*Q1. Give an example of 3 events A, B, C which are pairwise independent but not independent.*

*Hint: find an example where whether C occurs is completely determined if we know whether A occurred and whether B occurred, but completely undetermined if we know only one of these things.*

Consider two fair, independent coin tosses, and let A be the event that the first toss is Heads, B be the event that the second toss is Heads, and C be the event that the two tosses have the same result.

Then A, B, C are dependent since, but they are pairwise independent: A and B are independent by definition; A and C are independent since and similarly B and C are independent.

*Q2. A bag contains one marble which is either green or blue, with equal probabilities. A green marble is put in the bag (so there are 2 marbles now), and then a random marble is taken out. The marble taken out is green. What is the probability that the remaining marble is also green?*

Let A be the event that the initial marble is green, B be the event that the removed marble is green, and C be the event that the remaining marble is green. We need to find P(C|B)

To find we will use Bayes’ rule;

So,