**Homework Assignment 4 (Submission is due the beginning of class 5). Max 6 points.**

You are not required to use EXCEL to solve the problems below. If you use EXCEL, please add the EXCEL screenshots to your PDF write-up. If you don’t use EXCEL, just submit the PDF with the write-up.

**Lucky Strike**

Sterling Cooper & Partners Company has designed two different advertising campaigns: “It’s Toasted” and “The World Is Dangerous”. In addition, there is the option to not launch a new ad campaign, but rather to stick with the old campaign. The entries in the table below represent the revenue for the next year resulting from every combination of action (chosen ad campaign) and state.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Market Response** | | |
|  |  | **Good** | **Fair** | **Poor** |
|  | No new ad campaign | 100 | 60 | -10 |
| Decision | It’s toasted | 200 | 50 | -40 |
|  | The World is Dangerous | 300 | 40 | -100 |

As covered in class, the probability of a good market response is 20%, a fair market response is 50%, and a poor market response is 30%. However, now the market is two years. Whatever campaign strategy you choose, you must keep for both years. The market response stays consistent over the two years (e.g., if it is fair in year 1, it’s fair in year 2).

Your revenues (losses) in year 1 are shown in the table above. Your revenues (losses) in year 2 depend on whether your competitors sue you for misleading advertising practices. If the market response is poor, then competitors don’t file a lawsuit and your year 2 revenues are half of the year 1 revenues (or losses). However, if the market is good or fair, a competitor may file a lawsuit which will lead to litigation costs worth one quarter of the year 1 revenues. If, the lawsuit is filed, then your year 2 payoff consists of the revenues in year 1 minus the litigation costs. If the lawsuit is not filed, your payoff in year 2 is equal to the revenues in year 1. Lastly, the probability of a competitor filing a lawsuit depends on the market response and your campaign strategy.

* **Fair market response.** the likelihood of the lawsuit depends on your strategy:
* **No new ad campaign:** Since you have no new ads, your competitors do not file a lawsuit.
* **It’s Toasted:** the lawsuit is filed with 30% probability.
* **The World is Dangerous:** the lawsuit is filed with 40% probability.
* **Good market response.** the likelihood of the lawsuit depends on your strategy:
* **No new ad campaign:** Since you have no new ads, your competitors do not file a lawsuit.
* **It’s Toasted:** the lawsuit is filed with 50% probability.
* **The World is Dangerous:** the lawsuit is filed with 80% probability.

1. Consider your payoff as the sum of the year 1 and year 2 revenues (and potential costs). What is the Maximax strategy? Provide a table to justify your answer.

*Hint: make sure you have considered all possible states in your payoff table.*

1. What is the Maximin strategy? Provide a table to justify your answer.
2. What is the Minimax Regret strategy? Provide a table to justify your answer.
3. What is the maximum expected payoff strategy and what is the expected revenue under this strategy? Justify your answer with a table or with a decision tree. If you use a decision tree, you may use any program such as Powerpoint, Excel, OneNote or Paint to represent your decision tree. You may even draw it on paper, neatly scan it, and attach it to the homework. The main thing is that it is understandable. Points will be deducted if it’s not clear what’s being represented.