1.a) $$\frac{{}^{13}C_4 * {}^{13}C_1}{{}^{52}C_5}$$

$$= \frac{715 \cdot 13}{2598960}$$

$$= 0.003576430572$$

b) $$\frac{{}^{13}C_3 * {}^{39}C_2}{{}^{52}C_5} + \frac{{}^{13}C_4 * {}^{39}C_1}{{}^{52}C_5} + \frac{{}^{13}C_5 * {}^{39}C_0}{{}^{52}C_5}$$

$$0.081542617 + 0.010729291 + 0.000495198 0792$$

$$= 0.092767106$$

c) $$\frac{{}^{4}C_0 * {}^{48}C_5}{{}^{52}C_5} + \frac{{}^{4}C_1 * {}^{48}C_4}{{}^{52}C_5} + \frac{{}^{4}C_2 * {}^{48}C_3}{{}^{52}C_5}$$

$$0.658841998 + 0.299473635 + 0.039929818$$

$$0.998245452$$

2)

$$= \frac{{}^{13}C_3 * {}^{13}C_2 * {}^{13}C_1}{{}^{52}C_6}$$

$$= {}^{n}C_R = \frac{n!}{(n-R)!R!}$$

$$P = \frac{\frac{13!}{(13-3)!3!} \times \frac{13!}{(13-2)!2!} \times \frac{13!}{(13-1)!1!}}{\frac{52!}{(52-6)!6!}}$$

$$P = \frac{\frac{13!}{10!3!} \times \frac{13!}{11!2!} \times \frac{13!}{12!1!}}{\frac{52!}{46!6!}}$$

3.a) $\#N1 = {}^5C_2$

$\#N2 = {}^{15}C_2$

$$P = \frac{{}^5C_2 \times {}^{15}C_2}{{}^{20}C_4}$$

$P = 0.2167$

b) $\#N1 = {}^5C_4 = 5$

$$P = {}^5/_{{}^{20}C_4} = 0.0011$$

c) $P = 1/4 \times 1/3$ $\quad \overline{P}_P = 0.0316 \times 0.0833$

$P = 0.0833$ $\quad \overline{P}_P = 0.0026$

4. a) #N (characters) = $36 \times 36 \times 36 \times 36 \times 36 \times 36$

$= (36)^6$

$= 2176782336$

#NID = $10 \times 36 \times 36 \times 36 \times 36 \times 36$

$= 10 \times (36)^5$

$= 604661760$

$$\frac{10 \times (36)^5}{36^6} = \frac{10}{36} = 0.2778$$

b) $26 \times 26 \times 26 \times 36 \times 36 \times 36 =$

$26^3 \times 36^3$

$$P = \frac{(26)^3 \times (36)^3}{(36)^6}$$

0.3767

c) 36^6 ID's

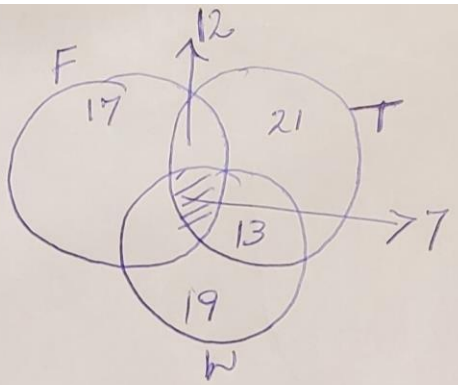
abcdf = $\frac{1}{36^6}$

d) $36 - 2 = 34$

$34 \times 34 \times 34 \times 34 = 34^4$

$$P_{required} = \frac{(34)^4}{(36)^6} = 0.00061$$

5 a)



$P(F) = 0.47, P(T) = 0.58$

$P(F \wedge W) = 0.31, P(F \wedge T) = 0.33$

$P(W \wedge T) = 0.36, P(F \wedge W \wedge T) = 0.08$

$P(W) = 0.33$

b) i $P(T \wedge \bar{F}) = P(T) - P(T \wedge F)$

$= 0.58 - 0.33$

ii) $P(T \wedge W \wedge \bar{F}) = P(T) + P(W) - P(T \wedge F) - P(W \wedge F) - P(T \wedge W \wedge F)$

$= 0.58 + 0.53 - 0.33 - 0.31 - 0.08$

$= 1.11 - 0.72$

$= \underline{0.39}$

iii) $P(T \vee F \cup W) = P(T) + P(F) + P(W) - P(F \wedge W) - P(F \wedge T) - P(W \wedge T) + P(F \wedge W \wedge T)$

$= 0.47 + 0.58 + 0.53 - 0.31 - 0.33 - 0.36 + 0.08$

$= \underline{0.66}$