**Atividade Extra-Classe 4**

1)

a)

FƐ{Q} u {Q, Ɛ}  
FƐ{Q} arrow9.png arrow9.png

b

a

A,b

Q

P

S (P, Ɛ) = {P,Q}  
S (Q, Ɛ) = {Q}

S= (p,a) (r|r ϵ s(s,a) ϵ δ ( P, Ɛ)   
S= (p) (r|r ϵ s(s,a) ϵ δ (P,Q)  
 (r|r ϵ δ (p,a) u (q,a)   
 = P, ᴓ  
   
S= (p,b) (r|r ϵ s(s,b) ϵ δ ( P, Ɛ)   
S= (p) (r|r ϵ s(s,b) ϵ δ (P,Q)  
 (r|r ϵ δ (p,b) u (q,b)   
 = ᴓ, Q

S= (Q,a) (r|r ϵ s(s,b) ϵ δ ( Q, Ɛ)   
S= (Q) (r|r ϵ s(s,b) ϵ δ (Q)  
 (r|r ϵ δ (Q,a)  
 = ᴓ  
  
S= (Q,b) (r|r ϵ s(s,b) ϵ δ ( Q, Ɛ)   
S= (Q) (r|r ϵ s(s,b) ϵ δ (Q)  
 (r|r ϵ δ (Q,b)  
 = ᴓ

b)

FƐ{A) u {A, Ɛ} u {B, Ɛ} u {C, Ɛ} = {A,B}  
FƐ{B} u {B, Ɛ} u {C, Ɛ} = {B,A}  
FƐ{C} u {C, Ɛ} = {C,A}

S= (A,a) (r|r ϵ s(s,a) ϵ δ ( A, Ɛ)   
S= (A) (r|r ϵ s(s,a) ϵ δ (A,B)  
 (r|r ϵ δ (A,a) u (B,a)   
 = B,A

S= (B,a) (r|r ϵ s(s,a) ϵ δ ( B, Ɛ)   
S= (A) (r|r ϵ s(s,a) ϵ δ (B,A)  
 (r|r ϵ δ (B,a) u (A,a)   
 = B, ᴓ

S= (B,b) (r|r ϵ s(s,b) ϵ δ ( B, Ɛ)   
S= (A) (r|r ϵ s(s,b) ϵ δ (B,A)  
 (r|r ϵ δ (B,b) u (A,b)   
 = C, ᴓ

S= (C,a) (r|r ϵ s(s,a) ϵ δ ( C, Ɛ)   
S= (C) (r|r ϵ s(s,a) ϵ δ (C,A)  
 (r|r ϵ δ (C,a) u (A,a)   
 = ᴓ , ᴓ

S= (C,b) (r|r ϵ s(s,b) ϵ δ ( C, Ɛ)   
S= (C) (r|r ϵ s(s,b) ϵ δ (C,A)  
 (r|r ϵ δ (C,b) u (A,b)   
 = C, ᴓ

a,b

a

arrow9.png arrow9.png

a

A

A,b

b

B

b

b

C

arrow9.png

b

c)

FƐ{Q1} = {Q1, Ɛ} u {Q2, Ɛ} u {Q3, Ɛ}, {Q4, Ɛ} = {Q1,Q2,Q3,Q4}  
FƐ{Q2}= {Q2} u {Q3, Ɛ} u {Q4, Ɛ} = {Q2,Q3,Q4}  
FƐ{Q3}= {Q3, Ɛ} u {Q4, Ɛ} = {Q3,Q4}  
FƐ{Q4}= {Q4, Ɛ} = {Q4}  
  
  
S= (Q1,a) (r|r ϵ s(s,a) ϵ δ ( Q1, Ɛ)   
S= (Q1) (r|r ϵ s(s,a) ϵ δ (Q1,Q2,Q3,Q4)  
 (r|r ϵ δ (Q1,a) u (Q2,a) u (Q3,a) u (Q4,a)   
 = Q1,Q2,Q3,Q4

S= (Q1,B) (r|r ϵ s(s,a) ϵ δ ( Q1, Ɛ)   
S= (Q1) (r|r ϵ s(s,b) ϵ δ (Q2,Q3,Q4)  
 (r|r ϵ δ (Q2,b) u (Q3,b) u (Q4,b)   
 = Q2,Q3,Q4

S= (Q2,a) (r|r ϵ s(s,a) ϵ δ ( Q2, Ɛ)   
S= (Q2) (r|r ϵ s(s,a) ϵ δ (Q2,Q3,Q4)  
 (r|r ϵ δ (Q2,a) u (Q3,a) u (Q4,a)   
 = Q2,Q3

S= (Q2,B) (r|r ϵ s(s,a) ϵ δ ( Q2, Ɛ)   
S= (Q2) (r|r ϵ s(s,b) ϵ δ (Q2,Q3,Q4)  
 (r|r ϵ δ (Q2,b) u (Q3,b) u (Q4,b)   
 = Q2,Q3,Q4

S= (Q3,a) (r|r ϵ s(s,a) ϵ δ ( Q2, Ɛ)   
S= (Q3) (r|r ϵ s(s,a) ϵ δ (Q3,Q4)  
 (r|r ϵ δ (Q3,a) u (Q4,a)   
 = Q3, ᴓ

S= (Q3,b) (r|r ϵ s(s,b) ϵ δ ( Q3, Ɛ)   
S= (Q3) (r|r ϵ s(s,b) ϵ δ (Q3,Q4)  
 (r|r ϵ δ (Q3,b) u (Q4,b)   
 = Q3, q4

S= (Q4,a) (r|r ϵ s(s,a) ϵ δ ( Q4, Ɛ)   
S= (Q4) (r|r ϵ s(s,a) ϵ δ (Q4)  
 (r|r ϵ δ (Q4,a)   
 = Q4  
S= (Q4,b) (r|r ϵ s(s,b) ϵ δ ( Q4, Ɛ)   
S= (Q4) (r|r ϵ s(s,b) ϵ δ (Q4)  
 (r|r ϵ δ (Q4,b)   
 = Q4

A,b

A,b

arrow9.png

A,b

A,b

Q3

Q1

Q2

arrow9.png

A,b

A,b

a

Q4

arrow9.png

b

d)   
FƐ{Q0} = {Q0, Ɛ} u {Q1, Ɛ} u {Q2, Ɛ}, {Q3, Ɛ} = {Q1,Q3}  
FƐ{Q1}= {Q1} u {Q1, Ɛ} u {Q2, Ɛ} u {Q3, Ɛ} = {Q1,Q3}  
FƐ{Q2}= {Q2} u {Q2, Ɛ} u {Q3, Ɛ} = {Q2, Q3}  
FƐ{Q3}= {Q3} u {Q3, Ɛ} = {Q3}

S= (Q0,a) (r|r ϵ s(s,a) ϵ δ ( Q0, Ɛ)   
S= (Q0) (r|r ϵ s(s,a) ϵ δ (Q1,Q3)  
 (r|r ϵ δ (Q1,a) (Q3,a)   
 = Q1,Q2

S= (Q0,b) (r|r ϵ s(s,b) ϵ δ (Q0, Ɛ)   
S= (Q0) (r|r ϵ s(s,b) ϵ δ (Q1,Q3)  
 (r|r ϵ δ (Q1,b) (Q3,b)  
 = Q1,Q3

S= (Q1,a) (r|r ϵ s(s,a) ϵ δ ( Q1, Ɛ)   
S= (Q0) (r|r ϵ s(s,a) ϵ δ (Q1,Q3)  
 (r|r ϵ δ (Q1,a) (Q3,a)   
 = Q1,Q2

S= (Q1,b) (r|r ϵ s(s,b) ϵ δ (Q1, Ɛ)   
S= (Q1) (r|r ϵ s(s,b) ϵ δ (Q1,Q3)  
 (r|r ϵ δ (Q1,b) (Q3,b)  
 = Q1,Q3

S= (Q2,a) (r|r ϵ s(s,a) ϵ δ ( Q2, Ɛ)   
S= (Q2) (r|r ϵ s(s,a) ϵ δ (Q2,Q3)  
 (r|r ϵ δ (Q2,a) (Q3,a)   
 = Q2,Q2  
  
S= (Q2,b) (r|r ϵ s(s,b) ϵ δ (Q2, Ɛ)   
S= (Q2) (r|r ϵ s(s,b) ϵ δ (Q2,Q3)  
 (r|r ϵ δ (Q2,b) (Q3,b)  
 = ᴓ, Q3

S= (Q3,a) (r|r ϵ s(s,a) ϵ δ ( Q3, Ɛ)   
S= (Q2) (r|r ϵ s(s,a) ϵ δ (Q3)  
 (r|r ϵ δ (Q3,a)   
 = Q2

S= (Q3,b) (r|r ϵ s(s,b) ϵ δ (Q3, Ɛ)   
S= (Q3) (r|r ϵ s(s,b) ϵ δ (Q3)  
 (r|r ϵ δ (Q3,b)  
 = Q3

a,   
 a b  
 a,b a

Q3

Q2

QO

Q1

arrow9.png

A,b

A,b

e)

FƐ{X} = {X} u {X, Ɛ} u {(X, Ɛ), Ɛ }  
FƐ{X} = {X} u {A} u {B}   
FƐ{X} = {X,A,B}

FƐ{A} = {A} u {A, Ɛ}  
FƐ{A} = {A} u {B}   
FƐ{A} = {A,B}  
  
FƐ{B} = {B}

S= (X) (r|r ϵ s(s,a) ϵ δ ( X, Ɛ)   
S= (Q0) (r|r ϵ s(s,a) ϵ δ (X,A,B)  
 (r|r ϵ δ (X,a) (A,a) (B,a)  
 = B

S= (X,b) (r|r ϵ s(s,b) ϵ δ (X, Ɛ)   
S= (X) (r|r ϵ s(s,b) ϵ δ (X,A,B)  
 (r|r ϵ δ (X,b) (A,b) (B,b)  
 = B

S= (A) (r|r ϵ s(s,a) ϵ δ ( A, Ɛ)   
S= (A) (r|r ϵ s(s,a) ϵ δ (A,B)  
 (r|r ϵ δ (A,a) (B,a)  
 = ᴓ

S= (A) (r|r ϵ s(s,b) ϵ δ ( A, Ɛ)   
S= (A) (r|r ϵ s(s,b) ϵ δ (A,B)  
 (r|r ϵ δ (A,b) (B,b)  
 = B

S= (B) (r|r ϵ s(s,a) ϵ δ ( B, Ɛ)   
S= (B) (r|r ϵ s(s,a) ϵ δ (B)  
 (r|r ϵ δ (B,b)  
 = ᴓ

S= (B) (r|r ϵ s(s,b) ϵ δ ( B, Ɛ)   
S= (B) (r|r ϵ s(s,b) ϵ δ (B)  
 (r|r ϵ δ (B,b)  
 = B

A,b

B

X

B arrow9.png

b

A