SECI 1013

DISCRETE STRUCTURE

TUTORIAL 2

LECTURER:

Dr Razana Alwee

SUBMITTED BY:

Amir Iskandar Bin Norkhairulazaddin (A20EC0011)

Mek Zhi Qing (A20EC0077)

Roshini Thavan Nair (A20EC0139)

Semester 1 2020/2021

NO.: Date:

Tutorial 2

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

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

c) odd digit = {3, 5, 7}
$2 \times 3 \times 3 = 18$

2. a) $(6-1)! \times 5! = 14400$

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

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

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

3. a) $5! = 120$

b) ${}_5C_3 \times 4! = 240$

c) ${}_5C_3 \times {}_3C_3 \times 3! = 180$

4. a) $\frac{(12+6-1)!}{12! \times 5!} = 6188$

b) We will first select 2 croissants from each kind,
$2 \times 6 = 12$
two dozen = 24
$24 - 12 = 12$
Still need to select remaining 12 croissants
$\frac{(12+6-1)!}{12! \times 5!} = 6188$

Scanned with CamScanner

NO.: Date:

c) We will first select 5 chocolate croissants and 3 almond croissants.

$24 - 5 - 3 = 16$

$$\frac{(16+6-1)!}{16! \times 5!} = 20349$$

5. a) Games end with 2 condition : 2 wins and 1 tie/win or 1 win + 3 ties/wins

2 wins among 4 games $= {}^4C_2$

$= 6$

1 win among 3 games $= {}^3C_1$

$= 3$

2 wins and 1 ties / wins $= 6 \times 3 \times 2$

$= 36$

1 win and 3 ties / wins $= 3 \times 6 \times 2^3$

$= 96$

Total scenarios $= 2 \times (36 + 96)$

$= 264$

b) $2^{10} = 1024$

264 scenario settled in first round of 10 penalty kicks

$1024 - 264 = 760$

$760 \times 264 = 200640$

c) sudden death: $2+2+2+2+2$

$= 10$

scenario first and second round $= 760 \times 760$

$= 577600$

total scenario $= 577600 \times 10$

$= 5776000$

Scanned with CamScanner

NO.: Date:

6. 4 choices, 10 questions

$4^{10} = 1048576$

$k+1 = 3$

$k = 2$

$m = kn+1$

$= 2(1048576)+1$

$= 2097153$

7. Let P(H) = student passed in History

Let P(M) = student passed in Mathematics

P(H) = 75%

P(M) = 65%

$P(H \cap M) = 50\%$

$P(H \cup M) = 75\% + 65\% - 50\%$

$= 90\%$

Fail both = 100% - 90%

= 10%

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

$x = 350$

total = 350 candidates

8. Total number from 300 to 780 = 780 - 300 + 1

= 481

1 in 3 digits = 0

1 in 1 digits = 301, 310, 312, 321, 313, 331, 314, 341, 315, 351, 316, 361, 317, 371, 318,

3 _ _ 381, 319, 391

= 18 numbers

4 _ _ = 18 numbers

5 _ _ = 18 numbers

6 _ _ = 18 numbers

7 _ _ = 701, 712, 721, 710, 713, 731, 714, 741, 715, 751, 716, 761, 717, 771, 718, 719

= 16 numbers

1 in 2 digits = 311, 411, 511, 611, 711

= 5 numbers

Scanned with CamScanner

NO.: Date:

Total numbers = 0 + 18(4) + 16 + 5
= 93

probability = $\frac{93}{481}$
= 0.1933

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

(b) ! - - - - - - - - - -
empty slots

$\frac{6!}{4!\times 2!} \times \frac{4!}{4!} \times 7 = 105$

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

10. (a) P(email) = 0.4 p(receive | email) = 0.6
P(letter) = 0.1 p(receive | letter) = 0.8
P(handphone) = 0.5 p(receive | handphone) = 1

P(receive) = 0.6(0.4) + 0.8(0.1) + 1(0.5)
= 0.82

b) $P(\text{email} \mid \text{receive}) = \frac{P(\text{email} \cap \text{receive})}{P(\text{receive})}$
$= \frac{(0.6)(0.4)}{0.82}$
= 0.2927

Scanned with CamScanner

11. let C = cars

T = Light truck

F = fatal accident

N = not a fatal accident

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

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

$P(T) = 0.4$

$P(C) = 1 - 0.4$

$= 0.6$

$P(T|F) = \frac{P(T \cap F)}{P(F)}$

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

$= 0.4545$

12. Total number of ways = 4^9

$= 262144$

Let T = number of ways tetrahedron box have no letters

C = number of ways cube box have no letters

P = number of ways polyhedron box have no letters

D = number of ways dodecahedron box have no letters.

total ways with at least 1 letter in each box

$= 262144 - [{}^4C_1 \times 3^9 - {}^4C_2 \times 2^9 + {}^4C_3 \times 1^9 - {}^4C_4 \times 0^9]$

$= 186480$

CS Scanned with CamScanner