Apply-IT #2, Beyond the Book

Download and open the Apply-IT 2 Start File Excel workbook located on Blackboard. Save the workbook as **FirstName.LastName.Apply-IT 2.xlsx**

# Part 1: What-If Analysis with Data Tables

All Around Vision Care sets a goal for each office to expand its services each year. It establishes a percentage growth rate but uses an adjustment factor for each city to recognize differences in its markets. You have been asked to build a one-variable data table that tests several overall growth percentages to see the effect on the revenues forecast. You also will build a two-variable data table for Boston where you’ll illustrate revenues if both the growth percentage and its adjustment factor are changed.

1. Open the worksheet ***Revenues***
2. Trace dependent cells for cell H4 to see how the overall growth rate affects the 4 year revenues forecast in cell H18. *Hint: click “Trace Dependents” in the Formula Tab | Formula Auditing group 3 times.* Click “Remove Arrows” after you have completed your evaluation.
3. One-Variable Data Table
   1. You would like to evaluate growth rates between **1.00%** and **3.00%**. Interpolate the data to fill in the cells A26:A32. These percentages represent possible overall growth rates to replace the current value in cell H4. Your goal is to explore various growth rates using a constant amount of increase from 1% to 3%, rather than a constant percentage increase. *Interpolating from a Starting Value to an Ending Value EX9-6b*
   2. Set up your one-variable data table by creating a reference to the four-year revenue forecast in cell B24. Make the number bold. *EX 8-3* [*Working with Data Tables*](javascript://)*. Watch this video:*  <https://www.excel-easy.com/examples/data-tables.html>
   3. Create a data table that shows revenues if the overall growth rate is set to the percentages shown in cells A25:A33. Format the results to improve readability.
   4. Use Conditional Formatting to highlight the Overall Growth Rate AND the corresponding Revenue Forecast on your one-variable data table, dependent on what is entered into cell H4. For instance, if you enter 3.00% in cell H4, cells A33 and B33 should be highlighted.
4. Two-Variable Data Table
   1. Next, create a data table with the result in cells F24:I31 that shows Boston Four-Year Total revenues when the overall growth rate and Boston’s adjusted growth factor are varied.
   2. Use Conditional Formatting to highlight the Overall Growth Rate, the Boston Adjustment Factor AND the corresponding Revenue Forecast on your two-variable data table, dependent on what is entered into cells H4 and H6. For instance, if you enter 2.25% in cell H4 and 1.75 in H6, cells E29, H23 and H29 should be highlighted.
5. Save your file now and often!

# PART 2: What-If Analyses with Solver

Michael Abbas is a manager at the Daybreak movie theater. One of his jobs is to create the weekly work schedule for the movie ushers. The theater employs 15 ushers—13 are full­time and two are part­time. The theater needs eight ushers to work each weekday, 11 on Saturday, and 10 on Sunday. Michael is currently working on the usher schedule for the second week in August. Michael tries to accommodate all time­off requests while maintaining the required staff. He has been developing a workbook to automatically generate the work schedule. The workbook already contains the names of the ushers and their time­off requests. He asks you to determine which ushers will be working which days. Complete the following:

1. Use the numbers 0 and 1 to indicate which shifts each employee is working. For example, 0 indicates an employee is not working that day, whereas 1 indicates that employee is scheduled to work.

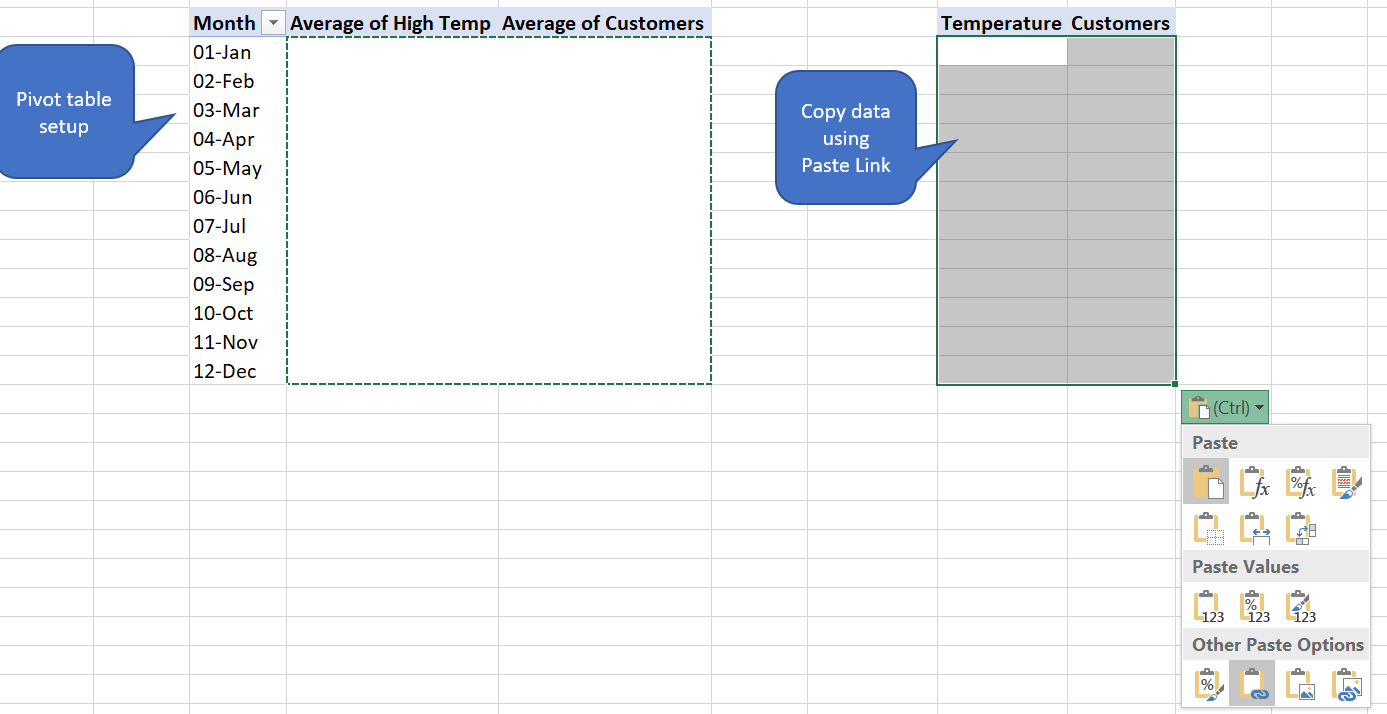
In the Schedule worksheet, in the range D5:J19, enter 0 in each cell to indicate that you have not yet scheduled any shift for any employee.

1. In the range K5:K19, enter formulas to calculate the total number of shifts for each employee.
2. In the range L5:L19, calculate the total number of hours worked by each employee. Each shift is eight hours.
3. In the range D21:J21, enter the number of shifts required per day. The theater requires eight shifts on weekdays, 11 shifts on Saturday, and 10 shifts on Sunday.
4. In the range D22:J22, enter a formula that calculates the total number of shifts actually scheduled for the employees on each day.
5. In the range D23:J23, enter a formula to subtract the attendants required value from the attendants actually scheduled value. A negative number indicates that not enough employees have been scheduled to cover the day’s shifts.
6. In cell D25, calculate the total shortfall in shifts by entering a formula to total the values in the range D23:J23.
7. Create a Solver model that sets the value of cell D25 to 0 (indicating that all shifts are covered) by changing the values in the range D5:J19 under the following constraints:
   1. Add a binary constraint to force every value in the range D5:J19 to be either a 0 or a 1.
   2. Add a constraint to limit the total hours worked by each full­time employee to less than or equal to 40.
   3. Add a constraint to limit the total hours worked by each part­time employee to less than or equal to 24.
   4. Add a constraint to require that the difference values in the range D23:J23 all equal 0.
   5. Based on the entries in the range C5:C19, add constraints so that employees are not scheduled to work shifts on days when they are unavailable to work.
8. Run the Solver model using the Evolutionary method. (Note that Solver might take a minute to arrive at a solution.) Confirm that the schedule generated by Solver fulfills all of the requirements—all shifts are covered each day, no employee works more hours than allowed by his or her full­ or part­time status, and no employee works on a requested day off.

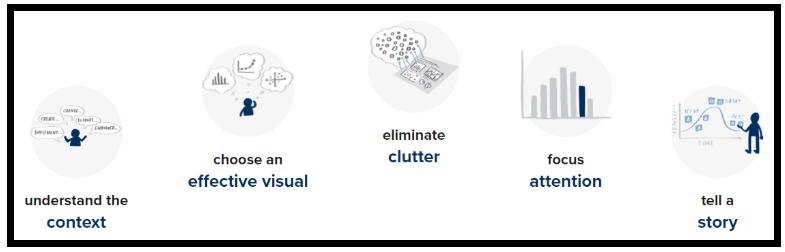
# Part 3: Business Intelligence with Power Query & Power Pivot

Joan Amari is a sales executive for Yummy Frozen Yogurt, a chain of frozen yogurt stores. Joan is responsible for overseeing 20 franchises in California. Joan wants to compare average customers per day at the franchises over the past three years and determine whether factors such as location, date, and weather play a significant role in the volume of customer traffic. She has data that contains over 21,000 records from the daily sales in the 20 stores from the past three years.

1. Use Power Query to access the **Support\_EX\_10\_Yogurt** Access database, creating a **connection only** to the *Sales* and *Stores* tables into the workbook’s Data Model.
2. You would like to create a column with the abbreviation for monthly sales, using the first 3 characters such as Jan, Feb, Mar. Complete this using 2 steps:
   1. Within Power Query, add a new column to the **Sales** table using the **Date** command on the ribbon to display the name of the month (January, February, March).
   2. Add another column using the **Extract** command to insert the first 3 characters of the month (Jan, Feb, Mar). Rename this column **Month Abbreviation.**
3. Open Power Pivot to view the Data Model in Diagram View.
   1. Create a relationship between the Sales and Stores table through the Store ID field.
   2. In the Sales table, create a hierarchy named **Calendar** containing the *Year* and *Month Abbreviation* fields. Return to the workbook.
4. Go to the Datasets worksheet and review the fields in your dataset. Joan wants to analyze the **average** number of customers served by the Yummy Frozen Yogurt by *Temperature, Rainfall* and *Time*. Create 3 Pivot Charts to analyze these categories. Use the **Staging Worksheet** to create your Pivot Tables and charts.
   1. Create 3 different types of charts (ie: not all clustered column) to evaluate *Temperature, Rainfall* and *Time.*
   2. The *time* chart must use a hierarchy drilled down into the **2021** Year category to the level of **month**
   3. *Temperature* chart must use a scatter chart to analyze the relationship between average high temperature and average number of customers. Because PivotCharts cannot be created as scatter charts, you need to create your pivot table first. Then, copy the data and use Paste Link to paste the copied cells. Use the copied cells to create your scatter chart.



* 1. Use best practices for chart making,



* 1. Move your 3 pivot charts to the **Sales Report** worksheet, in the highlighted sections.

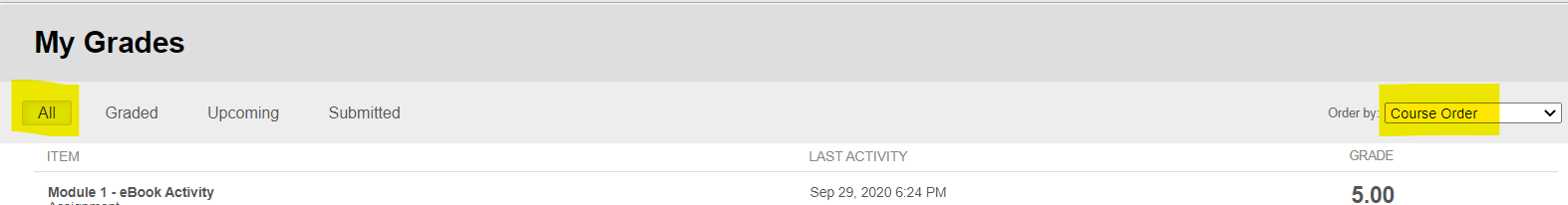
1. Joan wants to view the charts on the Sales Report worksheet filtered by city. Create a slicer in the Sales Report worksheet that is connected to all 3 charts. Put the slicer in cells **B4:I13** using an appropriate number of columns. Use the City slicer to show results for the Malibu store only.

# Part 4: Grade Calculator with Power Query & Functions

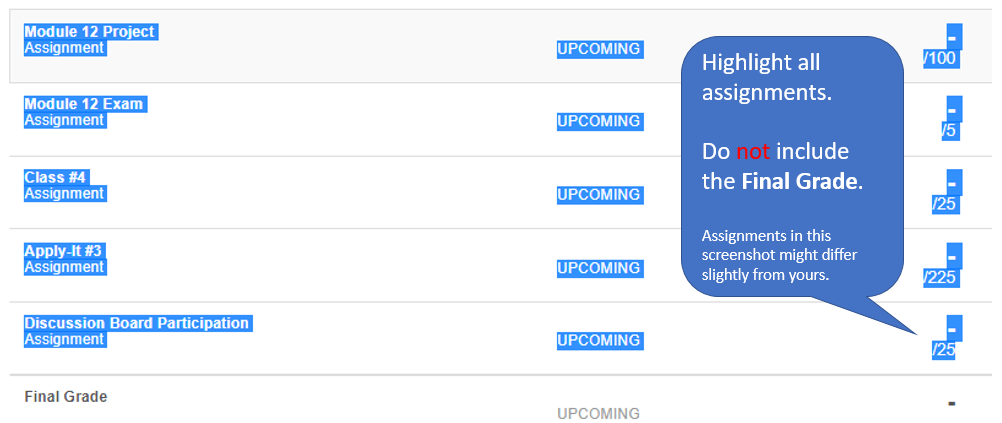
Have you ever tried to copy your gradebook from Blackboard into Excel, but when you did you got one unwieldly column that seemed impossible to turn into a gradebook? Getting raw data that is in a format unsuitable for analysis is typical for analysts, and it’s important to learn tricks to ‘clean’ the data for your needs.

In this assignment you will create a grade calculator in Excel using PowerQuery and formulas to transform your raw data. The calculator will show each assignment completed during the semester and will calculate your current grade. As the semester progresses, you can add new scores to keep track of your grade. Use this guide in other classes as well to track your grades from the Blackboard gradebook.

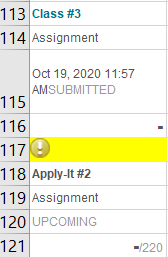
1. In Blackboard, go to **My Grades**.
   1. Click on the **ALL** tab to see all of your grades.
   2. Sort by **Course Order**



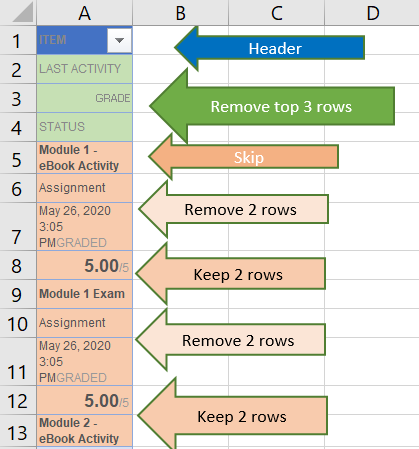
* 1. Highlight the word **Item** in the upper left column and continue to highlight all of your assignments, not including the Final Grade. Copy your highlighted data using Ctrl+C.



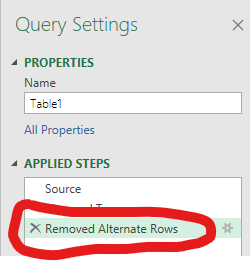
1. Paste your data into **column A** of the **My Grades** worksheet using Ctrl+V.
2. Check to ensure you don’t have any assignments that are submitted and **Needs Grading.** In this example, Class #3 is ungraded.
   1. Delete any row with an exclamation point (row **117** in this example). You don’t need to delete the exclamation point itself, just the row.
   2. Assign points to the ungraded assignment in the cell that has a dash (row **116** was changed to **‘-/25** in this example because the Class #3 assignment is worth 25 points. You have added an apostrophe to tell Excel this is text, and not a formula.)



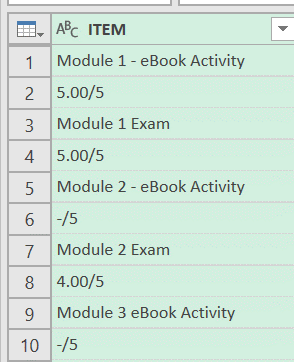
1. Use Power Query to clean up your data. With your data in column A highlighted, insert the data **from a Table/Range** into Power Query via the Get & Transform Data group.
2. Clean up your data. *Your grade values will be different from mine.*
   1. Remove the first 3 rows using the **Remove Rows** command.



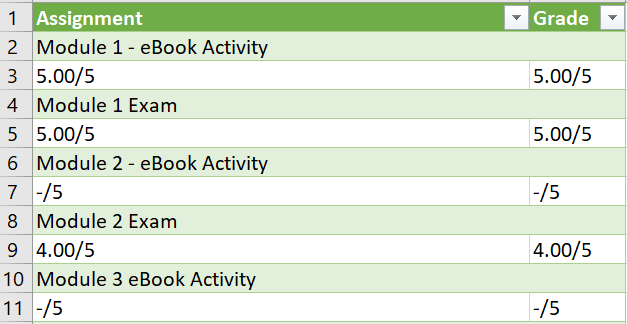
1. Use the Remove Alternate Rows command to keep only every 2 rows, starting with the 2nd row. *Hint: if you removed the wrong rows, delete your step and try again*.



* 1. If you have more than 74 rows, delete blank rows.

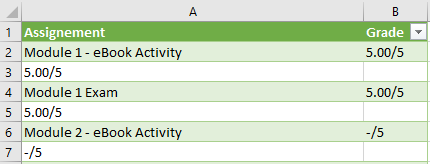


1. Load your data to a new worksheet by creating a table. Rename this worksheet **Grade Calculator**.
2. Next, we need to move all of your grades to column B
   1. Type **Assignment** in cell **A1**. Type **Grade** in cell **B1**.
   2. Let’s copy only the grades to column B, but how? Notice that all of the grades are in odd rows. How can we ask Excel to check if the row number is odd, & if so, copy the assignment value from column A into column B? Use the functions IF, ISODD & ROW to solve this puzzle.
3. ISODD function returns TRUE if number is odd, or FALSE if number is even. Example: ISODD(A1)
4. ROW() function returns the row number of the reference
5. *Hint: start your formula with this:* =IF(ISODD(ROW(

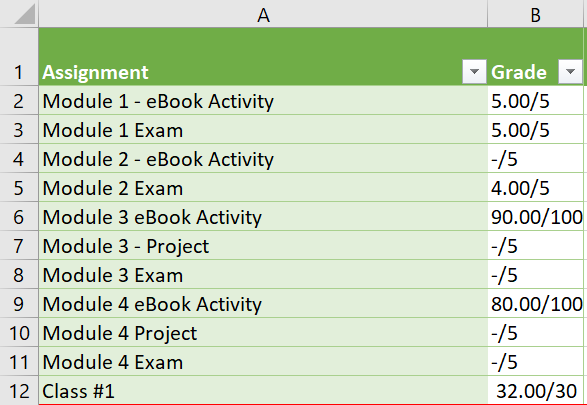


* 1. Copy and paste the data in column B using **Paste Values**, to remove the formulas. Remove any extra columns you may have used to accomplish this step, so that you only have column A and column B in your table.

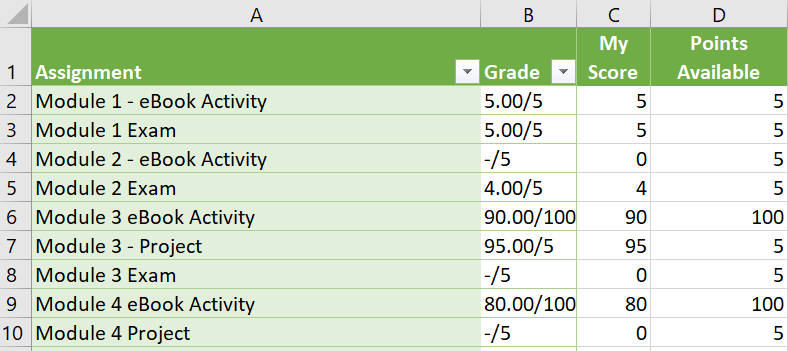
1. Move all of the grades in column B up one row.



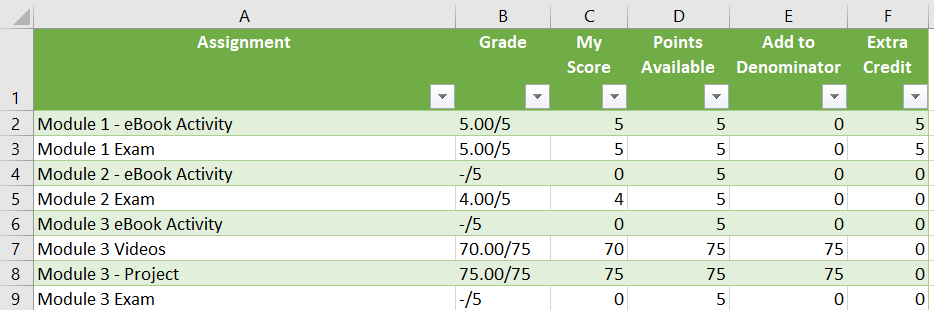
1. Delete the rows where the cells in column B are blank. Don’t delete one row at a time; imagine instead of 30+ rows you had thousands. Harness your Excel knowledge to complete this task. *Hint: filter to show only the rows you want to delete*



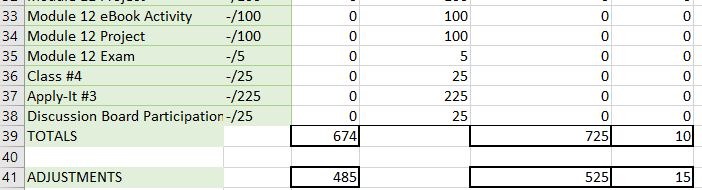
1. Use Flash Fill to create columns **C *My Score*** and **D *Points Available*.**
   1. If you have any cells in column D with a dash and the note ***needs grading*** replace the dash with the correct point value.
2. Replace the dashes with zeros in column **C**.



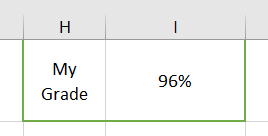
1. Use a formula to calculate your Grade Basis, to be used in your % grade calculation. We need to figure out which cells are extra credit and which assignments we have not completed, and therefore will not be used for the denominator of our percent grade. In cell **E1**, type **Add to Denominator.** In column E, use a formula to indicate how many points for graded assignments should count toward the grade bases. There are many ways to solve this problem. Here is one way, which assumes you didn’t get zero on any required assignments:
   1. If both of the statements below are true, copy the points available from that row, otherwise assign zero points.
      1. If the **Points Available** are more than 5, the assignment is a not extra credit and should be counted in the denominator.
      2. If **My Score** is more than 0, I have completed the assignment and the assignment should be counted in the denominator.
   2. We will adjust for assignments where you could do either the activity or project and use one for extra credit in step 16.
2. Use a formula to determine if you got 5 on any extra Credit assignment, since any extra credit assignment less than 5 doesn’t meet the 90% or higher for points criteria. Put your results in column **F** and label the column **Extra Credit**.



1. Write the word **TOTALS** in cell **A39.** Add the totals for **My Score, Add to Denominator** and **Extra Credit** in row 39 of your table.
2. Write the word **ADJUSTMENTS** in **A41**. create an Adjustment formula for **My Score, Add to Denominator** and **Extra Credit.** For Modules 5, 6 and 8 you had the option to do either the Activity OR the Project.
   1. If you did both, you want to count the top score and 5 points of extra credit if you scored > 90% on the lower-scored assignment. Create formulas that will work for any combination of scenarios even if you did not complete both the Activity AND the Projects. That way, you can keep track of your grade throughout the semester and it will be accurate as you complete assignments and extra credit.
   2. **My Score**: In cell **C41**, subtract the lesser of the grades received for Module 5, 6 or 8 Activity or Project from the **My Score** total. Also subtract any assignment that is Extra Credit.
   3. **Add to Denominator**: If both the activity and the project for Module 5, 6 or 8 were completed, subtract 100 points where appropriate to the total of **Add to Denominator** in cell **E41.**
   4. **Extra** **Credit**: If both the activity and the project in the Module 5, 6 or 8 are completed with >=90%, add 5 points to the **Extra Credit** score in **F41.**



1. Type **My Grade** into cell **H1**. Calculate your percentage grade in **I1** by adding your (adjusted Score and adjusted Extra Credit) divided by your adjusted Denominator.



1. As you complete assignments for the rest of the semester, update your grade calculator to track your grade.

# COMPLETED ASSIGNMENT

Submit your finished workbook to Blackboard.

*Fall 2020*