5. EXCEL LOGIC & IF FUNCTION

Winter 2019

Comparison Operators

- Compare two values and produce either true or false
  - =2*3**=**4+2
  - =A1**>**0
  - =average(a1:a10)**>**60

- Must include at least one comparison operator.
  - >　　　　　　　>=　　　　　　　=
  - <　　　　　　　<=　　　　　　　<>

Built-in IF Function

- The IF function allows our spreadsheet to make a decision when analyzing the data

- The function asks the question: Is some condition true or false?

- Perform one action for true or a different action for false

- Our task: choose the correct conditions to check

IF Function Syntax

- =IF(condition, action_if_true, action_if_false)

- Examples:
    - =IF(speed>55, "TICKET", "SAFE")
        - where speed is a named cell
    - =IF(average(A1:D1) >= 60, "PASS", "FAIL")
    - =IF(speed>55,100, 0)

- Note that the double quotes "" are only used when displaying text. If you are displaying a number or formula, then do not use quotes.

Problem 5.1

- Create a sheet like the one below, which contains a bank account statement where a W implies an amount of money withdrawn and a D is a deposit.

	A	B	C	D	E
1	Initial Balance	$3,874.00			
2					
3	**Date**	**Amount**	**Type**	**Balance**	**Amount Over $50?**
4	1/12/2016	$34.50	W		
5	2/12/2016	$100.00	D		
6	2/29/2016	$20.00	W		

- Write the formula needed in E4 to display Yes or No, then fill this formula down to E6
- Write the formula for column D

Logical Operators

- Logical OR
  - OR(condition#1, condition#2)

- A value of TRUE is returned if EITHER of the logical tests returns a value of TRUE; otherwise, a value of FALSE is returned

  - =IF(OR(temperature > 90, weather = "RAIN") ,"Yuck", "Pleasant")

- Note: You can have more than two logical tests

Logical Operators

- Logical AND
  - AND(condition#1, condition#2)

- A value of TRUE is returned if BOTH of the logical tests return a value of TRUE; otherwise, a value of FALSE is returned

  =IF(AND(temperature > 90, weather = "RAIN") , "Awful", "could be worse")

If / And / Or

- What decision do you need to make?

- What data will you base your decision on?

- How can you write the decision as a condition?

- What actions will you take?

Inspect the data!

Problem 5.2

- Import the following data from:
  - http://zeus.cs.pacificu.edu/chadd/cs130w17/Problem52.html

	A	B	C	D	E
1	Name	District	Sales	Emp. Yrs	Job Level
2	Linda	East	$20,000.00	2	
3	Joe	West	$42,302.00	9	
4	Bill	East	$53,001.00	3	
5	Mary	South	$12,000.00	12	
6	Mark	South	$ 2,050.00	6	
7	John	North	$9,000.00	0	
8	Ted	East	$40,000.00	4	

- Write a formula in column E that will assign a job level based on two different criteria:
- Salespeople who have been employed for more than 5 years AND have annual sales of more than $10,000 should be assigned a job level code of 2. All others should have a job level code of 1.
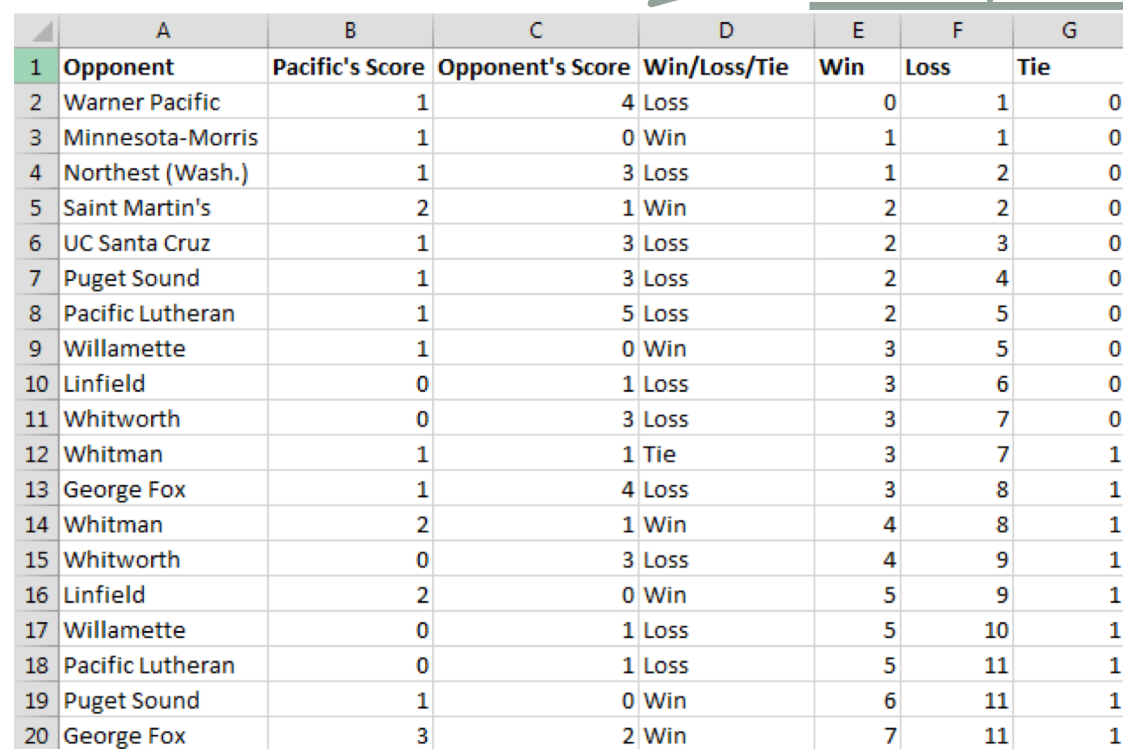
Problem 5.2 continued

- Add a Bonus column to the right of the table
  - An employee gets a 10% bonus if they have either worked for more than 5 years or achieved more than $7,000 in sales
  - Otherwise they get a 1% bonus

- The bonus column should display the bonus amount in dollars (10% of $20,000 is $2,000)

Problem 5.3 Soccer Scores

http://zeus.cs.pacificu.edu/chadd/cs130w17/Problem53.html

Use an If() to fill in this column!

Calculate these columns!

	A	B	C	D	E	F	G
1	Opponent	Pacific's Score	Opponent's Score	Win/Loss/Tie	Win	Loss	Tie
2	Warner Pacific	1	4	Loss	0	1	0
3	Minnesota-Morris	1	0	Win	1	1	0
4	Northest (Wash.)	1	3	Loss	1	2	0
5	Saint Martin's	2	1	Win	2	2	0
6	UC Santa Cruz	1	3	Loss	2	3	0
7	Puget Sound	1	3	Loss	2	4	0
8	Pacific Lutheran	1	5	Loss	2	5	0
9	Willamette	1	0	Win	3	5	0
10	Linfield	0	1	Loss	3	6	0
11	Whitworth	0	3	Loss	3	7	0
12	Whitman	1	1	Tie	3	7	1
13	George Fox	1	4	Loss	3	8	1
14	Whitman	2	1	Win	4	8	1
15	Whitworth	0	3	Loss	4	9	1
16	Linfield	2	0	Win	5	9	1
17	Willamette	0	1	Loss	5	10	1
18	Pacific Lutheran	0	1	Loss	5	11	1
19	Puget Sound	1	0	Win	6	11	1
20	George Fox	3	2	Win	7	11	1

5.3 Pie Chart

- Let's build a Pie Chart of the final Wins/Losses/Ties

- Y Values are the numeric values
  - Bottom of the chart

- Horizontal (Category) Axis Labels are the Labels Wins, Losses, Ties

Wins, Losses, Ties for Men's
Soccer
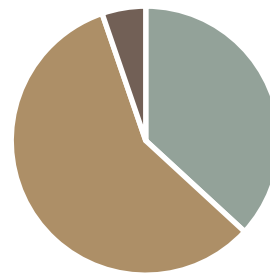
▪ Wins　▪ Losses　▪ Ties

Problem 5.4

http://zeus.cs.pacificu.edu/chadd/cs130w17/Problem54.html

- Output the rate of commission that a salesperson receives based on the amount of sales they have generated for that month. Commissions are based on the following:
  - From $1 to $10 earns 10% commission
  - From $10.01 to $100 earns 15% commission
  - Anything over $100 earns 20% commission

- See next slide

Problem 5.4 Continued

Use an If() to fill in this column!

Calculate this column!

	A	B	C
1	**Amount of Sales**	**Commission Rate**	**Amount of Commission**
2	$15.00	15.00%	$2.25
3	$253.00	20.00%	$50.60
4	$10.00	10.00%	$1.00
5	$84.00	15.00%	$12.60
6	$12.00	15.00%	$1.80
7	$5.00	10.00%	$0.50
8	$32.00	15.00%	$4.80
9	$56.00	15.00%	$8.40
10	$150.00	20.00%	$30.00
11	$120.00	20.00%	$24.00

Problem 5.5

- Open a new worksheet and download the data from:
  - http://zeus.cs.pacificu.edu/chadd/cs130w17/Problem55.html

- Notice that the difference between this sheet and the previous one is that the values for minimum sales, maximum sales, and commission rate are to be read from the bottom table, instead of storing the values in the formula.
  - See next slide

- Why is this a better design?

Problem 5.5

Use an If() to fill in this column!

Calculate this column!

Use the table below to set the rates.

|	A	B	C
1	**Amount of Sales**	**Commission Rate**	**Amount of Commission**
2	$15.00	15.00%	$2.25
3	$253.00	20.00%	$50.60
4	$10.00	10.00%	$1.00
5	$84.00	15.00%	$12.60
6			
7	**Minimum**	**Maximum**	**Commission**
8	$1.00	$10.00	10%
9	$10.01	$100.00	15%
10	$100.01	–	20%

More on importing from the Web

- Right click the area of the spreadsheet imported from the web
    - Refresh: pulls the data down from the same web page again. If the web page changed, this will change the data in your spreadsheet
    - Edit Query: change the webpage that provides the data to the spreadsheet.
    - Data Range Properties: Enable auto-refresh, control auto-formatting, etc.

Conditional Formatting

Format the Cell based on the data the cell contains.
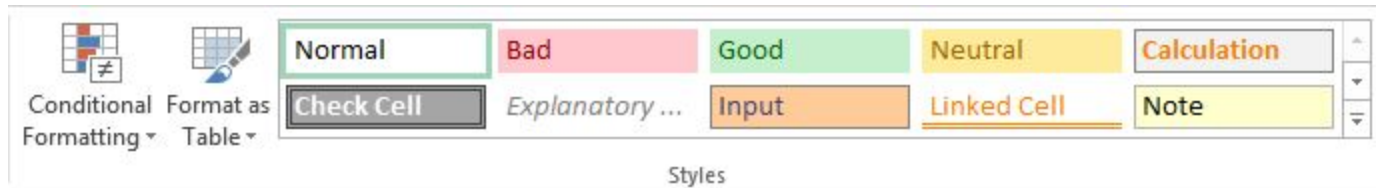
Problem 5.6 - Grades

- Using a web browser, navigate to:
  - http://zeus.cs.pacificu.edu/chadd/cs130w17/Problem56.pdf

- Copy and paste the top table into Excel.
- Did the table copy and paste correctly?
- If not, try a different web browser: Chrome, Firefox, IE

- Copy and paste the bottom table into Excel.
- Did the table copy and paste correctly?
- If not, try a different web browser: Chrome, Firefox, IE

Problem 5.6 - Grades

- Add two additional columns to the top table as follows:
  - Average is a person's total points divided by the max points possible

  - Letter Grade shows the student's letter grade in the course
    90-100 A, 80-90 B, 70-80 C, 60-70 D, 0-60 F.

Problem 5.6 - Grades

- Create a Pie Chart that shows the percentage of A's, B's, etc.

- You will need to add cells calculating the number of A's, number of B's, etc.

  - Hint: look up the COUNTIF function
  - You can look up how it works in Excel help