Assignment 3

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February 2021

1 Prob. 2.10

A family has two children. What is the probability that both the children are boys given that at least one of them is a boy ?
Solution:
Let g and b denote girl and boy respectively. then sample space

$$S = \{gg, gb, bg, bb\}$$

X_1	Random variable for first children
X_2	Random variable for second children
X_3	Random variable that at least one children is boy or girl

$$X_1, X_2, X_3 \in \{0,1\}$$

$P(X_3 = 1) = \frac{3}{4}$

$P(X_1 = 1, X_2 = 1) = \frac{1}{4}$

$P(X_1 = 1, X_2 = 1 | X_3 = 1) = \frac{P(X_1=1, X_2=1)}{P(X_3=1)}$

$= \frac{\frac{1}{4}}{\frac{3}{4}}$

$= \frac{1}{3}$

$= 0.333$