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B10

TFCS Tut - 9

Sol 1: (a) $M = P(7,7) = 7!$ ways

(b) $(7-1)! = 6!$ ways

Sol 2:

$P(n,2) = n(n-1) = n^2 - n = 72$

$n^2 - n - 72 = 0$

$(n-9)(n-8) = 0 \Rightarrow n = 9$ or $n = -8$

$n = 9$

Sol 3: (a) $^{10}C_4 = \dfrac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1} = 210$

(b) $= {}^6C_2 \times {}^4C_2 = \dfrac{6 \times 5}{2 \times 1} \times \dfrac{4 \times 3}{2 \times 1} = 90$

(c) $n = {}^6P_3 = 6 \times 5 \times 4 = 120$

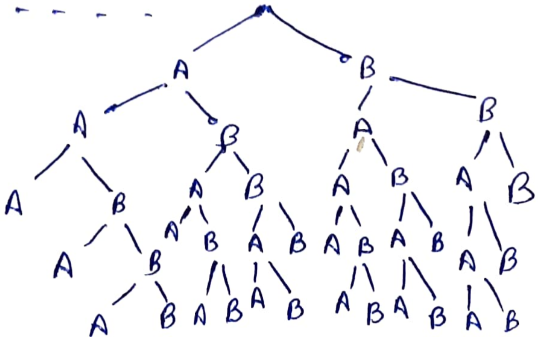
Sol 4: (a) $^{14}C_2 = \dfrac{14 \times 13}{2 \times 1} = 91$

(b) For Blue, $^8C_2 = 28$

For Red, $^6C_2 = 15$

By sum rule, $n = 28 + 15 = 43$

Sol 5. AAA, AABA, AABBA, AABBB, ABAA . . . . . .



Sol 6: $t = 22 + 18 = 40$

Sol 7: (a) $m = n(P \cap B) = n(P) + n(B) - n(P \cup B) = 30 + 14 - 32 = 12$

(b) $m = n(P \setminus B) = n(P) - n(P \cap B) = 30 - 12 = 18$

(c) $m = n(B \setminus P) = n(B) - n(P \cap B) = 14 - 12 = 2$

Sol 8: (a) Consider subsets $(1,3,5,7,9)$ and $(2,4,6,8)$ of S as pigeonhole

So $n = 3$

(b) Consider 5 subsets $\{1,6\}, \{2,7\}, \{3,8\}, \{4,9\}, \{5\}$ of S as pigeonholes.

So $n = 6$

Sol 9: $n = 4$ classes are pigeonholes and $k + 1 = 5$ so $k = 4$.

Thus among $kn + 1 = 17$ students (pigeon), five of them belong to same class.

Sol 10: (a) $n = 6$ pegeonholes

Here $k + 1 = 4$ so $k = 3$

$nk + 1 = 6(3) + 1 = 19 < 21$. Hence some sublist has atleast four consecutive consonants.

(b) $n = 5$ sublists. Here $k + 1 = 5$

So $k = 4$.

Hence $kn + 1 = 21$

Thus some sublist has atleast five consecutive consonants.