure 1 below. The dataset list will show the first 200 rows. Choose ‘Load’ and the data will automatically be arranged with the column header in Dataset1 sheet.

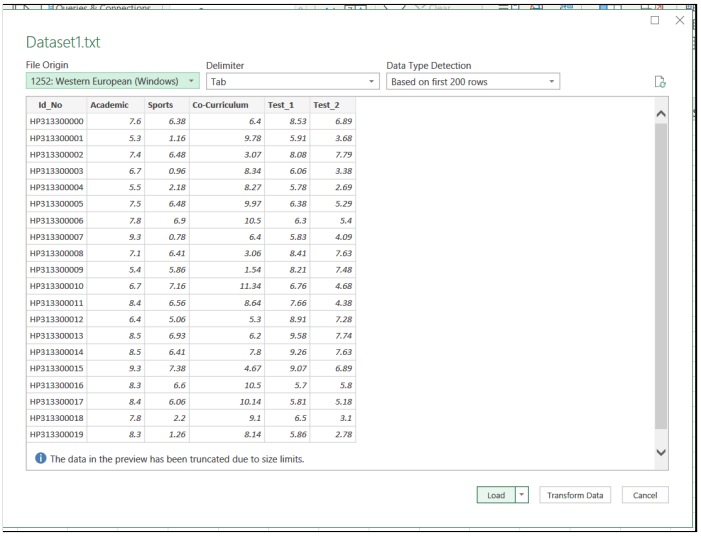


Figure 1: Load .txt data to Excel

	Id_No	Academic	Sports	Co-Curriculum	Test_1	Test_2
2	HP313300000	7.6	6.38	6.4	8.53	6.89
3	HP313300001	5.3	1.16	9.78	5.91	3.68
4	HP313300002	7.4	6.48	3.07	8.08	7.79
5	HP313300003	6.7	0.96	8.34	6.06	3.38
6	HP313300004	5.5	2.18	8.27	5.78	2.69
7	HP313300005	7.5	6.48	9.97	6.38	5.29
8	HP313300006	7.8	6.9	10.5	6.3	5.4
9	HP313300007	9.3	0.78	6.4	5.83	4.09
10	HP313300008	7.1	6.41	3.06	8.41	7.63
11	HP313300009	5.4	5.86	1.54	8.21	7.48
12	HP313300010	6.7	7.16	11.34	6.76	4.68
13	HP313300011	8.4	6.56	8.64	7.66	4.38
14	HP313300012	6.4	5.06	5.3	8.91	7.28
15	HP313300013	8.5	6.93	6.2	9.58	7.74
16	HP313300014	8.5	6.41	7.8	9.26	7.63
17	HP313300015	9.3	7.38	4.67	9.07	6.89
18	HP313300016	8.3	6.6	10.5	5.7	5.8
19	HP313300017	8.4	6.06	10.14	5.81	5.18
20	HP313300018	7.8	2.2	9.1	6.5	3.1
21	HP313300019	8.3	1.26	8.14	5.86	2.78
22	HP313300020	7.8	6.06	9.14	7.56	6.98
23	HP313300021	6.7	2.66	2.74	5.51	8.18
24	HP313300022	7.5	1.16	2.24	5.86	4.08
25	HP313300023	9.9	5.71	7.44	6.41	5.93
26	HP313300024	7.9	1.56	2.04	5.86	3.88

Figure 2: Imported data in Dataset1 sheet

2. Next, the table size should not exceed the data size. In order to cut off the blank row under the table, choose ‘Resize table’ under ‘Table Design’ and fill ‘$A$1:$R$111520’ as our last data row is at row 111520.

3. It will be more synchronized if all numerical data are in 2 decimal places. To format the data, choose cell B2 to F2, Ctrl+Shift+↓, right click -> format cell -> number-> state the decimal place to ‘2’ -> OK.

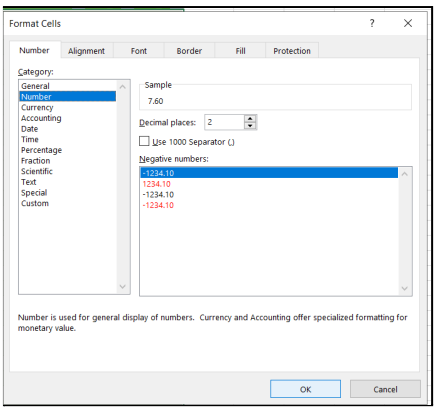


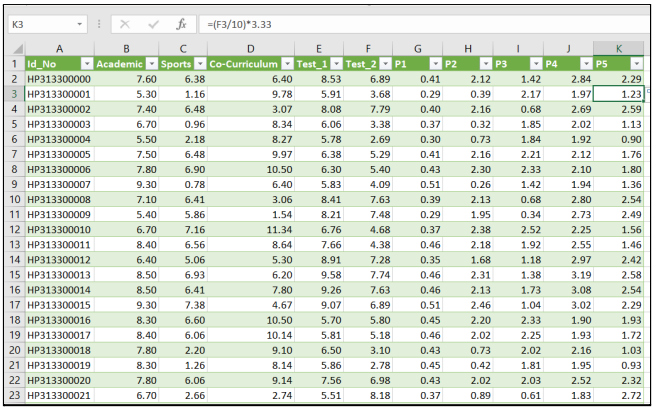
Figure 3: Set data to 2 decimal place

4. Create a new column for each column to standardize the maximum value to 3.33 and name it as below:

   Academic : P1 (column G)
   Sports : P2 (column H)
   Co-Curriculum: P3 (column I)
   Test_1 : P4 (column J)
   Test_2 : P5 (column K)

   We will divide the score by its full mark. The formula for each column are:
   column P1 : '=(B2/61)*3.33'
   column P2 : '=(C2/10)*3.33'
   column P3 : '=(D2/15)*3.33'
   column P4 : '=(E2/10)*3.33'
   column P5 : '=(F2/10)*3.33'

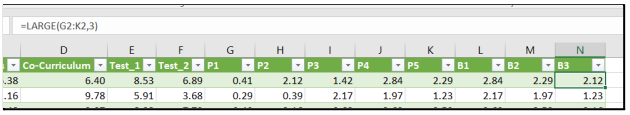
   For each column, click enter as soon after filling the formula and it will apply to the entire column.



	A	B	C	D	E	F	G	H	I	J	K
1	Id_No	Academic	Sports	Co-Curriculum	Test_1	Test_2	P1	P2	P3	P4	P5
2	HP313300000	7.60	6.38	6.40	8.53	6.89	0.41	2.12	1.42	2.84	2.29
3	HP313300001	5.30	1.16	9.78	5.91	3.68	0.29	0.39	2.17	1.97	1.23
4	HP313300002	7.40	6.48	3.07	8.08	7.79	0.40	2.16	0.68	2.69	2.59
5	HP313300003	6.70	0.96	8.34	6.06	3.38	0.37	0.32	1.85	2.02	1.13
6	HP313300004	5.50	2.18	8.27	5.78	2.69	0.30	0.73	1.84	1.92	0.90
7	HP313300005	7.50	6.48	9.97	6.38	5.29	0.41	2.16	2.21	2.12	1.76
8	HP313300006	7.80	6.90	10.50	6.30	5.40	0.43	2.30	2.33	2.10	1.80
9	HP313300007	9.30	0.78	6.40	5.83	4.09	0.51	0.26	1.42	1.94	1.36
10	HP313300008	7.10	6.41	3.06	8.41	7.63	0.39	2.13	0.68	2.80	2.54
11	HP313300009	5.40	5.86	1.54	8.21	7.48	0.29	1.95	0.34	2.73	2.49
12	HP313300010	6.70	7.16	11.34	6.76	4.68	0.37	2.38	2.52	2.25	1.56
13	HP313300011	8.40	6.56	8.64	7.66	4.38	0.46	2.18	1.92	2.55	1.46
14	HP313300012	6.40	5.06	5.30	8.91	7.28	0.35	1.68	1.18	2.97	2.42
15	HP313300013	8.50	6.93	6.20	9.58	7.74	0.46	2.31	1.38	3.19	2.58
16	HP313300014	8.50	6.41	7.80	9.26	7.63	0.46	2.13	1.73	3.08	2.54
17	HP313300015	9.30	7.38	4.67	9.07	6.89	0.51	2.46	1.04	3.02	2.29
18	HP313300016	8.30	6.60	10.50	5.70	5.80	0.45	2.20	2.33	1.90	1.93
19	HP313300017	8.40	6.06	10.14	5.81	5.18	0.46	2.02	2.25	1.93	1.72
20	HP313300018	7.80	2.20	9.10	6.50	3.10	0.43	0.73	2.02	2.16	1.03
21	HP313300019	8.30	1.26	8.14	5.86	2.78	0.45	0.42	1.81	1.95	0.93
22	HP313300020	7.80	6.06	9.14	7.56	6.98	0.43	2.02	2.03	2.52	2.32
23	HP313300021	6.70	2.66	2.74	5.51	8.18	0.37	0.89	0.61	1.83	2.72

Figure 4: Column P1 until P5

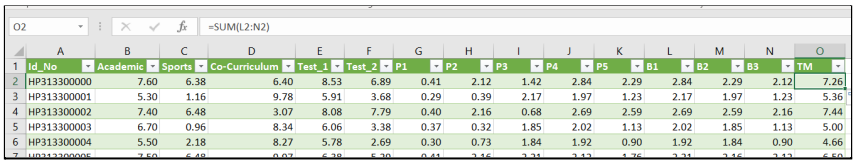
5. After that, column L (B1), M (B2) and N (B3) are required to determine the top 3 biggest values among column P1 until P5. Column L will display the largest value, followed by second highest in M and third highest in N. Insert formula '=MAX(G2:K2)' at cell L2 and click enter. In cell M2, type '=LARGE(G2:K2,2)'. This formula will find the second largest value from G2 to K2 column. Lastly to get the third largest value, enter '=LARGE(G2:K2,3)' in cell N3.



	D	E	F	G	H	I	J	K	L	M	N
	Co-Curriculum	Test_1	Test_2	P1	P2	P3	P4	P5	B1	B2	B3
	.38	6.40	8.53	6.89	0.41	2.12	1.42	2.84	2.29	2.84	2.29	2.12
	.16	9.78	5.91	3.68	0.29	0.39	2.17	1.97	1.23	2.17	1.97	1.23

Figure 5: Column B1 until B3

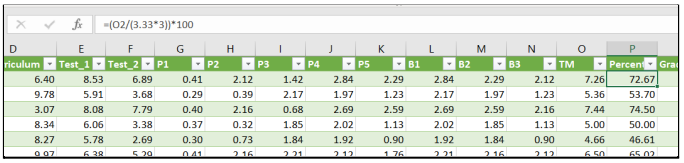
6. Calculate the sum of the top 3 highest values in column O or TM using the formula '=SUM(L2:N2)'.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Id_No	Academic	Sports	Co-Curriculum	Test_1	Test_2	P1	P2	P3	P4	P5	B1	B2	B3	TM
2	HP313300000	7.60	6.38	6.40	8.53	6.89	0.41	2.12	1.42	2.84	2.29	2.84	2.29	2.12	7.26
3	HP313300001	5.30	1.16	9.78	5.91	3.68	0.29	0.39	2.17	1.97	1.23	2.17	1.97	1.23	5.36
4	HP313300002	7.40	6.48	3.07	8.08	7.79	0.40	2.16	0.68	2.69	2.59	2.69	2.59	2.16	7.44
5	HP313300003	6.70	0.96	8.34	6.06	3.38	0.37	0.32	1.85	2.02	1.13	2.02	1.85	1.13	5.00
6	HP313300004	5.50	2.18	8.27	5.78	2.69	0.30	0.73	1.84	1.92	0.90	1.92	1.84	0.90	4.66

Figure 6: Sum of top 3 score in column TM with its formula

7. Add column 'Percentage' after TM to calculate the percentage of the added value in TM. In cell P2, insert formula '=(O2/(3.33*3))*100'.



	D	E	F	G	H	I	J	K	L	M	N	O	P
	riculum	Test_1	Test_2	P1	P2	P3	P4	P5	B1	B2	B3	TM	Percen
		6.40	8.53	6.89	0.41	2.12	1.42	2.84	2.29	2.84	2.29	2.12	7.26	72.67
		9.78	5.91	3.68	0.29	0.39	2.17	1.97	1.23	2.17	1.97	1.23	5.36	53.70
		3.07	8.08	7.79	0.40	2.16	0.68	2.69	2.59	2.69	2.59	2.16	7.44	74.50
		8.34	6.06	3.38	0.37	0.32	1.85	2.02	1.13	2.02	1.85	1.13	5.00	50.00
		8.27	5.78	2.69	0.30	0.73	1.84	1.92	0.90	1.92	1.84	0.90	4.66	46.61

Figure 7: Percentage of total score

8. Name the header in column Q as ‘Grade’. It will store the grade obtained by each row. Use IFS formula to write multiple conditions as the grade has 13 different ranges. Choose cell Q2, click ‘fx’ at the left of the formula bar and pick ‘IFS’. Fill the condition statement as figure 8 below or just type

‘=IFS(AND(P2 >= 90, P2 <=100),"A+",AND(P2 >= 80, P2 < 90),"A",AND(P2 >= 75, P2 < 80),"A-",AND(P2 >= 70, P2 < 75),"B+",AND(P2 >= 65, P2 < 70),"B",AND(P2 >= 60, P2 < 65),"B-",AND(P2 >= 55, P2 < 60),"C+",AND(P2 >= 50, P2 < 55),"C",AND(P2 >= 45, P2 < 50),"C-",AND(P2 >= 40, P2 < 45),"D+",AND(P2 >= 35, P2 < 40),"D",AND(P2 >= 30, P2 < 35),"D-",AND(P2 >= 0, P2 < 30),"E")’

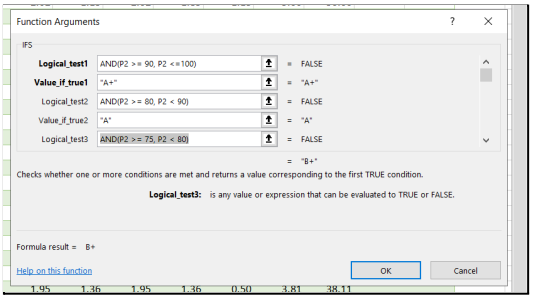
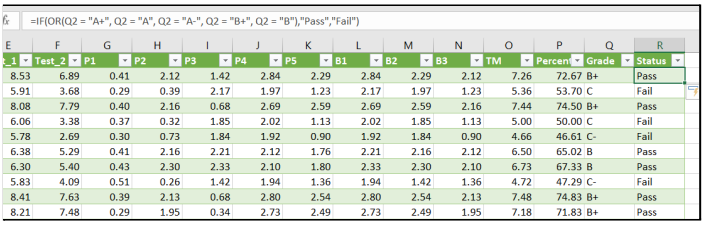


Figure 8: IFS statement to classify grade

9. Add column R as ‘Status’ to decide whether the grade is ‘Pass’ or ‘Fail’. For score in column Percentage that is equal or bigger than 65, Status will show ‘Pass’ and for score under 65 is ‘Fail’. In cell R2, insert the formula ‘=IF(OR(Q2 = "A+", Q2 = "A", Q2 = "A-", Q2 = "B+", Q2 = "B"),"Pass","Fail")’. Double click at the bottom right of R2 cell to apply the formula to the whole column.



E	F	G	H	I	J	K	L	M	N	O	P	Q	R
_1	Test_2	P1	P2	P3	P4	P5	B1	B2	B3	TM	Percen	Grade	Status
8.53	6.89	0.41	2.12	1.42	2.84	2.29	2.84	2.29	2.12	7.26	72.67	B+	Pass
5.91	3.68	0.29	0.39	2.17	1.97	1.23	2.17	1.97	1.23	5.36	53.70	C	Fail
8.08	7.79	0.40	2.16	0.68	2.69	2.59	2.69	2.59	2.16	7.44	74.50	B+	Pass
6.06	3.38	0.37	0.32	1.85	2.02	1.13	2.02	1.85	1.13	5.00	50.00	C	Fail
5.78	2.69	0.30	0.73	1.84	1.92	0.90	1.92	1.84	0.90	4.66	46.61	C-	Fail
6.38	5.29	0.41	2.16	2.21	2.12	1.76	2.21	2.16	2.12	6.50	65.02	B	Pass
6.30	5.40	0.43	2.30	2.33	2.10	1.80	2.33	2.30	2.10	6.73	67.33	B	Pass
5.83	4.09	0.51	0.26	1.42	1.94	1.36	1.94	1.42	1.36	4.72	47.29	C-	Fail
8.41	7.63	0.39	2.13	0.68	2.80	2.54	2.80	2.54	2.13	7.48	74.83	B+	Pass
8.21	7.48	0.29	1.95	0.34	2.73	2.49	2.73	2.49	1.95	7.18	71.83	B+	Pass

Figure 9: Pass and Fail status

10. For every row that has ‘Pass’ status, fill its Percent column with green colour and the entire row with light red. First choose cell P2 and Ctrl+Shift+↓ to choose the entire percent column. At Home tab, go to Conditional Formatting -> Highlight cell rules -> More rules.

11. Then, select Rule Type ‘Format only cell that contain’. Edit the Rule Description same as Figure 10. To pick the green colour, click ‘Format..’ -> Fill and choose green. Click OK.

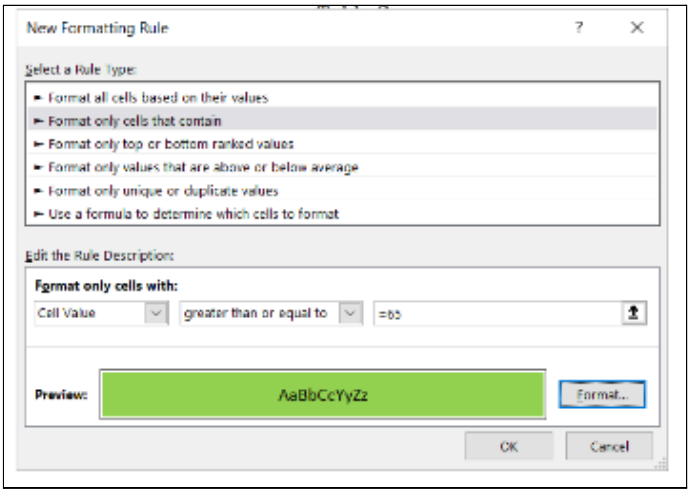


Figure 10: Green cell formatting for column Percent

12. The other way to do conditional formatting is choose the whole cell E2 until O2 then choose ‘Manage rules’ from ‘Conditional Formatting’. Add New Rule -> Use a formula to determine which cell to format -> Fill formula with ‘=$R2=’Pass’’. Pick light red colour at ‘Format..’ -> fill and click OK. Do the same for column Q and R with the exact formula. Colour the text in column B1 to B3 with red colour.

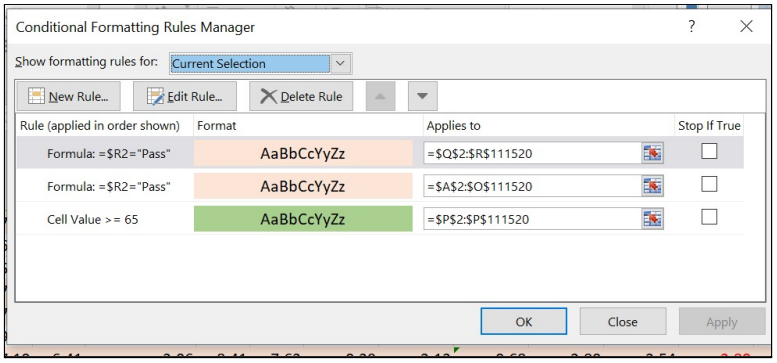


Figure 11: Cell formatting for column E to O and Q to R

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Test_1	Test_2	P1	P2	P3	P4	P5	B1	B2	B3	TM	Percent	Grade	Status
2	8.53	6.89	0.41	2.12	1.42	2.84	2.29	2.84	2.29	2.12	7.26	72.67	B+	Pass
3	5.91	3.68	0.29	0.39	2.17	1.97	1.23	2.17	1.97	1.23	5.36	53.70	C	Fail
4	8.08	7.79	0.40	2.16	0.68	2.69	2.59	2.69	2.59	2.16	7.44	74.50	B+	Pass
5	6.06	3.38	0.37	0.32	1.85	2.02	1.13	2.02	1.85	1.13	5.00	50.00	C	Fail
6	5.78	2.69	0.30	0.73	1.84	1.92	0.90	1.92	1.84	0.90	4.66	46.61	C-	Fail
7	6.38	5.29	0.41	2.16	2.21	2.12	1.76	2.21	2.16	2.12	6.50	65.02	B	Pass
8	6.30	5.40	0.43	2.30	2.33	2.10	1.80	2.33	2.30	2.10	6.73	67.33	B	Pass
9	5.83	4.09	0.51	0.26	1.42	1.94	1.36	1.94	1.42	1.36	4.72	47.29	C-	Fail
10	8.41	7.63	0.39	2.13	0.68	2.80	2.54	2.80	2.54	2.13	7.48	74.83	B+	Pass
11	8.21	7.48	0.29	1.95	0.34	2.73	2.49	2.73	2.49	1.95	7.18	71.83	B+	Pass
12	6.76	4.68	0.37	2.38	2.52	2.25	1.56	2.52	2.38	2.25	7.15	71.60	B+	Pass
13	7.66	4.38	0.46	2.18	1.92	2.55	1.46	2.55	2.18	1.92	6.65	66.60	B	Pass
14	8.91	7.28	0.35	1.68	1.18	2.97	2.42	2.97	2.42	1.68	7.08	70.83	B+	Pass
15	9.58	7.74	0.46	2.31	1.38	3.19	2.58	3.19	2.58	2.31	8.08	80.83	A	Pass
16	9.26	7.63	0.46	2.13	1.73	3.08	2.54	3.08	2.54	2.13	7.76	77.67	A-	Pass
17	9.07	6.89	0.51	2.46	1.04	3.02	2.29	3.02	2.46	2.29	7.77	77.80	A-	Pass
18	5.70	5.80	0.45	2.20	2.33	1.90	1.93	2.33	2.20	1.93	6.46	64.67	B-	Fail
19	5.81	5.18	0.46	2.02	2.25	1.93	1.72	2.25	2.02	1.93	6.20	62.10	B-	Fail
20	6.50	3.10	0.43	0.73	2.02	2.16	1.03	2.16	2.02	1.03	5.22	52.22	C	Fail
21	5.86	2.78	0.45	0.42	1.81	1.95	0.93	1.95	1.81	0.93	4.68	46.89	C-	Fail
22	7.56	6.98	0.43	2.02	2.03	2.52	2.32	2.52	2.32	2.03	6.87	68.78	B	Pass
23	5.51	8.18	0.37	0.89	0.61	1.83	2.72	2.72	1.83	0.89	5.44	54.50	C	Fail
24	5.86	4.08	0.41	0.39	0.50	1.95	1.36	1.95	1.36	0.50	3.81	38.11	D	Fail
25	6.41	5.93	0.54	1.90	1.65	2.13	1.97	2.13	1.97	1.90	6.01	60.17	B-	Fail
26	5.86	3.88	0.43	0.52	0.45	1.95	1.29	1.95	1.29	0.52	3.76	37.67	D	Fail
27	8.46	6.88	0.29	2.28	0.76	2.82	2.29	2.82	2.29	2.28	7.39	74.00	B+	Pass
28	6.96	5.18	0.49	2.28	2.65	2.32	1.72	2.65	2.32	2.28	7.25	72.60	B+	Pass
29	6.66	7.58	0.38	2.08	2.07	2.22	2.52	2.52	2.22	2.08	6.83	68.33	B	Pass

Figure 12: Final visual of sheet Dataset1 before create the dashboard

Creating Dashboard

1. Create a new blank sheet in the same workbook and rename it as Dashboard.

Figure 13: Dashboard sheet

2. Plan the layout for the dashboard. Start by merging cells to create a few different big single cells where the reference data will be displayed. Leave at least a row above every merged cell for labelling.

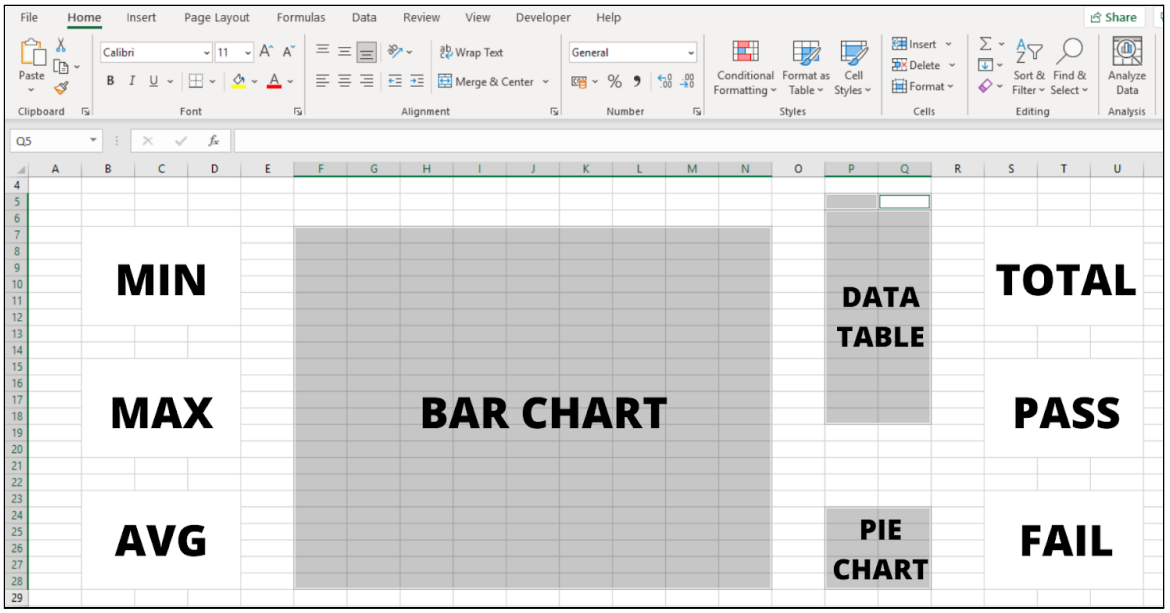


Figure 14: Dashboard layout

3. All the referencing data above will involve the "Percent" column in the dataset. First, find the minimum percentage from all the dataset. To do that, highlight the cell dedicated for min value, type in the formula by using the MIN() function in excel by referencing the whole column for percentage.

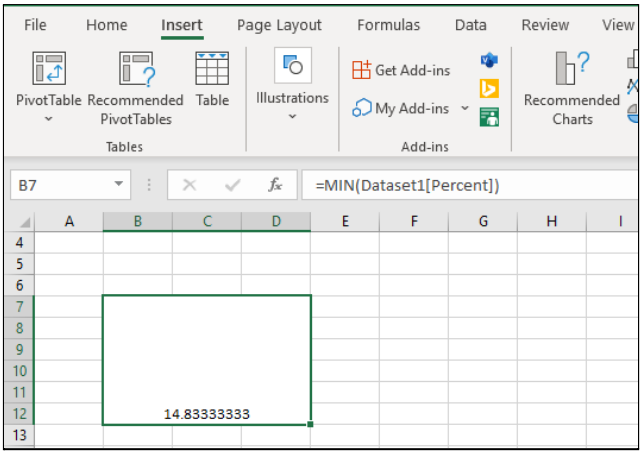


Figure 15: Min cell

4. Next, do the same for maximum (Max) value in its cell by using a different function which is the MAX() function. The maximum value or the highest value exists in the "Percent" column will be displayed in the cell.

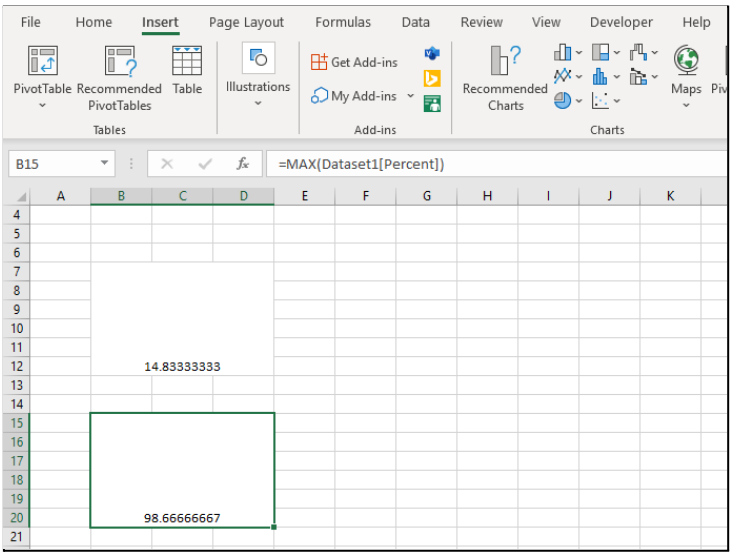


Figure 16: Max cell

5. To find the Average (Avg) value for all the values in the "Percent" column, use the AVERAGE() function in Excel. This function will automatically calculate the average for percent dataset.

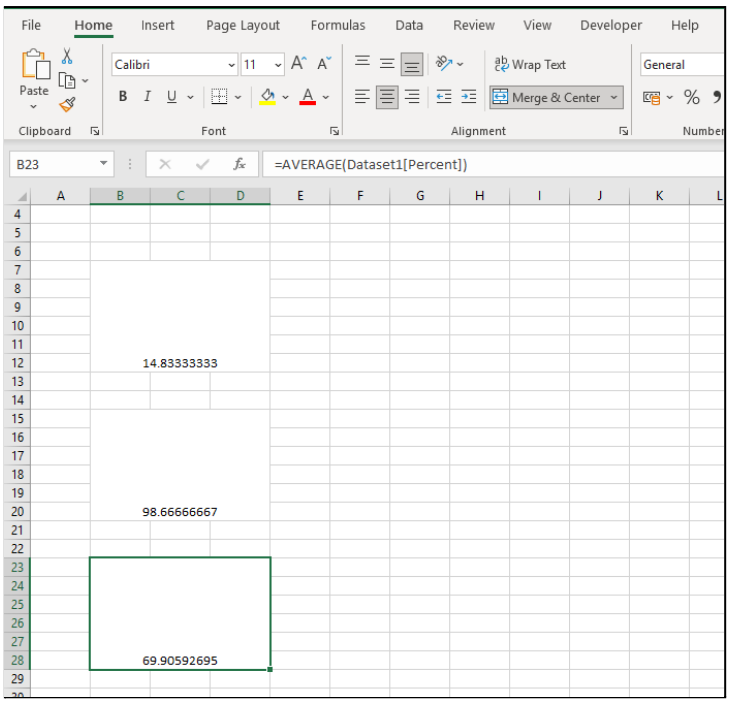


Figure 17: Average cell

6. Next, calculate the number of records in the TOTAL cell by counting the number of rows that exist in the dataset. To do this, use the ROWS() function and use the column Id_No as the parameter for the function. This is because the column indicates the unique student id involved in the dataset.

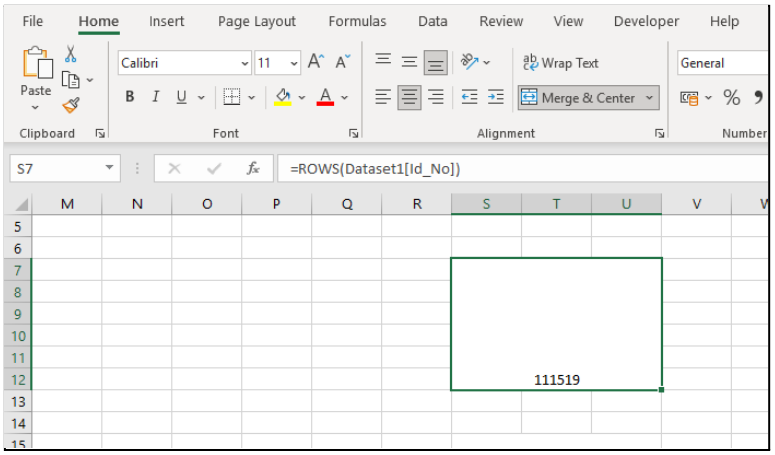


Figure 18: Total record

7. For the PASS cell, it is used to display the percentage of students that passed the course. This can be done by using the formula by counting the number of students who passed the course and dividing them with the total number of students. In this context, use the COUNTIF() function to calculate the number of students that passed.

This function accepts two parameters which are the cell range and the criteria. Change the format of this cell into a percentage format with two decimal places.

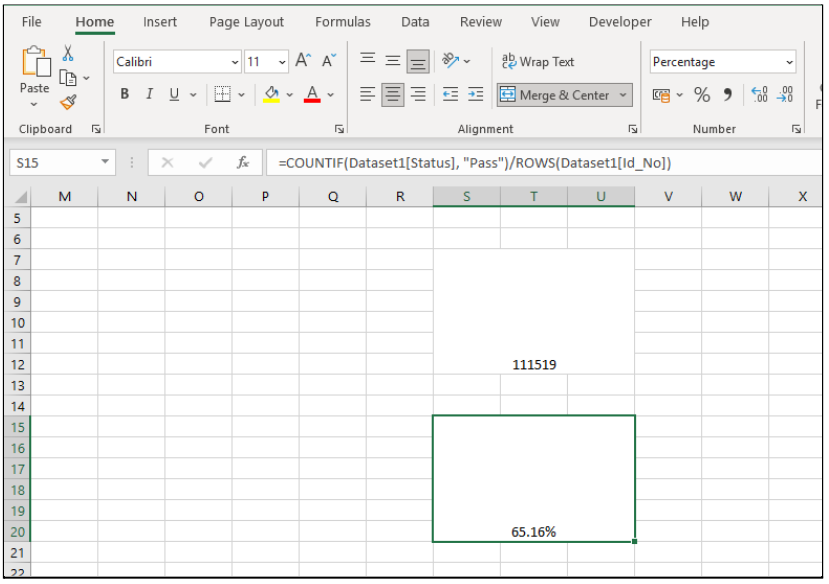


Figure 19: Percentage of Pass

8. Do the same thing for the FAIL cell but change the criteria for COUNTIF() function to “Fail”.

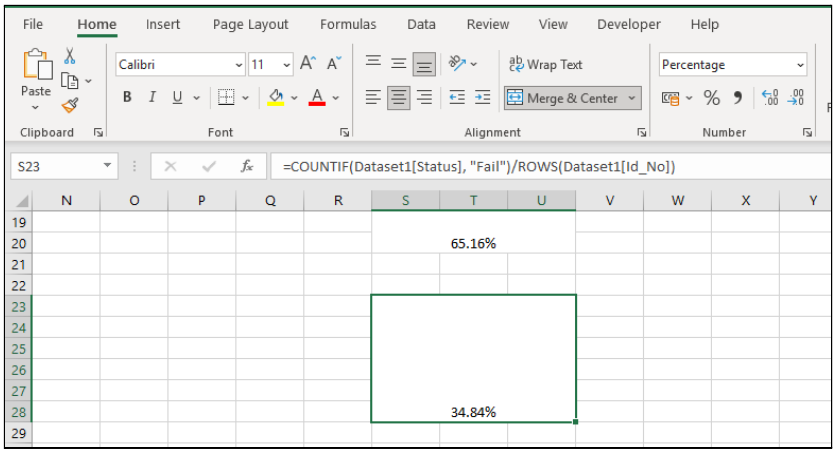


Figure 20: Percentage of Fail

9. In order to create a bar chart, we must first create a pivot table that contains the elements or the axis of the bar chart. To create a pivot table, highlight the whole table in the dataset and click on the Insert tab at the menu bar. In this tab, click on the PivotTable button to create a pivot table. An Excel wizard will appear on top of the screen.

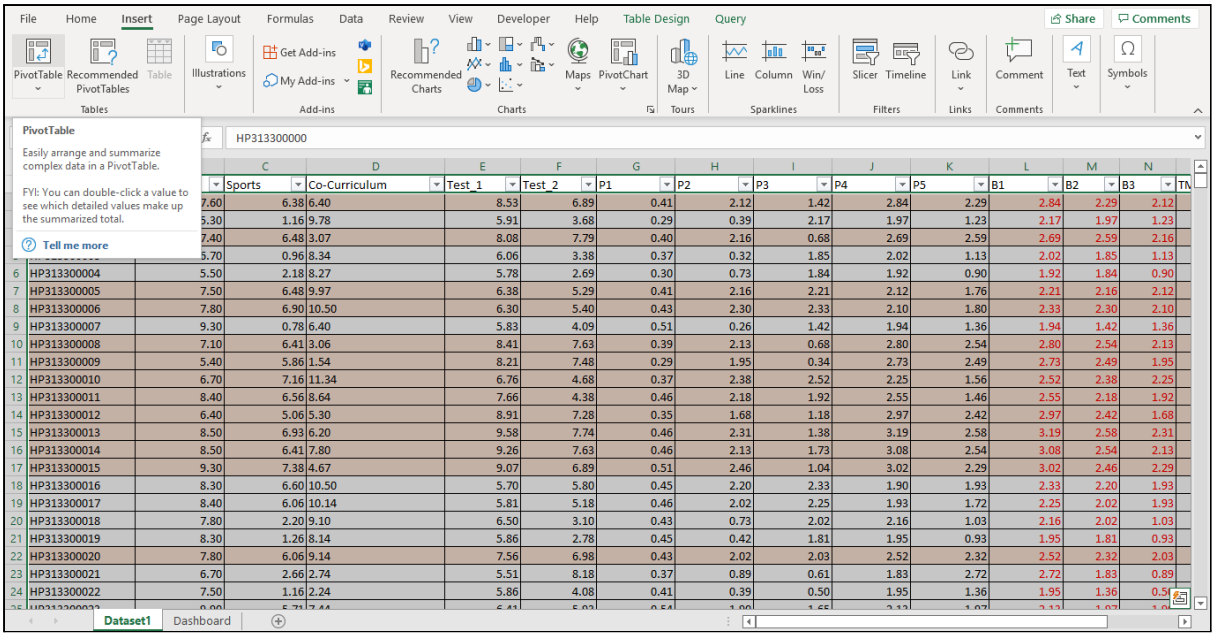


Figure 21: Selected data for Pivot Table creation

10. Since the table is already highlighted, the first field in the wizard will show the name of the sheet. On the other hand, tick the first option which is the new worksheet as the place to put the PivotTable. Upon clicking the OK button, a new sheet will appear. Rename it as “Barchart Pivot” for easier use in the future.

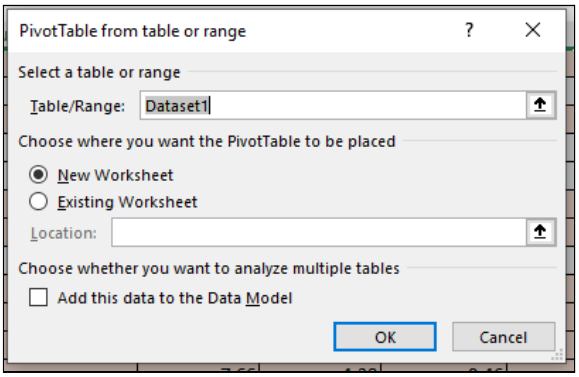


Figure 22: Choosing Pivot Table location

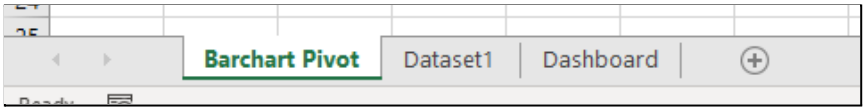
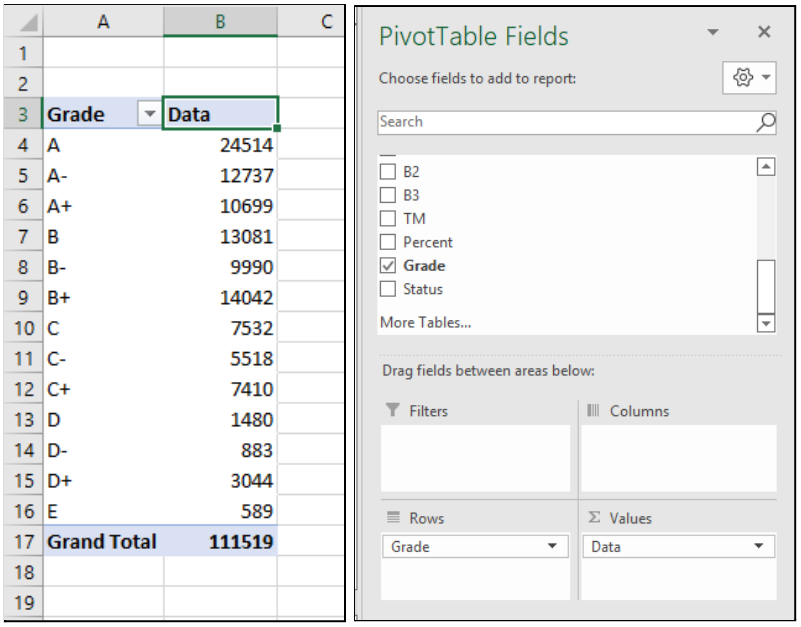


Figure 23: Barchart Pivot sheet

11. In the new sheet, there is a tab for the PivotTable fields. This field is used to generate the table. Simply drag the Grade field into the Rows and Values section. A table will be generated automatically in this sheet.



	A	B	C
1			
2			
3	**Grade**	**Data**	
4	A	24514	
5	A-	12737	
6	A+	10699	
7	B	13081	
8	B-	9990	
9	B+	14042	
10	C	7532	
11	C-	5518	
12	C+	7410	
13	D	1480	
14	D-	883	
15	D+	3044	
16	E	589	
17	**Grand Total**	**111519**	
18			
19			

Figure 24: Creating desired table for the bar chart

12. Note that the arrangement of the grade is sorted in an alphabetical order. Therefore, the grade A is put at the top instead of the grade A+. This will affect the formation of the barchart. To sort this, make sure the sort option is set to manual so that these rows can be sorted easily by dragging them. Sort the rows to an appropriate order based on how the barchart is needed to be formed.

	A	B	C
1			
2			
3	**Grade**	**Data**	
4	A+	10699	
5	A	24514	
6	A-	12737	
7	B+	14042	
8	B	13081	
9	B-	9990	
10	C+	7410	
11	C	7532	
12	C-	5518	
13	D+	3044	
14	D	1480	
15	D-	883	
16	E	589	
17	**Grand Total**	**111519**	
18			
19			

Figure 25: Sorted grade

13. To generate a new bar chart, highlight one of the cells in the PivotTable and click the insert tab. Click on the bar chart menu and find the clustered column button. A Bar Chart will be generated based on the PivotTable automatically. Choose the preferred colours and design for the barchart. Set the y-axis format of the chart to a Thousands unit.

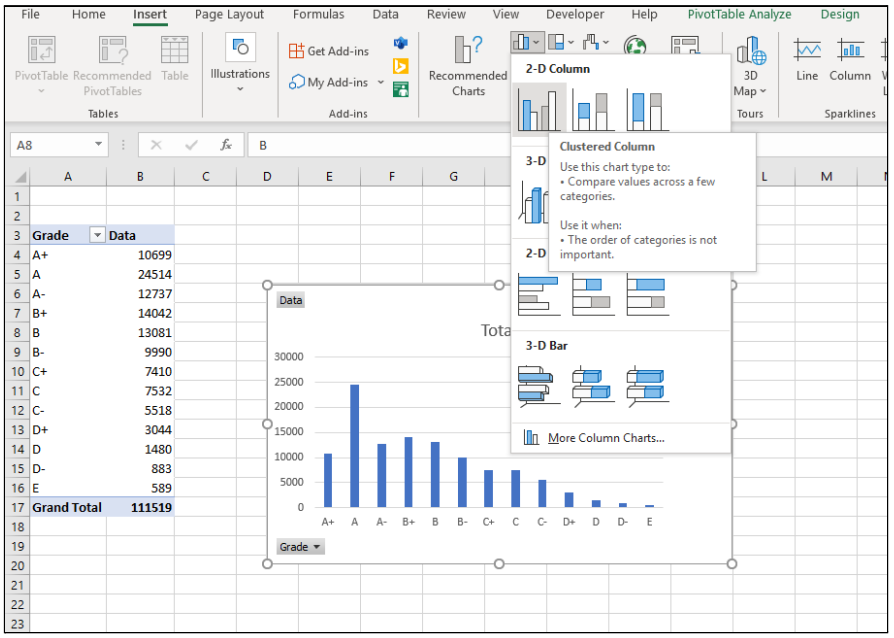


Figure 26: Initial bar chart

14. The Barchart generated after being modified.

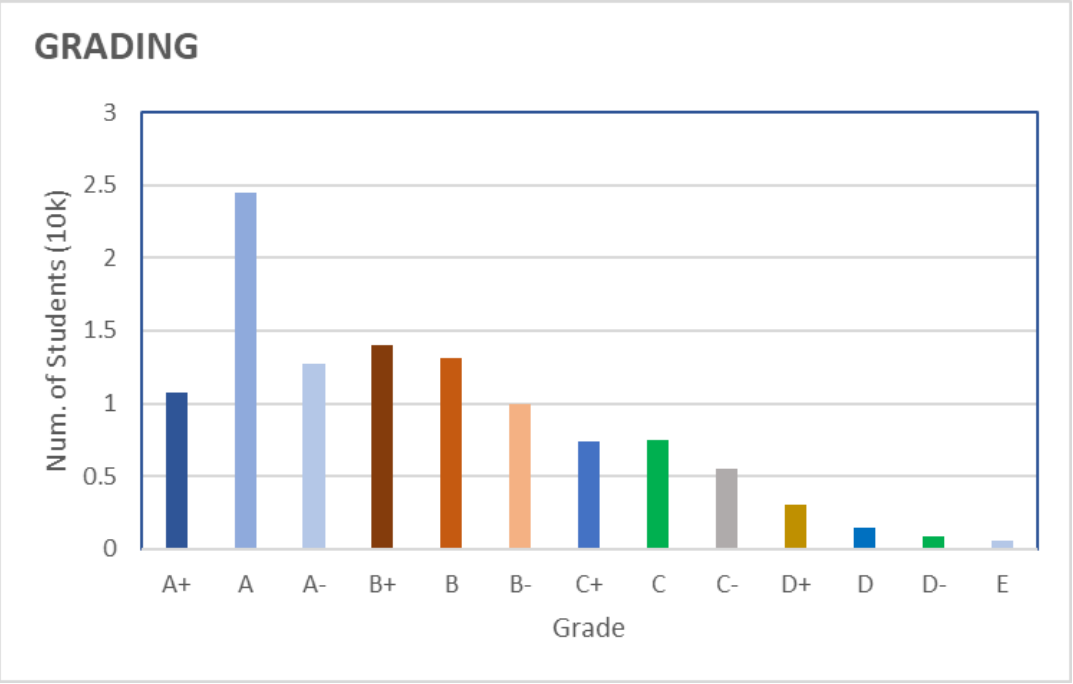


Figure 27: Modified bar chart

15. Copy and paste both the PivotTable and the Grading bar chart into the dashboard sheet. Then put them into their designated area.

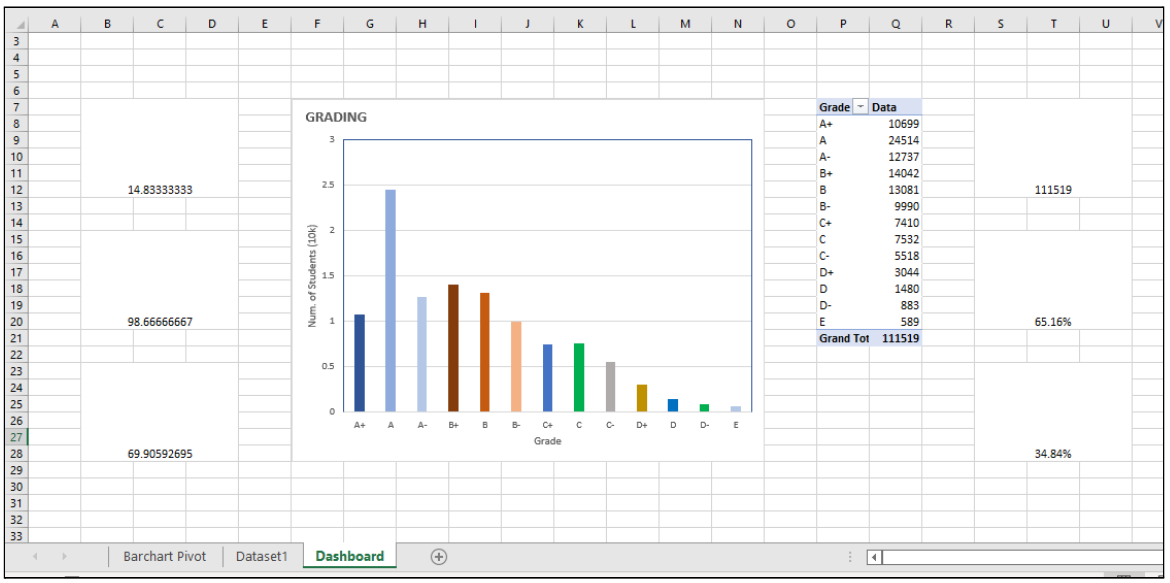


Figure 28: Bar chart and Pivot Table in Dashboard sheet

16. Upon completing the process for Bar Chart generation, start the process to generate a Pie Chart. This pie chart is used to show the segments of pass and fail students from the total record. Create a new pivot sheet and rename it as “Piechart Pivot”.

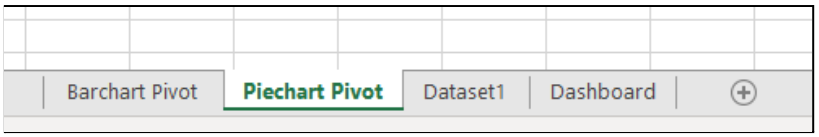


Figure 29: Piechart Pivot sheet

17. In the PivotTable fields, drag the Status field into both rows and values areas. A new PivotTable will be formed showing the counted number of pass and fail.

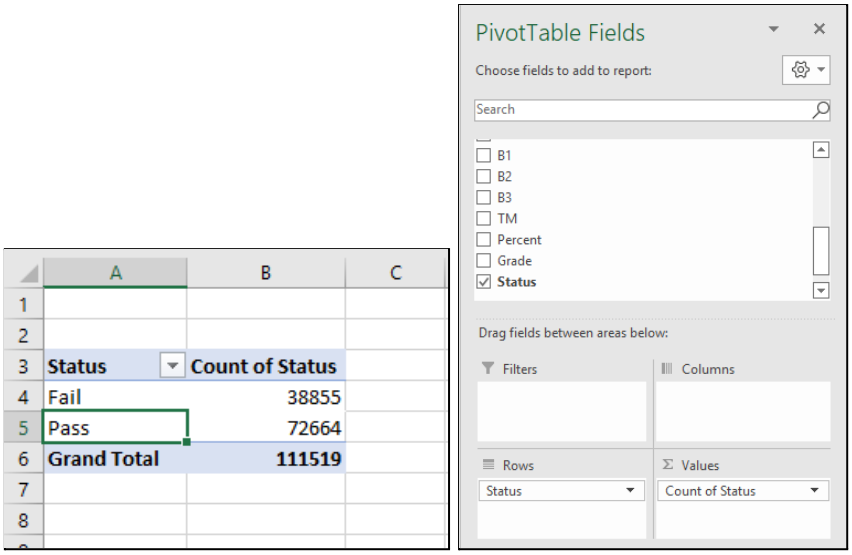


Figure 30: PivotTable Fields for status

18. To generate a new pie chart, highlight one of the cells in the PivotTable and click the Insert tab. In this tab, find the button for pie chart and click on the Doughnut pie in the dropdown menu. A new pie chart will be generated automatically.

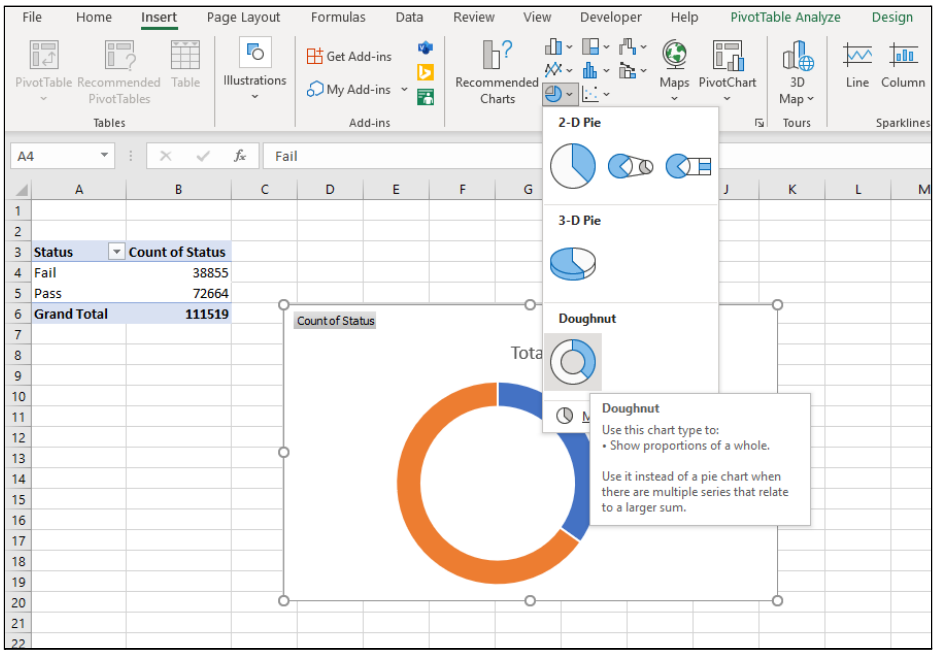


Figure 31: Pie chart created from the Pivot table

19. Modify the pie chart according to the preference. Below is the pie chart generated.

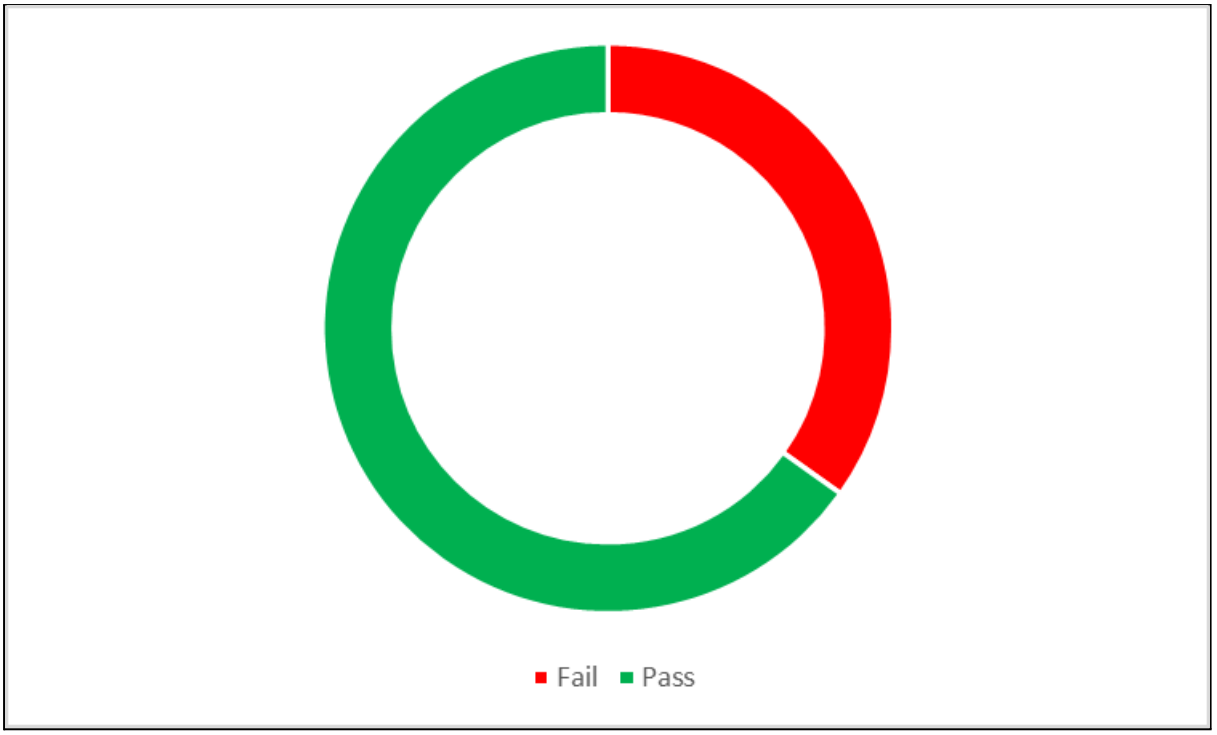


Figure 32: Modified Pie chart

20. Copy and paste the pie chart into the dashboard sheet. Put it into the designated area.

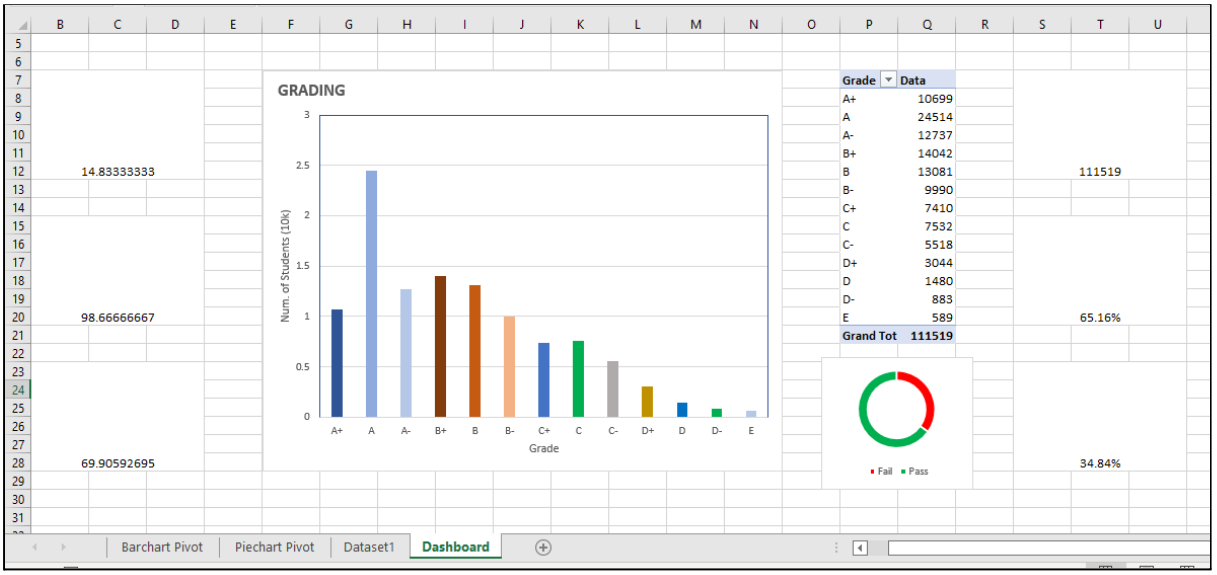


Figure 33: Pasted pie chart at Dashboard sheet

21. Change the cell format for the MIN, MAX and AVERAGE values into numbers with two decimal places. Modify the appearance of the dashboard according to the example output shown in the case study file given.

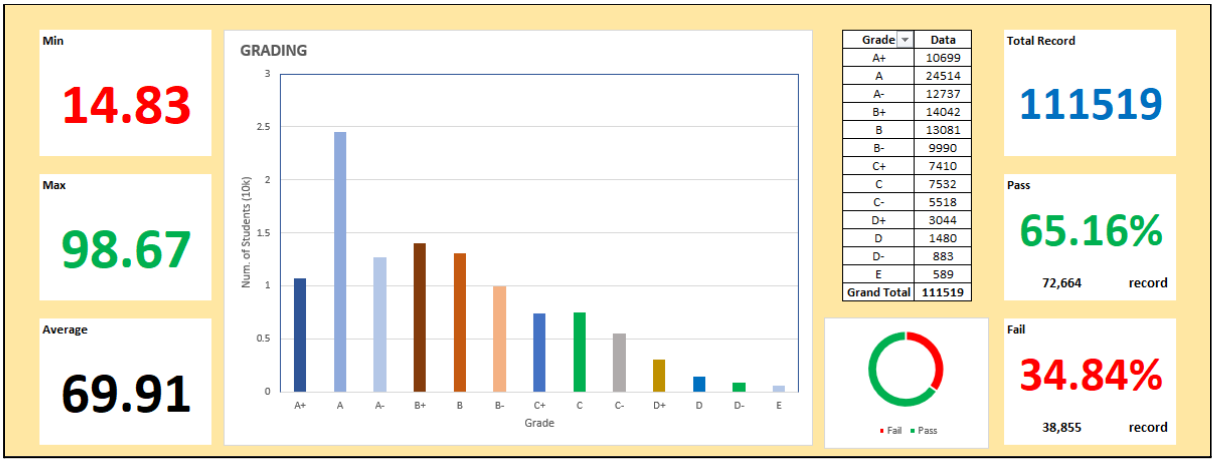


Figure 34: Arranged element and two decimal point data

22. To change the format of the total record into a "k" format, right click on the cell and choose the "Format Cells…" menu. An Excel format cells wizard will appear on top of the screen. On the left side of the wizard, choose Custom as the category. Type in '#,##0.0, "k"' in the Type field. Click the OK button.

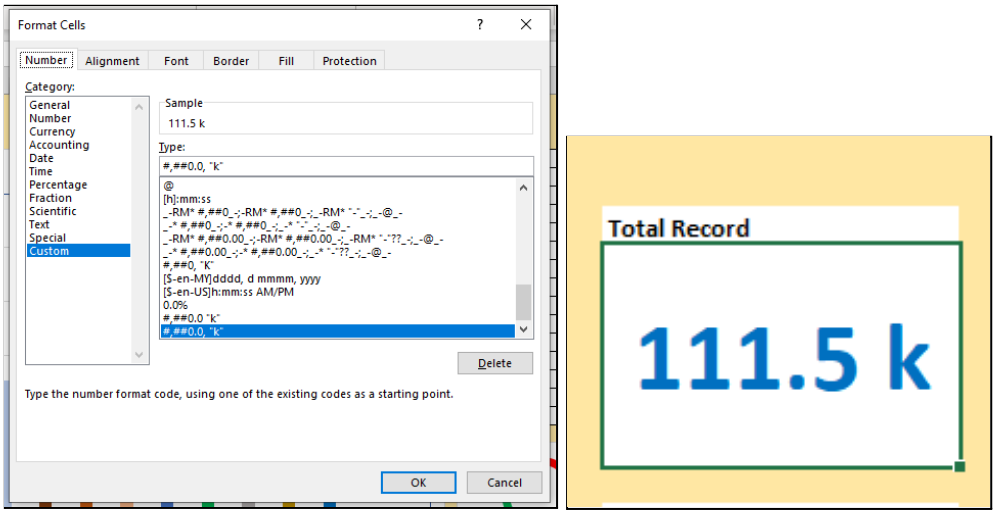


Figure 35: Custom cell formatting

23. Add a title and the final result of the dashboard would look like the figure below.

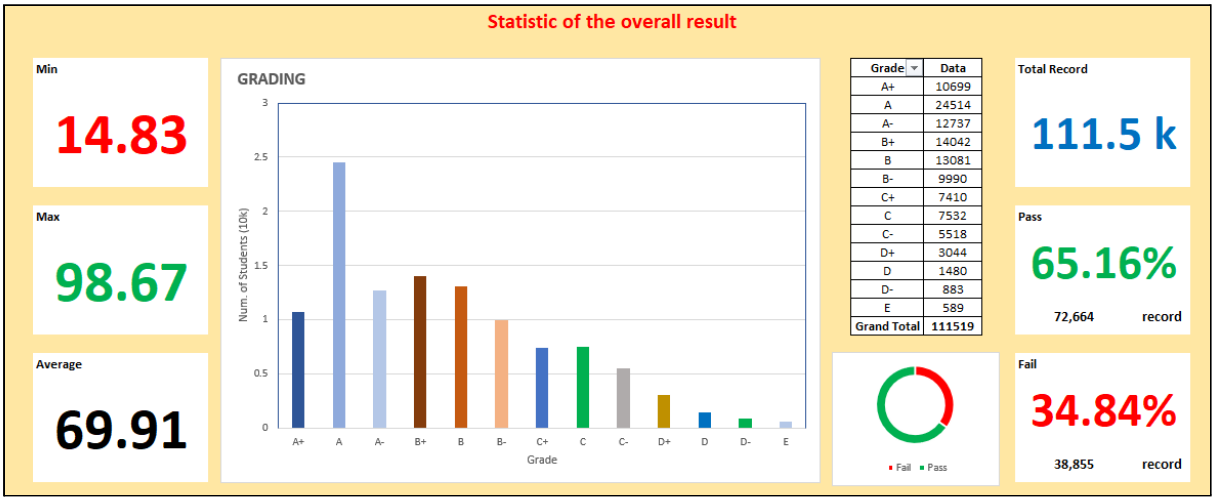


Figure 36: Final Dashboard result