Final Exam

Instructions

Please write your name and university-issued email address below in the space provided:

Name: _____

Email Address: _____

You will have 90 minutes to answer the questions contained herein. You may submit the exam at any time within that period. Once you begin the exam, you may not leave the room until you submit it. So if you need to use the restroom, please do so before opening the test booklet.

Before beginning, please also remove all items from your desktop (except drinks or water bottles with covers/lids). And if you are wearing a hat, please remove it (except if prohibited for religious reasons).

During the exam period, you are expected to not consult with any other source of information, and there should be no talking for any reason. If you have a question about the exam material, raise your hand and wait for an opportunity to ask an instructor for clarification.

When you are ready, you may begin. Good luck!

Evaluation

Partial credit may be awarded for any question, and there is no penalty for guessing. The professor may “curve” grades up to meet a desired minimum average score. The weight of each question is detailed below:

Question Number	Question Weight
1	5%
2	10%
3	10%
4	5%

Question Number	Question Weight
5	5%
6	5%
7	10%
8	50%

Decision-Support Systems within a Business Context

1. What is an **information system**? Please define the term.

2. How can **businesses benefit from computer-based decision-support systems**? In other words, how can these systems provide value to a business? Please include benefits / value which can be measured in quantifiable terms.

3. Decision-support systems can be built using different tools and technologies besides VBA in MS Excel. **In what business situations is VBA the right tool for the job?** And in what business situations might VBA not be the right tool for the job? What are the relative strengths and weaknesses of VBA in MS Excel, as compared to other toolsets?

4. For any given VBA variable named `X`, **write VBA code** to display a textual alert message (i.e. “pop up” window) containing the variable’s **value**:

5. For any given VBA variable named `X`, **write VBA code** to display a textual alert message (i.e. “pop up” window) containing the variable’s **datatype**:

6. For each of the following example VBA objects, specify its **datatype**:

   a. `“Hello World”` Datatype: _____

   b. `False` Datatype: _____

   c. `3.14` Datatype: _____

   d. `557` Datatype: _____

   e. `#05/12/2019#` Datatype: _____

7. For a numeric VBA variable named `Price` which has been assigned a value of `45.12345`, **write VBA code** to display a textual alert message (i.e. “pop-up window”) containing a human-friendly representation of the variable’s value, formatted as USD with a dollar sign and two decimal places (i.e. exactly the phrase `“The Price is: $45.12”`):

8. Given the accompanying business prompt and materials provided on subsequent pages, **write VBA code** in the box below to satisfy the prompt's desired functionality requirements. NOTE: you shouldn't have to modify the provided workbook setup, just focus on writing code to leverage the existing setup.

"Interface" Code Document:

*This page is to be used in conjunction with **Question 8**. Feel free to detach this page and make notes on it. Its contents will not be evaluated.*

Business Prompt:

You're building a financial modeling tool using VBA in MS Excel. The ultimate goal of the tool is to provide financial planning recommendations over a 30-year time horizon. To account for future uncertainty, for each year in that period, you plan on generating a pseudo-random annual investment return rate which you hope to incorporate into further calculations. Even though there will be additional steps involved in building the final version of this tool, the first step is to **simulate 30 years worth of annual investment return rates, and write these values to a spreadsheet**.

Existing Setup:

- You have created a new macro-enabled workbook with an "Interface" sheet and a "Data" sheet.
- On the "Interface" sheet, you have configured cells "E7", "E9", and "E11" to capture numeric input values from the user (i.e. the maximum, likely, and minimum annual interest rates, respectively).
- On the "Interface" sheet, you have created an ActiveX Command Button called `CommandButton1` which has a caption of "Generate!".
- On the "Data" sheet, you have created a header row with "year" in the first column and "return rate" in the second column.
- In the VBA Editor window, you have created a new module document called "Module1" where you have pasted the provided Triangular Distribution Function (i.e. `Triang`, see definition on subsequent page. The role of this function is to generate a simulated annual return rate. The function as it is currently defined accepts input parameters representing the minimum, likely, and maximum interest rates, respectively. And it will return a numeric annual interest rate greater than the minimum rate and less than the maximum rate, centered around the likely rate).

Desired Functionality:

- When the "Generate!" button is clicked, it should write a record to the "Data" sheet for each year between the current year and 30 years from now, inclusive.
- The values for each record should include the integer year (e.g. `2021`) in the first column, and a simulated annual return rate (e.g. `0.076`) in the second column.
- To calculate the simulated annual return rate for any year, invoke the provided Triangular Distribution Function. Pass as parameter values the minimum, likely, and maximum interest rates provided by the user via the aforementioned input cells.

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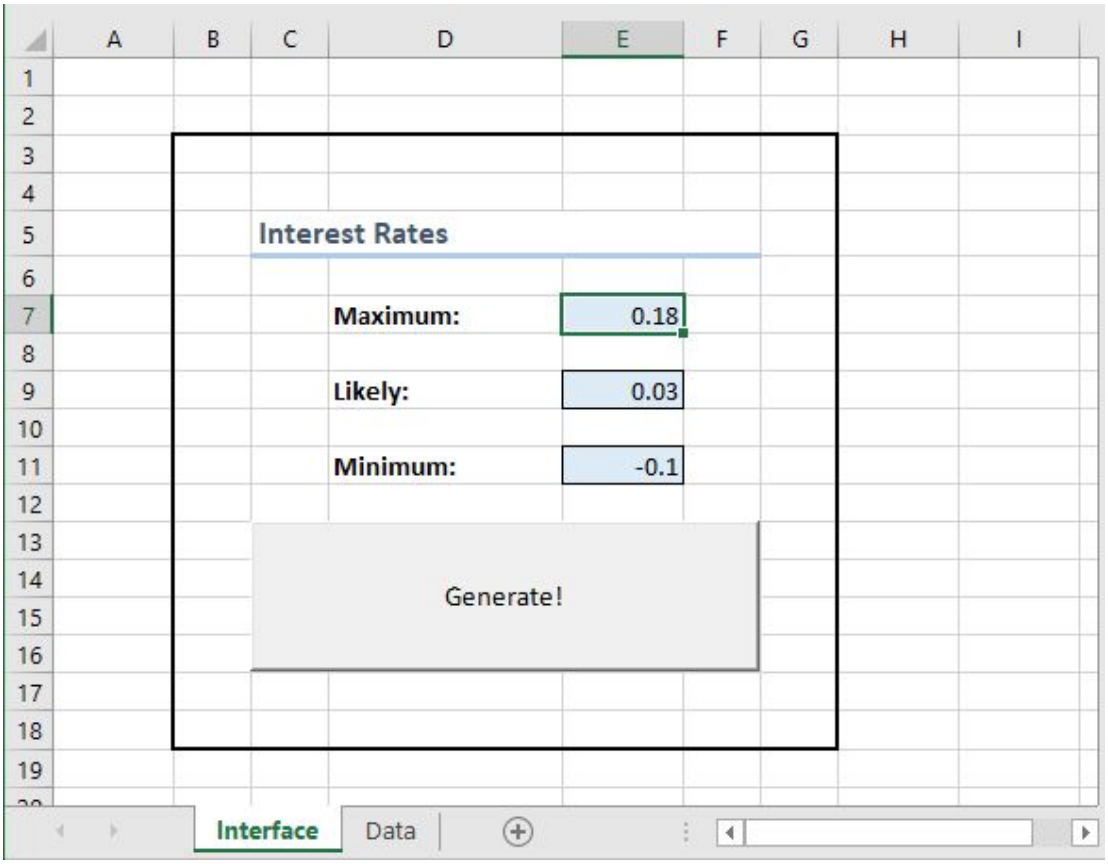
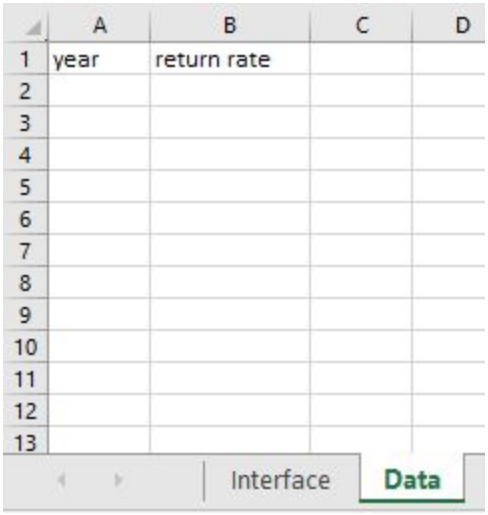
"Interface" Sheet (existing setup):



"Data" Sheet (existing setup):



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"Module1" Code Document (existing setup):

```
' Triangular Distribution Function

Public Function Triang(Min, Likely, Max)
    MyRand = Rnd()

    If MyRand <= (Likely - Min) / (Max - Min) Then
        Triang = Min + SquareRoot(MyRand * (Max - Min) * (Likely - Min))
    Else
        Triang = Max - SquareRoot((1 - MyRand) * (Max - Min) * (Max - Likely))
    End If
End Function

Public Function SquareRoot(N)
    SquareRoot = N ^ (1 / 2)
End Function
```

"Data" Sheet (desired end result):

	A	B
1	year	return rate
2	2019	0.021391775
3	2020	-0.00091302
4	2021	-0.055015524
5	2022	-0.005787665
6	2023	0.150356675
7	2024	-0.05291124
8	2025	0.01919148
9	2026	0.015264189
26	2043	0.096182742
27	2044	-0.073869478
28	2045	-0.012493325
29	2046	-0.048116465
30	2047	-0.038044559
31	2048	0.009880285
32	2049	-0.031675072
33		
34		

Interface | Data