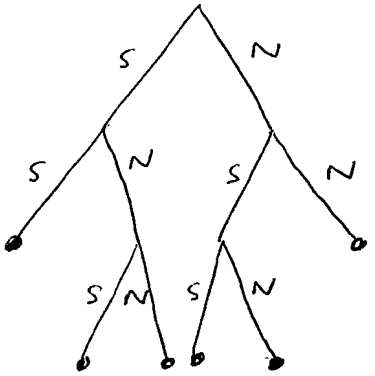
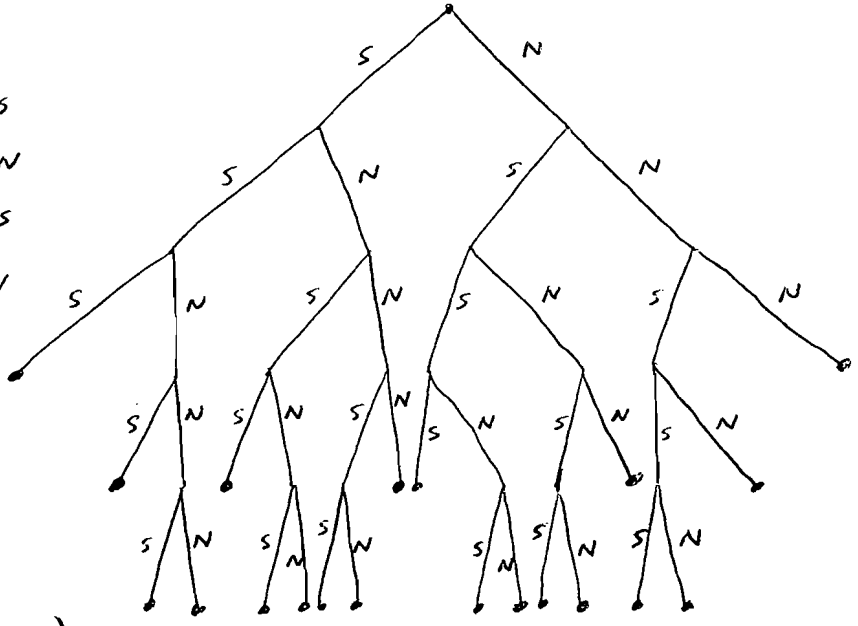
HW Section 2.1

No. 2.1
Date 1

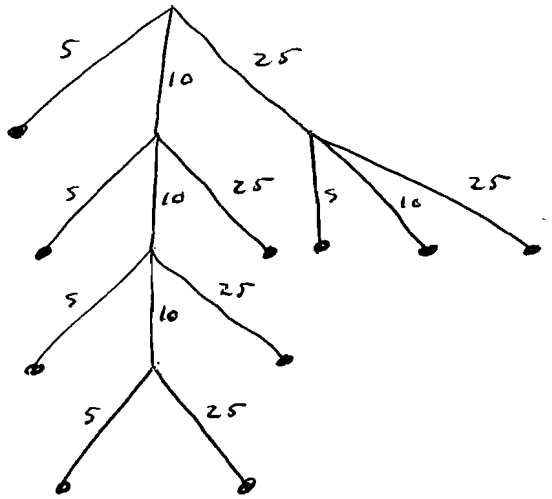
Problem	Ans	Reason
1	SS SNS SNN NSS NSN NN (6 elements)	
2	SSS NSSS SSNS NSSNS SSNNS NSSNN SSNNN NS NSS SNSS NSNSN SNSNS NS NN SNSNN NNSSS SNNSS NNSSN SNNSN NNSN SNNN NNN (20 elements)	
3	$w_2 = .3$	Abbr $w = w_4$ $1 = w_1 + w_2 + w_3 + w_4 + w_5$ $\quad\quad = .4 + 3w + w + w + w$ $1 = .4 + 6w$ $.6 = 6w \quad\quad w = .1$ $w_2 = .3$

Problem	Ans	Reason
4	$w_4 = .17$	$1 = w_1 + w_2 + w_3 + w_4 + w_5$ $\quad = .23 + .14 + w + w + .29$ Abbr $w = w_4$ $.34 = 2w$ $.17 = w$
5	$E = \{31, 32, 34, 35, 36, 13, 23, 43, 53, 63\}$ $F = \{31, 32, 33, 34, 35, 36, 13, 23, 43, 53, 63\}$ $= E \cup \{33\}$ $G = \{21, 12, 41, 32, 23, 14, 61, 52, 43, 34, 25, 16, 63, 54, 45, 36, 65, 56\}$ $H = \{11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 31, 32, 33, 34, 41, 42, 43, 51, 52, 61\}$	
6	.45	$1 - .55 = .45$

Problem	Ans	Reason

7

N
DN
DDN
DDDN
DDDQ
DDQ
DQ
QN
QD
QQ
(10 elements)



8

(a) {SH, SL, SN, UH, UL, UN}
(b) {SH, SL, SN}

	H	L	N
S	•	•	•
U	•	•	•

9

n = 26

n satisfies

$$1 = \frac{3}{n} + \frac{11}{n} + \frac{5}{n} + \frac{7}{n}$$

10

i	w_i
1	32/63
2	16/63
3	8/63
4	4/63
5	2/63
6	1/63

Abbr $w = w_6$

i	1	2	3	4	5	6
w_i	32w	16w	8w	4w	2w	w

$1 = 32w + 16w + 8w + 4w + 2w + w$

$1 = 63w$

$w = 1/63$

Problem	Ans	Reason
11	$Pr[\Theta_2] = .15$	$1 - .85 = .15$
12	(a) $Pr[E] = .52$ (b) $Pr[E'] = .48$ (c) 1	

i	1	2	3	4	5
w_i	.09	.26	.32	$2w$	w

$w = w_5$

$1 = .09 + .26 + .32 + 2w + w$

$.33 = 3w$

$.11 = w$

$Pr[E] = w_1 + w_3 + w_5$

$= .09 + .32 + .11 = .52$

13 $w_2 = 1/12$

Abbr $w = w_2$

i	1	2	3	4	5
w_i	.2	w	w	.35	$.2 + w$

$1 = .2 + w + w + .35 + .2 + w$

$1 = .75 + 3w$ $\quad 1 - .75 = .25 = 1/4$

$1/4 = 3w$

$1/12 = w$

14 $Pr[b] = 1/2$

Abbr $x = Pr[b]$

outcome	a	b	c
Pr	$\frac{1}{3}$	x	$\frac{x}{3}$

$1 = \frac{1}{3} + x + \frac{x}{3}$ $\quad \frac{2}{3} = \frac{4x}{3}$ $\quad x = 1/2$

Problem | Ans | Reason

15

i	w_i
1	$3/10$
2	$3/10$
3	$1/10$
4	$1/10$
5	$1/10$
6	$1/10$

Abbr $w = w_6$

i	1	2	3	4	5	6
w_i	$3w$	$3w$	w	w	w	w

$1 = 3w + 3w + w + w + w + w$

$= 10w$ $\quad w = 1/10$

16

i	w_i
1	$1/4$
2	$1/12$
3	$1/4$
4	$1/12$
5	$1/4$
6	$1/12$

Abbr $w = w_6$

i	1	2	3	4	5	6
w_i	$3w$	w	$3w$	w	$3w$	w

$1 = 3w + w + 3w + w + 3w + w$

$= 12w$ $\quad w = 1/12$

17

i	w_i
1	$1/6$
2	$2/6$
3	$3/6$

i	1	2	3
w_i	$1/a$	$2/a$	$3/a$

$1 = 1/a + 2/a + 3/a = 6/a$

$a = 6$

18

i	w_i
1	.1
2	.1
3	.1
4	.1
5	.2
6	.4

Abbr $w = w_1$

i	1	2	3	4	5	6
w_i	w	w	w	w	$2w$	$4w$

$1 = w + w + w + w + 2w + 4w = 10w$

$w = \frac{1}{10}$

Problem	Ans	Reason
19	5/9	Abbr $w = w_6$

i	1	2	3	4	5	6
w_i	$2w$	w	$2w$	w	$2w$	w

$1 = 2w + w + 2w + w + 2w + w = 9w$

$w = 1/9$

$Pr[1,3,6] = 2w + 2w + w$

$= 5/9$

20	$k = 3$

i	1	2	3	4	5	6
w_i	$\frac{k}{12}$	$\frac{1}{12}$	$\frac{k}{12}$	$\frac{1}{12}$	$\frac{k}{12}$	$\frac{1}{12}$

$1 = \frac{k}{12} + \frac{1}{12} + \frac{k}{12} + \frac{1}{12} + \frac{k}{12} + \frac{1}{12}$

$= \frac{3(k+1)}{12}$

$3k + 3 = 12$

$3k = 9$

$k = 3$

21	$Pr[E] = \frac{3}{10}$	$Pr(E) = w_2 + w_4$
	$Pr[F'] = 7/10$	$= \frac{1}{5} + \frac{1}{10} = \frac{3}{10}$

$Pr[F'] = 1 - w_1 - w_4$

$= w_2 + w_3 + w_5$

$= \frac{1}{5} + \frac{2}{5} + \frac{1}{10}$

$= 7/10$

Problem	Ans	Reason
22	$2/15$	Abbr $w = w_{10}$

i	1	2	3	4	5	6	7	8	9	10
w_i	$2w$	w	$2w$	w	$2w$	w	$2w$	w	$2w$	w

$1 = w_1 + w_2 + \cdots + w_{10}$

$= 15w \qquad w = 1/15$

23	$Pr[Pass] = .85$	$.15 + .20 + .35 + .15 = .85$
	$Pr[W \cap F] = .15$	$.10 + .05 = .15$

24 (a) Set of outcomes is $\{U, E, N\}$

(b)

U	E	N
$\frac{38}{200}$	$\frac{12}{200}$	$\frac{150}{200}$

25

event	\$0	\$10	\$1000	\$10000
weight	$\frac{98979}{100,000}$	$\frac{1}{100}$	$\frac{1}{5000}$	$\frac{1}{100,000}$

$$1 - \frac{1}{100} - \frac{1}{5000} - \frac{1}{100,000} = \frac{98979}{100,000}$$

26

outcome	in sales	not in sales
prob	$\frac{110}{200}$	$\frac{90}{200}$

$65 + 45 = 110$

No. 2.1
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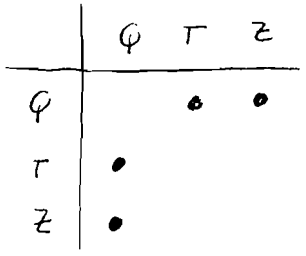
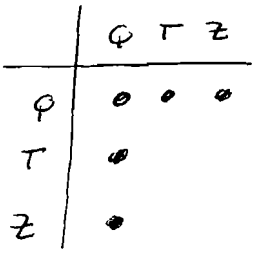
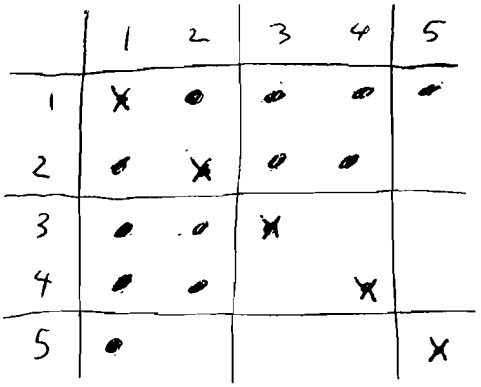
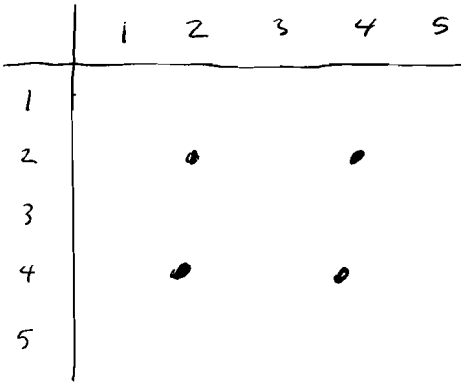
Problem	Ans	Reason
27	(a) 36 (b) $\frac{1}{36}$ (c) 1/4	Sample space is $\{1,2,3,5\} \times \{\varphi, \tau, z\} \times \{\varphi, \tau, z\}$ #codes = 4 x 3 x 3 = 36 9 of these codes contain the number 3 9/36 = 1/4
28	(a) 4/9 (b) 5/9	 exactly one φ  at least one φ
29	(a) 20 (b) 1/20 (c) 9/10	5 x 4 = 20 the event that both balls are even is {24, 42}. Prob is $\frac{2}{20}$ a 1/10 $1 - \frac{1}{10} = 9/10$
30	3/5	 ● means sum of row, col is Less than 7 there are 12 dots $\frac{12}{20} = \frac{6}{10} = \frac{3}{5}$

Problem	Ans	Reason
31	8 outcomes, Each has prob $1/8$	Sample space is HHH, HHT, HTH, HTT THH, THT, TTH, TTT Each element is equaly likely
32	$1/2$	(HHH) (HHT) (HTH) HTT (THH) THT TTH TTT $4/8 = 1/2$
33	At least 677	26×26 poss initials $676 = 26 \times 26$
34	$\frac{25+26}{26 \times 26 \times 9}$	sample space has $26 \times 26 \times 9$ elements $26+25$ of the elements contain M and I.
35	6	Sample space is {rby, ryb, yrb, ybr, byr, bry}
36	(a) $2/6 = 1/3$ (b) $3/6 = 1/2$	(rby) (ryb) yrb ybr byr bry (rby) (ryb) (yrb) ybr byr bry
37	(a) 25 (b) $1/25$ (c) $21/25$	 In 4 out of 25 outcomes both balls are even

Problem	Ans	Reason

38

a)

	L	M	H
W	•	•	•
S	•	•	•
E	•	•	•

b)

	L	M	H
W			
S	•	•	•
E			

c)

	L	M	H
W	•		
S	•	•	•
E	•		

d)

	L	M	H
W			
S	•		
E			

39

(a) {S, WS, NS, WWS, WNS, NWS, NNS}

(b) {WS, WWS, WWW, WWN, WNS, WNW, WNN, NWS, NWW, NWN, NNW}

(c) {WS, WNS, WNN, NWS, NWN, NNW}