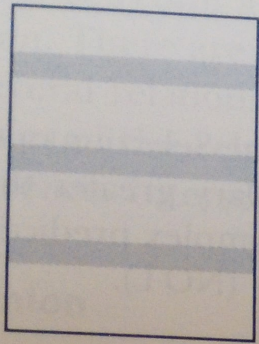
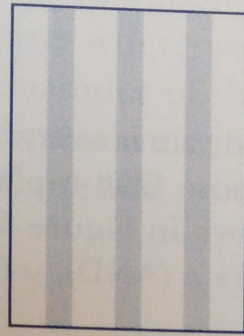


5.1 The Relational Algebra

Figure
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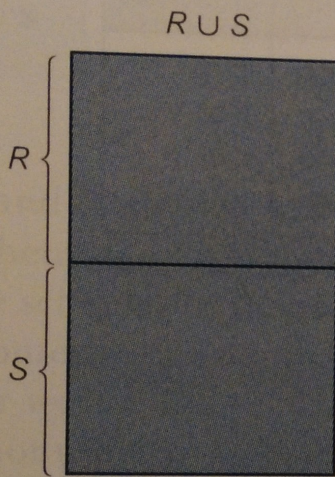
(a) Selection



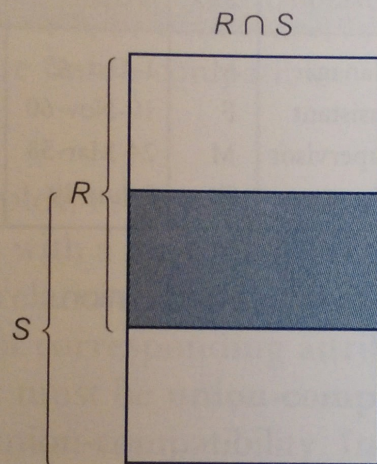
(b) Projection

P	Q	$P \times Q$														
<table><tr><th>A</th></tr><tr><td>a</td></tr><tr><td>b</td></tr></table>	A	a	b	<table><tr><th>B</th></tr><tr><td>1</td></tr><tr><td>2</td></tr><tr><td>3</td></tr></table>	B	1	2	3	=							
A																
a																
b																
B																
1																
2																
3																
		<table><tr><th>A</th><th>B</th></tr><tr><td>a</td><td>1</td></tr><tr><td>a</td><td>2</td></tr><tr><td>a</td><td>3</td></tr><tr><td>b</td><td>1</td></tr><tr><td>b</td><td>2</td></tr><tr><td>b</td><td>3</td></tr></table>	A	B	a	1	a	2	a	3	b	1	b	2	b	3
A	B															
a	1															
a	2															
a	3															
b	1															
b	2															
b	3															

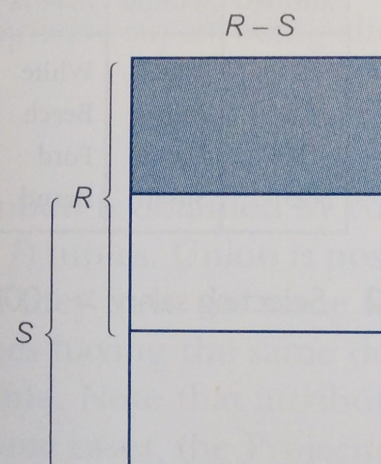
(c) Cartesian product



(d) Union



(e) Intersection



(f) Set difference

T	
A	B
a	1
b	2

U	
B	C
1	x
1	y
3	z

$T \bowtie U$		
A	B	C
a	1	x
a	1	y

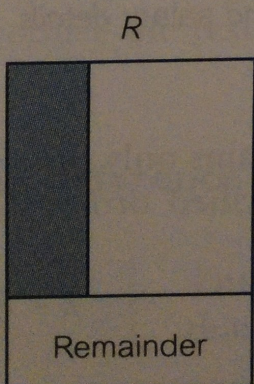
(g) Natural join

$T \triangleright_B U$	
A	B
a	1

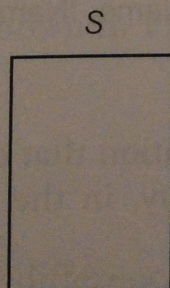
(h) Semijoin

$T \bowtie_B U$		
A	B	C
a	1	x
a	1	y
b	2	

(i) Left Outer join



(j) Division (shaded area)



V	
A	B
a	1
a	2
b	1
b	2
c	1

W	
B	
1	
2	

$V \div W$	
A	
a	
b	

Example of division