

$$\underline{h^{-1}(R_2) \longrightarrow R_1}$$

$$\sqrt{(4,4) \rightarrow \{(a,a)\}}$$

$$\sqrt{(4,2) \rightarrow \{(a,b)\}}$$

$$\sqrt{(4,1) \rightarrow \{(a,c), (a,d), (a,e), (a,g), (a,i)\}} \quad \text{need 1}$$

$$\sqrt{(2,2) \rightarrow \{(b,b)\}}$$

$$\sqrt{(2,1) \rightarrow \{(b,c), (b,d), (b,e), (b,g), (b,i)\}} \quad \text{need 1}$$

$$\sqrt{(1,1) \rightarrow \{(c,c), (c,d), (c,e), (c,g), (c,i), (d,c), (d,d), (d,e), (d,g), (d,i), (e,c), (e,d), (e,e), (e,g), (e,i), (g,c), (g,d), (g,e), (g,g), (g,i), (i,c), (i,d), (i,e), (i,g), (i,i)\}} \quad \text{only need 1}$$

$$(1,2) \rightarrow \{(c,b), (d,b), (e,b), (g,b), (i,b)\} \quad \text{only need 1}$$

$$(1,3) \rightarrow \{(c,j), (d,j), (e,j), (g,j), (i,j)\} \quad \text{only need 1}$$

$$(5,4) \rightarrow \{(f,a), (h,a), (k,a)\} \quad \text{only need 1}$$

$$(5,5) \rightarrow \{(f,f), (f,h), (f,k), (h,f), (h,h), (h,k), (k,f), (k,h), (k,k)\} \quad \text{only need 1}$$

$$(3,1) \rightarrow \{(j,c), (j,d), (j,e), (j,g), (j,i)\} \quad \text{only need 1}$$

$$(3,5) \rightarrow \{(j,f), (j,h), (j,k)\} \quad \text{only need 1}$$

$$(3,3) \rightarrow \{(j,j)\}$$

S_L is a strong

Homomorphism of S_1

w/.
mapping,

$$a \rightarrow 4$$

$$b \rightarrow 2$$

$$c \rightarrow 1$$

$$d \rightarrow 1$$

$$e \rightarrow 1$$

$$f \rightarrow 5$$

$$g \rightarrow 1$$

$$h \rightarrow 5$$

$$i \rightarrow 1$$

$$j \rightarrow 3$$

$$k \rightarrow 5$$

$$h(R_1) \rightarrow R_2$$

problem 1A

(a,a) \rightarrow (4,4)
(a,b) \rightarrow (4,2)
(a,i) \rightarrow (4,1)
(b,b) \rightarrow (2,2)
(b,c) \rightarrow (2,1)
(b,d) \rightarrow (2,1)
(c,c) \rightarrow (1,1)
(c,g) \rightarrow (1,1)
(c,i) \rightarrow (1,1)
(d,b) \rightarrow (1,2)
(d,d) \rightarrow (1,1)
(e,c) \rightarrow (1,1)
(e,e) \rightarrow (1,1)
(e,j) \rightarrow (1,3)
(f,a) \rightarrow (5,4)
(f,h) \rightarrow (5,5)
(f,k) \rightarrow (5,5)
(g,c) \rightarrow (1,1)
(g,d) \rightarrow (1,1)
(g,i) \rightarrow (1,1)
(h,f) \rightarrow (5,5)
(h,h) \rightarrow (5,5)
(h,k) \rightarrow (5,5)
(i,c) \rightarrow (1,1)
(i,g) \rightarrow (1,1)
(i,i) \rightarrow (1,1)
(i,j) \rightarrow (1,3)
(j,e) \rightarrow (3,1)
(j,h) \rightarrow (3,5)
(j,j) \rightarrow (3,3)
(k,a) \rightarrow (5,4)
(k,f) \rightarrow (5,5)
(k,h) \rightarrow (5,5)
(k,k) \rightarrow (5,5)