CompareFormulas VBA Script Documentation

Overview

This VBA script is designed to compare excel formulas written within certain cells of a student's workbook with those in an official answer sheet. It assigns marks and provides feedback based on the comparison.

The code:

- First checks if the student has answered using a formula.
- If so, the code compares the student's formula letter by letter against an answer formula (ignoring additional spaces or $ signs), as well as against alternate answer and common mistake formulas if these are given.
- If the student's formula does not match any of the above, it is checked that the student's formula uses the same input cells as the answer formula.
- If so, these input cells are replaced with suitable random inputs and it is checked if the student's formula and the answer formula achieve the same output in order to determine if the student's formula is fit for purpose.

There are various additional checks in instances where the student's formula is incorrect in order to determine precise feedback. For example, the code checks if the students answer has a common substring with the official answer to check if they were close.

Prerequisites

Before using this script, ensure the following:

- You have an Excel workbook open with macros enabled.
- The workbook contains two worksheets: "Answers" and "Student". The cells you need to check should be the same in both worksheets. For example, if you wanted to check cells "A1" and "B3", then the code will compare cell A1 on sheet Answers to cell A1 on sheet Student and cell B3 on sheet Answers to cell B3 on sheet Student etc.
- All cells on the Answers sheet being checked should contain a formula. If you also want to compare hard coded numbers or words then the code needs to be updated.
- There is an option to place alternative correct answers to the cell immediately right of any correct answer on the Answers worksheet. Note that an alternative correct answer will be marked as correct by the vba code even if not listed here, the only change is to the feedback given. No formulas that are not alternative correct answers should be placed to the immediate right of an answer being checked.
- There is an option to place common mistake formulas to the cell two to the right of any correct answer on the Answers worksheet. And three to the right of the correct answer cell you can place feedback for that common mistake. You should not provide a common mistake formula unless also providing feedback. Common mistake formulas are awarded a mark of 0 when found in the Student worksheet.
- Note that the Question Name and Question Mark columns in the example Answers excel spreadsheet have no effect and can be ignored.

The first figure below shows an example answer worksheet with the location of alternate correct answers and common mistake answers and feedback. The second figure below shows the

corresponding students worksheet with the location of marks and feedback. The code in this case was written to compare cells B8, B9 and B10 and further cells not shown in the diagrams. Feedback was placed from cell E3 on the Students worksheet.

	A	B	C	D	E	F	G
1	Q1	Correct answers	Alternate correct answers	Common mistake Answers	Feedback if common mistake	Question Name	Question mark
2	loan amount at time 0	$100,000.00					
3	nominal interest rate	3.10%					
4	compounding frequency	2					
5	i_p	3.12%					
6	number of level repayments from	13					
7	Final smaller repayment	600					
8	amount of level repayment	$9,773.43				Q1a)	1
9	loan outstanding at time 3	$68,703.81	$68,703.81			Q1b)	1
10	loan outstanding at time 8	$28,109.97	$28,109.97			Q1c)	1

	A	B	C	D	E	F	
1	Q1						
2	loan amount at time 0	$100,000.00					
3	nominal interest rate	3.10%			Question	Mark	Feedback
4	compounding frequency	2			Q1a	0	Question not attempted. The correct answer wa
5	i_p	3.12%			Q1b	1	Your answer is identical to the worked solution
6	number of level repayments from time 0 to time 12	13			Q1c	0	Your answer is incorrect and your formula does
7	Final smaller repayment	600			Q2a	0	You did not convert the rate to half yearly
8	amount of level repayment				Q2b	0	Incorrect number, and no formula used. The co
9	loan outstanding at time 3	$454.90			Q2c	0	Your answer is incorrect and your formula does
10	loan outstanding at time 8	$531.53			Q2d	1	Your answer is identical to the worked solution

Required edits when using the code

You need to update the following arrays when applying the code to a new situation.

- `QuestionNumbers`: An array that stores question numbers.
- `CellsToCheck`: An array that stores the cell addresses to be checked.
- `Feedback`: An array that stores the top left cell address of where feedback will be placed on the student worksheet. Make sure there will be plenty of space on the right and below this cell to fit the marks and feedback.

Usage

1. Open Excel files and enable macros (if not already enabled).

2. Open a workbook that contains the macro code or create a new one.

3. Run the `CompareFormulas` macro to compare formulas and values.

4. Review the marks and feedback provided in the "Student" worksheet.