1. You are going to play 2 games of chess with an opponent whom you have never played against before (for the sake of this problem). Your opponent is equally likely to be a beginner, intermediate, or a master. Depending on
(a) What is your probability of winning the first game?
(b) Congratulations: you won the first game! Given this information, what is the probability that you will also win the second game
(c) Explain the distinction between assuming that the outcomes of the games are independent and assuming that they are conditionally independent given the opponent's skill level. Which of these assumptions seems more reasonable, and why?

Solution:

a) Given : your level is beginner
Given: Your opponent level depending upon your game
So Initially both players having same probability to win first game that is : **0.5**

b) Given: You already won first game
So, your level with respect to opponent may be intermediate or master
Your probability of win second game in this scenario will be **greater than 0.5**

c) Outcomes of the games are independent : means the next game outcome does not depend upon the first result.
Conditionally independent given the opponent's skill level: Means next game outcome does not depend upon opponent skill.

here as per given information and data opponent skill is set by your winning or losing the game, so for this question conditional independence is more reasonable.