Exercise 1 (2 points)

A) Is this game dominance-solvable? If it was, what would the dominant strategy equilibrium be?

B) What is/are Nash equilibrium/s of this game? Find all of them.

		Player 2	
		X	Y
Player 1	A	0 , 0	0 , 1
	B	2 , 0	0 , 0

Exercise 2 (2 points)

Two gas-distribution companies decide on entering a new market. Company A is a well-established firm. Company B is a newcomer. Both companies make decisions independently, however, they are aware of each other's intentions. If they both enter, they will face each other. Expected gross revenue for A is $75 million, for B $65 million, however, both would also spend $35 m. as investment and advertising costs. If A enters the market and B does not, A will have to spend $30 m., but this will be offset by expected income of $110 m. B will loose $20 m. in costs. If neither of them enter, A will get $30 m. and B $20 m., since they would not need to invest. If only B enters the market, it will spend $20 m. on investment, but will cash $70 m. in returns, while A would save itself $30 m. of investment. If we presume rationality of both actors, how would both companies decide and why?

		B	
		Enter	Stay out
A	Enter		
	Stay out		

Exercise 3 (2 points)

Two companies are developing a new drilling technology. Given the circumstances, the question of compatibility of both technologies is important. Drill&Co is developing technology DC7, company NorthStar is developing incompatible technology NSx. Both companies understand, that if they both adopt the same technology, they would cash $20 billion from the developing industry. If they adopt different technologies, compatibility issues would jeopardize both companies and each would end up with $0. Accommodating technology of the competitor would cost Drill&Co $10 billion. If NorthStar was to adopt the competitor's technology, it would need to spend $25 billion. Which technology should be used, if both companies were aware of the costs, they acted rationally and the decision was made simultaneously?

		NorthStar	
		DC7	NSx
Drill&Co	DC7		
	NSx		

Exercise 4 (2 points)

Imagine a situation, where natural gas producer P is deciding, whether to ship natural gas via pipelines of the transit country T. Transit country T decides, whether to siphon (steal) natural gas from transit pipelines, or not. It is important to note that producer has no other transit option. P decides between shipping 90 bcm (billion of cubic meters) of gas, each bcm worth $400. T is capable of stealing 10 bcm. If T steals 10 bcm, P will loose the revenue of the stolen amount and will earn revenue of the rest, while T earns the value of stolen gas. If P decides not to ship gas, it will loose all the revenues from the whole shipment of 90 bcm. If T decides not to steal or no amount is shipped, it will earn 0. What is/are the equilibrium/s of this game? How could we interpret it?

		P	
		Ship	Stop
T	Steal		
	Not-steal		

Exercise 5 (2 points)

How would the previous game change if there was an alternative route of transport, through which P was able to ship the whole amount of its obligations? What is/are the equilibrium/s of this modified game?

		P: Ship	P: Stop
T	Steal		
	Not-steal		

Bonus question (1 extra point)

How many equilibriums are there in the game below? Try to explain the result.

		Player 2		
		R	P	S
Player 1	R	0 , 0	-1 , 1	1 , -1
	P	1 , -1	0 , 0	-1 , 1
	S	-1 , 1	1 , -1	0 , 0

Hints:

1. Row player's payoffs are always written first, column player's payoffs are second

2. When searching for dominant strategy equilibrium, compare payoffs of the player between her strategies - for row player, compare all her payoffs in each column; for column player, compare all her payoffs in each row

3. When searching for NE, compare, what is the player's A best reply to player's B particular strategy - always ask: if player B played a strategy *s*, which strategy of player A is A's best response to (yields highest payoff given) B's strategy *s*? Again, compare payoffs in each column for row player; compare payoffs in each row for column player