



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

DISCRETE STRUCTURE (SECI 1013-03)

SEMESTER 1-2020/2021

ASSIGNMENT 2

GROUP 5

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1 a) $6 \times 6 \times 6 = 216$

b) $6 \times 5 \times 4 = 120$

c) $2 \times 3 \times 3 = 18$

2 a) ${}^5P_5 \times {}^5P_5 = 14400$

b) $(9-1)! \times 2 = 80640$

c) $(5-1)! \times 5! = 2880$

d) $11! \times 2 = 79833600$

3 a) $5! = 120$

b) $4! = 24$

c) $3! = 6$

4a) ${}^{(6+12-1)}C_{12} = {}^{17}C_{12} = 6188$

b) $24 - 6 \times 2 = 12$

(still have 12 croissants to choose)

${}^{(6+12-1)}C_{12} = {}^{17}C_{12} = 6188$

c) $24 - 5 - 3 = 16$

(still have 16 croissants to choose)

${}^{(6+16-1)}C_{16} = 20349$

$$5 \text{ a) } 2 \text{ win \& 1 tie} = {}^4C_2 \times {}^3C_1 \times 2 = 36$$

$$1 \text{ win \& 3 ties} = {}^3C_1 \times {}^4C_3 \times 23 = 96$$

$$= 2 (36 + 96) = 264$$

$$b) \quad 2^{10} = 1024$$

$$1024 - 264 = 760$$

$$760 \times 264 = 200640$$

$$c) \quad 760 \times 760 \times 10 = 5776000$$

$$6) \text{ a, b, c, d} = 410$$

$$2 \times (410) + 1 = 2097153$$

$$7) \text{ H= history M= mathematics}$$

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

$$n(H^c \cap M^c) = 35$$

$$P(H \cup M) = P(H) + P(M) - P(H \cap M)$$

$$= 0.75 + 0.65 - 0.50$$

$$= 0.90$$

$$N = n(H \cup M) / 0.90$$

$$N = (N - 35) / 0.90$$

$$N = 350$$

$$8) \text{ total numbers} = 9 \times 10^2 = 900$$

$$\text{Number where 1 is not included} = 9^3 = 729$$

$$\text{Numbers contain 1 as at least one digit} = 900 - 729 = 171$$

$$= 171/900$$

$$9a) {}^{10}C_6 \times \frac{6!}{4!2!} = 3150$$

$$b) {}^7C_6 \times \frac{6!}{4!2!} \times \frac{4!}{4!} = 105$$

Probability that the empty lots are next to each other

$$= \frac{105}{3150}$$

$$= \frac{1}{30}$$

10a) E - Email L - Letter H - Handphone M - Receive message

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

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

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

$$P(M)$$

$$= P(M | E) \times P(E) + P(M | L) \times P(L) + P(M | H) \times P(H)$$

$$= (0.6) \times (0.4) + (0.8) \times (0.1) + 1 \times (0.5)$$

$$= 0.82$$

$$b) P(E | M) = \frac{P(M | E) \times P(E)}{P(M)}$$

$$= \frac{0.6 \times 0.4}{0.82}$$

$$= 0.2927$$

11) L - Light truck C - Car F - Fatal accident F' - Not fatal accident

$$P(L) = 0.4$$

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

$$P(F | L) = \frac{25}{100000}$$

$$P(F | L') = \frac{20}{100000}$$

$$= 0.00025$$

$$= 0.0002$$

$$P(L | F) = \frac{P(F | L) P(L)}{P(F | L) P(L) + P(F | L') P(L')}$$

$$= \frac{(0.00025)(0.4)}{(0.00025)(0.4) + (0.0002)(0.6)}$$

$$= 0.4545$$

$$12) {}^9C_4 \times {}^5C_2 \times {}^3C_2 \times {}^1C_1 \times 4! = 90720$$

$${}^9C_3 \times {}^6C_3 \times {}^3C_2 \times {}^1C_1 \times 4! = 120960$$

$${}^9C_3 \times {}^6C_2 \times {}^4C_2 \times {}^2C_2 \times 4! = 181440$$

$$90270 + 120960 + 181440 = 393120$$