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**
Decision	No new ad campaign	100	60	-10
	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). (1/2). 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 (1/4).
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.

a) 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.
Maximax strategy needs to consider alternative with highest profit.

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor	Max
No new ads	-	-	200	120	-15	200
"It's toasted"	350	87.5	400	100	-60	400
"The world is dangerous"	525	70	600	80	-150	600

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor	Max
No new ads	-	-	=100*2	=60*2	=-10+(-10)/2	200
"It's toasted"	=200*2-50	=50*2-50*0.25	=200*2	=50*2	=-40+(-40)/2	400
"The world is dangerous"	=300*2-75	=40*2-10	=300*2	=40*2	=-100+(-100)/2	600

So the maximax strategy is to use 'the world is dangerous' in the good and not filed situation, which is 600.

b) What is the Maximin strategy? Provide a table to justify your answer.

Maximin profit needs to pick alternative with highest lowest profit.

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor	Min
No new ads	-	-	200	120	-15	-15
"It's toasted"	350	87.5	400	100	-60	-60
"The world is dangerous"	525	70	600	80	-150	-150

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor	Min
No new ads	-	-	=100*2	120	=-10 -5	-15
"It's toasted"	=200*2-50	=50*2-12.5	=200*2	100	=-40-20	-60
"The world is dangerous"	=300*2-75	=40*2-10	=300*2	80	=-100-50	-150

So the maximin strategy is to use 'no new ads' in the poor situation, which is -15.

c) What is the Minimax Regret strategy? Provide a table to justify your answer.

Minimax regret needs to pick lowest highest regret.

Regret under alternative X = best outcome in a given state – outcome in that state under X

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor
No new ads	-	-	200	120	-15
"It's toasted"	350	87.5	400	100	-60
"The world is dangerous"	525	70	600	80	-150

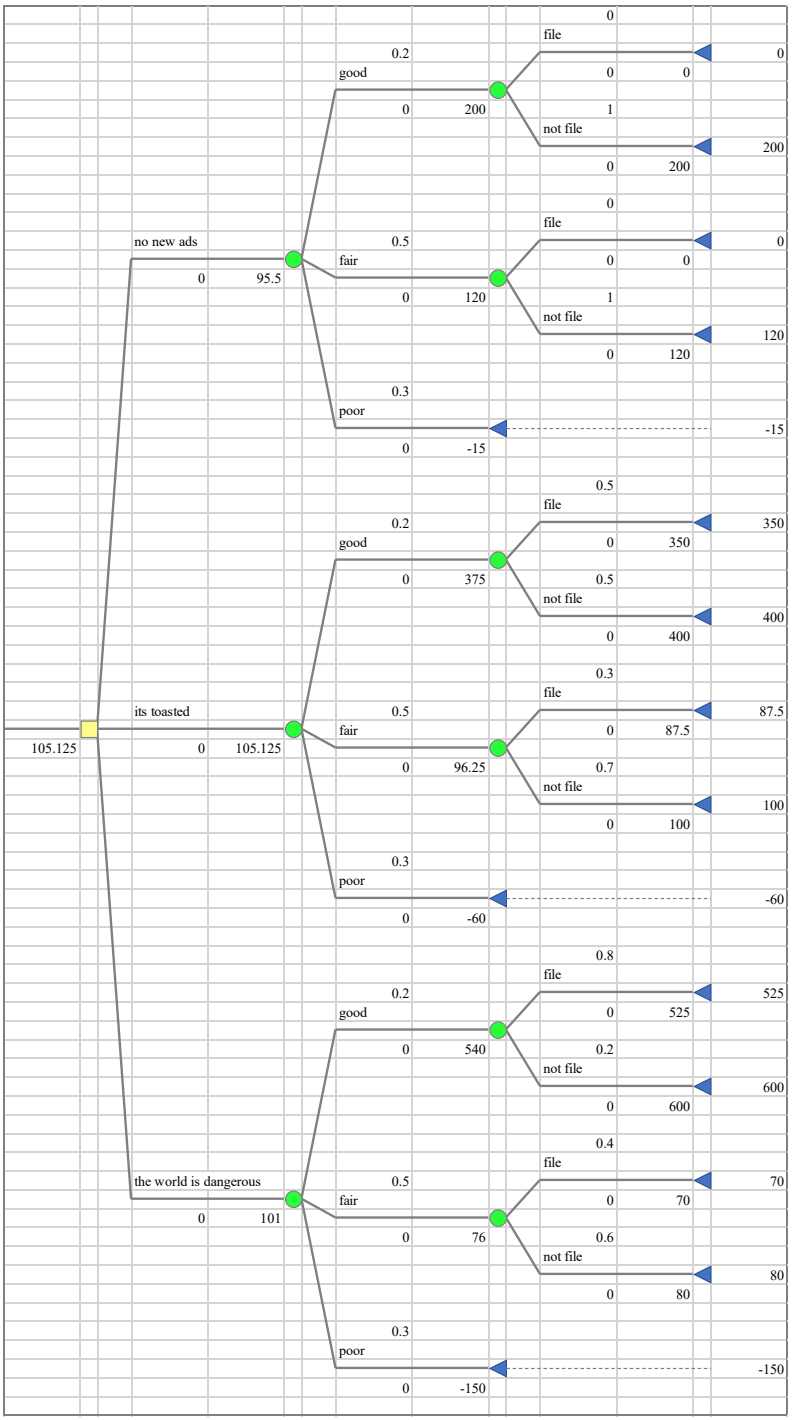
Payoff table

Ad type/ Response	Good(Filed)	Fair(Filed)	Good(Not Filed)	Fair(Not Filed)	Poor	Max
No new ads	-	-	400	0	0	400
"It's toasted"	175	0	200	20	45	200
"The world is dangerous"	0	17.5	0	40	135	135

Regret table

The lowest highest value is 135, which is when the situation poor and 'the world is dangerous'.

d) 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.



risk profile of the best strategy			we choose its toasted		
			profits	probability	
		good and file us	350	0.1	35
		good and not file us	400	0.1	40
		fair and file us	87.5	0.15	13.125
		fair and not file us	100	0.35	35
		poor	-60	0.3	-18
					105.125

the maximum expected payoff strategy is using ‘it’s toasted’ and the expected revenue under this strategy is 105.125.