Additional Exercises for PBE

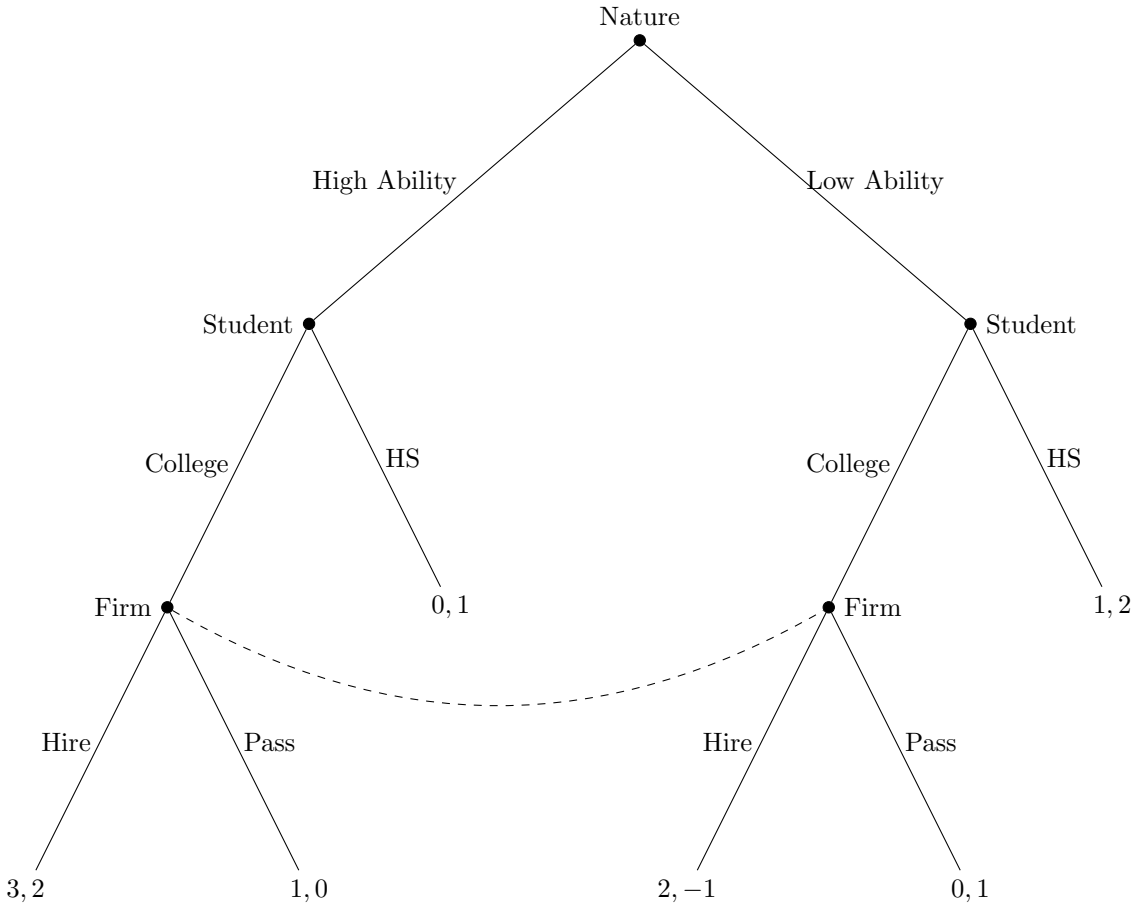
April 2018

Exercise 1

Imagine a world in which a student is either of the "high ability" type or the "low ability" type. The student knows which type she is, but a potential employer does not know. The student then gets to choose whether to go to college, or whether to stop her education after high school. A firm that is looking to hire a high-ability individual gets to choose whether to hire the student if she goes to college, or whether to pass on her application when she goes to college. If the student does not go to college, the firm does not get to make a decision.

In an ideal world, going to college would be a *signal* of a student's ability: she should go to college if she is of the high type, signaling that she is the high type; and she should not go to college if she is the low type, signaling that to a future employer. Check if this is true in the game below by evaluating the following strategies.

Assume Nature initially chooses the student to be of the high type with probability p(High) = .6.



(a) Is the strategy (College|High, HS|Low; Hire|College; p(High|College)=1) a PBE? Why or why not? Show your calculations in detail.

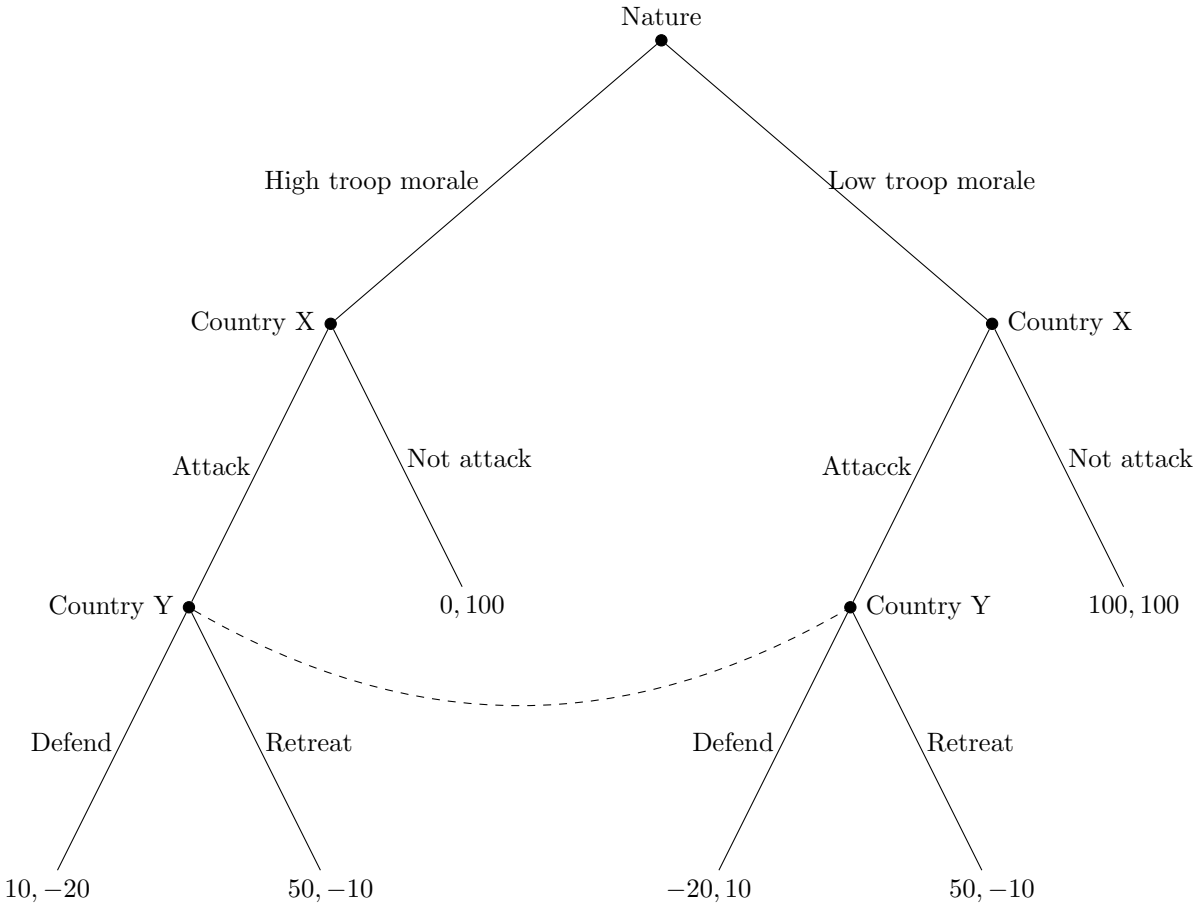
(b) Is the strategy (College|High, College|Low; Hire|College; p(High|College)=1) a PBE? Why or why not? Show your calculations in detail.

(c) Is the strategy (College|High, College|Low; Hire|College; p(High|College)=.6) a PBE? Why or why not? Show your calculations in detail.

Exercise 2

Country X is considering invading Country Y. Country X knows whether its troops are highly motivated or unmotivated. Country Y does not know that. If Country X attacks, Country Y can either defend its territory, or retreat. The payoffs are given in the game tree below.

Assuming that nature initially chooses troops to be highly motivated with a probability of .7, evaluate the following strategies.



(a) Is (Attack|High, Attack|Low; Defend|Attack; p(High|Attack)=1) a PBE? Why or why not? Show your calculations in detail.

(b) Is (Attack|High, Attack|Low; Defend|Attack; p(High|Attack)=.7) a PBE? Why or why not? Show your calculations in detail.

(c) Is (Attack|High, Attack|Low; Retreat|Attack; p(Low|Attack)=.3) a PBE? Why or why not? Show your calculations in detail.

(d) Is (Not attack|High, Attack|low; Defend|Attack; p(Low|Attack)=1) a PBE? Why or why not? Show your calculations in detail.

(e) Is (Attack|High, Not attack|Low; Retreat|Attack; p(High|Attack)=1) a PBE? Why or why not? Show your calculations in detail.