Question 3

What is known:

* P (A) = Probability of space in A = 0.05
* P (B) = Probability of space in B = 0.10
* P (B|A) = Probability of space in B if A has space = 0.3

P(A) = 0.05

P(~A) = 0.95

P(B|A) = 0.3

P(A AND B) = P(A) P(B|A) = 0.05\*0.3 = 0.015

Approach: Using Probability Tree

P(B|~A) = 0.085/0.95 = 0.089

P(~A AND B) = P(~A) P(B|~A) = 0.085

P(A AND ~B) = P(A) P(~B|A) = 0.05\*0.7 = 0.035

P(~B|A) = 0.7

P(~A AND ~B) = P(~A) P(~B|~A) = 0.865

P(~B|~A) = 0.911

\*Completing the tree using algebra:

P(B) = 0.1

P(B) = P(B and A) + P (B and ~A)

0.1 = 0.015 + P(B and ~A)

P(B and ~A) = 0.1 – 0.015 = 0.085

Solution:

1. If I show up at 8:15AM, what is the probability I can get a parking spot?  
     
   In mathematical terms:

*P (A and B) = P(A) P(B|A) = 0.05 \* 0.3 =* ***0.015*** ***Therefore, the probability I can get a parking spot is approximately 1.5%***

*This was under the assumption Prob of getting a parking spot meant P (A and B)*

P (A or B) = P(A) + P(B) – P(A and B) = 5% + 10% - 1.5% = 13.5%

**Therefore, the probability that I can get a parking spot is approximately 13.5%**

1. Assuming I drove all over the college and find the last remaining spot, what is the probability it is in Lot A?  
     
   In mathematical terms, we will search for all probabilities in which P(A) is successful and P(B) is not.

= P(A|~B) / [P(A|~B) + P(~A|B)]

= 0.035/ (0.035+0.085)

= 0.035/0.12

= ~0.29

**Therefore, the probability that the last remaining spot is in 29%.**