SECI1013: DISCRETE STRUCTURE

Group No: 6

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ASSIGNMENT 2

1. a. $6 \times 6 \times 6 = 216$
   b. $6 \times 5 \times 4 = 120$
   c. $2 \times 3 \times 3 = 18$

2. a. $(6-1)! \times (5)! = 14400$
   b. $(9\text{-}1)! \times 2! = 80640$
   c. Men and women sit in alternate seats$=(5\text{-}1)!(5)!$
   $=(4)!(5)!$
   $=2880$
   d. $11! \times 2! = 79833600$

3. a. $5 \times 4 \times 3 \times 2 \times 1 = 120$
   b. $4! \times C(5,2) = 24 \times 10$
   $= 240$
   c. $3! \times C(5,2) \times C(3,2) = 6 \times 10 \times 3$
   $= 180$

4. a. $n = 6, r = 12$
   $C(6 + 12 - 1,12) = 6188$
   b. $n = 6, r = 12$
   $C(6 + 12 - 1,12) = 6188$
   c. $n = 6, r = 16$
   $C(6 + 16 - 1,16) = 20349$

5. a. 2 wins and 1 ties/wins: $C(4,2) \times C(3,1) \times 2 = 36$
   1 win and 3 ties/wins: $C(3,1) \times C(4,3) \times 2^3 = 96$
   $2 \times (36 + 39) = 264$

   b. Penalty kicks = $2^{10} = 1024$
   First round = $1000 - 264 = 760$
   Second round = 264
   $760 \times 264 = 200640$

   c. First round = Second round = 760
   Sudden-death = $2 + 2 + 2 + 2 + 2 = 10$
   $760 \times 760 \times 10 = 577600$

6.

Total 4 possibilities for each question

$Total\ possibilities = 4^{10}, M = 3$

$n = k(M-1)+1$

$= 4^{10} \times (3-1)+1$

$= 2097153$

7. $P(H) = 0.75 \quad P(H') = 0.25$

$P(M) = 0.65 \quad P(M') = 0.35$

$P(H \cap M) = 0.50 \quad H' \cap M' = 35\ participates$

$P(H \cup M) = 0.75 + 0.65 - 0.50 = 0.90$

$P(H' \cap M') = 1 - 0.90 = 0.10$

Let T = Numbers of candidates

$\frac{10}{100} \times T = 35$

$T = 350$

8. Number between 300 to 780 = $780 - 300 + 1 = 481$

1 in 2 digits

311,411,511,611,711 = 5

1 in 1 digit

301-391=18

401-491=18

501-591=18

601-691=18

701-780=16

$18 \times 4 + 16 = 88$

$5 + 88 = 93$

P(at least one digit)= $\frac{93}{481}$

9. a. $C(10,6) = 210$

$C(10,6) \times \frac{6!}{4! \times 2!} = 210 \times 15 = 3150$

b.

$C(7,6) \times \frac{6!}{4! \times 2!} \times \frac{4!}{4!} = 105$

probability: $\frac{105}{3150} = \frac{1}{30}$

10. M=message, E=email, L=letter, H=handphone

$P(E) = 0.4 \quad P(M|E) = 0.6$

$P(L) = 0.1 \quad P(M|L) = 0.8$

$P(H) = 0.5 \quad P(M|H) = 1$

a. $P(M) = 0.4(0.6) + 0.1(0.8) + 0.5(1) = 0.82$

b. $P(E|M) = \frac{0.4(0.6)}{0.82} = 0.293$

11. A’ = cars
    A = light trucks
    B = Fatal accident
    B’ = Not a fatal accident

$$P(B|A') = \frac{20}{100000} = 0.00020$$

$$P(B|A) = \frac{25}{100000} = 0.00025$$

$$P(A) = 0.4$$

$$P(A') = 1 - 0.4 = 0.6$$

$$P(A|B) = \frac{P(B|A)P(A)}{P(B|A)P(A) + P(B|A')P(A')}$$

$$= \frac{0.00025(0.4)}{0.00025(0.4) + 0.00020(0.6)}$$

$$= 0.4545$$

12. Without restrictions: $4^9 = 262144$
    Disallowed way:

$$4 \times 3^9 = 78732$$

$$4 \times 2^9 = 2048$$

$$4 \times 1^9 = 4$$

$$262144 - 78732 - 2048 + 4 = 181368$$