BAMS 517: Assignment 1

(Each team submits one Word or PDF report and one Excel file on Canvas before the deadline. The Word/PDF report should include your answers to the questions with succinct explanations. Include the full names of the team members on the front page of the report. The Excel file should include your TreePlan models. Name your files as "Lastname_Firstname_HW1.xxx"; the name of any team member can be used, which has no implication on the relative contributions of the team members.)

1. Who Wants to be a Millionaire? (I)

You are a contestant on "Who Wants to be a Millionaire?" You already have answered the $250,000 question correctly and now must decide if you would like to answer the $500,000 question. You can choose to walk away at this point with $250,000 in winnings or you may decide to answer the $500,000 question. If you answer the $500,000 question correctly, you can then choose to walk away with $500,000 in winnings or go on and try to answer the $1,000,000 question. If you answer the $1,000,000 question correctly, the game is over and you win $1,000,000. If you answer either the $500,000 or the $1,000,000 question incorrectly, the game is over immediately and you take home "only" $32,000.

A feature of the game "Who Wants to be a Millionaire?" is that you have three "lifelines"—namely "50-50," "ask the audience," and "phone a friend." At this point (after answering the $250,000 question), you already have used two of these lifelines, but you have the "phone a friend" lifeline remaining. With this option, you may phone a friend to obtain advice on the correct answer to a question before giving your answer. You may use this option only once (i.e., you can use it on either the $500,000 question or the $1,000,000 question, but not both).

Since some of your friends are really smart and knowledgeable, "phone a friend" significantly improves your odds for answering a question correctly. Without "phone a friend," if you choose to answer the $500,000 question you have a 65 percent chance of answering correctly, and if you choose to answer the $1,000,000 question you have a 50 percent chance of answering correctly (the questions get progressively more difficult). With "phone a friend," you have an 80 percent chance of answering the $500,000 question correctly and a 65 percent chance of answering the $1,000,000 question correctly.

(a) Use TreePlan to construct and solve a decision tree. What is the best course of action, assuming your goal is to maximize your *expected* winnings? (10 pts)

2. Brainy Business Case (I)

While El Niño is pouring its rain on northern California, Charlotte Rothstein, CEO, major shareholder and founder of Cerebrosoft, sits in her office, contemplating the decision she faces regarding her company's newest proposed product, Brainet. This has been a particularly difficult decision. Brainet might catch on and sell very well. However, Charlotte is concerned about the risk involved. In this competitive market, marketing Brainet also could lead to substantial losses.

Should she go ahead anyway and start the marketing campaign? Or just abandon the product? Or perhaps buy additional marketing research information from a local market research company before deciding whether to launch the product? She has to make a decision very soon and so, as she slowly drinks from her glass of high protein-power multivitamin juice, she reflects on the events of the past few years.

Cerebrosoft was founded by Charlotte and two friends after they had graduated from business school. The company is located in the heart of Silicon Valley. Charlotte and her friends managed to make money in their second year in business and continued to do so every year since. Cerebrosoft was one of the first companies to sell software over the Internet and to develop PC-based software tools for the multimedia sector. Two of the products generate 80 percent of the company's revenues: Audiatur and Videatur. Each product has sold more than 100,000 units during the past year. Business is done over the Internet: customers can download a trial version of the software, test it, and if they are satisfied with what they see, they can purchase the product (by using a password that enables them to disable the time counter in the trial version). Both products are priced at $75.95 and are exclusively sold over the Internet.

Users can “surf the Web,” accessing information available worldwide. Users can also make files available on the Internet, and this is how Cerebrosoft generates its sales. Selling software over the Internet eliminates many of the traditional cost factors of consumer products: packaging, storage, distribution, sales force, and so on. Instead, potential customers can download a trial version, take a look at it (that is, use the product) before its trial period expires, and then decide whether to buy it. Furthermore, Cerebrosoft can always make the most recent files available to the customer, avoiding the problem of having outdated software in the distribution pipeline.

Charlotte is interrupted in her thoughts by the arrival of Jeannie Korn. Jeannie is in charge of marketing for online products and Brainet has had her particular attention from the beginning. She is more than ready to provide the advice that Charlotte has requested. “Charlotte, I think we should really go ahead with Brainet. The software engineers have convinced me that the current version is robust and we want to be on the market with this as soon as possible! From the data for our product launches during the past two years we can get a rather reliable estimate of how the market will respond to the new product, don't you think? And look!” She pulls out some presentation slides. “During that time period we launched 12 new products altogether and 4 of them sold more than 30,000 units during the first 6 months alone! Even better: the last two we launched even sold more than 40,000 copies during the first two quarters!” Charlotte knows these numbers as well as Jeannie does. After all, two of these launches have been products she herself helped to develop. But she feels uneasy about this particular product launch. The company has grown rapidly during the past three years and its financial capabilities are already rather stretched. A poor product launch for Brainet would cost the company a lot of money, something that isn't available right now due to the investments Cerebrosoft has recently made.

Later in the afternoon, Charlotte meets with Reggie Ruffin, a jack-of-all-trades and the production manager. Reggie has a solid track record in his field and Charlotte wants his opinion on the Brainet project.

“Well, Charlotte, quite frankly I think that there are three main factors that are relevant to the success of this project: competition, units sold, and cost—ah, and of course our pricing. Have you decided on the price yet?”

“I am still considering which of the three strategies would be most beneficial to us. Selling for $50.00 and trying to maximize revenues—or selling for $30.00 and trying to maximize market share. Of course, there is still your third alternative; we could sell for $40.00 and try to do both.”

At this point Reggie focuses on the sheet of paper in front of him. “And I still believe that the $40.00 alternative is the best one. Concerning the costs, I checked the records; basically we have to amortize the development costs we incurred for Brainet. So far we have spent $800,000 and we expect to spend another $50,000 per year for support and shipping the CDs to those who want a hard copy on top of their downloaded software.” Reggie next hands a report to Charlotte. “Here we have some data on the industry. I just received that yesterday, hot off the press. Let's see what we can learn about the industry here.” He shows Charlotte some of the highlights. Reggie then agrees to compile the most relevant information contained in the report and have it ready for Charlotte the following morning. It takes him long into the night to gather the data from the pages of the report, but in the end he produces three tables, one for each of the three alternative pricing strategies. Table 1 shows the corresponding probability of various amounts of sales (high = 50,000, medium = 30,000, or low = 20,000) given the level of competition (severe, moderate, or weak) that develops from other companies.

The next morning Charlotte is sipping from another power drink. Jeannie and Reggie will be in her office any moment now and, with their help, she will have to decide what to do with Brainet. Should they launch the product? If so, at what price?

When Jeannie and Reggie enter the office, Jeannie immediately bursts out: “Guys, I just spoke to our marketing research company. They say that they could do a study for us about the competitive situation for the introduction of Brainet and deliver the results within a week.”

Charlotte asks, “Don't we have a simple estimate of how the market will react?”

“Some prior probabilities, you mean? Sure, from our past experience, the likelihood of facing high competition is 20 percent, whereas it is 70 percent for medium competition and 10 percent for low competition,” Jeannie has her numbers always ready when needed.

All that is left to do now is to sit down and make sense of all this…

	Competition Level:		
High Price	Severe	Moderate	Weak
Sales High	0.20	0.25	0.30
Sales Medium	0.25	0.30	0.35
Sales Low	0.55	0.45	0.35
Medium Price	Severe	Moderate	Weak
Sales High	0.25	0.30	0.40
Sales Medium	0.35	0.40	0.50
Sales Low	0.40	0.30	0.10
Low Price	Severe	Moderate	Weak
Sales High	0.35	0.40	0.50
Sales Medium	0.40	0.50	0.45
Sales Low	0.25	0.10	0.05

Table 1

(a) Create a payoff table. (5 pts)

Hints:

- You may use different payoff tables for different scenarios if you prefer, though it's not required.
- Payoff tables do not account for probabilities.
- Sunk costs that affect all action-outcome combinations equally can be disregarded.

(b) Use TreePlan to construct and solve a decision tree. What is Charlotte's best decision if she wants to maximize the *Expected Monetary Value*? (10 pts)