HAMLINE UNIVERSITY
School of Business

Spreadsheet Model Project

QMBE 3730- Advanced Business Analytics
Spring 2025

Description of Project

Your team is assigned one of two case studies. Each case includes a set of specific assignment questions. As part of this project, you will complete a short report for each case that clearly answers all the assignment questions.

The goal of each case is to create a useful spreadsheet model to answer the question. Remember that a good spreadsheet model meets the goals of:

- Communication
- Reliability
- Auditability
- Modifiability

Deliverables

1. A well-designed spreadsheet model saved as a *.xlsx file.

2. A Business memo (1-3 pages) containing the following sections:
    a. Executive Summary: Introduction and Summary of Report
    b. Problem Definition and Scope (including any assumptions made)
    c. Description of Analyses Conducted
    d. Discussion of Results/Findings
    e. Conclusions/Recommendations

3. A 5–7-minute presentation of the case, including your results and recommendations.

Reminder: Although every group must prepare a presentation, only a selection of groups will be chosen to present on Thursday, March 13th.

Case 1- The Estate of Erich Blackman (Based loosely on either true events or events from HBO's Silicon Valley)

Background

Erich Blackman was a Silicon Valley investor who amassed a large fortune before running away overseas and retiring on a small island in Southeast Asia. Initially after his sudden departure, he continued to be an active entrepreneur and to grow his fortune by building and investing in successful businesses from his new island home. After a few years, however, he completely disappeared from public life and now rumors have begun to spread that Erich Blackman is dead.

Jimmy Li is an old friend and business partner of Blackman's. As Blackman apparently left behind no children or other legal next of kin, Jimmy believes that he has a right to a share of the Blackman inheritance. He even claims the existence of a document signed by Blackman, which declares Jimmy a beneficiary as part of the terms of an earlier partnership agreement. Currently, Jimmy believes this document is stored in the archives of another business now owned by a different former business partner, but he is relatively sure that he will have no trouble acquiring the document. The executors of the Blackman estate are aware of Jimmy's assertion and have offered him a settlement of $15 million to walk away and forgo any claim he may have. In order to help navigate this situation, Jimmy has hired your team of analysts to review his options and provide a recommendation.

Several hurdles stand between Jimmy Li and the Blackman estate. First, Blackman has yet to be declared legally deceased. Jimmy's attorneys have begun a legal petition to the courts to make the official declaration and estimate the probability of success to be 0.60. If the petition is denied, the attorneys plan to challenge the decision and estimate a 0.30 probability that the challenge will succeed and ultimately result in an official declaration of death.

Even if Blackman is declared legally dead, Jimmy must still obtain the alleged document proving his claim to the estate. His attorneys believe that Jimmy's probability of obtaining access to the archives is 0.70. The probability of the document being subsequently found in the archives is estimated to be 0.80.

Finally, if Blackman is declared dead and Jimmy manages to obtain the necessary evidence for his case, Jimmy's lawyers predict that the trustees of the Blackman estate are likely to offer Jimmy a settlement of $40 million rather than go to court. If taken to court, Jimmy's advisors predict a 0.20 probability that the case will be dismissed. If successful, the amount of money Jimmy will inherit depends on other simultaneous claims made to the estate. His attorneys predict a 0.04 probability of receiving $338 million, a 0.16 probability of receiving $68 million, a 0.40 probability of receiving $34 million, and a 0.20 probability of receiving $17 million.

Assignment

1. Use principles of good spreadsheet design to create a spreadsheet model for this decision:
    a. Use EMV where necessary to create payoff values (Hint: You may want to create a decision tree for this problem and use backward induction to create expected

values. You do not need to create the tree in Excel, but your spreadsheet model should include informative notes about how expected values are calculated.)

   b. Which choice has the best EMV?
2. What is the minimum settlement value he should accept according to EMV?
3. What OTHER issues might you want to consider?
   a. Consider creating Data Tables to show how the result is sensitive to various inputs (e.g., probabilities, payoffs).
4. What do you advise?

Case 2- Retirement Planning (Based loosely on nothing in particular)

Background

Alfred has been the butler for a local billionaire family for several years. After the parents in this family were killed in a terrible accident, Alfred has also become the sole caretaker of the family's only child. Alfred is now 37 years old and decides that he wants to be more deliberate in his planning for future retirement.

Alfred currently has $43,482.62 in his retirement savings account and he expects an annual rate of return of 5.1 percent on this account.

Alfred's current contract with his employer includes the following:

Alfred's current salary:	$95,000
Automatic annual contribution from Alfred's salary:	2.5%
Automatic annual contribution from Alfred's employer:	5%
Alfred's expected annual raise in salary:	2%

This reflects the maximum that his employer will match in annual contributions. Alfred can also choose to make an additional nominal contribution to his retirement account of up to $22,500 per year.

Currently, Alfred believes that he would like to retire at age 65. After retirement, he expects an annual rate of return of 4 percent on whatever he has left in his account at the end of the year. He expects that he will require $80,000 per year to live on after retirement (in current dollar terms), but this value is expected to rise at an expected inflation rate of 3 percent per year. Alfred also expects that he will be required to pay 15 percent of whatever money he withdraws from his retirement account each year in taxes.

Assignment

1. Use principles of good spreadsheet design to create a spreadsheet model that Alfred can use for retirement planning.
2. Outputs of the model should include:
    a. the total amount of accumulated savings that Alfred will have at the beginning of retirement.
    b. the age at which all retirement funds will be depleted.
3. How do these outputs depend on different decisions that Alfred can make?
    a. Consider creating Data Tables to show how the result is sensitive to various inputs (e.g., retirement age, additional pre-tax contributions).
4. What other considerations may be important to Alfred's retirement decisions?

Grading Rubric

Graded Elements & Relative Weighting		Does Not Meet Expectations 1	Approaches Expectations 2	Meets Expectations 3	Exceeds Expectations 4
Final Individual Grade is Weighted by Partner Scores (0-100%)		"Who was my partner again?"	"My partner contributed only minimal effort to this project."	"My partner's contributions were helpful, but inadequate."	"My partner participated fully in completing this project."
Completeness and Breadth of Analysis 30%		The analysis did not complete all the assignment steps and the elements within each step are not clearly motivated. The analysis did not provide actionable insight.	The analysis either did not adequately follow all the assignment steps OR all steps were followed but the elements of each step are not clearly motivated or relevant (e.g., too much incoherent information). The analysis, while incomplete, was actionable.	The analysis was thorough, insightful and actionable. The analysis clearly follows most assignment steps. Each step includes enough analysis to support story, but the purpose of some information is unclear.	The analysis is thorough, insightful, actionable, and thought provoking. The analysis clearly follows all assignment steps. Each step includes only relevant analysis and the reason for including any analysis is clear.
Accuracy and Appropriate Application of Analysis Tools 30%		Calculations and analysis are not appropriate/meaningful or contain serious errors.	Analysis reflects a basic understanding of concepts. Analysis tools and/or tables/graphs are either misapplied, misinterpreted, or incorrectly calculated/formatted.	Analysis tools are appropriate and correctly applied/interpreted. The analysis may contain some minor errors. Tables and graphs accurately reflect the data but are not formatted clearly.	Analysis reflects advanced understanding of concepts. Analysis tools are appropriate and correctly applied and neatly formatted. All statistics are accurately calculated and interpreted. Tables and graphs accurately reflect the data.
Communication of Results 30%	**Business Memo 15%**	The memo/poster/presentation did not adequately address required sections. Descriptions or discussions of results is difficult to follow and understand.	All sections are represented, but the descriptions or discussions are sometimes incomplete or difficult to understand.	The memo/poster/presentation provides clear descriptions for each section. The analysis and discussion of results are conveyed in a manner that is ultimately understood. The sections may seem somewhat independent of each other and lack a clear, coherent story.	The memo/poster/presentation provides clear, thoughtful descriptions for each section. Both the analysis and discussion of results are conveyed in a manner that is easily understood. All sections fit together to tell a coherent story.
	Poster/ Presentation 15%				