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CS 513-B Knowledge Dis & Data Mining: Homework 1

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Homework 1.1

True

False

False

True

True

Homework 1.2

A is the event that Juan loses a dollar and there are six possibilities for this:

(1,6), (2,5), (3,4), (4,3), (5,2), (6,1)

So, P(A) = 6/36

B is the event that Juan wins 2 dollars and there is only one possibility for this:

(1, 1).

So, P(B) = 1/36

Since P(A)>2P(B), Juan will lose dollars.

Homework 1.3

B is the event that Jerry was at the bank but Susan was not.

P(A)= 0.2

P(B)= 0.3

$P(A \cup B) = 0.08$

1. $P(1) = P(A|B) = P(A \cap B)/P(B) = 0.08/0.3=0.267$
2. $P(2) = P(A)-P(A \cap B)/\{1-P(B)\}= (0.2-0.08)/(1-0.2)=0.1714$
3. $P(A \cup B) = P(A)+P(B)-P(A \cap B)=0.42$
    $P(3)=P(A \cap B)/ P(A \cup B)=0.08/0.42=0.19$

Homework 1.4

H, M denotes the events that Harold and Mary gets a "B"

P(H) = 0.8

P(M) = 0.9

P(H∪M) = 0.91

P(H∩M) = P(H)+P(M)-P(H∪M)=0.79

P(a) = P(H)-P(H∩M)=0.01

P(b) = P(M)-P(H∩M)=0.11

P(c) = 1-P(H∪M)=0.09

Homework 1.5

Not independent

Because A is the event that Susan was at the bank but Jerry wasn't

B is the event that Jerry was at the bank but Susan was not.

P(A)=0.2

P(B)=0.3

P(A∩B) = 0.08

P(A)*P(B) ≠ P(A∩B)

Homework 1.6

a. Not independent

A, B denotes the event that "the sum is 6" and "the second die shows 5".

P(A)=5/36

P(B)=6/36

P(A∩B) = 1/36

P(A)*P(B) ≠ P(A∩B)

b. Independent

   A, B denotes the event that "the sum is 7" and "the first die shows 5".

   P(A)=6/36

Homework 1.7

$$P(B)= \frac{60\%*30\%}{60\%*30\%+10\%*10\%+30\%*20\%}=\frac{18}{25}=72\%$$

Homework 1.8

A denotes the event that the outcomes is success and specialist said yes

$$P(A)= \frac{0.2\times0.9}{0.2\times0.9+0.2+0.5+0.1+0.3} = \frac{18}{31}=58\%$$