NYU Computer Science Bridge HW8

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Question 7

Exercise 6.1.5 b
Three of a kind
$(C(13,1) * C(4,3) * C(12,2) * C(4,1) * C(4,1))/C(52,5) \approx 0.021$

Exercise 6.1.5 c
5 cards of same suit
$C(4,1) * C(13,5)/C(52,5) \approx 0.00198$

Exercise 6.1.5 d
Two of a kind
$(C(13,1) * C(4,2) * C(12,3) * C(4,1) * C(4,1) * C(4,1))/C(52,5) \approx 0.4225$

Exercise 6.2.4 a
The hand has at least 1 club
Exercise 6.2.4 b
The hand has at least two cards with the same rank
Exercise 6.2.4 c
The hand has exactly one club or one spade
Exercise 6.2.4 d
The hand has at least one club or at least one spade

Question 8

Exercise 6.3.2 a
p(A)=
p(B)=
p(C)=
Exercise 6.3.2 b
p(A|C) =
Exercise 6.3.2 c
p(B|C) =
Exercise 6.3.2 d
p(A|B) =
Exercise 6.3.2 e

Which pairs of events among A, B, and C are independent?
Exercise 6.3.6 b
The first 5 flips comes up heads. The last 5 flips comes up tails
Exercise 6.3.6 c

The first flip comes up heads. The rest of the flips come up tails
Exercise 6.4.2 d

Let F be the event that we chose the fair die.
Let R be the event that rolling the dice six times gives 4, 3, 6, 6, 5, 5.
$p(F) = \frac{1}{2}$
$p(\overline{F}) = \frac{1}{2}$
$p(R|F) = \frac{1}{6}$
$p(R|\overline{F}) = 0.15^4 * 0.25^2 * \frac{1}{2}$

$p(R|F) = \frac{p(R|F)p(F)}{p(R|F)p(F)+p(R|\overline{F}p(\overline{F}))}$
$p(R|F) = \frac{\frac{1}{6}^6 * \frac{1}{2}}{\frac{1}{6}^6 * \frac{1}{2} + 0.15^4 * 0.25^2 * \frac{1}{2}} \approx 0.40$

Question 9

Exercise 6.5.2 a
Exercise 6.5.2 b

Exercise 6.6.1 a

Exercise 6.6.4 a
Exercise 6.6.4 b

Exercise 6.7.4 a

Question 10

Exercise 6.8.1 a
Exercise 6.8.1 b
Exercise 6.8.1 c
Exercise 6.8.1 d

Exercise 6.8.3 b