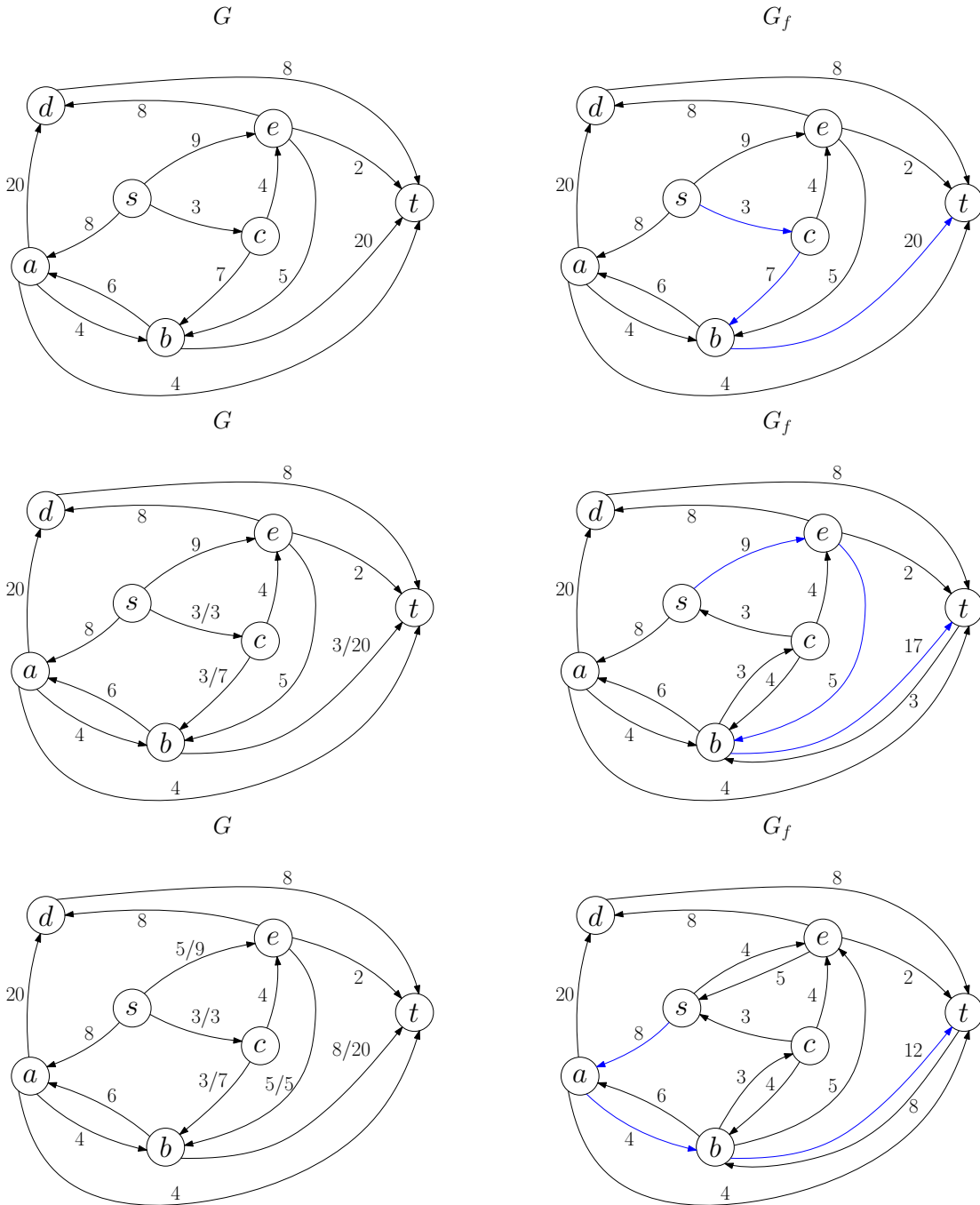


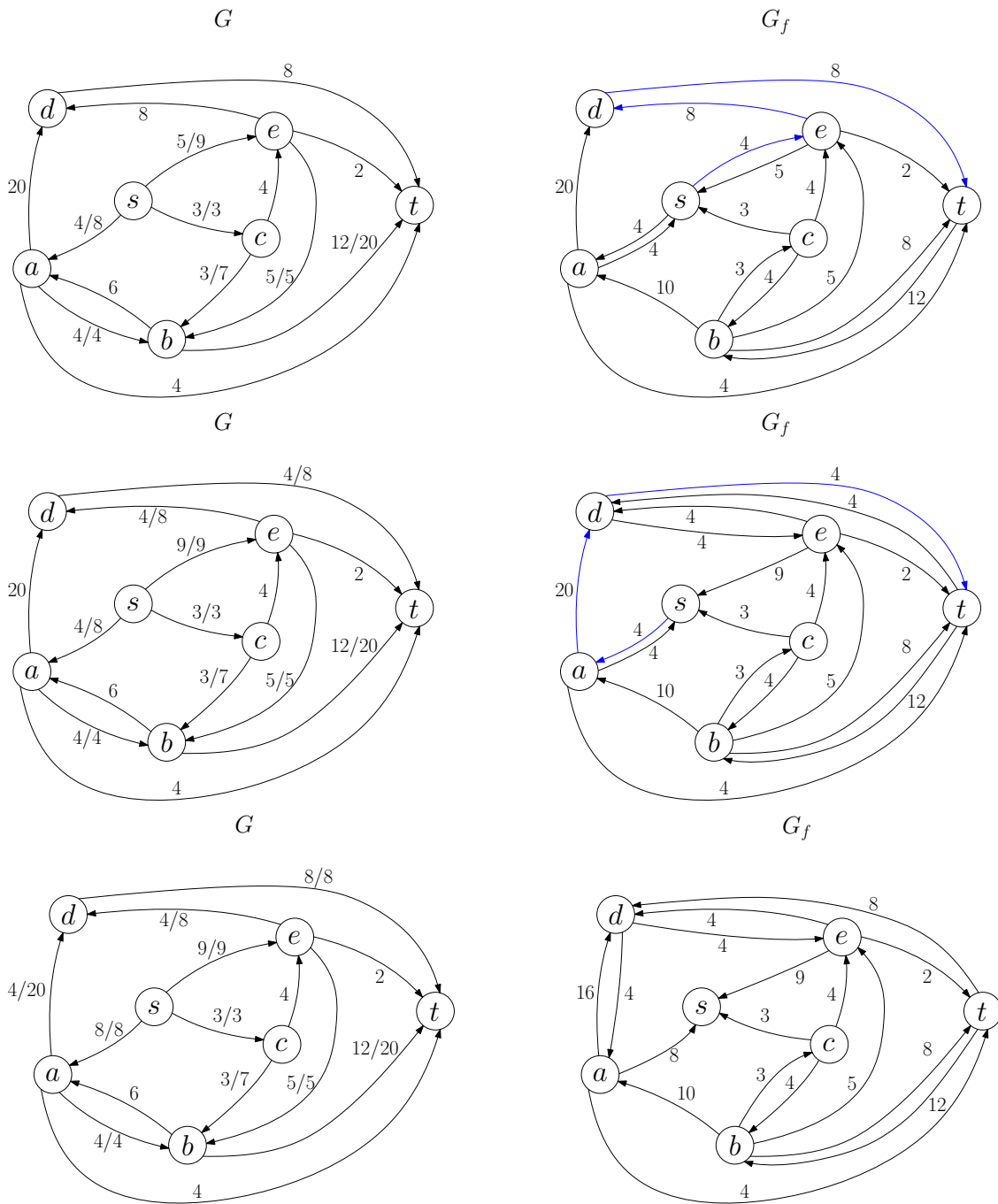
CSIT 5500 Advanced Algorithms

2020 Spring Semester

Written Assignment 4 solution

1. (10 points)





2. (10 points)

p_1	p_1	p_1
p_2	p_2	p_2
p_3	p_3	p_3
p_4	p_4	p_4
free people	propose	pairing

p_2	p_1	j_1	p_1	j_1
p_3	p_2		p_2	
p_4	p_3		p_3	
	p_4		p_4	
free people	propose		pairing	

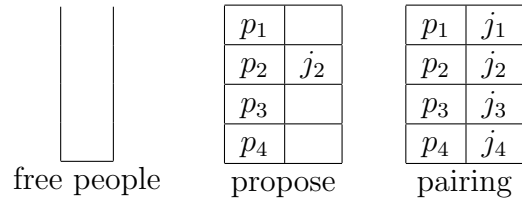
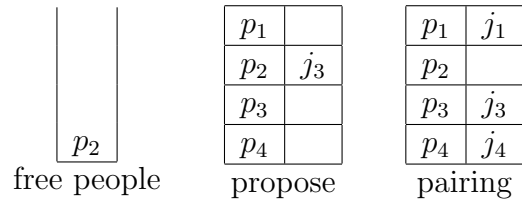
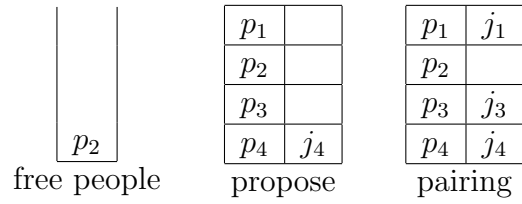
p_2	p_1		p_1	j_1
p_3	p_2	j_1	p_2	
p_4	p_3		p_3	
	p_4		p_4	
free people	propose		pairing	

p_3	p_1		p_1	j_1
p_4	p_2	j_4	p_2	j_4
	p_3		p_3	
	p_4		p_4	
free people	propose		pairing	

p_3	p_1		p_1	j_1
p_4	p_2		p_2	j_4
	p_3	j_1	p_3	
	p_4		p_4	
free people	propose		pairing	

p_4	p_1		p_1	j_1
	p_2		p_2	j_4
	p_3	j_3	p_3	j_3
	p_4		p_4	
free people	propose		pairing	

p_4	p_1		p_1	j_1
	p_2		p_2	j_4
	p_3		p_3	j_3
	p_4	j_3	p_4	
free people	propose		pairing	



3. (10 points)

(a) Table A

a	7
$A[a]$	1

a	7	3
$A[a]$	1	1

a	7	3	1
$A[a]$	1	1	1

a	7	3	1
$A[a]$	1	1	2

a	7	3	1	5
$A[a]$	1	1	2	1

a	1
$A[a]$	1

a	1	7
$A[a]$	1	1

a	1	7	5
$A[a]$	1	1	1

a	1	7	5	3
$A[a]$	1	1	1	1

a	1	7	5	3
$A[a]$	1	1	2	1

a	5
$A[a]$	1

a	5	1
$A[a]$	1	1

a	5	1
$A[a]$	2	1

(b) Frequencies tables

a	1	2	3	4	5	6	7	8
True frequencies	0	0	0	0	0	0	1	0
Estimated frequencies	0	0	0	0	0	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	0	0	1	0	0	0	1	0
Estimated frequencies	0	0	1	0	0	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	1	0	1	0	0	0	1	0
Estimated frequencies	1	0	1	0	0	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	0	1	0	0	0	1	0
Estimated frequencies	2	0	1	0	0	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	0	1	0	1	0	1	0
Estimated frequencies	2	0	1	0	1	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	1	0	1	0	1	0
Estimated frequencies	1	0	0	0	0	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	1	0	1	0	2	0
Estimated frequencies	1	0	0	0	0	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	1	0	2	0	2	0
Estimated frequencies	1	0	0	0	1	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	2	0	2	0	2	0
Estimated frequencies	1	0	1	0	1	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	2	0	3	0	2	0
Estimated frequencies	1	0	1	0	2	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	2	1	2	0	3	0	2	1
Estimated frequencies	0	0	0	0	1	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	3	1	2	0	3	0	2	1
Estimated frequencies	1	0	0	0	1	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	3	1	2	0	4	0	2	1
Estimated frequencies	1	0	0	0	2	0	0	0

a	5	1	4
$A[a]$	2	1	1

a	5	1	4
$A[a]$	2	1	2

a	5	1	4	2
$A[a]$	2	1	2	1

a	5	1	4	2
$A[a]$	2	2	2	1

a	5	1	4
$A[a]$	1	1	1

a	5	1	4	8
$A[a]$	1	1	1	1

a
$A[a]$

a	6
$A[a]$	1

a	6	8
$A[a]$	1	1

a	6	8	7
$A[a]$	1	1	1

a	6	8	7	5
$A[a]$	1	1	1	1

a	6	8	7	5
$A[a]$	1	1	2	1

a	7
$A[a]$	1

a	1	2	3	4	5	6	7	8
True frequencies	3	1	2	1	4	0	2	1
Estimated frequencies	1	0	0	1	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	3	1	2	2	4	0	2	1
Estimated frequencies	1	0	0	2	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	3	2	2	2	4	0	2	1
Estimated frequencies	1	1	0	2	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	0	2	1
Estimated frequencies	2	1	0	2	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	1	2	1
Estimated frequencies	1	0	0	1	1	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	1	2	2
Estimated frequencies	1	0	0	1	1	0	0	1

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	1	3	2
Estimated frequencies	0	0	0	0	0	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	2	3	2
Estimated frequencies	0	0	0	0	0	1	0	0

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	2	3	3
Estimated frequencies	0	0	0	0	0	1	0	1

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	4	2	4	3
Estimated frequencies	0	0	0	0	0	1	1	1

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	5	2	4	3
Estimated frequencies	0	0	0	0	1	1	1	1

a	1	2	3	4	5	6	7	8
True frequencies	4	2	2	2	5	2	5	3
Estimated frequencies	0	0	0	0	1	1	2	1

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	2	5	2	5	3
Estimated frequencies	0	0	0	0	0	0	1	0

a	7	5
$A[a]$	1	1

a	7	5	4
$A[a]$	1	1	1

a	7	5	4
$A[a]$	1	2	1

a	7	5	4	8
$A[a]$	1	2	1	1

a	7	5	4	8
$A[a]$	1	2	2	1

a	7	5	4	8
$A[a]$	1	3	2	1

a	5	4
$A[a]$	2	1

a	5	4	1
$A[a]$	2	1	1

a	5	4	1
$A[a]$	3	1	1

a	5	4	1	2
$A[a]$	3	1	1	1

a	5
$A[a]$	2

a	5	1
$A[a]$	2	1

a	5	1	2
$A[a]$	2	1	1

a	5	1	2
$A[a]$	2	2	1

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	2	6	2	5	3
Estimated frequencies	0	0	0	0	1	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	3	6	2	5	3
Estimated frequencies	0	0	0	1	1	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	3	7	2	5	3
Estimated frequencies	0	0	0	1	2	0	1	0

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	3	7	2	5	4
Estimated frequencies	0	0	0	1	2	0	1	1

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	4	7	2	5	4
Estimated frequencies	0	0	0	2	2	0	1	1

a	1	2	3	4	5	6	7	8
True frequencies	4	3	2	4	8	2	5	4
Estimated frequencies	0	0	0	2	3	0	1	1

a	1	2	3	4	5	6	7	8
True frequencies	5	3	2	4	8	2	5	4
Estimated frequencies	0	0	0	1	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	6	3	2	4	8	2	5	4
Estimated frequencies	1	0	0	1	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	6	3	2	4	9	2	5	4
Estimated frequencies	1	0	0	1	3	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	6	4	2	4	9	2	5	4
Estimated frequencies	1	1	0	1	3	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	6	4	2	4	9	2	6	4
Estimated frequencies	0	0	0	0	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	7	4	2	4	9	2	6	4
Estimated frequencies	1	0	0	0	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	7	5	2	4	9	2	6	4
Estimated frequencies	1	1	0	0	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	8	5	2	4	9	2	6	4
Estimated frequencies	2	1	0	0	2	0	0	0

a	5	1	2	3
$A[a]$	2	2	1	1

a	5	1
$A[a]$	1	1

a	1	2	3	4	5	6	7	8
True frequencies	8	5	3	4	9	2	6	4
Estimated frequencies	2	1	1	0	2	0	0	0

a	1	2	3	4	5	6	7	8
True frequencies	8	5	3	5	9	2	6	4
Estimated frequencies	1	0	0	0	1	0	0	0