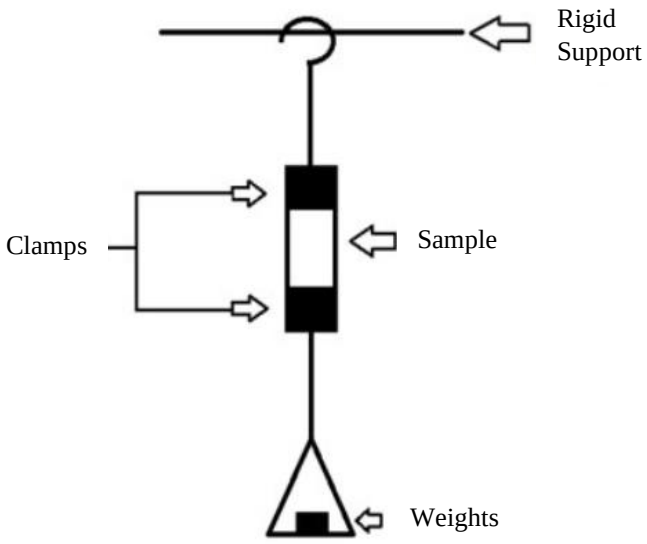
ENED 1120 – Spring 2024

Homework 12.1: VBA 3 (Repetition Flow)

INDIVIDUAL ASSIGNMENT: See the course syllabus for a definition of what constitutes an individual HW assignment.

Task 1 (of 1): Tensile Strength Testing of Biodegradable Plastic Prototypes and Safety Factor

When designing a system, it is important to build a safety factor to help ensure that the system does not fail. The safety factor (F.S.) for a system experiencing stress is defined as the ratio of the Strength (Yield, Ultimate, or Fracture; but usually Yield) Strength to the Design Stress (stress you expect the system to experience).



You did a similar task in your CFU for VBA 2: Conditional Flow. In this current task, you will step into the shoes of engineers working in a laboratory for a biodegradable plastic company. Your task is to analyze the results of tensile testing on prototype samples provided by three teams of safety engineers in your company to determine if they meet safety requirements.

The testing teams used the experimental apparatus in the image to the left. They used weights to identify the Yield Strengths of different biodegradable plastic prototype samples. Your task is to use the following equation to grade these samples as either Weak, Acceptable or Over Engineered using certain provided F.S. and Design Stress values as guides.

$$\text{F. S.} = \frac{\text{Yield Strength}}{\text{Design Stress}}$$

Use the starter file for the HW12p1_VBA3_Task1 from the community site to develop a Macro called "Biodegradable". The following steps may be helpful while you develop this VBA script.

- Start out by clearing out previous values. You can use

  ```
  ActiveSheet.Range("Cells Range Here").ClearContents
  ```

  to clean outputs columns and

  ```
  ActiveSheet.Range("Cells Range Here").Interior.Color = xlNone
  ```

  to clean colors from cells that you will be color-coding with your script.

- For each input Team column, please make sure there are at least 10 entries. If there are fewer than 10 tests conducted by any team, you will display “NMT” (short for “Need More Tests”) in the first cell of their corresponding output column and will not be doing any further calculations with the rest of the column. You could utilize a loop structure to do the count for you. The testing team may have collected up to 20 tests, but you will only be using the results of the first 15 tests in your analysis. This is where you will need your Do While or Until loop (ActiveSheet.Cells(row, col) <> "" And another condition to use a maximum of 15 tests.
- You also need to compare the calculated F.S. scores for each test with the given range of F.S. scores in cells F5 and H5. If your score is less than the F.S. in cell F5, the cell in your output section containing your calculated F.S. should be colored Yellow. If the calculated F.S. score is greater than the value in cell H5, the cell should turn Red. Finally, if the value is within the given F.S. range, the cell should turn Green. Use:
    - Yellow:
      `ActiveSheet.Cells(The Cell).Interior.Color = RGB(255, 255, 153)`
    - Red:
      `ActiveSheet.Cells(The Cell).Interior.Color = RGB(255, 0, 0)`
    - Green:
      `ActiveSheet.Cells(The Cell).Interior.Color = RGB(0, 255, 0)`
- Utilize a Loop structure where the loop takes care of moving to the next column (For col = 2 To 4) after the calculations with one column are complete.

Submit the file to your section site with the following name:
HW12p1_VBA3_UCusername.xlsm where *UCusername* is your 6+2.

TEST CASES:

Inputs: Requirements		
1	>=F.S. >=	1.2
Design Strength =	8	

Outputs: F.S.			
Test #	**Team 1**	**Team 2**	**Team 3**
1	1.13	1.00	**NMT**
2	1.13	0.25	
3	0.88	0.88	
4	1.00	1.00	
5	1.00	1.00	
6	1.13	1.13	
7	1.63	1.13	
8	1.13	1.13	
9	1.00	1.00	
10	1.00	2.00	
11	0.38	1.00	
12	1.13	1.13	
13	1.25	1.25	
14	1.88	1.13	
15	1.00	1.00	