

ECE 139
SPRING 2005
FRIDAY 10A-12P DISCUSSION
QUIZ #4
22 APRIL 2005

NAME:

1. You have an urn with 4 balls in it. 2 balls are red. 2 balls are blue. You choose a ball out of the urn. Call this Ball 1. If Ball 1 is blue, you put it back in the urn. If Ball 1 is red, you put it aside. You then choose another ball, Ball 2.

a. What is the probability that Ball 2 is blue?

b. Given that Ball 2 is blue, what is the probability that Ball 1 was also blue?(find $P[\text{Ball 1 is blue} \mid \text{Ball 2 is blue}]$)

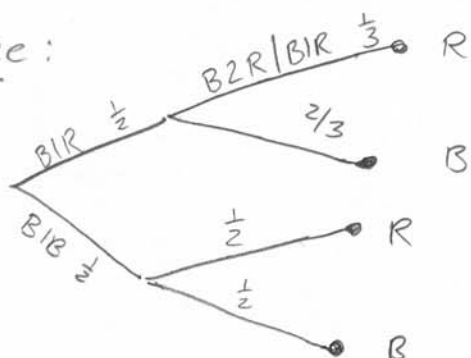
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- ① $B \times R =$ Ball x is Red
 $B \times B =$ Ball x is Blue

② $P[B_2B] = P[B_2B|B_1B]P[B_1B] + P[B_2B|B_1R]P[B_1R]$

Draw a tree:



So we fill in the values above

$$P[B_2B] = \left(\frac{2}{3}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \boxed{\frac{7}{12}}$$

③ $P[B_1B|B_2B] = \frac{P[B_2B|B_1B]P[B_1B]}{P[B_2B]}$

$$= \frac{\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)}{\left(\frac{7}{12}\right)} = \frac{12}{28} = \boxed{\frac{3}{7}}$$