**Triple-F Health Club**

Student Instructions

Triple-F Health Club (Family, Fitness, and Fun) is a not-for-profit family-oriented health club. The club's board of directors is developing plans to acquire more equipment and to expand club facilities. The board plans to purchase about $25,000 new equipment each year and wants to establish a fund to purchase the adjoining property in four or five years. The adjoining property has a market value of about $300,000.

The club manager, Luca Pacioli, is concerned that the board has unrealistic goals in light of the club's recent financial performance. He has sought the help of a club member (you!!! a UCF graduate) with a superior education to assist him in preparing a report to the board supporting his concerns.

While attending UCF you learned about the need for cash budgeting and that much of the data needed for the cash budget is plagued by random variables. For example how many members will we have in 2018 and 2019? How many of our members will enroll in additional lessons and classes, what will the costs be for towels and utilities, etc. Will we have enough cash generated from operations to meet our cash obligations and will we have enough cash for the planned equipment and land purchases in the future.

But you are undeterred because you know about Monte Carlo Simulation - where you can algebraically model the uncertainty of everything that goes into the cash budget using Excel and your knowledge of algebra and statistics.

With your knowledge of Monte Carlo Simulation you are confident you can predict the uncertainty of the cash flow at the end of next year and provide the Board of Directors with superior information about the cash flow in the future and make decisions with greater confidence.

You have reviewed the club's records and spoken to various employees to determine the following information.

You have studied the membership for this year and the past seven years in order to project the membership for the next two years. You have decided to use Excel’s "Forecast Sheet" feature to forecast the next two years membership.

|  |  |
| --- | --- |
| Year | Actual Members |
| 2010 | 5,833 |
| 2011 | 6,409 |
| 2012 | 7,161 |
| 2013 | 6,519 |
| 2014 | 7,443 |
| 2015 | 8,423 |
| 2016 | 7,250 |
| 2017 | 7,996 |

The board has been considering increasing the fee for the annual membership. They could leave the annual membership fee at $45 or increase it to $50 or even to $55. Use an empirical pdf for this variable in your MCS model

|  |  |  |
| --- | --- | --- |
|  | Amount | Probability |
| Current membership fee: | $45.00 | 10% |
| Increase to most likely: | $50.00 | 50% |
| Increase to a maximum of: | $55.00 | 40% |

For the "Lesson and class fees" you have decided to rely on the average percentage (percentage of total fees) over the past seven years. For the "Miscellaneous" you realize it is truly miscellaneous and is an arbitrary amount, so you have estimated the following for next year after consultation with Luca Pacioli.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Minimum | Mode | Maximum |
| Lesson and class fees | 55% | 63% | 70% |
|  | Minimum | Maximum |  |
| Miscellaneous | $2,000 | $3,000 |  |

The board plans to purchase new exercise equipment next year – they are not certain of the cost but they have the following best estimates:

|  |  |
| --- | --- |
| Minimum expected to pay | $25,000 |
| Most likely will pay | $30,000 |
| Maximum expected to pay | $32,000 |

You have been running some regression analysis of the membership and the various costs over this year and the past seven years to determine how much cost is fixed and how much is variable. The following data was used for the regression analysis.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Actual Members | Manager's salary and benefits | Regular employees' wages and benefits | Lesson and class employees' wages and benefits | Towels and supplies | Utilities (heat and light) | Mortgage interest | Miscellaneous |
| 2010 | 5,833 | $43,300 | $108,000 | $97,800 | $11,900 | $15,300 | $35,100 | $1,670 |
| 2011 | 6,409 | $43,300 | $115,100 | $103,900 | $11,800 | $15,400 | $35,100 | $1,570 |
| 2012 | 7,161 | $43,800 | $127,000 | $106,400 | $11,900 | $17,000 | $35,100 | $1,570 |
| 2013 | 6,519 | $41,700 | $118,900 | $118,400 | $12,800 | $16,000 | $35,100 | $1,620 |
| 2014 | 7,443 | $46,500 | $131,800 | $124,700 | $14,100 | $15,800 | $35,100 | $1,690 |
| 2015 | 8,423 | $52,100 | $142,600 | $129,300 | $13,700 | $17,100 | $35,100 | $1,830 |
| 2016 | 7,250 | $49,300 | $155,100 | $140,600 | $14,900 | $18,100 | $35,100 | $1,810 |
| 2017 | 7,996 | $56,000 | $160,000 | $150,000 | $14,500 | $18,200 | $35,100 | $2,000 |

The mortgage details are:

|  |  |
| --- | --- |
| Outstanding mortgage balance | $360,000 |
| Annual principal payment, November 1st every year | $30,000 |
| Interest rate on unpaid balance | 9.00% |

**Your Workbook**

Name your workbook:

TripleFHealthClub & your firstname &lastname.XLSX

e.g. TripleFHealthClub*LucaPacioli*.XLSX

In this assignment, you will create the following sheets:

* Worksheets: AlgebraicModel, RelevantTables can create now
* Chart Sheets: only created when you get to that stage of the assignment when you need a chart.



To Create Chart Sheets Review the Microsoft Help

<https://support.office.com/en-us/article/Create-a-chart-from-start-to-finish-0baf399e-dd61-4e18-8a73-b3fd5d5680c2>

**Required:**

1. Project the membership for the years 2018 and 2019 using Excel Exponential Smoothing (ETS) algorithms. Also project the 95% confidence limits of the membership projection.
2. Prepare a table for an empirical probability density function for the membership fee to use in your MCS model. Hint:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Membership Fee | PDF | CDF |
| Current membership fee | $45.00 |  |  |
| Increase to most likely | $50.00 |  |  |
| Increase to a maximum of | $55.00 |  |  |

This empirical probability density is best handled in Excel with an IF statement.

1. Using Members as the independent variable, estimate (using Excel LINEST) the variable and fixed costs for:

Regular employees' wages and benefits

Lesson and class employees' wages and benefits

Towels and supplies

Utilities (heat and light)

Assume the following cash flows are fixed:

Manager's salary and benefits

Miscellaneous

Mortgage interest – no pdf

Mortgage principal – no pdf

Planned equipment purchases

1. Based on a previous (not shown here) data analysis the following correlation matrix was determined:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Members | Annual Fee | Lesson and class fees | Towels and supplies |
| Members | 1 |  |  |  |
| Annual Fee | -0.80 | 1 |  |  |
| Lesson and class fees | 0.85 | -0.60 | 1 |  |
| Towels and supplies | 0.85 | -0.60 | 0.50 | 1 |

1. Create your Monte Carlo Simulation model. Here is my model layout to assist you.



For the assumption variables shown below, use the following probability density functions:

|  |  |
| --- | --- |
| **Assumption Variable** | **Probability Density Function** |
| Members | Triangular |
| Annual Fee | Empirical |
| Lesson & class fees | Triangular |
| Miscellaneous | Uniform |
|  |  |
| Manager’s salary and benefits | Uniform |
| Regular employees | Normal for variable cost and Uniform for fixed costs |
| Lesson and class employees | Normal for variable cost and Uniform for fixed costs |
| Towels and supplies | Normal for variable cost and Triangular for fixed costs |
| Utilities (heat and lights) | Normal for variable cost and Triangular for fixed costs |
| Miscellaneous | Uniform |
| Mortgage interest | Fixed cost, no pdf |
| Mortgage principal | Fixed cost, no pdf |
| Planned equipment purchases | Triangular |

1. Prepare the deterministic cash flow statement for 2018 – use the following as a model. Locate your table on the RelevantTables sheet.



1. Summarize your MCS results with relevant statistics. Use the following as a model. Locate your table on the RelevantTables sheet.



1. Prepare the following chart sheets:

|  |  |  |
| --- | --- | --- |
| **Chart sheet** | **Content** | **Comment** |
| Forecast | The past membership for 2010 to 2017 and your forecast for 2018 and 2019. |  |
| Regression | Regular employees' wages and benefits | Only present this one regression chart. If you do this correctly obviously you could chart all other expenses. |
| PDF | 2018 Net Cash Flow | Suggest 17 bins |
| CDF | 2018 Net Cash Flow |  |
| Tornado | 2018 Net Cash Flow |  |

1. Will the board have adequate funds to purchase the new exercise equipment next year? Support your answer with a sentence or two of explanation.
2. Will the board be able to save an “adequate chunk of funds” to buy the adjoining property in 5 years? Support your answer with a sentence or two of explanation.