UNIVERSITI TEKNOLOGI MALAYSIA

TUTORIAL 2

GROUP NAME : T5

GROUP MEMBERS : SYASYA BINTI AZMAN

TAY WEI JIAN

NURIN SOFIYA BINTI ROSLE

SECTION : SECI1013 – 09

Tutorial 2

1. a) $6 \cdot 6 \cdot 6 = 216$ numbers

b) $6 \cdot 5 \cdot 4 = 120$ numbers

c) $3\_\_ = 1 \cdot 3 \cdot 3$
$= 9$

$5\_\_ = 1 \cdot 3 \cdot 3$
$= 9$

$9 + 9 = 18$ numbers

2. a) $5! \times 5! = 14400$

b) $2! \times 8! = 80640$

c) $4! \times 5! = 2880$

d) $2! \times 11! = 79833600$

3. a) $C(5,1) = \frac{5!}{1!(5-1)!}$
$= 5$ ways

b) $C(5,2) = \frac{5!}{2!(5-2)!}$
$= 10$ ways

c) $C(5,2) \cdot C(3,2) = \frac{5!}{2!(5-2)!} \cdot \frac{3!}{2!(3-2)!}$
$= 30$ ways

4) a) $C(n+r-1, r) = C(6+12-1, 12)$

$= C(17, 12)$

$= \frac{17!}{12!(17-12)!}$

$= 6118$ ways

b) $C(n+r-1, r) = C(6+12-1, 12)$

$= C(17, 12)$

$= \frac{17!}{12!(17-12)!}$

$= 6118$ ways

c) Let the first 8 croissant consists of 5 chocolate and 3 almond.
So, $24-8 = 16$ croissant to choose.

$C(n+r-1, r) = C(6+16-1, 16)$

$= C(21, 16)$

$= \frac{21!}{16!(21-16)!}$

$= 20349$ ways

5. a) 2 win in 4 $= C(4, 2)$

$= \frac{4!}{2!(4-2)!}$

$= 6$

1 win in 4 $= C(3, 1)$

$= \frac{3!}{1!(3-1)!}$

$= 3$

2 win 1 tie/win $= C(4,2) \cdot C(3,1) \cdot 2$

$= 6 \cdot 3 \cdot 2$

$= 36$

1 win 8 tie/win $= C(3,1) \cdot C(4,3) \cdot 2^3$

$= 3 \cdot \frac{4!}{3!(4-3)!} \cdot 2^3$

$= 3 \cdot 4 \cdot 2^3$

$= 96$

num of scenario $= 2 \cdot (36+96)$

$= 2 \cdot 132$

$= 264$

b) 10 pk $= 2^{10}$

$= 1024$

by (a), 2nd round $= 264$

thus, 1st round $= 1024 - 264$

$= 760$

num of scenario $= 760 \cdot 264$

$= 200640$

c) To have result under 10 additional penalties in sudden death mode,

$2 \times 5 = 10$ scenarios

The number of scenarios for first and second not having result,

$760 \times 760 = 577600$

Total number of scenarios

$577600 + 10 = 577610$

6. Number of answer sheets = 4^{10}

$= 1048576$

For at least 2 answer sheets must be identical,

Number of students = 2×4^{10}

$= 2097152$

∴ According to 1st pigeonholes principle, to have at least three sheets must be identical, 2097153 is the minimum number of students that must be in the professor's class.

7. Let H = history
M = Mathematics

$P(H) = 0.75$ $P(H') = 0.25$

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

$P(H \cap M) = 0.50$

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

$= 0.75 + 0.65 - 0.50$

$= 0.9$

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

$= 1 - 0.9$

$= 0.10$

Total number of student = n

$n(H' \cap M') = 35$

$0.10\,n = 35$

$n = \frac{35}{0.10}$

$n = 350$ students

8. From 300 to 399

$\underline{3}\ \underline{\ }\ \underline{1} = 1 \times 10 \times 1$

$= 10$

$\underline{3}\ \underline{1}\ \underline{\ } = 1 \times 1 \times 10$

$= 10$

total $= 10 + 10 - 1$

$= 19$

400 to 499 = 19

500 to 599 = 19

600 to 699 = 19

700 to 780

$\underline{7}\ \underline{1}\ \underline{\ } = 1 \times 1 \times 10$

$= 10$

$\underline{7}\ \underline{\ }\ \underline{1} = 1 \times 9 \times 1$

$= 9$

Total $= 10 + 9 - 1$

$= 18$

∴ Total number of numbers with 1al least one digit

$19 + 19 + 19 + 19 + 18$

$= 94$

Total number of numbers = 481

Probability = $\frac{94}{481}$

$= 0.195$

9. a) $P(10,6) = \frac{10!}{4!}$

$= 151200$

$= \frac{151200}{2!4!}$

$= 3150$

b) $= C(6,4) \times C(7,1) + C(6,4) \times C(7,2)$

$= \frac{6!}{4!(2)!} \times \frac{7!}{1!(6)!} + \frac{6!}{4!(2)!} \times \frac{7!}{2!(5)!}$

$= 420$

probability $= \frac{420}{3150}$

$= \frac{2}{15}$

10. Let A = receive message

E = Email

L = letter

H = Handphone

a) $P(A) = 0.4 \times 0.6 + 0.5 \times 1.0 + 0.8 \times 0.1$

$= 0.82$

b) $P(E|A) = \frac{P(A|E).P(E)}{P(A|E)P(E) + P(A|L)P(L) + P(A|H)P(H)}$

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

$= 0.2927$

11. Let L = light trucks

C = car

F = fatal accident

$P(L) = 0.40$

$P(C) = 0.60$

$P(F \cap C) = 0.00020$

$P(F \cap L) = 0.00025$

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

$= \frac{\frac{0.00025}{0.40} \times 0.40}{\frac{0.00025}{0.40} \times 0.40 + \frac{0.00020}{0.60} \times 0.60}$

$= 0.556$

12. $= P(4,9) - 4 \times P(3,9) + 4 \times P(2,9) - 4 \times P(1,9)$

$= 4^9 - 4 \times 3^9 + 4 \times 2^9 - 4 \times 1^9$

$= 18546$