Assignment 3

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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

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

X1= Random variable for first children
X2=Random variable for second children

X1, X2 $\in$ {0,1}

F=event that at least one of them is a boy

$$P(F) = \frac{3}{4}$$

$$P(X1 = 1, X2 = 1) = \frac{1}{4}$$

$$P(X1 = 1, X2 = 1 | F) = \frac{P(X1 = 1, X2 = 1)}{P(F)}$$

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

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

$$= 0.333$$