Game Theory – B. Gobillard and F. Salanié – June 2016

You may write in English or in French. In any case justify your answers, and comment the results when asked for.

Exercise I: Study the following game:

	A	B
A	$(3,2)$	$(1,0)$
B	$(0,1)$	$(8,9)$

Exercise II : Two firms play the following game. In the first stage, firm 1 chooses to invest (I) or not invest (NI), at a cost $K > 0$. In the second stage, firms 1 and 2 play a simultaneous game in which each firm has two strategies : A or B. If firm 1 has chosen I in the first stage, payoffs are

	A	B
A	(2-K,-1)	(3-K,0)
B	(-K,3)	(-K,0)

If firm 1 has chosen NI in the first stage, payoffs are

	A	B
A	(-1,2)	(3,1)
B	(1,3)	(0,0)

In the following, assume $K < 1$. We focus on pure strategies.

1) In this question, we assume that at the end of the first stage firm 2 observes whether firm 1 has invested or not. Give an example of a strategy for firm 1. Give an example of a strategy for firm 2. What are the subgames ? Find all subgame-perfect Nash equilibria.

2) We now introduce imperfect information in this game, by assuming that firm 2 does not observe whether firm 1 has invested or not. Show that there are no equilibria in pure strategies.