



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

UNIVERSITI TEKNOLOGI MALAYSIA

SEMESTER 1, 2020/2021

DISCRETE STRUCTURE ASSIGNMENT 2

COURSE : DISCRETE STRUCTURE (SECI1013)

SECTION : 03

NAME : ONG HAN WAH

MATRIC NO. : A20EC0129

SCHOOL : SCHOOL OF COMPUTING

FACULTY : FACULTY OF ENGINEERING

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LECTURER'S NAME : DR NOR AZIZAH ALI

1. a. $6 \times 6 \times 6 = 216$
b. $6 \times 5 \times 4 = 120$
c. $4 \times 6 \times 3 = 72$

2. a. $5! \times (6-1)! = 14400$
b. $2! \times (9-1)! = 80640$
c. $(5-1)! \times 5! = 2880$
d. $2! \times 11! = 79833600$

3. a. $5! = 120$
b. ${}^5C_2 \times {}^3C_3 \times 4! = 240$
c. ${}^5C_2 \times {}^3C_2 \times {}^1C_1 \times 3! = 180$

4. a. ${}^{6+12-1}C_{12} = {}^{17}C_{12} = 6188$
b. ${}^{6+12-1}C_{12} = {}^{17}C_{12} = 6188$
c. ${}^{6+16-1}C_{16} = {}^{21}C_{16} = 20349$

5. a. Let it be 5 rounds and each round with 1 player from each team. Win means a team get 1 and another get 0. Tie can be both get 1 or both get 0. The round ends if any one team get:
win first three round: 1
any 2 wins & 2 ties: ${}^4C_2 \times {}^2C_2 \times 2^2 = 24$
any 1 win & 4 ties: ${}^5C_1 \times {}^4C_4 \times 2^4 = 80$
any 1win&3ties & last win: ${}^4C_1 \times {}^3C_3 \times 2^3 = 32$
any 2wins&1tie & last win: ${}^3C_2 \times {}^1C_1 \times 2^1 = 6$
total = $(1+24+80+32+6) \times 2 = 286$
b. The score is tied if two teams get 5 ties or 1 win & 3 ties or 2 wins & 1 tie.
 $(2^5 + {}^5C_1 \times {}^4C_3 \times 2^3 + {}^5C_2 \times {}^3C_1 \times 2^1) \times 286 = 252 \times 286 = 72072$
c. $252 \times 252 \times 10 = 720720$

6. $2(4^{10}) + 1 = 2097153$

7. Let H=passed in History and M=passed in Mathematics
 $P(H \cup M) = 0.75 + 0.65 - 0.50 = 0.90$
 $P(H \cup M)' = 1 - 0.90 = 0.10$
 $0.10n = 35$
 $n = 350$

$$8. (4 \times 10 \times 1) + (1 \times 8 \times 1) + (5 \times 1 \times 10) - 5 = 93$$

$$9. \text{ a. } {}^{10}C_2 \times {}^8C_4 = 3150$$

$$\text{ b. } {}^6C_2 \times {}^4C_4 \times 7 = 105$$

$$P(E) = \frac{105}{3150} = \frac{1}{30} = 0.03333$$

10. Let E= message sent via email

L= message sent via letter

H= message sent via handphone

R= trainee receives the message

$$\begin{aligned} \text{ a. } P(R) &= P(R|E)P(E) + P(R|L)P(L) + P(R|H)P(H) \\ &= (0.6)(0.4) + (0.8)(0.1) + (1)(0.5) \\ &= 0.82 \end{aligned}$$

$$\text{ b. } P(E|R) = \frac{P(R|E)P(E)}{P(R)} = \frac{(0.6)(0.4)}{0.82} = \frac{12}{41} = 0.2927$$

11. Let L=light trucks is involved

F=car accident involve fatality

$$P(L|F) = \frac{P(F|L)P(L)}{P(F|L)P(L) + P(F|L')P(L')} = \frac{(0.00025)(0.4)}{(0.00025)(0.4) + (0.0002)(0.6)} = \frac{5}{11} = 0.4545$$

$$12. 4^9 - 4 \cdot 3^9 + 6 \cdot 2^9 - 4 = 186480$$