Lecture Note #09: Conditional Formatting Part #1

BUSI 201: Business Data Analysis

Spring 2024

Topic 1. Conditional Formatting

Conditional formatting can be a powerful tool that can be used in initial rounds of data analysis, and also to produce a table that would be easier to read. Conditional formatting allows the user to alter the formatting of certain cells in the spreadsheet if certain conditions are met.

The range of conditions that the user can set is quite flexible, and the formatting options are similarly flexible. For instance, the user can change the background color of cells that include values that are among the top 10% of cells in a table. Or the user can change the font and font color of cells that have values that are less than or equal to the sample average.

This function can be accessed by navigating to `Home` > `Conditional Formatting` as displayed in Figure 1, and has various types of rules that we can apply. We will be covering four different types of conditional formatting options in this lecture: Highlighting Cell Rules, Top/Bottom Rules, Data Bars, and Icon Sets.
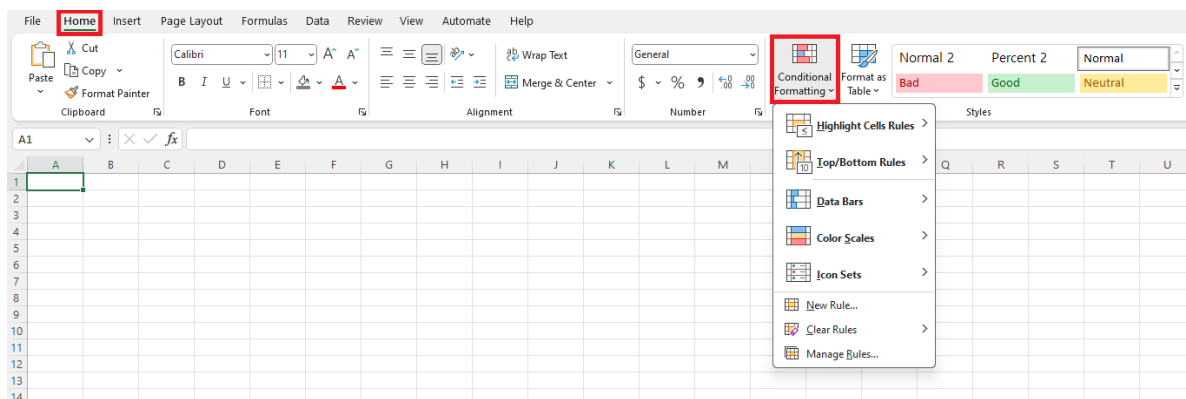

Figure 1: Conditional Formatting

Topic 2. Conditional Formatting: Greater Than...

Navigate to worksheet `LAW` in the workbook `BUSI201-LEC10-Workbook.xlsx`. This worksheet contains synthetic data on 26 applications received from a Law School. The data (`B4:G30`) includes the variables `Applicant ID`, `LSAT`, `GPA`, `References`, `Statements`, `Experiences`. Suppose that you are the administrative staff responsible of organizing this data according to the rules (`I2:L30`).

	LAW SCHOOL APPLICATION EVALUATIONS						EVALUATION RULES			
Applicant ID	LSAT	GPA	References	Statements	Experiences				LSAT	
							From	To	Verdict	Format
CL-20230001	146	3.88	8.3	3.4	6.9		170	180	Excellent	Score
CL-20230002	180	3.22	7.8	3.3	7.2		155	169	Satisfactory	Score
CL-20230003	152	3.47	1.8	1.3	9.1		145	154	Poor	Score
CL-20230004	154	3.4	9.5	7.4	9.6		0	144	Rejection	Score
CL-20230005	149	3.61	8.5	1.6	2.3					
CL-20230006	175	3.17	6.2	6.1	9.6				GPA	
CL-20230007	180	2.28	3.8	4	6.9		From	To	Verdict	Format
CL-20230008	176	4.25	7.2	1.7	9.3		3.7	4.3	Excellent	Score
CL-20230009	158	3.64	9.1	2.1	4.2		3.3	3.69	Satisfactory	Score
CL-20230010	162	3.74	4	9.6	8.3		3	3.29	Poor	Score
CL-20230011	176	4.12	7.1	2.9	2.1		0	2.99	Rejection	Score
CL-20230012	167	4.14	9.8	7.4	10					
CL-20230013	174	3.65	7.4	4.1	8.7				References	
CL-20230014	159	3.17	2.8	2	8.1		Criteria		Verdict	Format
CL-20230015	168	4.07	5.1	9.1	9		Top 25%		Excellent	Score
CL-20230016	147	3.18	1.2	8.7	8.2		Top 50%		Satisfactory	Score
CL-20230017	149	3.24	1.7	7.9	1.9		Top 75%		Poor	Score
CL-20230018	162	3.3	6.8	3	2.6		Bottom 25%		Rejection	Score
CL-20230019	143	3.95	8.7	6.3	9.2					
CL-20230020	138	3.24	1.7	9.8	5.1				Statements	
CL-20230021	152	4.25	6	2.6	8.3		Criteria		Verdict	Format
CL-20230022	159	3.45	9	9.9	5.8		Top 20%		Excellent	Score
CL-20230023	152	3.57	9.5	8.8	1.5		Top 50%		Satisfactory	Score
CL-20230024	176	4.1	3.7	7.3	2		Top 80%		Poor	Score
CL-20230025	153	3.53	3	5.9	6.5		Bottom 20%		Rejection	Score
CL-20230026	128	3.83	4.3	2.4	9.2					

Figure 2: The LAW Sheet

Formatting: Understanding LSAT Score Rules

The rules for the LSAT scores are given as the first rule in `I2:L30`. If the applicant has an LSAT score greater than or equal to 170, they are classified as "Excellent," and the cells that stores their LSAT scores should have a green background, the font color should be white, and the text itself should be bolded.

Similarly, LSAT scores between 155 and 169 are classified as "Satisfactory," and the cells should have a light green background. Those between 145 and 154 are classified as "Poor," and have no special formatting. If the LSAT scores are lower than or equal to 144, this will trigger an automatic rejection, and the cells containing these scores should have a red background and white text color.

Formatting: Applying LSAT Score Rules

We will start off with the first conditional formatting task of marking the scores that are classified as "Excellent."

1. Start off by selecting the portion of the data that stores LSAT scores (excluding the row that contains the variable name) as displayed by the red box in Figure 3.

2. Then head to Home > Conditional Formatting and select Highlight Cells Rules then More Rules to call up the New Formatting Rule window.

3. In the New Formatting Rule window, change the "greater than" to "greater than or equal to" in the green box.

4. In the purple box, choose I5, which contains the value 170 in the evaluation criteria table.

5. Then click on the Format… button… (continued on the next page)

Figure 3: Conditional Formatting: Excellent LSAT Part 1
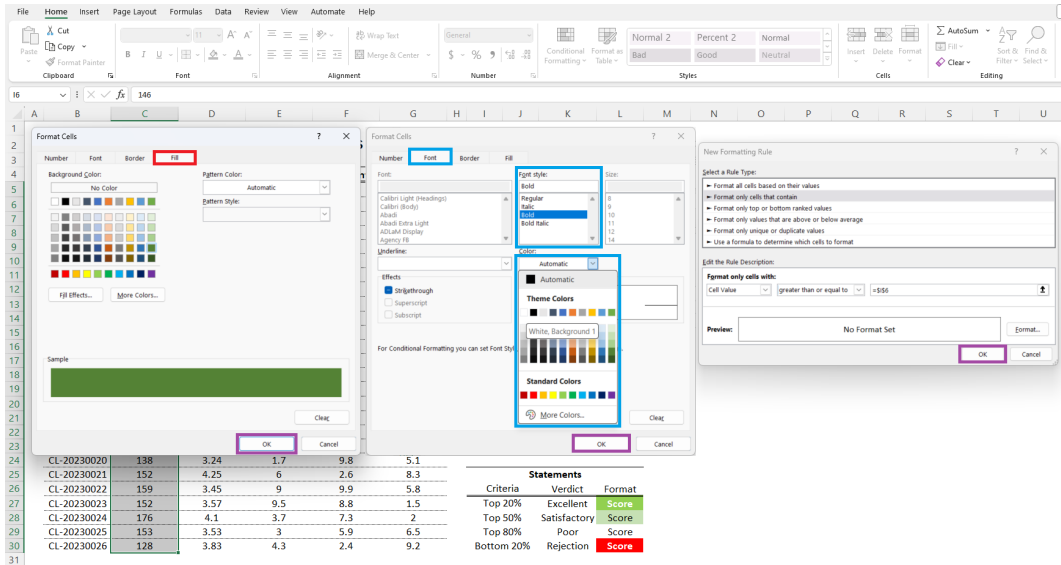
Figure 4: Conditional Formatting: Excellent LSAT Part 2

6. Under `Fill`, select a dark green background color for the cells with 170+ LSAT scores.

7. Under `Font`, select the `bold` text style, and white text color.

8. Click on `OK` to check the final result.

Figure 5: Conditional Formatting: Excellent LSAT Part 3

Detour: Editing Conditional Formatting

Although we do have the "Excellent" LSAT scores formatted, it is not exactly the format we wanted. The background seems to be a bit darker than what we were aiming for, depicted in cell L5 in Figure 5. We have two choices to deal with this situation; removing the conditional format and trying again, or editing the rules.
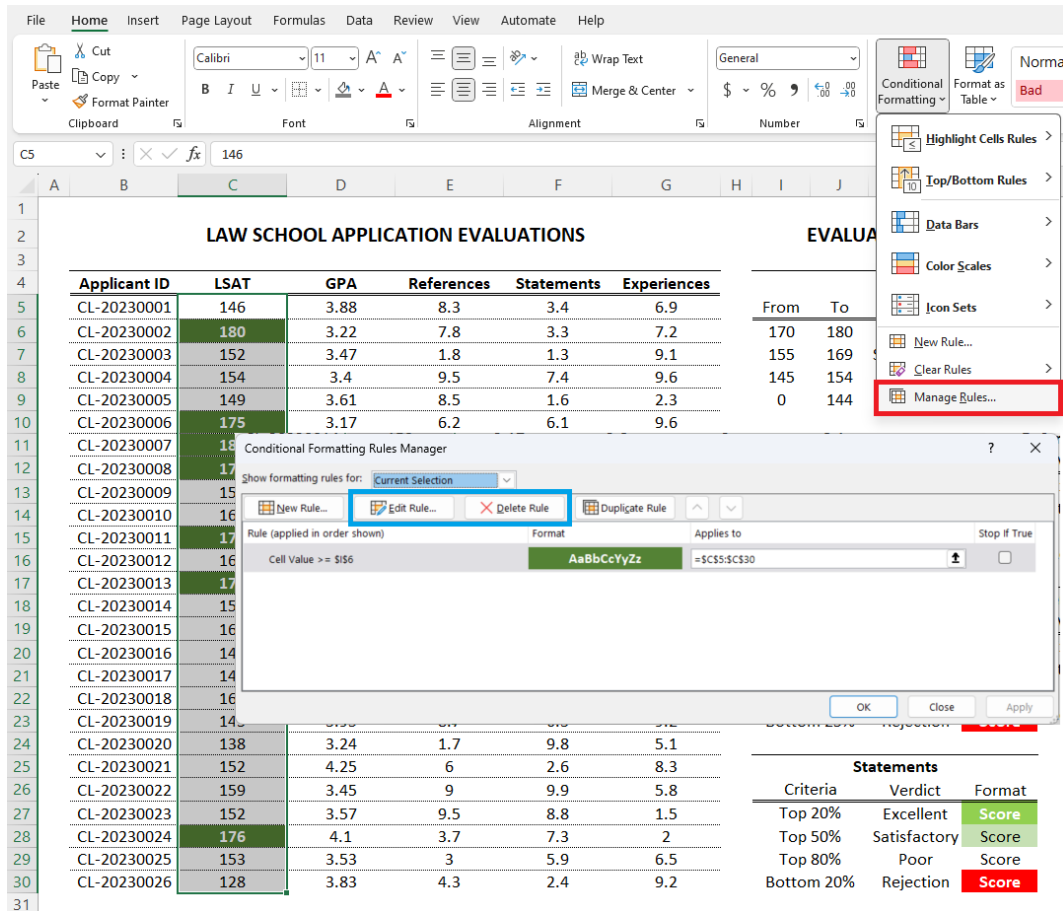
Figure 6: Conditional Formatting: Editing and Removing

Select the LSAT scores, and navigate to `Conditional Formatting > Manage Rules`. Then we can either delete the rule and start over by selecting the rule we have and clicking `Delete Rule`, or selecting the rule that we have and clicking `Edit Rule`. Clicking `Edit Rule` will bring you back to Figure 4, where you can adjust the background color to fit the desired format.

Topic 3. Conditional Formatting: Between...

Now we have the "Excellent" scores formatted, we must work with the "Satisfactory" scores which are scores between 155 to 169. Follow the instructions below to set up the conditional formatting for the "Satisfactory" LSAT scores in the dataset.
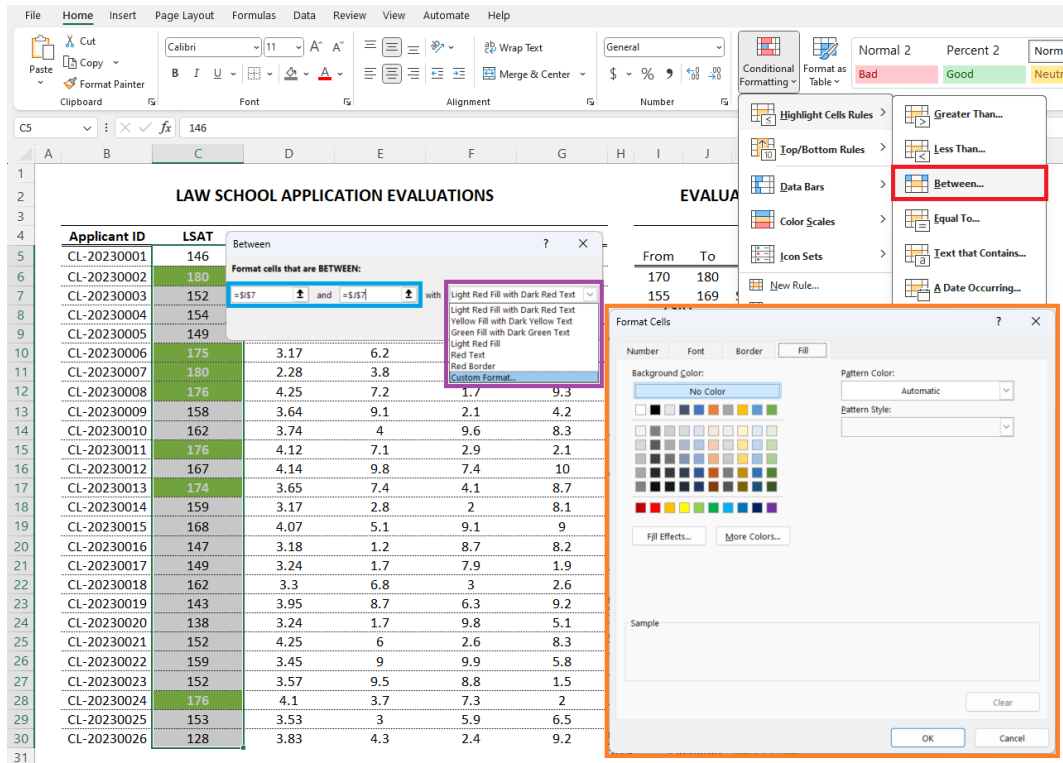
Figure 7: Between Two Values

1. Select the LSAT scores C5:C30, and

2. Select Between in the dropdown menu from Conditional Formatting.

3. Set up the lower and upper bounds in the popup Between window.

4. Select Custom Format.

5. Set up the desired format for the "Satisfactory" LSAT scores in the Format Cells window.

Topic 4. Conditional Formatting: Less than...

Now we have the "Excellent" and "Satisfactory" scores formatted, we must work with the last classification of "Rejection" scores which are scores less than or equal to 144. Following the steps listed below, we can finish formatting LSAT scores.

Figure 8: Less than or Equal to

1. Select the LSAT scores C5:C30, and

2. Select More Rules in the dropdown menu from Conditional Formatting.

3. Select less than or equal to in the dropdown.

4. Set up the threshold points in the orange box.

5. Set up the desired format for the "Rejection" LSAT scores by clicking the Format button.

Topic 5. Conditional Formatting: Bottom/Top Values

Scores for the references, statements, and experiences are graded relatively to the pool of applicants. Therefore, the top few applicants will be granted "Excellent" classification, the next few will be given "Satisfactory," and so forth... We will be using conditional formatting with top/bottom rules to acheive this task.

Figure 9: Top 25% in References

To access conditions based on rank...

1. Select the Reference scores E5 : E30, and

2. Select `Top/Bottom Rules > More Rules` in the dropdown menu from `Conditional Formatting`.

3. Select Top, Type in 25, and Check the "% of the selected range" in the dropdown.

4. Set up the desired format for the "Excellent" Reference scores by clicking the `Format` button.

The Ordering of Rules

We now move on to the "Satisfactory" category of reference scores. You can repeat the same process as the previous part, but typing in 50 instead of 25 in step 3. But you will immediately run into a problem as soon as you apply this conditional formatting as we can see in Figure 10.

Figure 10: Formats Overwritten

To fix this issue, open up the conditional formatting rules manager following the steps in Figure 6. Then select the first rule to be applied in the red box, and move it up by clicking the button in the orange box in Figure 11.
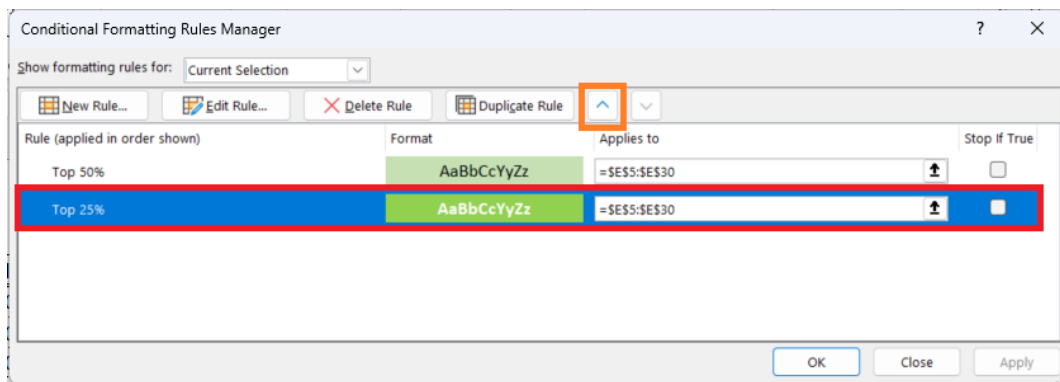

Figure 11: Conditional Formatting Rules Manager

Using these rules, fill out the remaining conditional formatting tasks in sheet LAW.

Topic 6. Formatting the Entire Row when it Meets a Condition

Navigate over to the next worksheet PUSHUP, which has data on a push-up trial. There are four criteria that determines who of the 14 people "passed" the test. In the text, we will talk about the first condition. Those who completed a total of 130 push-ups across their three attemps passes the test. The first task is to use the SUM function to find the number of push-ups that the individuals completed. In the previous task, we applied formats to the individual cells separately; so their LSAT, GPA, References, etc were all allowed to have different formats depending on how they performed in each aspect. Here, we want to check one condition for each person, and apply the format to the entire row for individuals who passed the test.
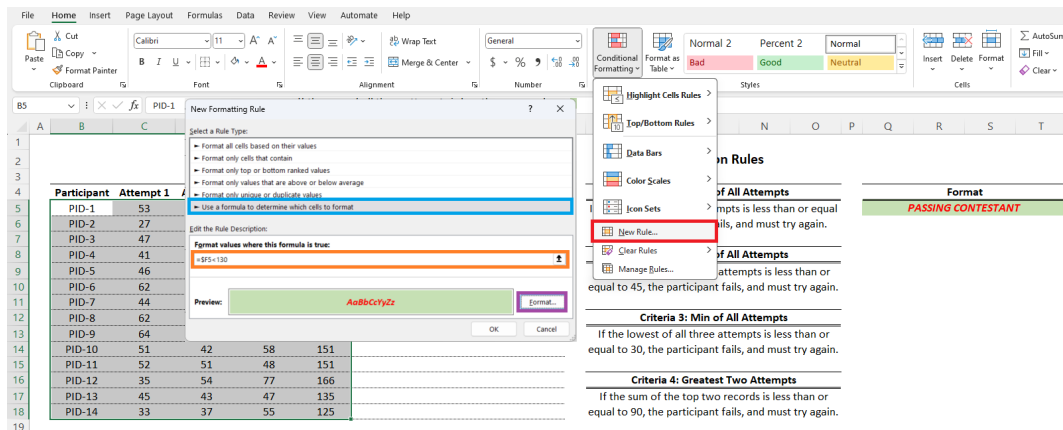

Figure 12: Pass Criteria #1

1. Select the data including the newly calculated total sum, B5:F18.

2. Select New Rule in the dropdown menu from Conditional Formatting.

3. Select use a formula to determine which cells to format .

4. Type in the condition =$F5>130.

5. Set up the desired format for the "Passing Push-ups" by clicking the Format button.

Figure 13: Pass Criteria #1 Completed

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Topic 7. Formatting the Entire Row when it Meets Many Conditions

Navigate over to the next worksheet TRIATHLON, which has data on a triathlon trial. We will learn how to format the entire row, while checking multiple conditions simultaneously. Suppose that we want to highlight the data entries for contestants that "passed" each element of the triathlon.
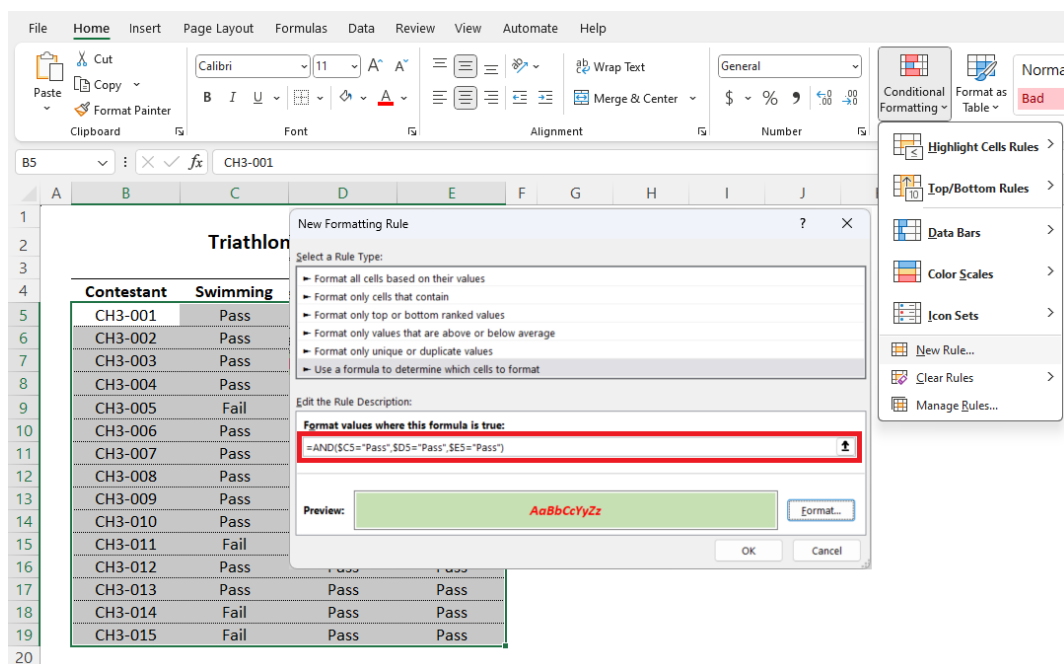

Figure 14: Triathlon Pass Criteria

1. Select the data B5:E19.

2. Select New Rule under Conditional Formatting, and select "use a formula to determine which cells to format."

3. Type in the condition =AND($C5="Pass",$D5="Pass",$E5="Pass").

4. Set up the desired format.