Slide 18:

P({3}) = ⅓

P({1, 2}) = ⅔

P({1, 2, 3}) =1

Slide 19:

P({1}) = ⅓

P({2}) = 0

P({3}) = ⅔

If S is a finite set, not all possible P({s}) can be 0.

Since = 1.

P({2,3,4…}) = 0.9

Smallest possible value of P({1, 2, 3}) = 0.1

Slide 20:

P(all eight showing 6) = 1/(68)

P(all eight show same number) = 1/67

P(Sum of values = 9) = 8C1(1/68) = 8(1/68)

P(exactly two 2 from 10 dices) = 10C2(1/62)(5/6)8

P(4 aces + King of spades) = 5/52 x 4/51 x 3/50 x 2/49 x 1/48

P(5 spades) = 13/52 x 12/51 x 11/50 x 10/49 x 9/48

P(No pairs) = 1 x 48/51 x 44/50 x 40/49 x 36/48

Slide 21:

P(13 spades) = 13/52 x 12/51 x 11/50 x … x 1/40

P(all four aces) = 4/52 x 3/51 x 2/50 x 1/49

P(sum of two cards >= 4) = 1- P(sum of two cards < 4)

=(4 x 4 x 2)/(52 x 51) + (4 x 3)/(52x51) + (4 x 3)/(52 x 51)

Slide 35:

P(First dice 2 | Three dice are 2) = ¾

P(First dice 2 | Atleast 3 dice are 2) = 16/21

P(1Head, dice=1) = 2 \* (1/2) \* (1/2) \* (1/6) = 1/12

P(2Heads, dice=2) = (1/2) \* (1/2) \* (1/6) = 1/24

P(number of heads = number showing on the dice) = P(1Head, dice=1) + P(2Heads, dice=2) = 1/8

P(H=1 | dice=1) = 1/2

The second one is larger than the first since the probability of getting two heads consecutively is 1/4 and getting a 2 on the dice is 1/6 which is eliminated in the second case as we know the dice are showing 1.

Slide 36:

P(3H) = 1/8

P(3H | Odd Heads) = 1/3

P(3H | Even Heads) = 0

Slide 37:

S = {R1(R2), R2(R1), R3(B3), B3(R3), B2(B1), B1(B2)}

P(Other side Red | Current side Red) = P(Other side red ⋂ Current side Red) / P(Current side Red)

P(Other side red ⋂ Current side Red) = 2/6 = 1/3

P(Current side Red) = 1/2

P(Other side Red | Current side Red) = 2/3

Conversely,

P(Other side Red | Current side Black) = (1/6)/(1/2) = 1/3

Slide 42:

P(snow) = 0.2

P(Accident) = 0.1

P(Accident | Snow) = 0.4

P(Snow | Accident) = P(Accident | Snow) P(Snow) / P(Accident) = 0.4 \* 0.2 / 0.1 = 0.8

P(No Spades in hand 2 | 3 Spades in Hand 1) =

P(No Spades in hand 2 ⋂ 3 Spades in Hand 1) / P(3 Spades in hand 1)

= (37/47)\*(36/46)\*(35/45)\*(34/44)\*(33/43) = 0.29

Take out 3 spades = 9 spades

5 cards appeared = 47 remaining.   
No spades at all with 5 cards in hand = 38/47\*37/46\*36/45\*35/44\*34/43

Slide 43:

S (all sum up to 12) = {156, 165, 246, 255, 264, 345, 354, **426, 435, 444, 453, 462**, 516, 525, 534, 543, 552, 561, 615, 624, 642, 651}

P(426,462…| Sum = 12) = 5/22

Slide 44:

P(door A win | door B not win) = P(door A win ⋂ door B not win) / P(door B not win)

P(door A win ⋂ door B not win) = ⅓ \* ⅔ = 2/9

P(door B not win) = 2/3

P(door A win | door B not win) = 1/3

P(door C win | door B not win) = P(door A not win | door B not win)

= 1 - P(door A win | door B not win) = 2/3

Or

P(door A not win ⋂ door B not win) = 2/3 \* 2/3 = 4/9

P(door C win | door B not win) = (4/9) / (2/3) = 2/3

Checking for independence test:

1. Is P(A) × P(B) = P(A and B)?
2. Is P(B|A) = P(B)?
3. Is P(A|B) = P(A)?

Either one needs to be tested. (Explained in next slides)

Slide 48:

A and B are not independent

A, C, and D are independent