

No:

Date:

Subject:

Discrete Structure Assignment 2 (GROUP 11)

Group

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Members

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1 (a)

$$\overline{6} \overline{6} \overline{6}$$

$$6 \cdot 6 \cdot 6 = 216$$

(c) 300-700, odd only

$$\overline{4} \overline{6} \overline{3}$$

$$= 4 \cdot 6 \cdot 3$$

$$= 72$$

(b)

$$\overline{6} \overline{5} \overline{4}$$

total numbers
if digits are

$$= 6 \cdot 5 \cdot 4$$

distinct

$$= 120$$

2 (a) Men insist sit each other

= 6 people in circle

$$= (6-1)! \times 5!$$

$$= 14400$$

(b) couple insist sit each other

= 9 people in circle

$$= 8! \times 2!$$

$$= 80640$$

(c) W&M sit alternate sit

$$= 4! \times 5!$$

$$= 2880$$

(d) Anita & husband stand to each other in row

$$= 11! \times 2!$$

$$= 79833600$$

Subject:.....

3 (a) no ties

$$= 5!$$

$$= 120$$

(b) Two sprinters tie

$$= {}^5C_2 \times 4!$$

$$= 240$$

(c) Two group of two sprinter tie

$$= {}^5C_2 \times {}^3C_2 \times 3!$$

$$= 180$$

$$\begin{aligned}
 4) \quad a) \quad C(12+6-1, 12) &= C(17, 12) \\
 &= \frac{17!}{12! 5!} \\
 &= 6188 \text{ ways}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad C(12+6-1, 12) &= C(17, 12) \\
 &= \frac{17!}{12! 5!} \\
 &= 6188 \text{ ways}
 \end{aligned}$$

$$\begin{aligned}
 c) \quad r &= 24 - 5 - 3 \\
 &= 16
 \end{aligned}$$

$$\begin{aligned}
 C(16+6-1, 16) &= C(21, 16) \\
 &= \frac{21!}{16! 5!} \\
 &= 20349 \text{ ways}
 \end{aligned}$$

$$\begin{aligned}
 5) \quad a) \quad 2 \text{ wins among 4 games: } C(4, 2) &= \frac{4!}{2! 2!} = 6 \\
 1 \text{ win among 3 games: } C(3, 1) &= \frac{3!}{1! 2!} = 3 \\
 2 \text{ wins and 1 tie/win: } C(4, 2) \cdot C(3, 1) \cdot 2 &= 36 \\
 1 \text{ win and 3 ties/wins: } C(3, 1) \cdot C(4, 3) \cdot 2^3 &= 96
 \end{aligned}$$

$$\begin{aligned}
 \text{No. of scenarios} &= 2 \cdot (36 + 96) \\
 &= 264
 \end{aligned}$$

$$\begin{aligned}
 b) \quad 10 \text{ penalty kicks} &= 2^{10} = 1024 \\
 1024 - 264 &= 760 \Rightarrow \text{First round} = 760, \text{ second round} = 246 \\
 \text{No. of scenarios} &= 246 \times 760 = 200640
 \end{aligned}$$

$$\begin{aligned}
 c) \quad \text{First round} &= 760, \text{ second round} = 760, \text{ sudden death} = 2(5) = 10 \\
 \text{No. of scenario} &= 760 \times 760 \times 10 \\
 &= 5776000
 \end{aligned}$$



$$6) m = 4^{10} = 1048576, k = 3$$

$$\begin{aligned} n &= m(k-1) + 1 \\ &= 1048576(3-1) + 1 \\ &= 2097153 \end{aligned}$$

7) $M \sim$ Pass Mathematics

$H \sim$ Pass History

$$P(M) = 0.65, P(H) = 0.75, P(H \cap M) = 0.50, n(H' \cap M') = 35$$

$$\begin{aligned} P(H \cup M) &= P(M) + P(H) - P(H \cap M) \\ &= 0.65 + 0.75 - 0.50 \\ &= 0.90 \\ &= 90\% \end{aligned}$$

$$\begin{aligned} P(H \cup M)' &= P(H' \cap M') = 100\% - 90\% \\ &= 10\% \end{aligned}$$

$$\begin{aligned} \text{Total number of candidates} &= 35 \times \frac{100}{10} \\ &= 350 \text{ students} \# \end{aligned}$$

$$8) n(\text{contain number 1}) = 93$$

$$\frac{P(\text{contain number 1})}{481} = \frac{93}{481}$$

$$\begin{aligned} 9) a) \text{No. of ways} &= C(10, 2) \times C(8, 4) \\ &= \frac{10!}{2!8!} \times \frac{8!}{4!4!} \\ &= 3150 \text{ ways} \end{aligned}$$

$$\begin{aligned} b) \text{No. of ways} &= 1 \times \frac{7!}{2!4!} \\ &= 105 \text{ ways} \end{aligned}$$

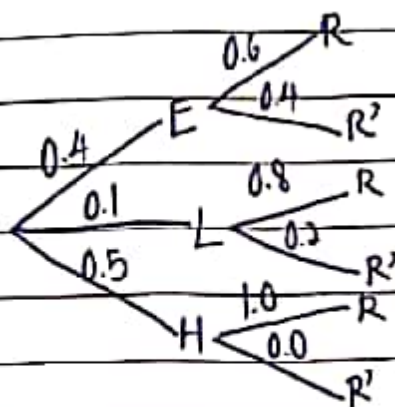
$$\begin{aligned} P(\text{empty lots next to each other}) &= \frac{105}{3150} \\ &= \frac{1}{30} \end{aligned}$$

10. E = email

L = letter

H = handphone

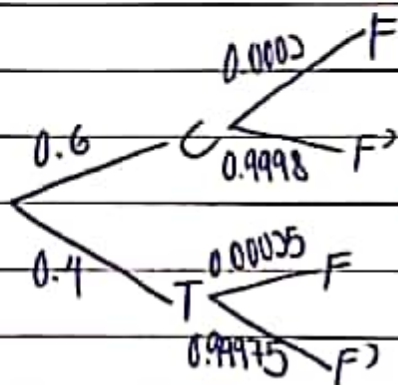
R = receive message



$$(a) P(R) = 0.4(0.6) + 0.1(0.8) + 0.5(1.0) \\ = 0.82$$

$$(b) P(E|R) = \frac{P(E \cap R)}{P(R)} \\ = \frac{0.4(0.6)}{0.82} \\ = 0.2927$$

11.



$$P(T|F) = \frac{P(T \cap F)}{P(F)} \\ = \frac{0.4(0.00025)}{0.6(0.0003) + (0.4)(0.00025)} \\ = 0.4545$$

12. Without restrictions, $4^9 = 262144$

$4 \times 3^9 = 78732$ (disallowed ways where 1 box has no ball)

$4 \times 1^9 = 4$ ways to put balls in one box twice

No. of ways $= 262144 - 78732 + 4 = 183416$