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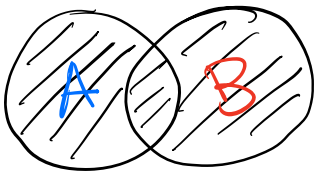
Stat 50

Quiz 2



1) (a) $P(A|F) = 0.8$
$P(B|F) = 0.7$
$P(F) = 0.05$

$P(A \cup B|F) = P(A|F) + P(B|F) - P(A \cap B|F)$

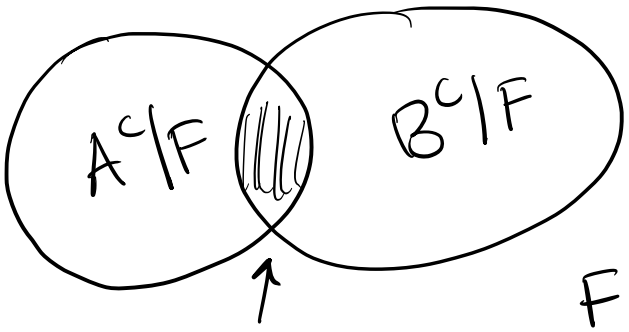
$P(A \cap B|F) = P(A|F) \cdot P(B|F) = 0.56$

$P(A \cup B|F) = 0.8 + 0.7 - (0.8 \cdot 0.7)$

$= 1.56 - 0.56$

$= \boxed{0.94}$

(b)



0.06

$F^c = 1 - F$

$= 1 - 0.05$

$= 0.95$

$P(A^c \cap B^c|F^c) = 1$

$$P(F|A^c \cap B^c) = \frac{P(A^c \cap B^c|F) \cdot P(F)}{P(A^c \cap B^c|F) \cdot P(F) + P(A^c \cap B^c|F^c) \cdot P(F^c)}$$

$$P(A^c \cap B^c|F) = 1 - P(A \cup B|F)$$

$$= 1 - 0.94 = 0.06$$

$$P(F|A^c \cap B^c) = \frac{0.06 \cdot 0.05}{(0.06 \cdot 0.05) + (1 \cdot 0.95)}$$

$$= \frac{0.003}{0.003 + 0.95}$$

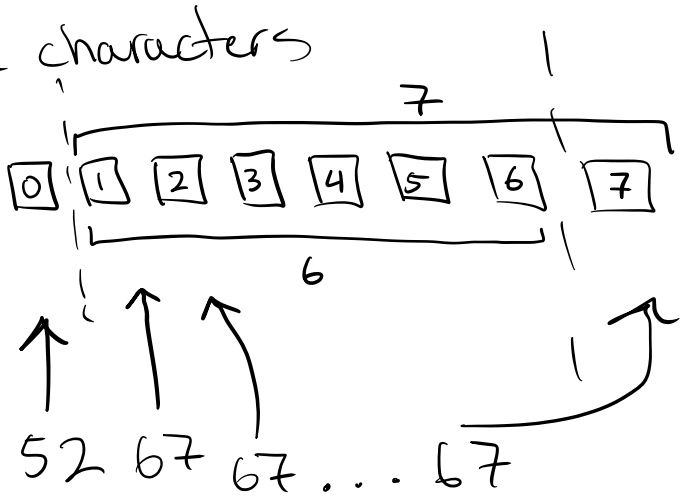
$$= \boxed{0.003148}$$

2) option B

7-8 case sensitive characters

26 upper
26 lower
9 numbers
6 special

67 total



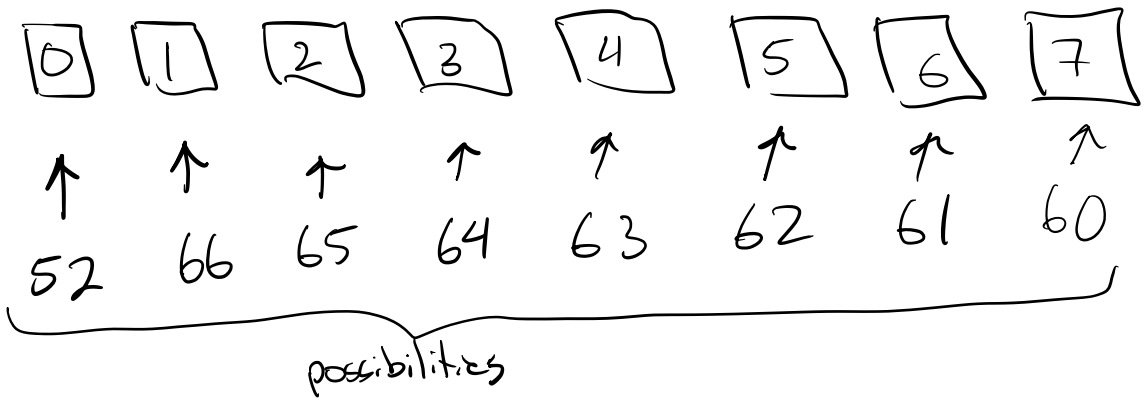
a) $52 \times 67^6 = 470383587\,2788$

$+ \quad 52 \times 67^7 = 3151570034767\,96$

$= 319860839349584$

There are 319,860,839,349,584 valid passwords.

b)



$$P(N,n) = \frac{N!}{(N-n)!}$$

$$52 \times \frac{66!}{(66-7)!} = 52 \times 3925098777600$$

$$= 204105136435200$$

$$52 \times \frac{66!}{(66-6)!} = 52 \times 65418312960$$

$$= 3401752273920$$

For passwords with 8 characters, there are 204,105,136,435,200 possible passwords such that all the characters are different.

For passwords with 7 characters there are 3,401,752,273,920 possible passwords such that all the characters are different.

There are 207,506,888,709,120 possible passwords (with 7 or 8 characters) such that all the characters are different.